

**CITY OF STORM LAKE
REGULAR COUNCIL MEETING, DUE TO
COVID-19, THIS MEETING WILL BE A
TELEPHONIC MEETING ONLY ~ DIAL IN
TO PARTICIPATE: 1-408-418-9388 ACCESS
CODE: 24570177
MAY 18, 2020
5:00 PM**



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

AGENDA

- A. Pledge of Allegiance
- B. Consideration of Changes in Agenda and Setting the Agenda
- C. Disclosure by City Council Members
- 1. Hear the Public
- 2. Consent Agenda
 - A. Resolution No. 71-R-2019-2020 to Approve Consent Agenda
 - B. Buy Local Information
 - C. SLPD City Code Enforcement Summary
 - D. Utility Billing Uncollectible Account Write-Off
 - E. Motion to Approve A Noise Variance Request For Younglove Construction, L.L.C.
- 3. Motion to Set Public Hearing on Application to IEDA For A CDBG Housing Rehabilitation Grant
- 4. Motion to Approve Professional Engineering Services with ISG for Storm Lake Waste Water Treatment Plant- Water Reclamation Facility Nutrient Reduction Project
- 5. Setting The Public Hearing On Plans, Specifications, Form Of Contract, and Engineer's Estimate of Cost For The Storm Lake Water Treatment Plant MCC Replacement Project
- 6. Resolution No. 72-R-2019-2020 Authorizing Interfund Transfers and Adjustments
- 7. Public Hearing for FY 2020 Budget Amendment
- 8. Resolution No. 73-R-2019-2020 Amending The Current Budget For the Fiscal Year Ending June 30, 2020
- 9. Motion To Approve Contract With Piper Sandler For Bond Services
- 10. Resolution No. 74-R-2019-2020 Setting Public Hearing for Not To Exceed \$2,200,000 GO Refunding Capital Loan Notes
- 11. Setting Public Hearing for Plans, Specifications, Form of Contract and Engineer's Estimate for Reconstruct Runway Lighting - 13/31, Reconstruct Taxiway Lighting
- 12. Public Hearing For Application to IEDA for A Water/Sewer CDBG Program - Memorial Lift Station
- 13. Resolution No. 75-R-2019-2020 Committing Matching Funds for CDBG Application for Memorial Lift Station Rehabilitation Project.

14. **Resolution No. 76-R-2019-2020 Authorizing Submittal of CDBG Application for Memorial Lift Station Rehabilitation Project.**
15. **Motion Approving Agreement with St. Mary's Catholic School For Memorial Ballfield**
16. **Resolution No. 77-R-2019-2020 Supporting Workforce Housing Tax Incentive Program**
17. **Motion Approving Professional Services Agreement for Final Design Engineering with Bolton & Menk for the Highway 7 & 110 Intersection Upgrade Project**
18. **City Council Requested Items**
19. Adjourn

Meeting Protocol

If you wish to speak today, please:

1. To speak on an agenda item please approach the podium when that agenda item is called and upon recognition by the Mayor identify yourself by stating your name and address.
2. If your issue is not a topic on the agenda please approach the podium under the "Hear the Public" agenda item and upon recognition by the Mayor identify yourself by stating your name and address.
3. Please keep your remarks to three (3) minutes or less.
4. If you require accommodation for this meeting including but not limited to translation services, hearing assistance, or accessibility please contact the City Clerk at least four (4) hours prior to the start of the meeting.

**If you have concerns about any of the items on the consent agenda, they may be separated from the consent agenda and voted on individually.*

***Ordinances may be read at three consecutive meetings or readings may be waived and ordinances may be passed at only one or two meetings.*



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Staff Summary

5/18/2020

Agenda Item # B.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
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REPORT TO: Honorable Mayor and City Council

FROM:

SUBJECT: Consideration of Changes in Agenda and Setting the Agenda

BACKGROUND:

FISCAL IMPACT:

RECOMMENDATION:

Staff Summary

5/18/2020

Agenda Item # C.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
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REPORT TO: Honorable Mayor and City Council

FROM:

SUBJECT: Disclosure by City Council Members

BACKGROUND:

FISCAL IMPACT:

RECOMMENDATION:

Staff Summary

5/18/2020

Agenda Item # A.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Mayra Martinez, City Clerk

SUBJECT: **Resolution No. 71-R-2019-2020 to Approve Consent Agenda**

BACKGROUND: The Consent Agenda Includes:

- List of bills for approval
- King's Pointe and Sunrise Pointe disbursements for approval
- Approve the May 4, 2020 City Council Minutes
- Acknowledge Board and Commission Minutes from April 2020
- Approve Renewal Liquor License for LaJuanita's, Valentina's and Walgreens (pending on dram shop)
- Approve a Renewal Cigarette Permit for BLP Phonpei Market
- Approve the Code Enforcement Summary (see staff summary)
- Approve Utility Billing Uncollectible Write-offs of \$169.78
- Approve a Noise Variance for Younglove Construction, LLC

FISCAL IMPACT: The City will pay the following expenditures:

- List of Bills - \$332,672.97
- King's Pointe and Sunrise Pointe Golf Course Bills - \$153,150.67

The City will receive the following revenues:

- Liquor License Renewals - \$1,445.00

RECOMMENDATION: Approve Resolution No. 71-R-2019-2020 to Approve Consent Agenda

ATTACHMENTS:

Description	Type
☐ Resolution No. 71-R-2019-2020	Resolution
☐ List of Bills	List of Bills
☐ King's Pointe and Golf Course List of Bills	List of Bills

- Minutes - May 4, 2020
- Airport Minutes - April, 2020
- Library Board April 2020 Minutes
- LaJuanita's Liquor Application 2020
- La Juanita Liquor Report
- Walgreens Liquor Application 2020
- Walgreens Liquor Report
- Valentina's Liquor Application 2020
- Valentina's Liquor Report 2020

- Minutes
- Minutes
- Minutes
- Application
- Backup Material
- Application
- Backup Material
- Application
- Backup Material

RESOLUTION NO. 71-R-2019-2020

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE,
IOWA:

To approve the Consent Agenda which includes a list of bills, list of King's Pointe and Sunrise Pointe Golf Course bills and to prorate to the appropriate funds.

To further approve the minutes as presented to the Council for the May 4, 2020 Regular City Council Minutes

To further acknowledge the minutes as presented to the Council for the April 2020 Library Board and Airport Commission Minutes

To further approve the Code Enforcement Summary information

To further approve liquor license renewals for LaJuanitas, Valentina's and Walgreens

To further approve a cigarette permit renewal for BIP Phonpei Market

To further approve the write off of the current balance of seven Utility Billing uncollectible accounts which is in the amount of \$169.78. There is no fiscal impact as the \$169.78 balance is in an accounts receivable ledger account which does not fiscally impact the general ledger.

To further approve a Noise Variance for Younglove Construction,.L.L.C. Younglove to start pouring concrete at 5:00 a.m. for the new Tyson Feed Mill Plant on May 27th, but may occur on a following date up to June 2nd, subject to weather.

PASSED AND APPROVED this 18th day of May, 2020.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk



Storm Lake, IA

My Buy Local_v1

Payment Date Range: 05/07/2020 - 05/20/2020

Vendor Name	Buy Local Info	Payable Description	Total Payments
BVC			
Mike's Electronics Inc	BVC	WWTP Blower Service Call	2,675.20
Mark Stanley	BVC	Services	207.60
Mike's Electronics Inc	BVC	Casino LS Service Call	120.00
Buena Vista County Solid Waste	BVC	Recycling Services	80.08
Mike's Electronics Inc	BVC	Service Call	110.00
Buena Vista County Solid Waste	BVC	Recycling	46.80
	BVC Total:	3,239.68	
Contract/Agreement			
Bolton & Menk, Inc	Contract/Agreement	Bidding Services	27,959.00
I & S Group, Inc	Contract/Agreement	Design Services	10,000.00
Bolton & Menk, Inc	Contract/Agreement	Construction & Admin Services	14,247.00
Emmons & Olivier Resources, Inc	Contract/Agreement	Implmentation Svc through 3/31/20	11,241.25
Bolton & Menk, Inc	Contract/Agreement	General Engineering Services	7,300.00
I & S Group, Inc	Contract/Agreement	Construction Services	3,332.89
Bolton & Menk, Inc	Contract/Agreement	Construction Admin	150.00
	Contract/Agreement Total:	74,230.14	
Local			
Jim Bartholomew	Local	May 2020 Airport Contract	5,451.95
Star Energy, LLC	Local	Fuel	5,353.60
Thanh Tan Ho	Local	2020 COVID Relief Program	4,800.00
American Veterans of World War II	Local	2020 COVID Relief Program	4,500.00
Alliant Energy	Local	Gas Services	4,173.78
Philip E Havens	Local	April 2020 Legal Services	4,033.34
Crystal Cook	Local	2020 COVID Relief Program	3,900.00
MKL LLC	Local	2020 COVID Relief Program	3,900.00
Rebnord Technologies, Inc	Local	IT Service Agreement	3,700.00
Central Bank	Local	Supplies	2,874.02
Verizon Wireless Services LLC	Local	Cell Phone Service	2,785.08
Vetter Equipment	Local	Concrete Saw	1,511.90
Sunjara Salon & Spa, LLC	Local	2020 COVID Relief Program	1,500.00
Iordanou, Inc	Local	2020 COVID Relief Program	1,500.00
Long Lines	Local	Fax Line & Emergency Line Service	1,438.71
Reding's Gravel & Excavating Co., Inc	Local	Rock	1,087.78
Siouxland Certified Testing Services, Inc	Local	Soil Testing	994.00
Reding's Gravel & Excavating Co., Inc	Local	Rock	852.55
Garbage Hauling Service Inc	Local	Garbage Service	847.25
Larson Oil & Distributing Co, Inc	Local	Propane	713.00
Storm Lake Ace Hardware	Local	Supplies	673.70
The Storm Lake Times	Local	April 2020 Publications	521.00
Friesen Home Improvement, LLC	Local	2020 PO Box Fees	425.00
Rebnord Technologies, Inc	Local	SCADA Computer Update	399.95
Color-ize Inc	Local	Campground Brochures	384.25
Graffix Inc	Local	Uniforms	379.75
Edwards Storm Lake	Local	Spark Plug Replacement	360.76
Rebnord Technologies, Inc	Local	Deep Freeze Subscription	350.00
Graham Tire	Local	New Tires (2)	327.90
Graffix Inc	Local	Uniforms	252.00
Reding's Gravel & Excavating Co., Inc	Local	April Scale Fees	234.00
Storm Lake Hydraulics Co, Inc	Local	Boom Motor Repairs	207.00
Graffix Inc	Local	Hand Sanitizer	200.00
Storm Lake Hydraulics Co, Inc	Local	Hyd Cyl Replacement	356.09
Rebnord Technologies, Inc	Local	Battery	149.95
Larson Oil & Distributing Co, Inc	Local	Propane	124.20

My Buy Local_v1
Payment Date Range: 05/07/2020 - 05/20/2020

Vendor Name	Buy Local Info	Payable Description	Total Payments
L & G Products, Inc	Local	Seed	123.50
Qwest Corporation	Local	Phone Service	119.99
Vetter Equipment	Local	Supplies	107.95
L & G Products, Inc	Local	Seed	90.00
Reding's Gravel & Excavating Co., Inc	Local	Rock	89.93
Graham Tire	Local	Tire Repairs	75.74
Rust Publishing NWIA, LLC	Local	Publication	60.16
Dennis R Julius	Local	Entrance Mat Services	60.00
Storm Lake Industrial Corporation	Local	Banquet Fee	60.00
Rent-All, Inc	Local	Saw Rental	60.00
Fastenal Company	Local	Inverted Wand	56.13
JNB Acquisition Corporation	Local	Copier Maintenance Agreement	52.63
The Storm Lake Times	Local	Advertising	51.20
Storm Lake Hydraulics Co, Inc	Local	Hyd Hose	48.18
Dennis R Julius	Local	Laundry Services	45.00
JNB Acquisition Corporation	Local	Copier Maintenance Agreement	36.98
MidAmerican Energy Company	Local	Electric Service- 1220 E 4th Street	35.15
Rent-All, Inc	Local	Brush Rental	33.75
JNB Acquisition Corporation	Local	Copier Maintenance Agreement	52.22
Graham Tire	Local	Tire Repairs	150.00
JNB Acquisition Corporation	Local	Copier Maintenance Agreement	22.40
Dianne Johnson	Local	Shots- Ozzy	18.00
McCrea Eneterprises	Local	Paint Supplies	15.95
O'Reilly Automotive Inc	Local	Wiper Blades	14.49
Storm Lake Hydraulics Co, Inc	Local	Supplies	9.03

Local Total: 62,750.89
Non-Local

General Traffic Controls, Inc	Non-Local	Flindt & Richland Video Detection Equipment	14,279.39
Electric Pump Inc	Non-Local	C65 LS Pump Repairs	12,810.45
Regional Transit Authority	Non-Local	FY2020 Funding	7,238.00
Mississippi Lime Company	Non-Local	Lime	16,747.86
MacQueen Equipment LLC	Non-Local	Installation of Radio Remote System	5,289.85
Iowa Department of Natural Resources	Non-Local	2020 Marina Dock Slip Fees	4,200.00
Ziegler, Inc	Non-Local	Motor	2,891.67
MacQueen Equipment LLC	Non-Local	Throttle Accuator	2,702.95
Municipal Supply, Inc	Non-Local	Smart Points	2,610.00
Hawkins, Inc	Non-Local	Hydo	2,426.67
Siouxland Turf Products	Non-Local	Chemicals	2,340.50
Piper Jaffray & Co	Non-Local	Dissemination Agent Fees	2,250.00
Municipal Supply, Inc	Non-Local	3" Meter	1,654.72
Siouxland Turf Products	Non-Local	Herbicide	1,470.00
SKM, LLC	Non-Local	Annual Aerial Maintenance	1,465.00
MacQueen Equipment LLC	Non-Local	Delivery of Blower	1,452.00
Foundation Analytical Laboratory, Inc	Non-Local	Testing Services	1,191.75
Electric Pump Inc	Non-Local	ABS Pump Seals	1,002.69
Central Iowa Distributing, Inc	Non-Local	Cleaning Supplies	1,617.20
Siouxland Turf Products	Non-Local	Chemicals	623.95
Tyler Technologies, Inc	Non-Local	Coverison Services	562.50
Central Iowa Distributing, Inc	Non-Local	Cleaning Supplies	528.80
Getty Images (US), Inc.	Non-Local	Istock Subscription	518.75
Sioux City Fence LLC	Non-Local	Gate Repair	497.55
Utility Supply of America, Inc	Non-Local	Cap & Supplies	491.82
Speed's Automotive Supply, Inc	Non-Local	Starter	400.00
Foundation Analytical Laboratory, Inc	Non-Local	Testing Services	759.55
Heiman Inc	Non-Local	Sensor	365.70
Central Iowa Distributing, Inc	Non-Local	Cleaning Supplies	321.70
Twin Rivers Media, LLC	Non-Local	Advertising	300.00
Electric Pump Inc	Non-Local	Sensor	240.30
Sirchie Acquisition Company, LLC	Non-Local	Evidence Supplies	216.80
Aurelia Lumber Company Inc	Non-Local	Supplies	215.88

My Buy Local_v1

Payment Date Range: 05/07/2020 - 05/20/2020

Vendor Name	Buy Local Info	Payable Description	Total Payments
Schumacher Elevator Company	Non-Local	Elevator Maintenance Services	214.24
MacQueen Equipment LLC	Non-Local	Lock Plate & Antenna	186.24
Iowa Division of Labor	Non-Local	Boiler Inspection Fee	160.00
Siouxland Turf Products	Non-Local	Chemicals	160.00
Dale Vitito	Non-Local	Uniform	145.84
Iowa Division of Labor	Non-Local	Boiler Inspection Fee	135.00
Tyler Technologies, Inc	Non-Local	Software License through 7/31/2020	125.00
ABC Pest Control, Inc	Non-Local	Pest Control Services	100.00
Underground Location Company	Non-Local	Locate Services	98.20
Central Iowa Distributing, Inc	Non-Local	Scrubs	97.20
Iowa Dept of Natual Resources	Non-Local	Permit ID#1178001	85.00
Davis Equipment Corporation	Non-Local	Switch	81.66
Cintas First Aid & Safety	Non-Local	First Aid Supplies	78.05
Iowa Lakes Regional Water	Non-Local	May 2020 Water Service	71.19
Salus LLC	Non-Local	March 2020 Memberships	60.00
Steven A Beeck	Non-Local	Window Cleaning Services	39.00
Ingram Library Services, Inc	Non-Local	Books	74.02
Ed M. Feld Equipment Company, Inc	Non-Local	Battery	33.50
UPS	Non-Local	Shipping Services	24.51
Ingram Library Services, Inc	Non-Local	Books	22.36
Central Iowa Distributing, Inc	Non-Local	Cleaning Supplies	22.23
Ingram Library Services, Inc	Non-Local	Books	154.96
UPS	Non-Local	Shipping	15.64
Ingram Library Services, Inc	Non-Local	Books	25.51
Siouxland Turf Products	Non-Local	Open Credit	-77.00
		Non-Local Total:	93,816.35
Payroll/Refunds			
Lisa Hurd	Payroll/Refunds	COVID-19 Shelter House Refund	160.00
Angelberto Medina	Payroll/Refunds	COVID-19 Shelter House Refund	160.00
Bobbi Butler	Payroll/Refunds	2020 COVID Shelter House Refund	160.00
Custodian of Petty Cash	Payroll/Refunds	Postage	51.88
Michael Porsch	Payroll/Refunds	Iowa Lakes Corridor Meeting Expense	43.13
		Payroll/Refunds Total:	575.01
		Grand Total:	234,612.07

King's Pointe Resort

Claims Publication

From 5/1/2020 to 5/14/2020

Vendor	Description	Amount
Alliant Energy	Utilities	\$243.65
City of Storm Lake- Water Dept.	Utilities	\$93.83
Long Lines LLC	Utilities	\$983.69
Mediacom	Utilities	\$472.90
MidAmerican Energy	Utilities	\$8,318.75
Verizon Wireless	Utilities	\$183.07
American Hotel Register Company	Supplies	\$1,480.31
Cintas Corporation	Supplies	\$2,801.41
Color-ize	Supplies	\$251.22
Deluxe Branded Marketing	Services	\$190.00
ECOLAB	Supplies	\$1,367.32
Julius Cleaners	Services	\$118.25
Steven A. Beeck dba Steve's Window Service	Services	\$225.00
Storm Lake Ace Hardware	Supplies	\$85.89
Sysco Iowa, Inc.	Food	\$1,269.42
Weigand-Omega Management March 2020 Mgt Fee	Services	\$7,476.40
A&A Automotive Inc	Services	\$212.01
Arnold Motor Supply, LLP	Supplies	\$49.84
Boz Wellz-Inc.	Services	\$256.37
Color-ize	Supplies	\$3,265.05
COUNSEL	Supplies	\$79.28
HyVee	Supplies	\$95.24
Kaleidoscope Marketing	Services	\$1,330.00
Loews Carpet One	Services	\$2,088.02
Mike's Lawn Service, Inc.	Services	\$58.25
Office Elements	Supplies	\$155.76
Pilot Tribune	Services	\$33.60
Rath Lighthouse Inn LLC	Services	\$145.60
Rebnord Technologies, Inc.	Services	\$2,787.48
Rex Rimmer	Reimbursement	\$60.00
Storm Lake Ace Hardware	Supplies	\$504.07
Weigand Omega Management PPP Program	Contract	\$17,583.13
Weigand Omega Management Payroll 5/13/2020	Payroll	\$14,323.22
American Hotel Register Company	Supplies	\$551.38
Cintas Corporation	Supplies	\$487.72
Color-ize	Supplies	\$360.02
ECOLAB	Supplies	\$30.67
GuestSupply	Supplies	\$1,568.57
Steven A. Beeck dba Steve's Window Service	Services	\$214.00
Storm Lake Ace Hardware	Supplies	\$87.91
Sysco Iowa, Inc.	Food	\$1,833.38
Bomgaars Supply Inc.	Supplies	\$43.97
KAYL/KKIA	Advertising	\$1,050.00
Melanders	Services	\$3,515.00
Michael P. Reinert dba Olsen Welding & Machine	Services	\$45.00
Rebnord Technologies, Inc.	Services	\$2,717.53
Storm Lake Ace Hardware	Supplies	\$109.28

Storm Lake Times	Advertising	\$40.00
Vista Paints	Supplies	\$223.30
ACCO Unlimited Corporation	Supplies	\$1,185.00
ECOLAB	Supplies	\$942.88
Plumbing and Heating Wholesale, Inc.	Supplies	\$343.15
Woosung CNA, LLC	Services	\$752.93
HyVee	Beverages	\$391.45
Doll Distributing	Beverages	\$830.65
City of Storm Lake	Utilities	\$1,526.50
Fintech	Services	\$56.65
Martin Brothers	Food	\$2,468.98
Authnet Gateway	Services	\$25.00
Iowa Dept of Revenue	Taxes	\$61,461.00
Heartland Payment Services	Services	\$1,700.72
		<u>\$153,150.67</u>

REGULAR COUNCIL MEETING, CITY OF STORM LAKE, IOWA, CITY HALL, MAY 4, 2020 5:00 P.M. DUE TO COVID-19, THIS MEETING WILL BE A TELEPHONIC MEETING ONLY ~ DIAL IN TO PARTICIPATE: 1-408-418-9388 ACCESS CODE: 24570177

Present via telephone: Mayor Michael Porsch, Council Members Jose Ibarra, Tyson Rice, Dan Smith, Kevin McKinney and Maria Ramos. Absent: none

Staff present via telephone: City Manager Keri Navratil, Assistant City Manager David Derragon, City Attorney Phil Havens, Police Chief Chris Cole, Fire Chief Mike Jones, Water Quality Code Compliance Director Scott Olesen, Library Director Elizabeth Huff, Public Services Supervisor Scott Bonebrake, King's Pointe Manager Mark Clossey, Finance Director Brian Oakleaf, and City Clerk Mayra Martinez.

Media present via telephone: Ryan Thompson KAYL.

Public present via telephone: John Keenan, Brent Redenbaugh, Jen Hustedt and Nathan Jensen.

Mayor Porsch called the meeting to order at 5:00 pm.

Pledge of Allegiance

Agenda - Moved by Council Member McKinney to approve the agenda with the removal of agenda Item No. 3 with Resolution No. 67-R-2019-2020 approving Bids Collected for Runway 13/31 Lighting Replacement Project. Seconded by Council Member Ibarra. Roll call vote: All ayes. Motion carried.

Disclosure by City Council Members – None at this time.

Hear the Public - None at this time.

Consent Agenda - Moved by Council Member Ibarra to approve the consent agenda which includes list of bills check #'s 75149 through 75219, PR check #'s 59854 and 59855, EFT #'s 1093 through 1113. DFT # 720 through 731, 733 through 740, King's Point and Sunrise Pointe disbursements., April 20, 2020 City Council minutes, April 28, 2020 Special City Council minutes, Puff's, Wal-Mart and Malarky's liquor license renewals, a new liquor license for Grand Central, King's Pointe liquor license ownership update and the SLPD City Code Enforcement summary. Seconded by Council Member McKinney. Roll call vote: All ayes. Motion carried.

FY 2019-2020 Budget Amendment - Moved by Council Member Ibarra to set the public hearing for May 18, 2020 at 5:00 pm for the FY 2019-2020 budget amendment. Seconded by Council Member Ramos. Roll call vote: All ayes. Motion carried.

Oneida Street Reconstruction Project, Phase 1 – Mayor Porsch opened the public hearing for the Oneida Street Reconstruction Project, Phase 1 Plans, Specifications, and Form of Contract. Hearing no comments for public and no comments received the Mayor closed

Moved by Council Member Ibarra to adopt Resolution No. 68-R-2019-2020 approving to reject bids for the Oneida Street Reconstruction Project, Phase 1 Plans, Specifications, and Form of Contract. Rick Rohr, resident of construction site, commented that the need of rock be placed in the next bid proposal as well. Seconded by Council Member McKinney. Roll call vote: All ayes with Council Member Smith abstaining as he is related to the contractor. Motion carried.

RESOLUTION NO. 68-R-2019-2020

RESOLUTION REJECTING BIDS FOR THE 2020 UTILITY IMPROVEMENT PROJECT
(ONEIDA STREET PROJECT PHASE 1)

WHEREAS, the plans, specifications, form of contract, estimate of cost, and award bid were filed with the CITY for the construction of certain public improvements described in general as the 2020 Utility Improvement Project (Oneida Street Phase 1); and

WHEREAS, notice of hearing on plans, specifications, form of contract and estimate of cost for said public improvements was published as required by law:

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE, IOWA;

Section 1. That the bids received for the 2020 Utility Improvement Project are rejected.

PASSED AND APPROVED this 4th day of May 2020.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

Sunset Bay Condominium Entrance Road Project - Moved by Council Member Smith to adopt Resolution No. 69-R-2019-2020 approving to amend the engineering agreement with Emmons & Olivier Resources, Inc. (EOR) for the Sunset Bay condominium entrance road project. Seconded by Council Member McKinney. Roll call vote: All ayes. Council Members Ibarra, McKinney, Ramos, and Smith. Nays: Council Member Rice. Motion carried.

RESOLUTION NO. 69-R-2019-2020

**RESOLUTION TO APPROVE AN AMENDMENT TO THE ENGINEERING AGREEMENT
WITH EMMONS & OLIVIER RESOURCES, INC. FOR THE SUNSET BAY
CONDOMINIUM ENTRANCE ROAD PROJECT**

WHEREAS, the City of Storm Lake entered into an engineering agreement for design and construction oversight of the Sunset Bay Condominium Entrance Road Project; and

WHEREAS, the project experienced delays due to the construction deadline being extended twice, once to accommodate the condominium developer (2018 to 2019), and a second time to accommodate the concrete subcontractor's schedule (2019 to 2020):

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE, IOWA;

Section 1. That the amendment to the engineering agreement in the amount of \$1,000 is approved increasing the agreement from \$18,500 to \$19,500.

PASSED AND APPROVED this 4th day of May 2020.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

Memorial Lift Station CDBG Application – Moved by Council Member Rice to set the Public Hearing for May 18, 2020 at 5:00 pm at the Council Chambers for an application to IEDA for A Water/Sewer CDBG Program. Seconded by Council Member Ramos. Roll call vote: All ayes. Motion carried.

Workforce Housing Tax Incentive Program - Moved by Council Member Ibarra to adopt Resolution No. 70-R-2019-2020 supporting a Workforce Housing Tax Incentive Program for Brash, LLC . Seconded by Council Member Rice. Roll call vote: All ayes. Motion carried.

RESOLUTION NO. 70-R-2019-2020

A RESOLUTION IN SUPPORT OF A WORKFORCE HOUSING TAX INCENTIVE APPLICATION TO BE SUBMITTED TO THE IOWA ECONOMIC DEVELOPMENT AUTHORITY (IEA) BY BRASH, LLC FOR HOUSING PROJECTS LOCATED AT EMERALD WOODS TOWNHOME

WHEREAS, Brash, LLC plans on a \$1.75 Million capital investment for a housing development located at the; and

WHEREAS, the project consists of 5 buildings with 2 units each for a total of 10 single family constructed homes; and

WHEREAS, the project will add new assessable tax valuation to Storm Lake; and

WHEREAS, the City of Storm Lake will assist the project by providing tax abatement of 100% on the first \$75,000 of actual value added for five years; and

WHEREAS, the City of Storm Lake will provide building permits for \$1.00; and

WHEREAS, Brash, LLC intends to submit an application for Workforce Housing Tax Incentive through the Iowa Economic Development Authority; and

WHEREAS, the City of Storm Lake is a duly recognized political subdivision of the State of Iowa action under the laws of the State of Iowa; and

WHEREAS, the City Council is the duly elected governing body of Storm Lake, Iowa; and

IT IS HEREBY RESOLVED by the City Council of Storm Lake Iowa as follows:

- The City Council is in full support of the opportunity to promote housing development in Storm Lake, Iowa and fully supports the Application for Workforce Housing Tax Incentives.
- City staff is authorized to assist in the preparation of the application and related materials deemed necessary.

PASSED AND APPROVED this 4th day of May, 2020.

Michael Porsch, Mayor

ATTEST

Mayra A. Martinez, City Clerk

Buoys Contract Amendment - Moved by Council Member Ibarra to approve amending the contract to Buoys for tracking and control of the Marina dock slips to the City; to authorize the City to retain the rental fees from the slips and to credit Buoys \$32,000 on the concessionary fees for improvements they made during the first two years of the contract and authorizing the Mayor to sign documents. Seconded by Council Member Smith. Roll call vote: All ayes. Motion carried.

City Council Requested Items – Council Member Rice gave consensus to review the commercial trash collection and Council Member McKinney concurred.

Council Member Rice gave consensus to review urban chickens and Council Member McKinney concurred.

Council Member McKinney suggested the review of skate park per the request on the previous meeting but the City Manager Navratil reminded the Council that the request was suggested to be reviewed during budget time

Adjourn - Moved by Council Member Rice to adjourn the meeting at 6:40 pm. Seconded by Council Member McKinney. Roll call vote: All ayes. Motion carried.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

**Storm Lake Airport Commission
Regular Meeting - Airport Terminal
Monday, April 13, 2020 4:00 PM**

Present: Commission Members Bob Ansorge, Maxine Lampe and Doug White. Absent: Commissioners Sara Huddleston and Dan Richardson. Others Present: John Bartholomew, Tyler Gibbins and Greg Broussard with Bolten & Menk.

Chairman Bob Ansorge called the meeting to order at 4:05 pm.

Hear the Public – No comments.

Minutes – Moved by Commissioner to Lampe approve the March 9, 2020 Airport Commission Minutes. Seconded by Commissioner White. Vote: All ayes with Commissioners Huddleston and Richardson absent. Motion carried.

Financial Report – Moved by Commissioner White to approve the financial reports for March 2020. Seconded by Commissioner Lampe. Vote: All ayes with Commissioners Huddleston and Richardson absent. Motion carried.

Fuel Report – Moved by Commissioner Lampe to approve the March Fuel Report. Seconded by Commissioner White. Vote: All ayes with Commissioners Huddleston and Richardson absent. Motion carried.

Airport Manager's Monthly Report – John Bartholomew mentioned that the State Patrol Plane was removed from the property on April 10th due to the retirement of the local patrol officer. Staff will contact the State Patrol office to determine if they would like to continue to rent the stall at SLB until a new pilot is hired locally or if a termination of agreement is required.

Courtesy Car Usage: None 0 Miles
Fuel Meter Reading: Jet A – 471180
AV Gas – 114651.8

Administration Report – Recommended by Commissioner White to hold the hangar inspections on a weekend to assist with increased participation and complete all hangar inspections on a single inspection date. Commission will review a date for inspection at a later meeting.

Approve Bid for Runway 13/31 Lighting Project – Moved by Commissioner Lampe to approve award of project to Voltmer Inc contingent upon FAA approval of Good Faith Efforts submitted from Voltmer for the project DBE goal in the amount of \$352,252.58. If the FAA does not concur with the recommendation, then recommend award of the project to 2nd low bidder, K&W Electric Inc. in the amount of \$355,289.00. Seconded by Commissioner White. Vote: All ayes with Commissioners Huddleston and Richardson absent. Motion carried

Adjourn – Moved by Commissioner White adjourn the meeting at 4:30 pm. Seconded by Commissioner Lampe. Vote: All ayes with Commissioners Huddleston and Richardson absent. Motion carried

Mayra Martinez, City Clerk



Library Board Meeting, City of Storm Lake, April 13, 2020, 4:00 p.m. by telephonic conference, 1-408-219-9388

Present: Board President Mary Kay Hudspeth, Sarah Freking, John Hughes, Sue Lyngaas and Barb Wells. Also present, Elizabeth Huff, Library Director and Dana Larsen, Pilot-Tribune.

Board President Hudspeth called the meeting to order at 4:04 p.m.

Disclosure by Library Board Members – none.

Minutes – Board Member Lyngaas requested clarification of WhoFi count. Library Director replied count was the patron usage number on the library's internet. Moved by Board Member Wells to approve March Minutes. Seconded by Board Member Hughes. Vote by roll call, all ayes. Motion carried.

Director's Report – The calendar revealed the impact of COVID19 on library service: from March 17 as the last full-day of service to patrons and progressed from March 18 pick-up service to April 6 Governor's Proclamation of Libraries Closed to the Public. Bar Charts revealed a decline in attendance but a rise in Public Internet Use. Ledgers would be mailed to Board Members when they are available. Molly of Denali taught by Trista Peitzman will resume when the pandemic ends. Donations totaled \$150 for materials.

Bills – Moved by Board Member Lyngaas to approve April Bills. Seconded by Board Member Freking. Vote by roll call, all ayes. Motion carried.

Adjourn – Moved by Board Member Wells to adjourn meeting at 4:14 p.m. Seconded by Board Member Freking. Vote by roll call, all ayes. Motion carried.

Elizabeth Huff, Library Director.

Please note the above is an unapproved draft of minutes and will be approved by the Board of Trustees on May 11, 2020.

Applicant License Application (LC0031982)

Name of Applicant: <u>La Juanita Taqueria, Inc.</u>		
Name of Business (DBA): <u>La Juanita</u>		
Address of Premises: <u>613 Lake Ave.</u>		
City <u>Storm Lake</u>	County: <u>Buena Vista</u>	Zip: <u>50588</u>
Business <u>(712) 732-5173</u>		
Mailing <u>613 Lake Ave.</u>		
City <u>Storm Lake</u>	State <u>IA</u>	Zip: <u>50588</u>

Contact Person

Name <u>Christina</u>	
Phone: <u>(712) 732-5173</u>	Email <u>horneberlaw@horneberlawfirm.com</u>

Classification Class C Liquor License (LC) (Commercial)

Term:12 months

Effective Date: 06/06/2020

Expiration Date: 06/05/2021

Privileges:

Class C Liquor License (LC) (Commercial)

Sunday Sales

Status of Business

BusinessType: <u>Privately Held Corporation</u>	
Corporate ID Number: <u>XXXXXXXXXX</u>	Federal Employer ID <u>XXXXXXXXXX</u>

Ownership

Christina Bautista

First Name: <u>Christina</u>	Last Name: <u>Bautista</u>	
City:	State: <u>Nebraska</u>	Zip: <u>68776</u>
Position: <u>Owner</u>		
% of Ownership: <u>50.00%</u>	U.S. Citizen: <u>Yes</u>	

Victor Bautista

First Name: <u>Victor</u>	Last Name: <u>Bautista</u>	
City:	State: <u>Nebraska</u>	Zip: <u>68776</u>
Position: <u>Owner</u>		
% of Ownership: <u>50.00%</u>	U.S. Citizen: <u>Yes</u>	

Insurance Company Information

Insurance Company: <u>Western National Insurance</u>

Policy Effective Date:	Policy Expiration
Bond Effective	Dram Cancel Date:
Outdoor Service Effective	Outdoor Service Expiration
Temp Transfer Effective	Temp Transfer Expiration Date:

M E M O R A N D U M

TO: MAYRA MARTINEZ

FROM: CHRIS COLE

DATE: MAY 13, 2020

REFERENCE: LIQUOR LICENSE RENEWAL
LA JUANITA
613 LAKE AVE

Discussion: Per your request I have accessed the department computer for calls of interest to the aforementioned establishment. The calls are as follows:

	3-27-2018 to 04-13-2019	4-14-2019 to 5-10-2020
INCIDENTS		
911 Hang-Up Call	1	1
Accident	2	2
Ambulance Call	1	1
Automated Burglary Alarm	0	1
Bar Check	64	34
Burglary	0	1
Business Security	32	35
Citizen Assist	2	4
City/CO Dept Assist	0	2
Disturbance	0	1
Domestic	0	1
Drug Investigation	0	1
Fight	1	0
Forgery	2	1
Found	1	0
Hit and Run	1	0
Interpretation	2	0
Intoxicated Driver	1	1
Intoxicated Pedestrian	0	2
Keys Locked In Car	1	6
Juvenile Problem	0	1
Motorist Assist	1	1
Open Door/Window	0	1
Parking Complaint	1	0
Pedestrian Stop	1	2

PR/Talk/Presentation	16	12
Reckless Driver	1	0
Registration Check	0	1
Street Beat	6	6
Suspicious Activity	1	0
Suspicious Person	0	1
Suspicious Vehicle	1	0
Vehicle Stop	8	17
Wants/Warrants Check	2	0
Warrant Service	1	0

ARRESTS

Mittimus	1	0
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Recommendation: Approval of liquor license.

Applicant License Application (LE0002184)

Name of Applicant: <u>Walgreen Co.</u>		
Name of Business (DBA): <u>Walgreens #11330</u>		
Address of Premises: <u>800 Lake Ave</u>		
City <u>Storm Lake</u>	County: <u>Buena Vista</u>	Zip: <u>50588</u>
Business <u>(712) 732-0005</u>		
Mailing <u>300 Wilmot Rd, MS 3301</u>		
City <u>Deerfield</u>	State <u>IL</u>	Zip: <u>60015</u>

Contact Person

Name <u>Toni Franklin</u>	
Phone: <u>(847) 527-4402</u>	Email <u>toni.franklin@walgreens.com</u>

Classification Class E Liquor License (LE)

Term:12 months

Effective Date: 06/17/2020

Expiration Date: 06/16/2021

Privileges:

Class B Wine Permit

Class C Beer Permit (Carryout Beer)

Class E Liquor License (LE)

Sunday Sales

Status of Business

BusinessType: <u>Publicly Traded Corporation</u>	
Corporate ID Number: <u>XXXXXXXXXX</u>	Federal Employer ID <u>XXXXXXXXXX</u>

Ownership

Alexander Gourlay

First Name: <u>Alexander</u>	Last Name: <u>Gourlay</u>	
City: <u>Glencoe</u>	State: <u>Illinois</u>	Zip: <u>60022</u>
Position: <u>President</u>		
% of Ownership: <u>0.00%</u>	U.S. Citizen: <u>Yes</u>	

Alan Nielsen

First Name: <u>Alan</u>	Last Name: <u>Nielsen</u>	
City: <u>Crystal Lake</u>	State: <u>Illinois</u>	Zip: <u>60014</u>
Position: <u>VP/CFO/Treasurer</u>		
% of Ownership: <u>0.00%</u>	U.S. Citizen: <u>Yes</u>	

RICHARD ASHWORTH

First Name: <u>RICHARD</u>	Last Name: <u>ASHWORTH</u>
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City: HAWTHORN WOODS **State:** Illinois **Zip:** 60047
Position: President, Operations
% of Ownership: 0.00% **U.S. Citizen:** **Yes**
Todd Heckman
First Name: Todd **Last Name:** Heckman
City: Aurora **State:** Illinois **Zip:** 60503
Position: Vice President
% of Ownership: 0.00% **U.S. Citizen:** **Yes**
Hari Avula
First Name: Hari **Last Name:** Avula
City: Glencoe **State:** Illinois **Zip:** 60022
Position: Treasurer
% of Ownership: 0.00% **U.S. Citizen:** **Yes**
Susan Halliday
First Name: Susan **Last Name:** Halliday
City: Lincolnshire **State:** Illinois **Zip:** 60069
Position: Assistant Treasurer
% of Ownership: 0.00% **U.S. Citizen:** **Yes**

Insurance Company Information

Insurance Company: <u>Safeco Insurance Co</u>	
Policy Effective Date: <u>06/17/2020</u>	Policy Expiration <u>01/01/1900</u>
Bond Effective <u>2</u>	Dram Cancel Date:
Outdoor Service Effective	Outdoor Service Expiration
Temp Transfer Effective	Temp Transfer Expiration Date:

M E M O R A N D U M

TO: MAYRA MARTINEZ

FROM: CHRIS COLE

DATE: MAY 14, 2020

REFERENCE: LIQUOR LICENSE RENEWAL
WALGREENS
800 N LAKE AVE

Discussion: Per your request I have accessed the department computer for calls of interest to the aforementioned establishment. The calls are as follows:

	5-27-2017 to 4-10-2018	4-11-2018 to 5-11-2020
INCIDENTS		
911 Hang Up	0	2
Accident	1	4
Animal Complaint	2	1
Automated Fire Alarm	0	1
Burglar Alarm	0	3
Business Assist	0	2
Business Security	40	54
Citizens Assist	1	2
Drug Investigation	1	0
General Information	2	1
Hit and Run	0	2
Intoxicated Pedestrian	1	0
Keys Locked In Car	2	3
Meeting	0	1
Motorist Assist	0	4
PR/Talk/Presentation	8	6
Station Assignment	2	7
Street Beat	13	6
Suspicious Activity	1	2
Suspicious Person	1	0
Vehicle Stop	20	24
ARRESTS		
OWI	0	1

Poss of Drug Parapharnelia	1	0
Public Intox	1	0
Warrant Served	1	1

Recommendation: Approval of liquor license

Applicant License Application (BC0030849)

Name of Applicant: <u>Mayela Morelos</u>		
Name of Business (DBA): <u>Valentina's Meat Market</u>		
Address of Premises: <u>111 East 6th Street</u>		
City <u>Storm Lake</u>	County: <u>Buena Vista</u>	Zip: <u>50588</u>
Business <u>(712) 213-5348</u>		
Mailing <u>1212 Erie Street</u>		
City <u>Storm Lake</u>	State <u>IA</u>	Zip: <u>50588</u>

Contact Person

Name <u>Mayela or Silvino Morelos</u>	
Phone: <u>(712) 299-7543</u>	Email <u>mayelamorelos@icloud.com</u>

Classification Class C Beer Permit (BC)

Term:12 months

Effective Date: 06/04/2019

Expiration Date: 06/03/2020

Privileges:

Class B Wine Permit

Class C Beer Permit (BC)

Sunday Sales

Status of Business

BusinessType: <u>Sole Proprietorship</u>	
Corporate ID Number: <u>XXXXXXXXXX</u>	Federal Employer ID <u>XXXXXXXXXX</u>

Ownership

Mayela Morelos

First Name: <u>Mayela</u>	Last Name: <u>Morelos</u>	
City: <u>Storm Lake</u>	State: <u>Iowa</u>	Zip: <u>50588</u>
Position: <u>Owner</u>		
% of Ownership: <u>100.00%</u>	U.S. Citizen: <u>Yes</u>	

Silvino Morelos

First Name: <u>Silvino</u>	Last Name: <u>Morelos</u>	
City: <u>Storm Lake</u>	State: <u>Iowa</u>	Zip: <u>50588</u>
Position: <u>Spouse</u>		
% of Ownership: <u>0.00%</u>	U.S. Citizen: <u>No</u>	

Insurance Company Information

Insurance Company:

Insurance Company:

Policy Effective Date:

Policy Expiration

Bond Effective

Dram Cancel Date:

Outdoor Service Effective

Outdoor Service Expiration

Temp Transfer Effective Date:

Temp Transfer Expiration Date:

M E M O R A N D U M

TO: MAYRA MARTINEZ

FROM: CHRIS COLE

DATE: MARCH 27, 2020

REFERENCE: LIQUOR LICENSE RENEWAL
VALENTINA'S MEAT MARKET
111 E 6TH ST

Discussion: Per your request I have accessed the department computer for calls of interest to the aforementioned establishment. The calls are as follows:

03-27-2019

3-24-2020

INCIDENTS

911 Hang Up Call	1
Accident	2
Business Security	6
Citizen Assist	1
Extra Security	1
Harassment	1
Hit and Run	1
Interpretation	2
Keys Locked in Car	1
Lost Property	1
Open Window/Door	1
PR/Talk/Presentation	3
Station Assignment	2
Street Beat	2
Traffic Stop	1
Vandalism	1
Welfare Check	2

ARRESTS None

Recommendation: Approval of liquor license.

Staff Summary

5/18/2020

Agenda Item # B.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Mayra Martinez, City Clerk

SUBJECT: **Buy Local Information**

BACKGROUND: Early in 2011 during a Study Session discussion Council asked staff to look at putting together some analysis information regarding the amount of purchases made locally. We have pulled that information together and a provided a summary of purchases identified in the current list of bills to be approved that are purchased locally (within the City of Storm Lake), within Buena Vista County, and outside of Buena Vista County are presented here for Council's review. This information is presented for for both the City and King's Pointe's bills.

As the reader reviews the information they should note the following key notes:

- Costs associated with any major capital project (those bid under the State of Iowa Bid Law) are excluded from the calculation
- Costs associated with travel is excluded from the calculation and %
- Costs associated with payroll is excluded from the calculation and %
- In some cases there is only one vendor or an item is only available from vendors outside of the City limits and/or Buena Vista County – we have not identified these
- Some departments have fairly minor budgets and a major purchase can skew the % and or amount for a given review period (For Example: the Airport may have normally \$4,000 - \$6,000 in expenses until they purchase Jet Fuel or Av Gas which can be \$10,000 + and as a vendor who is not local this can skew the information for that review period)
- Local has been determined to be has an office front in the

area and based on where the office front is located for local vs. BV County (For Example: Wal-Mart is considered local since they have a store in Storm Lake even though their headquarters is not located here)

As with all analytical data it is possible to interpret the numbers in a variety of ways and as we move forward we would be happy to provide further detail and or revise the way in which we show the data. Likewise if you have any questions or concerns please don't hesitate to contact city staff.

FISCAL IMPACT:

Breakout	Calculated Expenses
Buena Vista County	\$ 3,239.68
Contract/Agreement	\$ 74,230.14
Local	\$ 62,750.89
Non- Local	\$ 93,816.35
Payroll/Refunds/PyrI Tax & Ins	\$ 98,635.91
Total Expenses	\$ 332,672.97
Supporting Documents Attached	

RECOMMENDATION: Review Buy Local Information

Staff Summary

5/18/2020

Agenda Item # C.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Chris Cole, Police Chief

SUBJECT: **SLPD City Code Enforcement Summary**

BACKGROUND: 05-02-20 to 05-13-20

Total Contacts 34
Accumulate Trash - 4
Accumulate Junk - 4
Junk Vehicles - 3
Parking Restricted to Hard Surfaces - 6
Tall Grass and Weeds - 17
0 Citations

FISCAL IMPACT: None

RECOMMENDATION: None

Staff Summary

5/18/2020

Agenda Item # D.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Tyler Gibbins, Staff Accountant

SUBJECT: **Utility Billing Uncollectible Account Write-Off**

BACKGROUND: Per the State of Iowa Auditor's Office, we are required to maintain a listing of all delinquent and uncollectible accounts. Moving forward the City Council will be provided the amount of delinquent, uncollectible accounts to write off for the annual audit.

The two most common causes of delinquent accounts are (1) the customer and/or business FIN the utility account was set up under has filed for bankruptcy and (2) persons leave town without paying their final bill and/or provide us with a forwarding address. Those persons who do not provide us any information have balances less than the state allowed \$50.00 to enter into a state operated Income Offset program.

The current balance of the uncollectible accounts is \$169.78. This balance is made up of 7 accounts with balances ranging from \$1.58 to \$40.00.

FISCAL IMPACT: There is no fiscal impact as the \$169.78 balance is in an accounts receivable ledger account which does not fiscally impact the general ledger.

RECOMMENDATION: Review and approve.

Staff Summary

5/18/2020

Agenda Item # E.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Scott Olesen, Building Official

SUBJECT: **Motion to Approve A Noise Variance Request For Younglove Construction, L.L.C.**

BACKGROUND: Younglove Construction, L.L.C. is the General Contractor on the Tyson Feed Mill project. Younglove is planning on making their first major concrete pour on May 27th, but may occur on a following date up to June 2nd, subject to weather. This concrete pour is expected to last at least 10 hours and will occur at the new Feed Mill site located at the intersection of Radio Road and Expansion Boulevard. The Concrete Contractor is Smith Concrete Service, Inc. of Storm Lake. Their batch plant is located at 300 Expansion Boulevard so there will be a direct travel route to the construction site. Younglove is proposing to start pouring concrete at 5:00 a.m. City Code Chapter 8-7-2(F) restricts construction activity between 7:00 a.m. and 9:00 p.m., therefore the Council is required to review and approve a noise variance under Section 8-7-4(A).

This activity will take place in the Heavy Industrial District and will allow the Contractor to complete the large concrete pour operation in a timely manner and will allow a margin of safety to get the work completed.

Younglove Construction, L.L.C., will ask for two additional noise variances for an additional foundation pour on or around June 20th and for the 24/7 slip forming operation tentatively scheduled from September 8th through the 22nd, at a future Council meeting.

FISCAL IMPACT: None.

RECOMMENDATION: Approve the request for a noise variance for Younglove Construction, L.L.C.

Staff Summary

5/18/2020

Agenda Item # 3.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Mayra Martinez, City Clerk

SUBJECT: **Motion to Set Public Hearing on Application to IEDA For A CDBG Housing Rehabilitation Grant**

BACKGROUND: We are setting a public hearing for June 1, 2020 at 5:00 pm for the proposed Community Development Block Grant for a housing rehabilitation.

FISCAL IMPACT: None

RECOMMENDATION: Set the Public Hearing for June 1, 2020 at 5:00 pm at City Hall via telephonic means by calling 1-408-418-9388 access number 24570177

ATTACHMENTS:

Description	Type
Public Hearing Notice	Backup Material

PUBLIC HEARING NOTICE

The City of Storm Lake, Iowa, is hereby serving as Public Notice that on June 1, 2020, at 5:00 p.m., the City Council will hold a public hearing during the regular City Council meeting which will be conducted by electronic means to consider the submission of an application for a Community Development Block Grant. The grant application will request funding assistance for a Housing Rehabilitation Program targeted for low-to-moderate income homeowners within the City.

This meeting will be held to give residents information concerning the proposed project. Citizens are encouraged to attend and express their preferences about the proposed activities. The Council meeting will be held via electronic means and residents are able to provide comments in writing in advance of the meeting by email to martinez@stormlake.org or by mail to PO Box 1086, Storm Lake, IA 50588. Additionally, citizens who wish to participate in the public hearing can do so by phone by calling 1-408-418-9388 and using the access number 24570177. Anyone having questions about this project or requiring special accommodations at the upcoming hearing may contact the City Clerk at 712-732-8000.

Mayra Martinez
City Clerk
City of Storm Lake, Iowa

Staff Summary

5/18/2020

Agenda Item # 4.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Scott Olesen, Building Official

SUBJECT: **Motion to Approve Professional Engineering Services with ISG for Storm Lake Waste Water Treatment Plant- Water Reclamation Facility Nutrient Reduction Project**

BACKGROUND: This project will provide Engineering services to evaluate the Waste Water Treatment Plant's current ability to remove Total Nitrogen (TN) and Total Phosphorus (TP). Utilizing this data, ISG will provide a report that will provide a plan for methods we can use to remove the above items from the outfall discharge so that we will be in compliance with Iowa DNR proposed new regulations.
The compliance plan is required to be submitted to the Iowa DNR by June 30th, 2020.

I have attached a copy of the proposed agreement for the Councils review.

FISCAL IMPACT: The total cost of engineering services is \$70,000.
The lump sum phases of the proposal are as follows:
Identify sources of TN and TP- \$6,250
Quantify current plant removal of TN and TP- \$8,250
Identify and evaluate compliance options-\$17,500
Process modeling-\$29,000
Nutrient reduction strategy final report-\$9,500

RECOMMENDATION: Approve agreement with ISG for Storm Lake Waste Water Treatment Plant –
Water reclamation facility nutrient reduction strategy project.

ATTACHMENTS:

Description	Type
□ Agreement - ISG	Contract

SHORT FORM OF AGREEMENT BETWEEN OWNER AND ENGINEER FOR PROFESSIONAL SERVICES

THIS IS AN AGREEMENT effective as of **May 18, 2020** ("Effective Date") between the City of Storm Lake ("Owner") and I&S Group, Inc. ("Engineer").

Owner's Project, of which Engineer's services under this Agreement are a part, is generally identified as follows: **Water Reclamation Facility Nutrient Reduction Strategy** ("Project").

Engineer's services under this Agreement are generally identified as follows:

- A. Identify, Review and Quantify Sources of Total Nitrogen (TN) and Total Phosphorus (TP) at the Owner's Water Reclamation Facility.**
 - **Identify sources of TN and TP.**
 - **Water Supply**
 - **Significant Industrial Users (SIUs)**
 - **Commercial**
 - **Residential**
 - **Others**
 - **Test and Review sources of TN and TP**
 - **Water Supply Testing Data (To be provided by Owner)**
 - **Significant Industrial Users (SIU's)**
 - **Commercial**
 - **Residential**
 - **Others**
 - **City to collect, perform laboratory analysis and provide data of samples at plant influent, plant effluent, SIU's and other locations of interest in wastewater system.**
- B. Quantify Current Plant Performance for TN and TP removal**
 - **Review existing Water Reclamation Facility information provided by Owner. Includes but is not limited to existing plans, plant operation, last 5 years of MOR data, planned improvements, etc.**
 - **Review existing influent and effluent TN and TP data to characterize current plant performance.**
 - **Review existing side stream TN and TP data.**
 - **Develop additional sampling protocol for additional TN and TP data that may be required.**
 - **City to collect and perform laboratory analysis based on sampling protocol and provide data to Engineer.**
- C. Identify, Evaluate and Discuss Compliance Options**
 - **Evaluate operational changes that can be made to help reduce TN and TP.**
 - **Evaluate changes/additions that need to be made to incorporate effluent wetland that will be constructed in 2020.**

- Discuss with DNR feasibility of having two separate outfalls from Water Reclamation Facility and the required monitoring, sampling and reporting protocol associated with having two outfalls.
 - Quantify effectiveness of TN and TP reduction through wetland flows.
 - Evaluate capital costs, and operation and maintenance (O&M) costs.
 - Evaluate incorporating City of Storm Lake's Watershed Management Plan into NRS report.
 - Include previously registered non-point source BMP's to receive credits to meet NRS goals.
 - Incorporate timeline for new non-point source BMP's to be constructed and registered into NRS timeline and goals to potentially receive credits for TN and TP.
 - Develop alternative incorporating non-point source BMP's to minimize upgrades required at WRF to meet goals of NRS.
 - Evaluate capital costs, O&M costs associated with alternative.
 - Identify and evaluate additional wastewater treatment technologies to reduce TN and TP.
 - Evaluate feasibility
 - Evaluate reasonableness
 - Evaluate practicability
 - Capital and O&M Costs
 - Impact on user rates
 - Non-water quality impacts (air pollution, increased sludge production, etc.)
 - Identify preferred method for reducing TN and TP through operational changes and/or installing new or additional treatment.
 - Estimate effluent quality achievable, in terms of TN and TP, for preferred method.
 - Proposed schedule for implementing TN and TP reduction.
 - Review meetings with Owner (2 meetings are included).
- D. Process Modeling**
- Create Water Reclamation Facility Model using software.
 - Headworks
 - Oxidation Ditches
 - Final Clarification
 - UV Disinfection
 - Sludge Digestion
 - Sludge Dewatering
 - Sludge Storage
 - Side Streams
 - Calibrate model with field data.
 - Collection and laboratory analysis of samples for calibration (Sampling to be performed by Owner and results provided to Engineer).
 - Perform analysis with model to evaluate TN and TP reduction strategies.
 - Operational Changes
 - Addition of Wetland to Outlet of Plant
 - New or additional treatment
 - Review Modeling results with Owner (1 meeting is included)
- E. Nutrient Reduction Strategy Final Report**
- Summarize findings and recommendation.

- **Submit Draft Report to Owner for Review and Comment.**
- **Meet with Owner to discuss comments/questions on final report. (1 meeting is included)**
- **Finalize report and submit to IDNR.**
- **Present final report to City Council and City Staff.**
- **Provide copies of Draft and Final NRS Report to Owner.**
 - **Electronic (pdf)**
 - **Hard Copies**

Owner and Engineer further agree as follows:

1.01 *Basic Agreement and Period of Service*

- A. Engineer shall provide or furnish the Services set forth in this Agreement. If authorized by Owner, or if required because of changes in the Project, Engineer shall furnish services in addition to those set forth above ("Additional Services").
- B. Engineer shall complete its Services within a reasonable period of time; **the Nutrient Reduction Strategy Report to be submitted to IDNR on or before June 30, 2021 as required by the Owner's NPDES permit.**
- C. If, through no fault of Engineer, such periods of time or dates are changed, or the orderly and continuous progress of Engineer's Services is impaired, or Engineer's Services are delayed or suspended, then the time for completion of Engineer's Services, and the rates and amounts of Engineer's compensation, shall be adjusted equitably.

2.01 *Payment Procedures*

- A. *Invoices:* Engineer shall prepare invoices in accordance with its standard invoicing practices and submit the invoices to Owner on a monthly basis. Invoices are due and payable within 30 days of receipt. If Owner fails to make any payment due Engineer for Services, Additional Services, and expenses within 30 days after receipt of Engineer's invoice, then (1) the amounts due Engineer will be increased at the rate of 1.0% per month (or the maximum rate of interest permitted by law, if less) from said thirtieth day, and (2) in addition Engineer may, after giving seven days written notice to Owner, suspend Services under this Agreement until Engineer has been paid in full all amounts due for Services, Additional Services, expenses, and other related charges. Owner waives any and all claims against Engineer for any such suspension.
- B. *Payment:* As compensation for Engineer providing or furnishing Services and Additional Services, Owner shall pay Engineer as set forth in Paragraphs 2.01, and 2.02 (Services). If Owner disputes an invoice, either as to amount or entitlement, then Owner shall promptly advise Engineer in writing of the specific basis for doing so, may withhold only that portion so disputed, and must pay the undisputed portion.

2.02 *Basis of Payment—Lump Sum and Hourly Rates*

- A. Owner shall pay Engineer for Services as follows:

1. A Lump Sum amount of **\$70,500**.

a. The Lump Sum Phases as included in the Proposal are subdivided as follows:

Identify, Review and Quantify Sources of TN and TP	<u>\$6,250</u>
Quantify Current Plant Performance for TN and TP removal	<u>\$8,250</u>
Identify, Evaluate and Discuss Compliance Options	<u>\$17,500</u>
Process Modelling	<u>\$29,000</u>
Nutrient Reduction Strategy Final Report	<u>\$9,500</u>

2.03 *Additional Services:* For Additional Services, Owner shall pay Engineer an amount equal to the cumulative hours charged in providing the Additional Services by each class of Engineer's employees, times standard hourly rates for each applicable billing class; plus reimbursement of expenses incurred in connection with providing the Additional Services and Engineer's consultants' charges, if any.

3.01 *Termination*

A. The obligation to continue performance under this Agreement may be terminated:

1. For cause,

a. By either party upon 30 days written notice in the event of substantial failure by the other party to perform in accordance with the Agreement's terms through no fault of the terminating party. Failure to pay Engineer for its services is a substantial failure to perform and a basis for termination.

b. By Engineer:

- 1) upon seven days written notice if Owner demands that Engineer furnish or perform services contrary to Engineer's responsibilities as a licensed professional; or
- 2) upon seven days written notice if the Engineer's Services are delayed for more than 90 days for reasons beyond Engineer's control, or as the result of the presence at the Site of undisclosed Constituents of Concern, as set forth in Paragraph 5.01.I.

c. Engineer shall have no liability to Owner on account of a termination for cause by Engineer.

d. Notwithstanding the foregoing, this Agreement will not terminate as a result of a substantial failure under Paragraph 3.01.A.1.a if the party receiving such notice begins, within seven days of receipt of such notice, to correct its substantial failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of notice; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such 30 day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period

provided for herein shall extend up to, but in no case more than, 60 days after the date of receipt of the notice.

2. For convenience, by Owner effective upon Engineer's receipt of written notice from Owner.

- B. In the event of any termination under Paragraph 3.01, Engineer will be entitled to invoice Owner and to receive full payment for all Services and Additional Services performed or furnished in accordance with this Agreement, plus reimbursement of expenses incurred through the effective date of termination in connection with providing the Services and Additional Services, and Engineer's consultants' charges, if any.

4.01 *Successors, Assigns, and Beneficiaries*

- A. Owner and Engineer are hereby bound and the successors, executors, administrators, and legal representatives of Owner and Engineer (and to the extent permitted by Paragraph 4.01.B the assigns of Owner and Engineer) are hereby bound to the other party to this Agreement and to the successors, executors, administrators, and legal representatives (and said assigns) of such other party, in respect of all covenants, agreements, and obligations of this Agreement.
- B. Neither Owner nor Engineer may assign, sublet, or transfer any rights under or interest (including, but without limitation, money that is due or may become due) in this Agreement without the written consent of the other party, except to the extent that any assignment, subletting, or transfer is mandated by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement.
- C. Unless expressly provided otherwise, nothing in this Agreement shall be construed to create, impose, or give rise to any duty owed by Owner or Engineer to any Constructor, other third-party individual or entity, or to any surety for or employee of any of them. All duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of Owner and Engineer and not for the benefit of any other party.

5.01 *General Considerations*

- A. The standard of care for all professional engineering and related services performed or furnished by Engineer under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality. Engineer makes no warranties, express or implied, under this Agreement or otherwise, in connection with any services performed or furnished by Engineer. Subject to the foregoing standard of care, Engineer and its consultants may use or rely upon design elements and information ordinarily or customarily furnished by others, including, but not limited to, specialty contractors, manufacturers, suppliers, and the publishers of technical standards.
- B. Engineer shall not at any time supervise, direct, control, or have authority over any Constructor's work, nor shall Engineer have authority over or be responsible for the means, methods, techniques, sequences, or procedures of construction selected or used by any Constructor, or the safety precautions and programs incident thereto, for security or safety at the Project site, nor for any failure of a Constructor to comply with laws and regulations applicable to such Constructor's

furnishing and performing of its work. Engineer shall not be responsible for the acts or omissions of any Constructor.

- C. Engineer neither guarantees the performance of any Constructor nor assumes responsibility for any Constructor's failure to furnish and perform its work.
- D. **Owner agrees that Engineer shall not be responsible for damages arising directly from any delays for causes beyond Engineer's control. For purposes of this Agreement, such causes include, but are not limited to, strikes or other labor disputes, severe weather disruptions or other natural disasters; fires, riots, war, epidemics, other emergencies or acts of God (*Force Majeure*); failure of any government agency to act in a timely manner; failure of performance by the Owner or the Owner's contractors or consultants; or discovery of any hazardous substances or differing site conditions. In addition, if delays resulting from any such causes increase the cost or time required by Engineer to perform its services in an orderly and efficient manner, Engineer shall be entitled to an equitable adjustment in schedule and/or compensation.**
- E. Engineer's opinions (if any) of probable construction cost are to be made on the basis of Engineer's experience, qualifications, and general familiarity with the construction industry. However, because Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from opinions of probable construction cost prepared by Engineer. If Owner requires greater assurance as to probable construction cost, then Owner agrees to obtain an independent cost estimate.
- F. Engineer shall not be responsible for any decision made regarding the construction contract requirements, or any application, interpretation, clarification, or modification of the construction contract documents other than those made by Engineer or its consultants.
- G. All documents prepared or furnished by Engineer are instruments of service, and Engineer retains an ownership and property interest (including the copyright and the right of reuse) in such documents, whether or not the Project is completed. Owner shall have a limited license to use the documents on the Project, extensions of the Project, and for related uses of the Owner, subject to receipt by Engineer of full payment due and owing for all Services and Additional Services relating to preparation of the documents and subject to the following limitations:
 - 1. Owner acknowledges that such documents are not intended or represented to be suitable for use on the Project unless completed by Engineer, or for use or reuse by Owner or others on extensions of the Project, on any other project, or for any other use or purpose, without written verification or adaptation by Engineer;
 - 2. any such use or reuse, or any modification of the documents, without written verification, completion, or adaptation by Engineer, as appropriate for the specific purpose intended, will be at Owner's sole risk and without liability or legal exposure to Engineer or to its officers, directors, members, partners, agents, employees, and consultants;
 - 3. Owner shall indemnify and hold harmless Engineer and its officers, directors, members, partners, agents, employees, and consultants from all claims, damages, losses, and expenses,

including attorneys' fees, arising out of or resulting from any use, reuse, or modification of the documents without written verification, completion, or adaptation by Engineer; and

4. such limited license to Owner shall not create any rights in third parties.
- H. Owner and Engineer may transmit, and shall accept, Project-related correspondence, documents, text, data, drawings, information, and graphics, in electronic media or digital format, either directly, or through access to a secure Project website, in accordance with a mutually agreeable protocol.
- I. Engineer shall procure and maintain Professional Liability Insurance in the Annual Aggregate amount of \$2,000,000 excluding fees, cost and expenses of investigation, claims adjustment, defense, and appeal. Notwithstanding any other provisions of this Agreement, and to the fullest extent permitted by law, the total liability, in the aggregate, of Engineer and Engineer's officers, directors, members, partners, agents, employees, and consultants to Owner and anyone claiming by, through, or under Owner for any and all claims, losses, costs, or damages whatsoever arising out of, resulting from the negligence, and professional errors or omissions, of Engineer or Engineer's officers, directors, members, partners, agents, employees, or consultants in the performance of this Agreement (hereafter "Owner's Claims"), shall not exceed the total insurance proceeds paid on behalf of or to Engineer by Engineer's Professional Liability insurers in settlement or satisfaction of Owner's Claims under the terms and condition of Engineer's insurance policies applicable thereto (excluding fees, costs and expenses of investigation, claims adjustment, defense, and appeal). Certificates of insurance will be provided to Owner upon request.
- J. The parties acknowledge that Engineer's Services do not include any services related to unknown or undisclosed Constituents of Concern. If Engineer or any other party encounters, uncovers, or reveals an unknown or undisclosed Constituent of Concern, then Engineer may, at its option and without liability for consequential or any other damages, suspend performance of Services on the portion of the Project affected thereby until such portion of the Project is no longer affected, or terminate this Agreement for cause if it is not practical to continue providing Services.
- K. Owner and Engineer agree to negotiate each dispute between them in good faith during the 30 days after notice of dispute. If negotiations are unsuccessful in resolving the dispute, then the dispute shall be mediated. If mediation is unsuccessful, then the parties may exercise their rights at law.
- L. This Agreement is to be governed by the law of the state in which the Project is located.
- M. Engineer's Services and Additional Services do not include: (1) serving as a "municipal advisor" for purposes of the registration requirements of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (2010) or the municipal advisor registration rules issued by the Securities and Exchange Commission; (2) advising Owner, or any municipal entity or other person or entity, regarding municipal financial products or the issuance of municipal securities, including advice with respect to the structure, timing, terms, or other similar matters concerning such products or issuances; (3) providing surety bonding or insurance-related advice, recommendations, counseling, or research, or enforcement of construction insurance or surety bonding requirements; or (4) providing legal advice or representation.

6.01 Total Agreement

- A. This Agreement (including any expressly incorporated attachments), constitutes the entire agreement between Owner and Engineer and supersedes all prior written or oral understandings. This Agreement may only be amended, supplemented, modified, or canceled by a duly executed written instrument.

7.01 Definitions

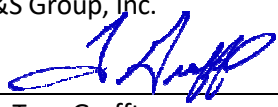
- A. *Constructor*—Any person or entity (not including the Engineer, its employees, agents, representatives, and consultants), performing or supporting construction activities relating to the Project, including but not limited to contractors, subcontractors, suppliers, Owner's work forces, utility companies, construction managers, testing firms, shippers, and truckers, and the employees, agents, and representatives of any or all of them.
- B. *Constituent of Concern*—Asbestos, petroleum, radioactive material, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, State, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, the Effective Date of which is indicated on page 1.

Owner: City of Storm Lake

By: _____
Print name: _____
Title: _____
Date Signed: _____

Engineer: I&S Group, Inc.

By: 
Print name: Tom Grafft
Title: Associate Principal
Date Signed: May 5, 2020

Engineer License or Firm's Certificate No. (if required):

State of: Iowa

Address for Owner's receipt of notices:

City of Storm Lake
620 Erie Street
Storm Lake, IA 50588

Address for Engineer's receipt of notices:

I&S Group, Inc.
1725 N. Lake Ave
Storm Lake, IA 50588

Staff Summary

5/18/2020

Agenda Item # 5.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Scott Olesen, Building Official

SUBJECT: **Setting The Public Hearing On Plans, Specifications, Form Of Contract, and Engineer's Estimate of Cost For The Storm Lake Water Treatment Plant MCC Replacement Project**

BACKGROUND: This agenda item will set the public hearing to approve the plans, specifications, form of contract, and Engineer's estimate of cost for the Storm Lake Water Treatment Plant MCC replacement project during the June 1st regularly scheduled City Council Meeting.

This project will replace the existing motor control center (MCC) at the Storm Lake Water Treatment plant. The MCC controls the various motors used in the water treatment process and is a vital part of providing drinking water for our customers. The current MCC is outdated and the parts are obsolete making repairs of the current system very difficult.

FISCAL IMPACT: Publication of the notice for the public hearing is estimated to be about \$200.

RECOMMENDATION: Set the Public Hearing for June 1, 2020 at 5:00 pm at City Hall via telephonic means by calling 1-408-418-9388 access number 24570177

ATTACHMENTS:

Description	Type
Public Hearing Notice	Backup Material

NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING ON PROPOSED PLANS AND SPECIFICATIONS, FORM OF
CONTRACT AND ESTIMATE OF COST FOR THE CONSTRUCTION OF WATER PLANT
MOTOR CONTROL CENTER REPLACEMENT FOR THE CITY OF STORM LAKE, IOWA

Notice is hereby given that the City Council of Storm Lake, Iowa, will meet at City Hall ., 620 Erie Street, Storm Lake, Iowa via electronic means and residents are able to provide comments in writing in advance of the meeting by email to cityhall@stormlake.org or by mail to PO Box 1086, Storm Lake, IA 50588. Additionally, citizens who wish to participate in the public hearing can do so by phone by calling 1-408-418-9388 and using the access number 24570177 on the **1st day of June, 2020, at 5:00 p.m.**, at which time and place a hearing will be held on the proposed plans and specifications, form of contract and estimate of cost for Water Plant Motor Control Center Replacement, Storm Lake, Iowa in and for said City. Any interested person may appear at said hearing and file objections to the proposed plans, specifications, form of contract and estimated costs for said improvements.

The general description of types of construction and their limits for which bids will be received shall be as follows:

Water Plant Motor Control Replacement

Includes replacement of motor control center, addition of switchboard, replacement of HVAC equipment, and all other miscellaneous components for improvements at the water treatment plant.

Plans and specifications governing the construction of the proposed improvements have been prepared by the Engineer. These plans and specifications, and the proceedings of the City referring to and defining said improvements, are hereby made a part of this Notice and the proposed contract by reference, and the proposed contract shall be executed to comply therewith.

Published upon order of the City of Storm Lake, Iowa.

CITY OF STORM LAKE, IOWA

BY /s/ Mike Porsch
Mayor

ATTEST:

BY /s/ Keri Navratil
City Manager

Staff Summary

5/18/2020

Agenda Item # 6.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Brian Oakleaf, Finance Director

SUBJECT: **Resolution No. 72-R-2019-2020 Authorizing Interfund Transfers and Adjustments**

BACKGROUND: Each fiscal year a number of interfund transfers must be completed in order to properly account for expenditures and accurately state Fund balances. This Resolution would authorize these transfers along with Audit adjustments and flow of funds through our Debt Service accounts.

These transfers are necessary to comply with Iowa Code 384.18 as the expenditures must be reflected within their originally budgeted Program.

The majority of the Transfers reflect Special Revenue funding of Capital Improvement Funding in their respective Departments. Additionally, there are adjustment due to Audit recommendation and all payment of Debt Service from the actual programs through their specific Service accounts.

FISCAL IMPACT: There is no actual fiscal impact as these simply reflect movement and accurate statement of Funds as opposed to additional expenditures.

RECOMMENDATION: Pass Resolution No. 72-R-20198-2020 and Authorize the attached Interfund Transfers and Adjustments.

ATTACHMENTS:

Description	Type
□ Resolution No. 72-R-2019-2020	Resolution

RESOLUTION NO. 72-R-2019-2020

A RESOLUTION AUTHORIZING INTERFUND TRANSFERS AND ADJUSTMENTS

Be it Resolved by the Council of the City of Storm Lake:

Section 1. Whereas, there is a need to transfer resources between funds provided as follows:

Fund Key:					
001	General Fund	177	Asset Forfeiture/Law Enforcement Fund	604	Utility Deposits
003	Outdoor Water Park Fund	178	Police Dept. Evidence Fund	610	Sewer Fund
004	Cottages	200	Debt Service Fund	611	Sewer Capital Improvements
005	Tort Insurance Fund	201	Storm Water Debt Service Fund	612	Sewer Debt Reserve
006	Marina	220	Outdoor Pool/Storm Water GO	613	FEMA HMGP - Sanitary Sewer
010	Franchise Fees	222	Hotel Motel Tax Debt Reserve	620	Storm Water Fund
030	Outdoor WP Replacement Reserve	223	\$2.5 Bond Sinking Fund	621	Storm Water Capital
040	Cottage Reserve Fund	224	TIF Debt Reserve Fund	622	Storm Water Sinking Fund
110	Road Use Tax Fund	225	Awaysis Local Option Sinking	670	Landfill Fund
112	Special Levy Fund	227	5.6M Series Sinking Fund	750	Lodge Operations Fund
119	Emergency Levy	228	2.94M Series Sinking Fund	753	Lodge Reserve Fund
121	Local Option Sales Tax Fund	230	Hotel/Motel Tax Bonds Fund	754	Lodge Taxes & Insurance
123	Hotel Motel Tax	231	McKenna Water Sinking Fund	755	Hotel Revenue Bonds Fund
124	Mitigation Fund	232	McKenna Sewer Sinking Fund	756	Hotel Property Tax Fund
125	TIF Fund	233	Bargloff Reserve Fund	757	Lodge Replacement Reserve Fund
126	Bargloff TIF	234	Bargloff Sinking Fund	822	Health Benefit Trust Fund
127	The Reserves - TIF	235	TIF Bonds Fund	824	125 Flexible Benefits Fund
128	#4 LMI Housing URA	299	Bond Refinancing	825	Wellness Fund
129	Storm Lake Sub-Division #5	301	Capital Improvement Projects	835	Employee Internal Fund
130	South School Urban Renewal	500	Erma Myers Trust Fund	910	Chapter 411 Pension Fund
131	LMI #5 Housing URA	600	Water Fund	960	Lake Improvement Commission
167	Restricted Gifts	601	Water Capital Improvements	970	Drainage Districts
168	Senior Center Trust Fund	602	Water Bond Reserve		-
172	Library Misc Memorial Trust	603	Water Plant Debt Service		-

Section 2. Whereas, there is a need to transfer resources between funds to provide for operations, fund balancing, and debt service in amounts not to exceed according to the certified budget for fiscal year 2019-2020 as follows:

Fund From:	Fund To:	Description (What):	Amount:
From 121	To 001	Airport Technology Upgrades	\$ 25,000.00
From 121	To 001	City Hall Door Access	\$ 10,000.00
From 121	To 001	City Hall Security Cameras	\$ 11,450.00
From 121	To 001	City Hall Updates	\$ 20,000.00
From 121	To 001	Computer Rotation	\$ 22,550.00
From 121	To 001	Council Chambers Technology Upgrades	\$ 50,000.00
From 004	To 001	Dock Replacement	\$ 10,000.00
From 119	To 001	Emergency Levy	\$ 84,184.00
From 121	To 001	FD Pagers	\$ 15,000.00
From 121	To 001	FD SCABA Replacement	\$ 6,000.00
From 121	To 001	Library Indoor/Outdoor Lighting Rep	\$ 33,000.00
From 121	To 001	New Phone System	\$ 66,000.00
From 010	To 001	Other IT Peripheral	\$ 3,000.00
From 121	To 001	Parks Compact Tractor	\$ 40,000.00
From 121	To 001	Parks Snow Blower & "V" Plow	\$ 10,000.00
From 121	To 001	PD Body Armor	\$ 4,800.00
From 121	To 001	PD Duty Weapons & Holsters	\$ 8,500.00
From 121	To 001	PD In-Car Cameras	\$ 11,000.00
From 121	To 001	PD In-Car Computers	\$ 20,100.00
From 121	To 001	PD Patrol Vehicle	\$ 46,000.00
From 121	To 001	PD Radar	\$ 3,200.00
From 121	To 001	Printers/Scanners	\$ 4,000.00
From 010	To 001	Recreation Set A-Side	\$ 5,000.00
From 123	To 001	Recreation Set A-Side	\$ 75,000.00
From 121	To 001	Russell Street Park	\$ 15,000.00
From 004	To 001	Server & Core Networking	\$ 4,860.00
From 010	To 001	Server & Core Networking	\$ 45,000.00
From 010	To 001	Standard IT Contract	\$ 13,000.00
From 010	To 001	Subscriptions	\$ 33,361.00
From 010	To 001	Trail Set A-Side	\$ 25,000.00
From 010	To 001	COVID-19 Relief Program	\$ 100,000.00
From 123	To 003	Circulation Pump	\$ 5,000.00
From 010	To 110	Mechanical Street Sweeper	\$ 215,000.00
From 121	To 110	Painting of Traffic Signal	\$ 80,000.00
From 010	To 110	Railroad Signal Upgrades	\$ 30,000.00
From 121	To 110	Street Dump Trailer	\$ 7,500.00

From 121	To 110	Street Stump Cutting Machine	\$ 59,000.00
From 620	To 200	\$1.5M NCSW SRF	\$ 101,521.00
From 124	To 200	\$1.755M NCSW SRF	\$ 80,000.00
From 620	To 200	\$1.755M NCSW SRF	\$ 3,401.00
From 123	To 222	\$400k of \$3.825M Bond	\$ 28,508.00
From 123	To 222	\$965k of \$1.34M Bond	\$ 93,938.00
From 755	To 223	\$1.85M Hotel Revenue Bond	\$ 200,466.00
From 125	To 224	\$1.7M of \$3.825M Bond	\$ 136,134.00
From 125	To 224	\$375k of \$1.34M Bond	\$ 24,504.00
From 121	To 225	\$3.545M GO Bond	\$ 400,000.00
From 224	To 227	\$1.7M of \$3.825M Bond	\$ 136,134.00
From 220	To 227	\$3.5M of \$3.825M Bond	\$ 232,646.00
From 222	To 227	\$400k of \$3.825M Bond	\$ 28,508.00
From 224	To 228	\$375k of \$1.34M Bond	\$ 24,504.00
From 222	To 228	\$965k of \$1.34M Bond	\$ 93,938.00
From 755	To 230	Interest of \$6.89M Hotel GO Bond	\$ 216,681.26
From 121	To 230	Principal of \$6.89 M Hotel GO Bond	\$ 235,000.00
From 125	To 231	\$200k McKenna Water Bond	\$ 17,390.00
From 610	To 232	\$680k McKenna Sewer Bond	\$ 52,725.00
From 126	To 233	\$2.685M GO Bond	\$ 215,950.00
From 233	To 234	\$2.685M GO Bond	\$ 215,950.00
From 010	To 301	Oneida Street to Milwaukee Recon (Eng)	\$ 275,000.00
From 121	To 301	Runway 13/31 Lighting Replacement	\$ 53,090.00
From 600	To 603	\$2.34M Water Revenue Bond	\$ 74,768.76
From 600	To 603	\$7.5M Water Revenue SRF	\$ 481,180.00
From 610	To 612	\$6.035 Sewer Revenue Bond	\$ 402,855.00
From 610	To 612	\$660k Sewer Revenue Bond	\$ 45,672.50
From 110	To 621	4th & Barton SW Project	\$ 72,382.00
From 010	To 621	4th & Oats SW Project	\$ 96,477.00
From 110	To 621	4th & Oats SW Project	\$ 40,000.00
From 610	To 621	WWTP Wetlands Project	\$ 150,462.00
From 620	To 622	\$1.1M SW Bond	\$ 74,660.00
From 620	To 622	\$729K NCSW SRF	\$ 45,900.00
From 620	To 622	\$750k NCSW SRF	\$ 47,940.00
From 125	To 756	Hotel Property Tax Transfer	\$ 156,160.00
From 121	To 757	King's Pointe Remodel/Refresh	\$ 86,250.00
From 125	To 757	King's Pointe Remodel/Refresh	\$ 100,000.00
From 112	To 825	Insurance Transfer	\$ 12,000.00
From 112	To 910	MFPRS Retirement System Transfer	\$ 286,043.39
			\$ 6,255,243.91

NOW THEREFORE be it resolved by the City Council of the City of Storm Lake, Iowa, to approve the above said transfers of funds for the 2019-2020 Fiscal Year.

PASSED AND APPROVED this 18th day of May, 2020.

Michael Porsch, Mayor

ATTEST:

Mayra Martinez, City Clerk

Staff Summary

5/18/2020

Agenda Item # 7.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Brian Oakleaf, Finance Director

SUBJECT: **Public Hearing for FY 2020 Budget Amendment**

BACKGROUND: The City of Storm Lake is required to hold a public hearing on any amendments to its current fiscal year budget. As such, notice has been published in the newspaper as required by Iowa Law.

The FY 2020 Budget Amendment includes amendments for the following major expense programs:

- Most Program lines see adjustments nearly each year based on insurance allocations, changing project dates and Capital Expenditures floating through Fiscal Years.
- Increase in Public Safety due to 411 allocations and some Capital Expense carry over and some preliminary costs to the Feed Mill project.
- Public Services building fell under Recreation, in addition, all refunds have to be classified as an expenditure.
- Community and Economic Development increases due to Relief Program and increased Contractual and Professional Services for additional projects.
- Inclusion of upcoming Debt refinancing.
- 4 major program areas required no Amendment.

FISCAL IMPACT: The fiscal impact of the budget amendment is an increase of revenue by \$2,785,379 and an increase in expenditures of \$2,368,618. The sum total of the Amendment represents a \$416,761 surplus in total funds. Our estimated Total Fund Balance on June 30th is \$18,763,034.

RECOMMENDATION: Open Public Hearing
Hear Comments
Close Public Hearing

ATTACHMENTS:

Description		Type
	Publication	Backup Material

NOTICE OF PUBLIC HEARING
AMENDMENT OF FY2019-2020 CITY BUDGET

The City Council of Storm Lake in BUENA VISTA County, Iowa
 will meet at City Council Chambers
 at 5:00pm on 5/18/2020
(hour) (Date)

,for the purpose of amending the current budget of the city for the fiscal year ending June 30, 2020
(year)
 by changing estimates of revenue and expenditure appropriations in the following functions for the reasons given.
 Additional detail is available at the city clerk's office showing revenues and expenditures by fund type and by activity.

		Total Budget as certified or last amended	Current Amendment	Total Budget after Current Amendment
Revenues & Other Financing Sources				
Taxes Levied on Property	1	4,210,329		4,210,329
Less: Uncollected Property Taxes-Levy Year	2	0		0
Net Current Property Taxes	3	4,210,329	0	4,210,329
Delinquent Property Taxes	4	0		0
TIF Revenues	5	778,044	1,855	779,899
Other City Taxes	6	2,649,102	-90,010	2,559,092
Licenses & Permits	7	164,195	99,749	263,944
Use of Money and Property	8	358,602	70,081	428,683
Intergovernmental	9	4,376,300		4,376,300
Charges for Services	10	15,371,470	361,704	15,733,174
Special Assessments	11	0		0
Miscellaneous	12	297,877		297,877
Other Financing Sources	13	8,022,563	2,202,000	10,224,563
Transfers In	14	6,939,041	140,000	7,079,041
Total Revenues and Other Sources	15	43,167,523	2,785,379	45,952,902
Expenditures & Other Financing Uses				
Public Safety	16	2,984,429	349,681	3,334,110
Public Works	17	1,760,570	0	1,760,570
Health and Social Services	18	23,750	0	23,750
Culture and Recreation	19	1,629,261	205,117	1,834,378
Community and Economic Development	20	389,920	206,053	595,973
General Government	21	718,593	0	718,593
Debt Service	22	2,189,790	2,147,767	4,337,557
Capital Projects	23	3,817,781	-680,000	3,137,781
Total Government Activities Expenditures	24	13,514,094	2,228,618	15,742,712
Business Type / Enterprises	25	22,225,918	0	22,225,918
Total Gov Activities & Business Expenditures	26	35,740,012	2,228,618	37,968,630
Transfers Out	27	6,939,041	140,000	7,079,041
Total Expenditures/Transfers Out	28	42,679,053	2,368,618	45,047,671
Excess Revenues & Other Sources Over (Under) Expenditures/Transfers Out Fiscal Year	29	488,470	416,761	905,231
Beginning Fund Balance July 1	30	17,857,803		17,857,803
Ending Fund Balance June 30	31	18,346,273	416,761	18,763,034

Explanation of increases or decreases in revenue estimates, appropriations, or available cash:

Largest increases in expense are due to anticipated Bond Refinancing.
 Annual true-up of Insurance costs.
 Economic relief payments
 Purchase of Public Services Building
 Transfers of Special Revenues to cover funding for above items.

There will be no increase in tax levies to be paid in the current fiscal year named above related to the proposed budget amendment. Any increase in expenditures set out above will be met from the increased non-property tax revenues and cash balances not budgeted or considered in this current budget.

Brian T. Oakleaf

City Clerk/ Finance Officer Name

Staff Summary

5/18/2020

Agenda Item # 8.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Brian Oakleaf, Finance Director

SUBJECT: **Resolution No. 73-R-2019-2020 Amending The Current Budget For the Fiscal Year Ending June 30, 2020**

BACKGROUND: Iowa Code prohibits any program expenditures to exceed their budgeted amounts and requires any amendment to be filed before June 1st. The Budget Process begins nearly 18 months from the end of the Budgeted Fiscal Year. This Amendment process allows us to reevaluate the assumptions and estimates made and adjust as we wind the Fiscal Year to a close.

- Most Program lines see adjustments nearly each year based on insurance allocations, changing project dates and Capital Expenditures floating through Fiscal Years.
- Increase in Public Safety due to 411 allocations and some Capital Expense carry over and some preliminary costs to the Feed Mill project.
- Public Services building fell under Recreation, in addition, all refunds have to be classified as an expenditure.
- Community and Economic Development increases due to Relief Program and increased Contractual and Professional Services for additional projects.
- Inclusion of upcoming Debt refinancing.
- 4 major program areas required no Amendment.

FISCAL IMPACT: The fiscal impact of the budget amendment is an increase of revenue by \$2,785,379 and an increase in expenditures of \$2,368,618. The sum total of the Amendment represents a \$416,761 surplus in total funds. Our estimated Total Fund Balance on June 30th is \$18,763,034.

RECOMMENDATION: Approve Resolution No. 73-R-2019-2020 Amending the FY 2020 Budget.

ATTACHMENTS:

Description	Type
📎 Resolution No. 73-R-2019-2020	Resolution
📎 Budget Amendment	Backup Material

RESOLUTION NO. 73-R-2019-2020

A RESOLUTION AMENDING THE CURRENT BUDGET FOR THE FISCAL YEAR ENDING JUNE 30, 2020

Be it Resolved by the Council of the City of Storm Lake:

Section 1. Following notice published May 8, 2019 and the public hearing held, May 18, 2020 the current budget is amended as set out herein and in the detail by fund type and activity that supports this resolution which was considered at that hearing:

		Total Budget as certified or last amended	Current Amendment	Total Budget after Current Amendment
<u>Revenues & Other Financing Sources</u>				
Taxes Levied on Property	1	4,210,329	0	4,210,329
Less: Uncollected Property Taxes-Levy Year	2	0	0	0
Net Current Property Taxes	3	4,210,329	0	4,210,329
Delinquent Property Taxes	4	0	0	0
TIF Revenues	5	778,044	1,855	779,899
Other City Taxes	6	2,649,102	-90,010	2,559,092
Licenses & Permits	7	164,195	99,749	263,944
Use of Money and Property	8	358,602	70,081	428,683
Intergovernmental	9	4,376,300	0	4,376,300
Charges for Services	10	15,371,470	361,704	15,733,174
Special Assessments	11	0	0	0
Miscellaneous	12	297,877	0	297,877
Other Financing Sources	13	8,022,563	2,202,000	10,224,563
Tranfers In	14	6,939,041	140,000	7,079,041
Total Revenues and Other Sources	15	43,167,523	2,785,379	45,952,902
<u>Expenditures & Other Financing Uses</u>				
Public Safety	16	2,984,429	349,681	3,334,110
Public Works	17	1,760,570	0	1,760,570
Health and Social Services	18	23,750	0	23,750
Culture and Recreation	19	1,629,261	205,117	1,834,378
Community and Economic Development	20	389,920	206,053	595,973
General Government	21	718,593	0	718,593
Debt Service	22	2,189,790	2,147,767	4,337,557
Capital Projects	23	3,817,781	-680,000	3,137,781
Total Government Activities Expenditures	24	13,514,094	2,228,618	15,742,712
Business Type / Enterprises	25	22,225,918	0	22,225,918
Total Gov Activities & Business Expenditures	26	35,740,012	2,228,618	37,968,630
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Total Expenditures/Transfers Out	28	42,679,053	2,368,618	45,047,671
Excess Revenues & Other Sources Over (Under) Expenditures/Transfers Out for Fiscal Year	29	488,470	416,761	905,231
Beginning Fund Balance July 1	30	17,857,803	0	17,857,803
Ending Fund Balance June 30	31	18,346,273	416,761	18,763,034

NOW THEREFORE be it resolved by the City Council of the City of Storm Lake, Iowa, to approve the above said budget amendment for the 2019-2020 Fiscal Year.

PASSED AND APPROVED this 18th day of May 2020.

Michael Porsch, Mayor

ATTEST:

Mayra Martinez, City Clerk

NOTICE OF PUBLIC HEARING
AMENDMENT OF FY2019-2020 CITY BUDGET

The City Council of Storm Lake in BUENA VISTA County, Iowa
 will meet at City Council Chambers
 at 5:00pm on 5/18/2020
(hour) (Date)

,for the purpose of amending the current budget of the city for the fiscal year ending June 30, 2020
(year)
 by changing estimates of revenue and expenditure appropriations in the following functions for the reasons given.
 Additional detail is available at the city clerk's office showing revenues and expenditures by fund type and by activity.

		Total Budget as certified or last amended	Current Amendment	Total Budget after Current Amendment
Revenues & Other Financing Sources				
Taxes Levied on Property	1	4,210,329		4,210,329
Less: Uncollected Property Taxes-Levy Year	2	0		0
Net Current Property Taxes	3	4,210,329	0	4,210,329
Delinquent Property Taxes	4	0		0
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Other City Taxes	6	2,649,102	-90,010	2,559,092
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Brian T. Oakleaf

City Clerk/ Finance Officer Name

Staff Summary

5/18/2020

Agenda Item # 9.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Brian Oakleaf, Finance Director

SUBJECT: **Motion To Approve Contract With Piper Sandler For Bond Services**

BACKGROUND: In preparing to call the City's \$2.2M GO Bond, it is necessary to have an agreement between the City of Storm Lake and our Financial Advisors, Piper Sandler. The agreement for these services is attached for Council's review.

The City has utilized the services of PSC (formerly Piper Jaffray) for bonding and borrowing several times in the past with a good relationship and beneficial outcomes.

FISCAL IMPACT: The agreement calls for an underwriting fee of 0.3% of the gross proceeds plus actual out-of-pocket expenses not to exceed 1% of the proceeds and a Placement Agent fee of 0.7%. The underwriting fee is consistent with what we have paid on previous issues and the Placement Agent fee is 0.3% lower than our most recent Placement.

RECOMMENDATION: Approve contract with Piper Sandler for financial services.

ATTACHMENTS:

Description	Type
□ Engagement Letter	Contract

May 8, 2020

Mr. Brian Oakleaf, Finance Director
City of Storm Lake
620 Erie Street
Storm Lake, IA 50588

Re: Engagement Letter with Piper Sandler & Co.

Dear Brian:

We understand that the City of Storm Lake, Iowa (the “Issuer” or “you”) wishes to issue General Obligation Refunding Capital Loan (to refinance 2015 Annual Appropriation GO debt for interest cost savings) (the “Bonds,” the “Bond Issue” or the “Project”) and has selected Piper Sandler & Co. (“Piper”; or “we”) to serve as underwriter or placement agent for the proposed issuance. We appreciate the opportunity to serve you in this manner. This letter will serve as an agreement regarding the terms of this engagement. In addition, we would like to take this opportunity to set forth some pertinent information about the financing process.

Although Piper Sandler intends to work closely with you during the period preceding the pricing and sale of the proposed Bond Issue with the aim of timely completion of the financing, we are not herein making a final commitment to underwrite bonds until certain events have occurred. Such a commitment is subject to, among other things, satisfactory completion and execution of all final documentation for an offering (including a Bond Purchase Agreement containing all provisions necessary to satisfy federal securities laws and the rules of the Municipal Securities Rulemaking Board, and all other applicable rules and regulations); absence of any material adverse change in the financial markets or in the financial condition, operations or prospects of the Issuer; receipts of all required governmental approvals and appropriate legal opinions; an underwriter’s review (“due diligence”) of the offering documents, as required under federal securities laws; the negotiation of appropriate indemnification; state blue sky reviews, as appropriate; and credit approval by Piper Sandler. This Agreement is therefore not a final commitment by Piper Sandler, express or implied, to underwrite, place, or purchase any securities, nor does it obligate Piper to enter into a Bond Purchase Agreement. While we do not anticipate difficulties in the course of the proposed financing, and look forward to a successful conclusion to this engagement, we prefer to identify these conditions to our final commitment at the outset.

During the term of our engagement, we will, as appropriate to the Transaction:

- a) consult with you in planning and implementing the Transaction;
- b) prepare various options and numbers to financing the project as requested
- c) assist with securing a rating on the proposed Bonds
- d) assist you in preparing any transaction materials (the “Transaction Materials”) we mutually agree are beneficial or necessary to the consummation of the Transaction;
- e) assistance with disclosure counsel regarding the preparation of the official statement
- f) identify potential investors and use our reasonable commercial efforts to assist in arranging sales of the Securities to investors;
- g) If a portion of any financing considered includes an advance refunding, subscribe for SLGS or acquire U.S. Treasury securities as agent for and on behalf of the Issuer
- h) consult with you in structuring the investment; and
- i) Coordinate the closing effort for the Bonds

Mr. Brian Oakleaf
Page Two
May 8, 2020

During the course of the engagement, Piper will participate in discussions with bond counsel, finance officials or internal legal counsel of the Issuer to assist in advising the Issuer, as part of the underwriting process, of various financial structures for the proposed offering and their probable reception in the municipal bond markets.

Piper will perform due diligence respecting any offering documents as part of their obligation under federal securities laws. If a final commitment to underwrite the Bonds is approved by Piper, and subject to the conditions described above, Piper will underwrite the Bonds and manage a public offering of the Bonds. Further details regarding the underwriting will be set forth in a Bond Purchase Agreement to be executed at the time of pricing of the Bonds. The Issuer and its chosen counsel agree to cooperate with and assist Piper in connection with such duties.

Compensation. As compensation for Piper's services, the Issuer will pay Piper a fee to be determined by the nature of the offering as set forth in Schedule A hereto. Fees will be payable to Piper in the form of an Underwriter's Discount or Placement Agent Fee on the Bond Issue as set forth therein. The fees, disbursements and other charges of Piper's outside legal counsel will be added to Piper's discount. Piper shall select such counsel in its sole discretion. Fees payable to Piper in the form of a placement agent fee shall be paying in immediately available funds, due at closing. The fee shall not be payable in the event the Transaction does not occur, other than for non-performance by You.

Termination. The Issuer may not terminate this Agreement at any time prior to completion of the Project other than for non-performance on the part of Piper, in which case the Issuer may terminate this agreement, and upon such termination, all fees due to Piper for time served assisting with the Project shall be due and payable immediately by the Issuer. Piper may terminate this Agreement at any time on 30 days written notice.

Assignment Neither Piper nor the Issuer shall have the right or power to assign this Agreement or parts thereof, or its respective duties, without the express written consent of the other party. In the event of acquisition of Piper by a third party firm, notice shall be given to the Issuer regarding the acquisition and the Issuer shall have the opportunity to consent to the assignment of this Agreement, which consent shall not be unreasonably withheld.

No Advisory or Fiduciary Role. You acknowledge that you have retained us solely to provide the services to you as set forth in this agreement. In rendering such services, we will act as an independent contractor. You acknowledge and agree that: (i) the primary role of Piper Sandler, as a placement agent or underwriter, is in an arms-length commercial transaction between you and Piper Sandler and Piper Sandler has financial and other interests that differ from your interests; (ii) Piper Sandler is not acting as a municipal advisor, financial advisor or fiduciary to you or any other person or entity and has not assumed any advisory or fiduciary responsibility to you with respect to the transaction contemplated hereby and the discussions, undertakings and proceedings leading thereto (irrespective of whether Piper Sandler has provided other services or is currently providing other services to you on other matters) (iii) the only obligations Piper Sandler has to you with respect to the Transaction contemplated hereby expressly are set forth in this Agreement and (iv) you have consulted your own legal, accounting, tax, financial and other advisors, as applicable, to the extent you deem appropriate in connection with the Transaction contemplated herein.

Mr. Brian Oakleaf
Page Three
May 8, 2020

No Recourse for Tax Matters. No recourse shall be had against Piper for loss, damage, liability, cost or expense (whether direct, indirect or consequential) of the Issuer arising out of or in defending, prosecuting, negotiating or responding to any inquiry, questionnaire, audit, suit, action, or other proceeding brought or received from the Internal Revenue Service in connection with the Bonds or otherwise relating to the tax treatment of interest on the Bond.

Governance This Agreement will be governed by, and construed in accordance with, the laws of the State of Iowa, without regard to principles of conflicts of law to the extent that the application of the laws of another jurisdiction would be required thereby. The Issuer and Piper each hereby irrevocably waive any right they may have to a trial by jury in respect of any claim based upon or arising out of this Agreement or the transactions contemplated hereby.

Consent to Jurisdiction; Service of Process, Jury Trial. The parties each hereby (a) submits to the jurisdiction of the Federal court sitting in Des Moines, Iowa with respect to any actions and proceedings arising out of or relating to this Agreement, (b) agrees that all claims with respect to such actions or proceedings may be heard and determined in such court, (c) waives the defense of an inconvenient forum, (d) agrees not to commence any action or proceeding relating to this Agreement other than in the Federal court sitting in Des Moines, Iowa and (e) agrees that a final judgment in any such action or proceeding shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. The parties each hereby agree to waive any right to a trial by jury with respect to any claim, counterclaim or action arising out of or in connection with this agreement or the transactions contemplated hereby.

Representations, Warranties and Agreements of the Issuer. You represent and warrant to, and agree with us, that:

- a) the Securities will be sold by you in compliance with the requirements for exemptions from registration or qualification of, and otherwise in accordance with, all federal and state securities laws and regulations;
- b) you agree to be responsible for the accuracy and completeness of any Transaction Materials to the extent of federal securities laws applicable to the Transaction. You agree to notify us promptly of any material adverse changes, or development that may lead to any material adverse change, in your business, properties, operations, financial condition or prospects and concerning any statement contained in any Transaction Material, or in any other information provided to us, which is not accurate or which is incomplete or misleading in any material respect;
- c) you will make available to us such documents and other information which we reasonably deem appropriate and will provide us with access to your officers, directors, employees, accountants, counsel and other representatives; it being understood that we will rely solely upon such information supplied by you and your representatives without assuming any responsibility for independent investigation or verification thereof; and
- d) at the closing, you will permit us to rely on your representations and warranties, and cause your counsel to permit us to rely upon any opinion, furnished to any purchaser of Securities.

Mr. Brian Oakleaf
Page Four
August 9, 2019

Issuer To Provide Information and Documents to Piper. The Issuer agrees to provide to Piper all documents on which the Issuer has relied for purposes of certifying the Issuer is not aware of a material fact, nor has the Issuer omitted to state any material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, with respect to the issuance of the Bonds. The Issuer also agrees to complete, and agrees to cause its agents and consultants to complete, upon request, answers and provide any documents requested by Piper as part of due diligence requested by Piper in compliance with Pipers duties and obligations with respect to MSRB, SEC or other regulatory requirements.

Miscellaneous. This Agreement embodies the entire agreement and understanding between the parties hereto and supersedes all prior agreements and understandings relating to the subject matter hereof. If any provision of this Agreement is determined to be invalid or unenforceable in any respect, such determination will not affect such provision in any other respect or any other provision of this Agreement, which will remain in full force and effect. This Agreement may not be amended or otherwise modified or waived except by an instrument in writing signed by both Piper and Issuer except that to the extent that any term of an executed Bond Purchase Agreement conflicts with the terms of this Agreement, in which case the terms of the Bond Purchase Agreement shall have precedence.

This letter agreement may be executed in any number of counterparts, each of which shall be an original and all of which, when taken together, shall constitute one agreement. Delivery of an executed counterpart of a signature page of this letter agreement by facsimile transmission shall be effective as delivery of a manually executed counterpart of this letter agreement. The invalidity or unenforceability of any provision of this agreement will not affect the validity or enforceability of any other provisions of this agreement, which will remain in full force and effect. You and us will endeavor in good faith negotiations to replace the invalid or unenforceable provisions with valid provisions the economic effect of which comes as close as possible to that of the invalid or unenforceable provisions. This agreement is solely for the benefit of you and us, and no other person [other than the Indemnified Persons set forth in Annex A hereto] will acquire or have any rights by virtue of this agreement.

Mr. Brian Oakleaf
Page Five
May 8, 2020

Please confirm that the foregoing correctly sets forth our agreement by signing and returning to Piper Sandler & Co., the enclosed original copy of this Agreement.

Very truly yours,



Timothy J. Oswald
Managing Director

Please acknowledge your acceptance by indicating below:

City of Storm Lake, Iowa

Signature _____

Name _____

Title _____

Date on which this letter is executed by the Issuer: _____

Acknowledgement of Approval of Engagement and Confirmation of Receipt of the Appendix A and B Disclosures

Schedule A – Maximum Fees

Underwriter

All fees are calculated based on either the par amount of bonds offered or the gross initial offering proceeds, whichever is higher.

Actual cost of takedowns plus actual out-of-pocket expenses plus 0.3% of the gross proceeds from the sale of the bonds, not to exceed 1%.

Placement Agent

0.7% of the par amount of bonds sold

Annex A

You agree to (i) indemnify and hold harmless us, our affiliates (within the meaning of the Securities Act of 1933), and each of our respective partners, directors, officers, agents, consultants, employees and controlling persons (within the meaning of the Securities Act of 1933) (each of Piper Sandler and such other person or entity is hereinafter referred to as an "Indemnified Person"), from and against any losses, claims, damages, liabilities and expenses, joint or several, and all actions, inquiries, proceedings and investigations in respect thereof, to which any Indemnified Person may become subject arising out of or in connection with our engagement or any matter referred to in the agreement to which this Annex A is attached and of which this Annex A forms a part (the "Agreement"), regardless of whether any of such Indemnified Persons is a party thereto, and (ii) periodically reimburse an Indemnified Person for such person's legal and other expenses as may be incurred in connection with investigating, preparing, defending, paying, settling or compromising any such action, inquiry, proceeding or investigation, whether or not such action, inquiry, proceeding or investigation is initiated or brought by you, your creditors or stockholders, or any other person. You are not responsible under clause (i) of the foregoing sentence for any losses, claims, damages, liabilities or expenses to the extent that such loss, claim, damage, liability or expense has been finally judicially determined to have resulted primarily and directly from actions taken or omitted to be taken by such Indemnified Person due to such person's gross negligence or willful misconduct. To the extent that any prior payment you made to an Indemnified Person is determined to have been improper by reason of such Indemnified Person's gross negligence or willful misconduct, such Indemnified Person will promptly pay you such amount.

If the indemnity or reimbursement referred to above is, for any reason whatsoever, unenforceable, unavailable or otherwise insufficient to hold each Indemnified Person harmless, you agree to pay to or on behalf of each Indemnified Person contributions for losses, claims, damages, liabilities or expenses so that each Indemnified Person ultimately bears only a portion of such losses, claims, damages, liabilities or expenses as is appropriate (i) to reflect the relative benefits received by each such Indemnified Person, respectively, on the one hand and you and your stockholders on the other hand in connection with the Transaction or Sale, or (ii) if the allocation on that basis is not permitted by applicable law, to reflect not only the relative benefits referred to in clause (i) above, but also the relative fault of each such Indemnified Person, respectively, and you as well as any other relevant equitable considerations; provided, however, that in no event will the aggregate contribution of all Indemnified Persons to all losses, claims, expenses, damages, liabilities or expenses in connection with any Transaction or Sale exceed the amount of the fee actually received by us pursuant to the Agreement. The respective relative benefits received by us and you in connection with any Transaction or Sale will be deemed to be in the same proportion as the aggregate fee paid or proposed to be paid to Piper Sandler in connection with the Transaction or Sale bears to the aggregate consideration paid or proposed to be paid in the Transaction or Sale, whether or not consummated.

Promptly after its receipt of notice of the commencement of any action or proceeding, any Indemnified Person will, if a claim in respect thereof is to be made against you pursuant to this letter, notify you in writing of the commencement thereof; but omission so to notify you will not relieve you from any liability which you may have to any Indemnified Person, except your obligation to indemnify for losses, claims, damages, liabilities or expenses to the extent that you suffer actual prejudice as a result of such failure, but will not relieve you from your obligation to provide reimbursement of expenses and any liability which you may have to an Indemnified Person otherwise than hereunder. If you so elect, you may assume the defense of such action or proceeding in a timely manner, including the employment of counsel (reasonably satisfactory to us) and payment of expenses, provided you permit an Indemnified Person and counsel retained by an Indemnified Person at its expense to participate in such defense. Notwithstanding the foregoing, in the event (i) you fail promptly to assume the defense and employ counsel reasonably satisfactory to us, or (ii) the Indemnified Person has been advised by counsel that there exist actual or potential conflicting interests between you or your counsel and such Indemnified Person, an Indemnified Person may employ separate counsel (in addition to any local counsel) to represent or defend such Indemnified Person in such action or proceeding, and you agree to pay the fees and disbursements of such separate counsel as incurred; provided however, that you will not, in connection with any one such action or proceeding, or separate but substantially similar actions or proceedings arising out of the same general allegations, be liable for fees and expenses of more than one separate firm of attorneys (in addition to any local counsel).

You will not, without our prior written consent, settle or compromise or consent to the entry of any judgment in any pending or threatened claim, action, suit or proceeding in respect of which indemnification or contribution may be sought under the Agreement, unless such settlement, compromise or consent includes an express, complete and unconditional release of us and each other Indemnified Person from all liability and obligations arising therefrom. Without your prior written consent, which will not be unreasonably withheld, delayed or conditioned, no Indemnified Person will settle or compromise any claim for which indemnification or contribution may be sought hereunder. Notwithstanding the foregoing sentence, if at any time an Indemnified Person requests that you reimburse the Indemnified Person for fees and expenses as provided in the Agreement, you agree that you will be liable for any settlement of any proceeding effected without your prior written consent if (i) such settlement is entered into more than 30 days after receipt by you of the request for reimbursement, and (ii) you will not have reimbursed the Indemnified Person in accordance with such request prior to the date of such settlement.

You also agree that no Indemnified Person will have any liability (whether in contract, tort or otherwise) to you or your affiliates, directors, officers, employees, agents, creditors or stockholders, directly or indirectly, related to or arising out of the Agreement or the services performed thereunder, except losses, claims, damages, liabilities and expenses you incur which have been finally judicially determined to have resulted primarily and directly from actions taken or omitted to be taken by such Indemnified Person due to such person's gross negligence or willful misconduct. In no event, regardless of the legal theory advanced, will any Indemnified Person be liable for any consequential, indirect, incidental, special or punitive damages of any nature. Your indemnification, reimbursement, exculpation and contribution obligations in this Annex A will be in addition to any rights that any Indemnified Person may have at common law or otherwise.

You understand that in the event that you reimburse Piper Sandler pursuant to this Annex A for the fees and expenses of its counsel, such reimbursement will be made on the basis of counsel's generally applicable rates, which may be higher than the rates that counsel charges Piper Sandler for other matters based on arrangements that it has entered into with such counsel.

Capitalized terms used, but not defined in this Annex A, have the meanings assigned to such terms in the Agreement.

Appendix A – G-17 Disclosure

We are providing you with certain disclosures relating to the captioned bond issue (the Bonds), as required by the Municipal Securities Rulemaking Board (MSRB) Rule G-17 in accordance with MSRB Notice 2012-25 (May 7, 2012). Under new federal regulations, all underwriters and placement agents are now required to send the following disclosures to you (as the Issuer of the Bonds) in order to clarify with you the role of an underwriter or placement agent and other matters relating to an underwriting or placing of the Bonds.

Piper Sandler intends to serve as an underwriter or placement agent respecting the Bonds and not as a financial advisor or municipal advisor to you. As part of our services as an underwriter or placement agent, Piper Sandler may provide advice concerning the structure, timing, terms, and other similar matters concerning an issue of municipal securities that Piper Sandler is underwriting or placing.

If Piper Sandler is engaged to act as your underwriter in a negotiated underwriting, and by engaging Piper Sandler as your underwriter, you determined to sell the Bonds by negotiated sale. A negotiated sale is the sale of a new issue of municipal securities by an issuer directly to an underwriter or underwriting syndicate selected by the issuer. A negotiated sale is distinguished from a sale by competitive bid, which requires public bidding by the underwriters. Piper Sandler did not advise you as to what method of sale (competitive or negotiated sale) you used for this issuance of municipal securities.

Our Role as Underwriter:

In serving as underwriter for the Bonds, these are some important disclosures that clarify our role and responsibilities:

- (i) MSRB Rule G-17 requires an underwriter to deal fairly at all times with both municipal issuers and investors;
- (ii) The underwriter's primary role is to purchase securities with a view to distribution in an arm's-length commercial transaction with the Issuer and it has financial and other interests that differ from those of the Issuer;
- (iii) Unlike a municipal advisor, the underwriter does not have a fiduciary duty to the Issuer under the federal securities laws and is, therefore, not required by federal law to act in the best interests of the Issuer without regard to its own financial or other interests;
- (iv) The underwriter has a duty to purchase securities from the Issuer at a fair and reasonable price, but must balance that duty with its duty to sell municipal securities to investors at prices that are fair and reasonable; and
- (v) The underwriter will review the official statement for the Issuer's securities in accordance with, and as part of, its responsibilities to investors under the federal securities laws, as applied to the facts and circumstances of the transaction.¹

Our Role as Placement Agent:

In serving as placement agent for the Bonds, these are some important disclosures that clarify our role and responsibilities:

- (i) MSRB Rule G-17 requires us to deal fairly at all times with both municipal issuers and investors;
- (ii) Our primary role in this transaction is to facilitate the sale and purchase of municipal securities between you and one or more investors for which we will receive compensation;
- (iii) Unlike a municipal advisor, we do not have a fiduciary duty to you under the federal securities laws and are, therefore, not required by federal law to act in your best interests without regard to our own financial or other interests;
- (iv) We have a duty to arrange the purchase securities from you at a fair and reasonable price, but must balance that duty with our duty to arrange the sale to investors at prices that are fair and reasonable; and
- (v) In the event an official statement is prepared, we will review the official statement for your securities in accordance with, and as part of, our responsibilities to investors under the federal securities laws, as applied to the facts and circumstances of the transaction.

¹ Under federal securities law, an issuer of securities has the primary responsibility for disclosure for investors. The review of the official statement by the underwriter is solely for purposes of satisfying the underwriter's obligations under the federal securities laws and such review should not be construed by an issuer as a guarantee of the accuracy or completeness of the information in the official statement.

Our Compensation:

As underwriter, compensation will be by a fee and/or an underwriting discount that will be set forth in the bond purchase agreement to be negotiated and entered into in connection with the issuance of the Bonds. As placement agent, compensation will be by a fee that was negotiated and entered into in connection with the issuance of the Bonds. Payment or receipt of the underwriting fee, discount or placement agent fee will be contingent on the closing of the transaction and the amount of the fee or discount may be based, in whole or in part, on a percentage of the principal amount of the Bonds. While this form of compensation is customary in the municipal securities market, it presents a conflict of interest since the underwriter or placement agent may have an incentive to recommend to the Issuer a transaction that is unnecessary or to recommend that the size of the transaction be larger than is necessary.

Risk Disclosures:

In accordance with the requirements of MSRB Rule G-17, attached as Appendix B is a description of the material aspects of a typical fixed rate offering, including the Bonds. This letter may be later supplemented if the material terms of the Bonds change from what is described here.

If you have any questions or concerns about these disclosures, please make those questions or concerns known immediately to me. In addition, you should consult with your own financial, legal, accounting, tax and other advisors, as applicable, to the extent you deem appropriate.

Appendix B – Risk Disclosures

The following is a general description of the financial characteristics and security structures of fixed rate municipal bonds (“Fixed Rate Bonds”), as well as a general description of certain financial risks that you should consider before deciding whether to issue Fixed Rate Bonds.

Financial Characteristics

Maturity and Interest. Fixed Rate Bonds are interest-bearing debt securities issued by state and local governments, political subdivisions and agencies and authorities. Maturity dates for Fixed Rate Bonds are fixed at the time of issuance and may include serial maturities (specified principal amounts are payable on the same date in each year until final maturity), one or more term maturities (specified principal amounts are payable on each term maturity date), a combination of serial and term maturities, or bullet maturities, in which all the Bonds mature on a single maturity date. The final maturity date typically will range between 10 and 30 years from the date of issuance. Interest on the Fixed Rate Bonds typically is paid semiannually at a stated fixed rate or rates for each maturity date.

Redemption. Fixed Rate Bonds may be subject to optional redemption, which allows you, at your option, to redeem some or all of the bonds on a date prior to scheduled maturity, such as in connection with the issuance of refunding bonds to take advantage of lower interest rates. Fixed Rate Bonds will be subject to optional redemption only after the passage of a specified period of time, often approximately ten years from the date of issuance, and upon payment of the redemption price set forth in the bonds, which may include a redemption premium. You will be required to send out a notice of optional redemption to the holders of the bonds, usually not less than 30 days prior to the redemption date. Fixed Rate Bonds with term maturity dates also may be subject to mandatory sinking fund redemption, which requires you to redeem specified principal amounts of the bonds annually in advance of the term maturity date. The mandatory sinking fund redemption price is 100% of the principal amount of the bonds to be redeemed.

Other Financial Characteristics Specific to Direct Purchases of Bonds. Purchasers of bonds in a direct purchase, private placement context sometimes ask for certain financial terms not typically included in publicly offered bonds. For example, after a stated period of time (typically ten years or less), the purchaser may require that the interest rate on the Bonds be reset at a higher rate or require that the entire notional amount of the Bonds become due, which may require the refinancing of the Bonds in unfavorable market conditions. See section entitled “*Refinancing Risk*” below. Financial terms could include other provisions that raise your interest rate during the term of the bonds. For example, a margin rate clause (also known as “gross up” or “increased cost”) triggers an automatic interest rate increase should federal corporate tax rates be reduced, allowing the purchaser to offset the decreased value of the bonds. Other potential interest rate increases could include a higher rate triggered by an event of

default (a “default rate”), an increase in the interest rate if there is a determination that interest on the bonds is includable in gross income for federal income tax purposes or a higher interest rate if the instrument fails to be bank-qualified. For any of these scenarios, the resulting interest rate may or not be capped by a maximum interest rate. If a rate cap applies, purchasers may ask that any interest that would have accrued but for a rate cap be deferred and paid out in later years. Another example of terms that may apply in a private placement include acceleration clauses, which may permit the bank purchaser to request immediate payment of outstanding principal in an event of default or otherwise force a restructuring of the bonds to a more accelerated amortization schedule. Lenders may also seek provisions requiring that any interest that would have accrued but for legal maximum rate restrictions to be deferred and paid if and when the applicable rate goes below such maximum rate (commonly known as a “clawback” or “recapture provision”).

These features could impact your liquidity, debt service coverage ratios or force you to divert funds to pay debt service on the Bonds that were intended for other purposes. Unexpected increases in interest rates could also impact your outstanding credit rating.

Security

Payment of principal of and interest on a municipal security, including Fixed Rate Bonds, may be backed by various types of pledges and forms of security, some of which are described below.

General Obligation Bonds

“General obligation bonds” are debt securities to which your full faith and credit is pledged to pay principal and interest. If you have taxing power, generally you will pledge to use your ad valorem (property) taxing power to pay principal and interest. Ad valorem taxes necessary to pay debt service on general obligation bonds may not be subject to state constitutional property tax millage limits (an unlimited tax general obligation bond). The term “limited” tax is used when such limits exist.

General obligation bonds constitute a debt and, depending on applicable state law, may require that you obtain approval by voters prior to issuance. In the event of default in required payments of interest or principal, the holders of general obligation bonds have certain rights under state law to compel you to impose a tax levy.

Revenue Bonds

“Revenue bonds” are debt securities that are payable only from a specific source or sources of revenues. Revenue bonds are not a pledge of your full faith and credit and you are obligated to pay principal and interest on your revenue bonds only from the revenue source(s) specifically pledged to the bonds. Revenue bonds do not permit the bondholders to compel you to impose a tax levy for payment of debt service. Pledged revenues may be derived from operation of the financed project or system, grants or excise or other specified taxes. Generally, subject to state law or local charter requirements, you are not required to obtain voter approval prior to issuance of revenue bonds. If the specified source(s) of revenue become inadequate, a default in payment of principal or interest may occur. Various types of pledges of revenue may be used to secure interest and principal payments on revenue bonds. The nature of these pledges may differ widely based on state law, the type of issuer, the type of revenue stream and other factors.

General Fund Obligations

“General Fund Obligations” are debt securities that are payable from an issuer’s general fund and are not secured by a specific tax levy like a general obligation bond or a specific revenue pledge like a revenue bond. General fund obligations come in many varieties and may be a continuing obligation of the general fund or may be subject to annual appropriation. Often general fund obligations are issued in the form of certificates of participation in a lease obligation of the issuer.

Financial Risk Considerations

Certain risks may arise in connection with your issuance of Fixed Rate Bonds, including some or all of the following:

Risk of Default and Fiscal Stress

You may be in default if the funds pledged to secure your bonds are not sufficient to pay debt service on the bonds when due. The consequences of a default may be serious for you and may include the

exercise of available remedies against you on behalf of the holders of the bonds. Depending on state law, if the bonds are secured by a general obligation pledge, you may be ordered by a court to raise taxes or other budgetary adjustments may be necessary to enable you to provide sufficient funds to pay debt service on the bonds. If the bonds are revenue bonds, subject to applicable state law and the terms of the authorizing documents, you may be required to take steps to increase the available revenues that are pledged as security for the bonds.

Bonds payable from the general fund, particularly bonds without a defined revenue stream identified to pay debt service, reduce your flexibility to balance the general fund. Because a fixed debt service payment is required to be paid regardless of how your general fund is impacted by revenue losses or by increased expenses, you have less flexibility in the options available to you in assuring a balanced budget for your general fund.

General Fund Obligations that are Project Based. Some general fund obligations are issued for projects which are expected to generate revenues that will pay for some or all of the debt service on the bonds. In the event the project does not generate the anticipated levels of revenues available for debt service, or, in the extreme case, does not create any revenue available for debt service, you may need to make payments from other available general fund revenues. This may force you to reduce other expenditures or to make difficult decisions about how to pay your debt service obligation while meeting other expenditure needs.

General Fund Obligations that are Subject to Annual Appropriation. Some general fund obligations require that debt service is subject to annual appropriation by your governing body. If your governing body decides not to appropriate payments for debt service, your credit ratings may be negatively impacted and you may be forced to pay a higher interest rate on future debt issuance or may be unable to access the market for future debt issuance.

For all bonds, a default may negatively impact your credit ratings and may effectively limit your ability to publicly offer bonds or other securities at market interest rate levels. Further, if you are unable to provide sufficient funds to remedy the default, subject to applicable state law and the terms of the authorizing documents, it may be necessary for you to consider available alternatives under state law, including (for some issuers) state-mandated receivership or bankruptcy. A default also may occur if you are unable to comply with covenants or other provisions agreed to in connection with the issuance of the bonds.

Redemption Risk

Your ability to redeem the bonds prior to maturity may be limited, depending on the terms of any optional redemption provisions. In the event that interest rates decline, you may be unable to take advantage of the lower interest rates to reduce debt service.

Refinancing Risk

If the financing plan contemplates refinancing some or all of the bonds at maturity (for example, if there are term maturities, bullet maturities or if a shorter final maturity is chosen than might otherwise be permitted under the applicable federal tax rules), market conditions, changes to the credit of the Bonds or changes in law may limit, make more expensive or prevent the refinancing of those bonds when required.

Reinvestment Risk

You may have proceeds of the bonds to invest prior to the time that you are able to spend those proceeds for the authorized purpose. Depending on market conditions, you may not be able to invest those proceeds at or near the rate of interest that you are paying on the bonds, which is referred to as “negative arbitrage”.

Tax Compliance Risk

The issuance of tax-exempt bonds is subject to a number of requirements under the United States Internal Revenue Code, as enforced by the Internal Revenue Service (IRS). You must take certain steps and make certain representations prior to the issuance of tax-exempt bonds. You also must covenant to take certain additional actions after issuance of the tax-exempt bonds. A breach of your representations or your failure to comply with certain tax-related covenants may cause the interest on the bonds to become taxable retroactively to the date of issuance of the bonds, which may result in an increase in the interest rate that you pay on the bonds or the mandatory redemption of the bonds. The

IRS also may audit you or your bonds, in some cases on a random basis and in other cases targeted to specific types of bond issues or tax concerns. If the bonds are declared taxable, or if you are subject to audit, the market price of your bonds may be adversely affected. Further, your ability to issue other tax-exempt bonds also may be limited.

Staff Summary

5/18/2020

Agenda Item # 10.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Brian Oakleaf, Finance Director

SUBJECT: **Resolution No. 74-R-2019-2020 Setting Public Hearing for Not To Exceed \$2,200,000 GO Refunding Capital Loan Notes**

BACKGROUND: This agenda item will set the public hearing for Not To Exceed \$2,200,000 GO Refunding Capital Loan Notes for June 1st, 2020. This is for the refinancing of the Series 2015B Annual Appropriation GO Bonds.

Our current timeline would have these Bonds Called on July 22nd, 2020.

This Refunding does not extend the maturity date and does not substantially change the Principal Schedule.

FISCAL IMPACT: The fiscal impact is the cost of the publication for the Public Hearing which is approximately \$100.

RECOMMENDATION: Adopt Resolution No. 74-R-2019-2020 Setting a Public Hearing

ATTACHMENTS:

Description	Type
□ Resolution No. 74-R-2019-2020	Resolution

RESOLUTION NO. 74-R-2019-2020

RESOLUTION FIXING DATE FOR A MEETING ON THE AUTHORIZATION OF A LOAN AGREEMENT AND THE ISSUANCE OF NOT TO EXCEED \$2,200,000 GENERAL OBLIGATION REFUNDING CAPITAL LOAN NOTES OF THE CITY OF STORM LAKE, STATE OF IOWA (FOR ESSENTIAL CORPORATE PURPOSES), AND PROVIDING FOR PUBLICATION OF NOTICE THEREOF

WHEREAS, the Loan Agreement and Notes shall be payable from the Debt Service Fund; and

WHEREAS, before a Loan Agreement may be authorized and General Obligation Refunding Capital Loan Notes, issued to evidence the obligation of the City thereunder, it is necessary to comply with the provisions of the Code of Iowa, as amended, and to publish a notice of the proposal and of the time and place of the meeting at which the Council proposes to take action for the authorization of the Loan Agreement and Notes and to receive oral and/or written objections from any resident or property owner of the City to such action.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE, STATE OF IOWA:

Section 1. That this Council meet at 5:00 P.M., on the 1st day of June, 2020, for the purpose of taking action on the matter of the authorization of a Loan Agreement and issuance of not to exceed \$2,200,000 General Obligation Refunding Capital Loan Notes, for essential corporate purposes, the proceeds of which notes will be used to provide funds to pay the costs of refunding or refinancing certain outstanding indebtedness of the City, including Taxable Annual Appropriation General Obligation Urban Renewal Refunding Capital Loan Notes, Series 2015B dated June 5, 2015.

Section 2. The Clerk is authorized and directed to proceed on behalf of the City with the negotiation of terms of a Loan Agreement and the issuance of General Obligation Refunding Capital Loan Notes, evidencing the City's obligations to a principal amount of not to exceed \$2,200,000, to select a date for the final approval thereof, to cause to be prepared such notice and sale information as may appear appropriate, to publish and distribute the same on behalf of the City and this Council and otherwise to take all action necessary to permit the completion of a loan on a basis favorable to the City and acceptable to the Council.

Section 3. That the Clerk is hereby directed to cause at least one publication to be made of a notice of the meeting, in a legal newspaper, printed wholly in the English language, published at least once weekly, and having general circulation in the City. The publication to be not less than four clear days nor more than twenty days before the date of the public meeting on the issuance of the Notes.

Section 4. The notice of the proposed action to issue notes shall be in substantially the following form:

(To be published between: May 19, 2020 and May 27, 2020)

NOTICE OF MEETING OF THE CITY COUNCIL OF THE
CITY OF STORM LAKE, STATE OF IOWA, ON THE
MATTER OF THE PROPOSED AUTHORIZATION OF A
LOAN AGREEMENT AND THE ISSUANCE OF NOT TO
EXCEED \$2,200,000 GENERAL OBLIGATION REFUNDING
CAPITAL LOAN NOTES OF THE CITY (FOR ESSENTIAL
CORPORATE PURPOSES), AND THE HEARING ON THE
ISSUANCE THEREOF

PUBLIC NOTICE is hereby given that the City Council of the City of Storm Lake, State of Iowa, will hold a public hearing on the 1st day of June, 2020, at 5:00 P.M, at which meeting the Council proposes to take additional action for the authorization of a Loan Agreement and the issuance of not to exceed \$2,200,000 General Obligation Refunding Capital Loan Notes, for essential corporate purposes, to provide funds to pay the costs of refunding or refinancing certain outstanding indebtedness of the City, including Taxable Annual Appropriation General Obligation Urban Renewal Refunding Capital Loan Notes, Series 2015B dated June 5, 2015. Principal and interest on the proposed Loan Agreement will be payable from the Debt Service Fund.

Due to public health concerns related to COVID-19, as authorized by emergency proclamation of the Governor of the State of Iowa, this meeting of the City Council will be conducted electronically, pursuant to Iowa Code Section 21.8, as holding the meeting in person is impossible or impractical.

The public may access the meeting electronically in the manner specified below:

To access this meeting by telephone, use the following call-in information:

DIAL IN TO PARTICIPATE: 1-408-418-9388 ACCESS CODE: 24570177

Please check the posted agenda in advance of the June 1, 2020 meeting for any updates to the manner in which the public may access the meeting.

All persons wishing to observe or participate in the meeting and/or public hearing may do so by accessing the meeting as directed above, and may also submit comments to the City prior to the meeting. At the above meeting the Council shall receive oral or written objections from any resident or property owner of the City to the above action. After all objections have been received and considered, the Council will at the meeting or at any adjournment thereof, take additional action for the authorization of a Loan Agreement and the issuance of the Notes to evidence the obligation of the City thereunder or will abandon the proposal to issue said Notes.

This notice is given by order of the City Council of the City of Storm Lake, State of Iowa, as provided by Sections 384.24A and 384.25 of the Code of Iowa.

Dated this 18th day of May, 2020.

City Clerk, City of Storm Lake, State of Iowa

(End of Notice)

PASSED AND APPROVED this 18th day of May, 2020.

Micheal Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

Staff Summary

5/18/2020

Agenda Item # 11.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Tyler Gibbins, Staff Accountant

SUBJECT: **Setting Public Hearing for Plans, Specifications, Form of Contract and Engineer's Estimate for Reconstruct Runway Lighting - 13/31, Reconstruct Taxiway Lighting**

BACKGROUND: The existing lighting on the taxiway and runway 13/31 were installed 30+ years ago and are in need of replacement. The existing lighting system is experiencing outages due to old lights and wire. The parts for the lights are also becoming more expensive and harder to find. The new installation will include replacing all the edge lights along the taxiway and runway 13/31. The engineer's estimate for this project is \$452,218.

FISCAL IMPACT: N/A

RECOMMENDATION: Set the Public Hearing for June 1, 2020 at 5:00 pm at City Hall via telephonic means by calling 1-408-418-9388 access number 24570177

ATTACHMENTS:

Description	Type
☐ Public Hearing Notice	Backup Material
☐ Estimate	Backup Material
☐ Plans	Backup Material
☐ Specs	Backup Material

NOTICE OF PUBLIC HEARING

Storm Lake Municipal Airport – Runway 13/31 Lighting City of Storm Lake

Public Hearing on Proposed Contract Documents and Estimated Costs for Repair or Improvement. A public hearing will be held by the City of Storm Lake on the proposed contract documents (plans, specifications and form of contract) and estimated cost for the improvement at its meeting at 5:00 P.M. on June 01, 2020, at 620 Erie Street, in Storm Lake, Iowa. The Council meeting will be held via electronic means and residents are able to provide comments in writing in advance of the meeting by email to martinez@stormlake.org or by mail to PO Box 1086, Storm Lake, IA 50588. Additionally, citizens who wish to participate in the public hearing can do so by phone by calling 1-408-418-9388 and using the access number 24570177.

Project Description: Installation of new runway and taxiway light for Runway 13/31 and the connection taxiway at the Storm Lake Municipal Airport. The scope of work includes the following approximate quantities: 10,132 LF of No 8 AWG cable, 8,546 LF of No 6 AWG cable, 7,839 LF of trenching, 8,903 LF of conduit, and 94 lights and 1 4kW regulator.

This Notice is given by authority of the
City of Storm Lake

Mayra A.Martinez, City Clerk



Real People. Real Solutions.

LIGHTING REPLACEMENTS - RUNWAY 13/31 & TAXIWAY

No.	ITEM	QTY	UNIT	UNIT PRICE	TOTAL	Federal 90%	State 0%	Local 10%
1	MOBILIZATION	1	LS	\$ 50,000.00	\$ 50,000.00	\$ 45,000.00	\$ -	\$ 5,000.00
2	TRAFFIC CONTROL	1	LF	\$ 10,000.00	\$ 10,000.00	\$ 9,000.00	\$ -	\$ 1,000.00
3	CONSTRUCTION STAKING	1	LF	\$ 10,000.00	\$ 10,000.00	\$ 9,000.00	\$ -	\$ 1,000.00
4	REMOVAL OF EXISTING EDGE LIGHTS	64	EA	\$ 100.00	\$ 6,400.00	\$ 5,760.00	\$ -	\$ 640.00
5	DIRECTIONAL BORE, 2" CONDUIT	900	LF	\$ 100.00	\$ 90,000.00	\$ 81,000.00	\$ -	\$ 9,000.00
6	CAN PLAZA	3	EA	\$ 10,000.00	\$ 30,000.00	\$ 27,000.00	\$ -	\$ 3,000.00
7	TRENCHING	12,000	LF	\$ 3.00	\$ 36,000.00	\$ 32,400.00	\$ -	\$ 3,600.00
8	CONDUIT, 2" PVC	12,000	LF	\$ 3.00	\$ 36,000.00	\$ 32,400.00	\$ -	\$ 3,600.00
9	5KV WIRE	13,000	LF	\$ 2.00	\$ 26,000.00	\$ 23,400.00	\$ -	\$ 2,600.00
10	5KV GROUND WIRE	12,000	LF	\$ 2.00	\$ 24,000.00	\$ 21,600.00	\$ -	\$ 2,400.00
11	HANDHOLE	20	EA	\$ 800.00	\$ 16,000.00	\$ 14,400.00	\$ -	\$ 1,600.00
12	MITL	50	EA	\$ 900.00	\$ 45,000.00	\$ 40,500.00	\$ -	\$ 4,500.00
13	MIRL, EDGE LIGHTS - L-861	40	EA	\$ 1,000.00	\$ 40,000.00	\$ 36,000.00	\$ -	\$ 4,000.00
14	MIRL, THRESHOLD LIGHTS - L-861SE	24	EA	\$ 1,200.00	\$ 28,800.00	\$ 25,920.00	\$ -	\$ 2,880.00
15	WINDCONE	2	EA	\$ 10,000.00	\$ 20,000.00	\$ 18,000.00	\$ -	\$ 2,000.00
					\$ -	\$ -	\$ -	\$ -
				Subtotal	\$ 468,200.00	\$ 421,380.00	\$ -	\$ 46,820.00
				PROJECT DEVELOPMENT / SCOPING	\$ 1,000.00	\$ 900.00	\$ -	\$ 100.00
				DESIGN ENGINEERING (10%)	\$ 46,800.00	\$ 42,120.00	\$ -	\$ 4,680.00
				CONSTRUCTION ENGINEERING (10%)	\$ 46,800.00	\$ 42,120.00	\$ -	\$ 4,680.00
				GRANT ADMINISTRATION	\$ 1,000.00	\$ 900.00	\$ -	\$ 100.00
				DISADVANTAGED BUSINESS ENTERPRISE (DBE) PLAN	\$ 1,500.00	\$ 1,350.00	\$ -	\$ 150.00
				ENVIRONMENTAL CATEX	\$ 1,000.00	\$ 900.00	\$ -	\$ 100.00
				ESTIMATED CITY ADMINISTRATION	\$ 1,000.00	\$ 900.00	\$ -	\$ 100.00
				LIGHTING REPLACEMENTS - RUNWAY 13/31 & TAXIWAY	\$ 567,300.00	\$ 510,570.00	\$ -	\$ 56,730.00

CONSTRUCTION PLANS FOR

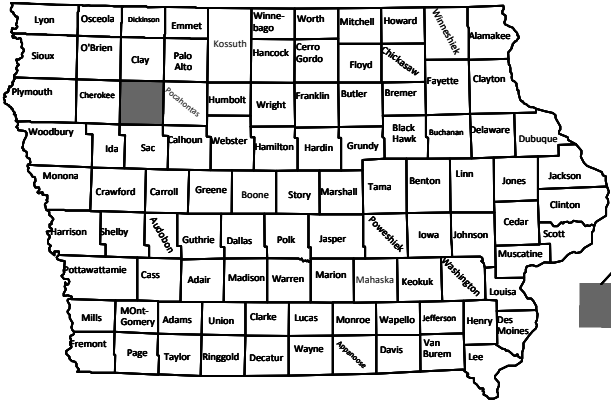
RUNWAY 13/31 LIGHTING REPLACEMENT

STORM LAKE MUNICIPAL AIRPORT

GOVERNING SPECIFICATIONS

FEDERAL AVIATION ADMINISTRATION'S AC 150/5370-10H, DATED SEPTEMBER 6, 2019 "STANDARDS FOR SPECIFYING CONSTRUCTION OF AIRPORTS" AND ALL SUPPLEMENTS.

AIP #3-19-0088-014-2020
STORM LAKE, IOWA
T51.119823
FEBRUARY 2020



STATE MAP

RESOURCE LIST

CITY OF STORM LAKE

CITY HALL
620 ERIE ST.
P.O. BOX 1086
STORM LAKE, IOWA 50588

CITY MANAGER: JAMES PATRICK

MAYOR: JON KRUSE

AIRPORT COMMISSION MEMBERS:
BOB ANSORGE
DOUG WHITE
MAXINE LAMPE
SARA HUDDLESTON
DAN RICHARDSON

CITY ENGINEER:
(CONSULTANT)
GREG BROUSSARD
BOLTON & MENK, INC.
2730 FORD STREET
AMES, IA 50010

UTILITIES

GAS
ALLIANT ENERGY
STORM LAKE, IA 50588
1-800-822-4348

TELEPHONE/CABLE
KNOLOGY
118 E. 5TH ST.
STORM LAKE, IA 50588
712-213-7425

MEDIACOM
720 LAKE AVE
STORM LAKE, IA 50588
712-213-5527

CENTURY LINK
426 LAKE AVE
STORM LAKE, IA 50588
712-732-8348

LOCAL
CITY OF STORM LAKE
433 VILAS ROAD
STORM LAKE, IA 50588
712-732-8029

ELECTRIC
MID AMERICAN
1016 VESTAL ST.
STORM LAKE, IA 50588
1-888-427-111

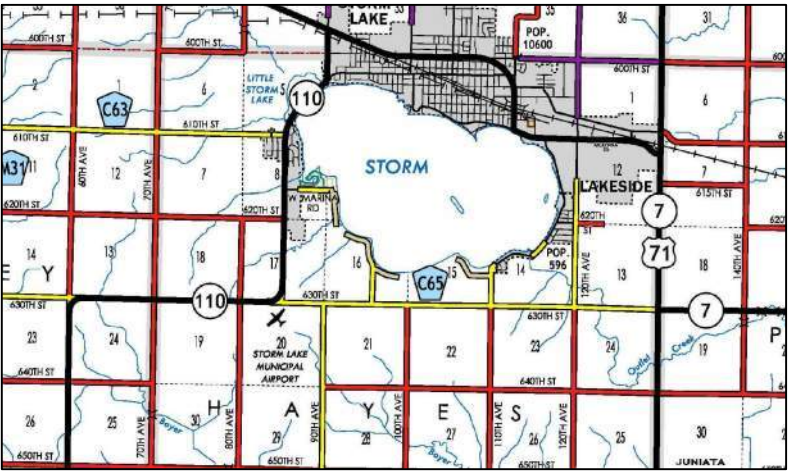


SHEET NUMBER	SHEET TITLE
GENERAL	
G0.01	TITLE SHEET
G1.01	QUANTITIES & ESTIMATE REFERENCE NOTES
G2.01 - G2.03	CONSTRUCTION SAFETY & PHASING PLAN
CIVIL	
C0.01 - C0.04	EXISTING CONDITIONS & REMOVALS PLAN
ELECTRICAL	
E0.01 - E0.04	ELECTRICAL LAYOUT PLAN
E1.01 - E1.03	ELECTRICAL DETAILS & NOTES

THIS PLAN SET CONTAINS 16 SHEETS.



THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



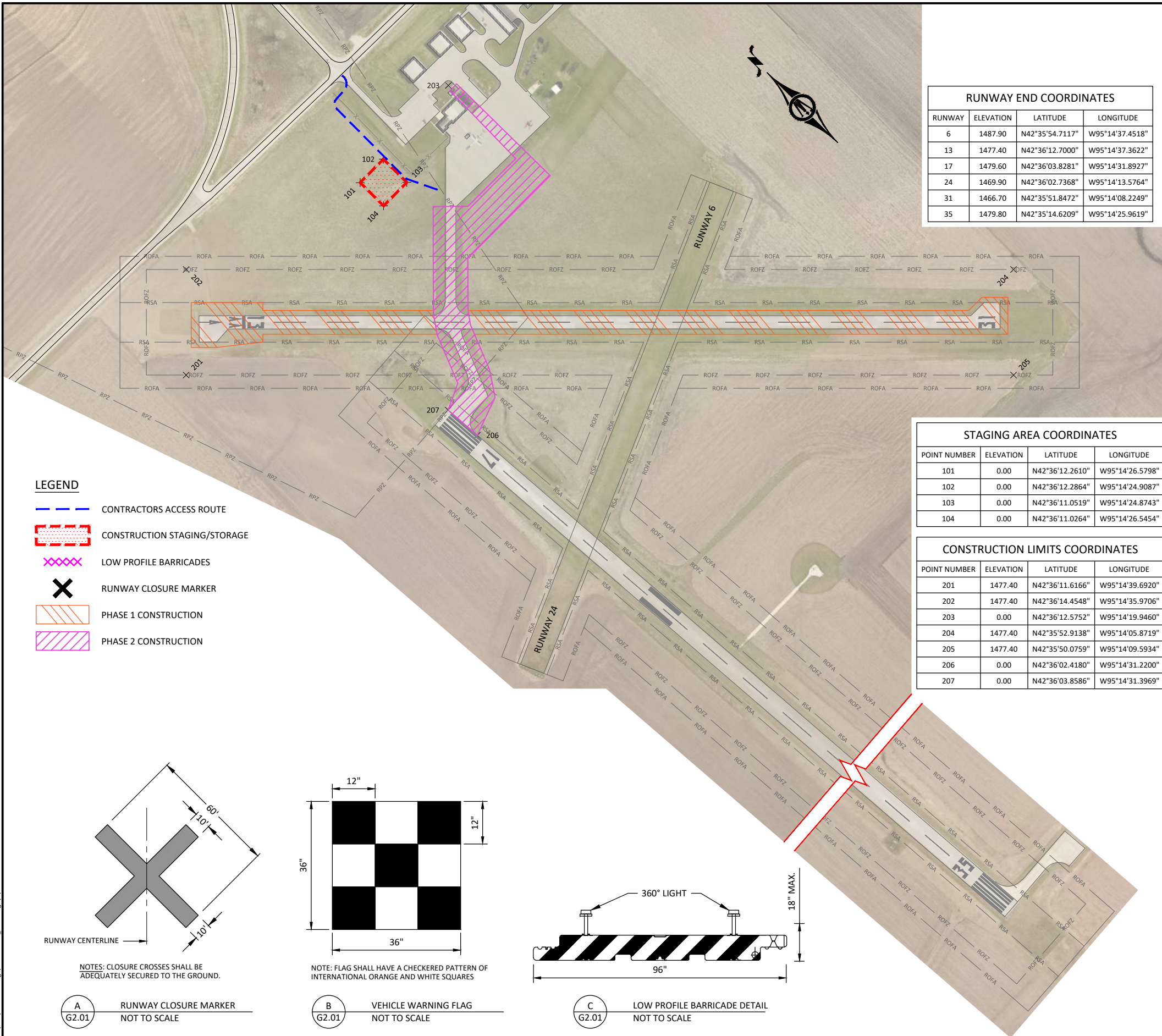
© Bolton & Menk, Inc. 2020. All Rights Reserved
A:\30401\11119823\04\CSA\Sheet Drawings\119823.GDD1 - EN.dwg 3/5/2020 9:23:15 AM

STATEMENT OF ESTIMATED QUANTITIES					
ITEM	ITEM CODE	ITEM	UNIT	QUANT	AS BUILT QUANT.
1	GP, SECTION 105	Mobilization	LS	1	
2	GP, 50-05	Traffic Control	LS	1	
3	GP	Construction Survey	LS	1	
4	SEE PLAN NOTE	Removals - Miscellaneous	LS	1	
5	P-501	Pavement Removal and Replacement, 6" PCC, with P-209 Granular Base	SY	294	
6	L-108-5.2	No. 8 AWG, 5KV, L-824, Type C Cable, Installed in Trench, Duct Bank, or Conduit	LF	10,135	
7	L-108-5.3	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above Duct Bank or Conduit, Including Ground Rods and Ground Connectors	LF	8,546	
8	L-108-5.4	Locate, Identify, & Mark Existing Airfield Wiring	LS	1	
9	L-108-5.1	Trenching	LF	7,840	
10	L-110-5.1	Concrete Encased Electrical Duct Bank, with (3) 2" Conduits	LF	395	
11	L-110-5.2	Concrete Encased Electrical Duct Bank, with (9) 2" Conduits	LF	440	
12	L-110-5.3	Bored Duct, with (1) 2" Conduits, Complete, in Place	LF	69	
13	L-110-5.4	Bored Duct, with (2) 2" Conduits, Complete, in Place	LF	221	
14	L-110-5.5	Bored Duct, with (4) 2" Conduits, Complete, in Place	LF	50	
15	L-110-5.6	Bored Duct, with (6) 2" Conduits, Complete, in Place	LF	60	
16	L-110-5.7	Non-Encased Electrical Conduit, 2" PVC, in Trench	LF	8,904	
17	L-115-5.1	North Can Plaza, Complete	LS	1	
18	L-115-5.2	South Can Plaza, Complete	LS	1	
19	L-115-5.3	Electrical Handhole, L-867, Size B	EA	15	
20	L-125-5.1	L-861T LED Taxiway Edge Light (MITL), Base-Mounted	EA	50	
21	L-125-5.2	L-861 LED Runway Edge Light (MIRL), Base-Mounted	EA	26	
22	L-125-5.3	L-861SE LED Runway Threshold Light (MIRL), Base-Mounted	EA	18	
23	L-125-5.4	L-828 Constant Current Regulator, 4 KW, Complete, in Place	EA	1	

ESTIMATE REFERENCE NOTES		
ITEM NO.	ITEM CODE	
1	GP, SECTION 105	Mobilization This item is a Lump Sum bid item, and shall include all preparatory work costs incurred. Also, costs of bonds, insurance, and other miscellaneous items that do not have their own separate bid items but are required to complete the project, shall be included in this bid item.
2	GP, 50-05	Traffic Control This item shall be paid by Lump Sum, and shall include all traffic control necessary for the layout per the plans.
3	GP	Construction Survey This item shall be paid by Lump Sum, and shall include all survey necessary for the layout and construction of the project.
4	SEE PLAN NOTE	Removals - Miscellaneous This item includes removal of all lights shown on the plans. Removal shall include all foundations to their full depth. It shall include all items as shown on the plans for removal, and shall be measured and paid by the Lump Sum.
5	P-501	Pavement Removal and Replacement, 6" PCC, with P-209 Granular Base Work under this bid item shall include PCC pavement removal and replacement. This shall include removal of the PCC, Aggregate, and subgrade removal and replacement of new structure. Payment shall be by the Square Yard. No measurement will be made for this item, but plan quantity shall be used unless plan changes are made.
6	L-108-5.2	No. 8 AWG, 5KV, L-824, Type C Cable, Installed in Trench, Duct Bank, or Conduit Work under this bid item shall be in accordance with reference specification L-108 and the plans. Payment shall be per Linear Foot, complete, in place.
7	L-108-5.3	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above Duct Bank or Conduit, Including Ground Rods and Ground Connectors Work under this bid item shall be in accordance with reference specification L-108 and the plans. Payment shall be per Linear Foot, complete, in place.
8	L-108-5.4	Locate, Identify, & Mark Existing Airfield Wiring Work under this bid item shall be in accordance with reference specification L-108 and the plans. This bid item shall be used to locate existing electrical circuits, should Contractor cut and/or damage existing circuits, repair of damage shall be the responsibility of the Contractor. Payment shall be paid by the Lump Sum.
9	L-108-5.1	Trenching Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
10	L-110-5.1	Concrete Encased Electrical Duct Bank, with (3) 2" Conduits Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
11	L-110-5.2	Concrete Encased Electrical Duct Bank, with (9) 2" Conduits Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
12	L-110-5.3	Bored Duct, with (1) 2" Conduits, Complete, in Place Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
13	L-110-5.4	Bored Duct, with (2) 2" Conduits, Complete, in Place Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
14	L-110-5.5	Bored Duct, with (4) 2" Conduits, Complete, in Place Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
15	L-110-5.6	Bored Duct, with (6) 2" Conduits, Complete, in Place Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
16	L-110-5.7	Non-Encased Electrical Conduit, 2" PVC, in Trench Work under this bid item shall be in accordance with reference specification L-110 and the plans. Payment shall be by the Linear Foot.
17	L-115-5.1	North Can Plaza, Complete Work under this bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per EACH.
18	L-115-5.2	South Can Plaza, Complete Work under this bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per EACH.
19	L-115-5.3	Electrical Handhole, L-867, Size B This bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per EACH. Handhole, complete, in place, including ground rods.

ESTIMATE REFERENCE NOTES CONTINUED		
ITEM NO.	ITEM CODE	
20	L-125-5.1	L-861T LED Taxiway Edge Light (MITL), Base-Mounted This bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per Each. Base-Mounted Taxiway Edge Light, complete, in place, including ground rods.
21	L-125-5.2	L-861 LED Runway Edge Light (MIRL), Base-Mounted This bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per Each. Base-Mounted Runway Light, complete, in place, including ground rods.
22	L-125-5.3	L-861SE LED Runway Threshold Light (MIRL), Base-Mounted This bid item shall be in accordance with reference specification L-125 and the plans. Payment shall be per Each. Base-Mounted Threshold/End Light, complete, in place, including ground rods.
23	L-125-5.4	L-828 Constant Current Regulator, 4 KW, Complete, in Place Work included under this bid item shall include furnishing and installing the new regulator in accordance with reference specification L-125, removal of the existing regulator to an on-site location as directed by the Airport, and all necessary labor and materials to install the regulator and complete a working system. This item shall be measured and paid by Each regulator furnished and installed, complete, in place.

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PROJECT DESCRIPTION:
RUNWAY 13/31 LIGHTING REPLACEMENT

GENERAL CONSTRUCTION SAFETY:

- THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS SET FORTH IN FAA AC 150/5370-2G "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION", WHICH IS INCLUDED IN THE PROJECT MANUAL APPENDIX. CONSTRUCTION SAFETY SHALL BE DISCUSSED DURING THE PRE CONSTRUCTION MEETING AND AT WEEKLY PROJECT MEETING.
- CONTRACTOR IS RESPONSIBLE FOR ALL PUBLIC AND PRIVATE UTILITY LOCATIONS DURING CONSTRUCTION.

CONSTRUCTION EQUIPMENT:

- ALL CONSTRUCTION EQUIPMENT SHALL BE PARKED IN DESIGNATED STAGING/STORAGE AREAS WHEN NOT IN USE OR OVERNIGHT. ALL BOOMS SHALL BE LOWERED WHEN NOT IN USE.
- THE EXPECTED MAXIMUM HEIGHT OF CONSTRUCTION EQUIPMENT IS 20 FEET AT ANY LOCATION. THE CONTRACTOR SHALL VERIFY ANY EQUIPMENT HEIGHT MORE THAN 20 FEET AND NOTIFY THE ENGINEER AND OWNER A MINIMUM OF 72 HOURS IN ADVANCE OF ANY CONSTRUCTION THAT REQUIRES EQUIPMENT WITH HEIGHTS OF MORE THAN 20 FEET SO THAT THE APPROPRIATE NOTICE TO AIRMEN (NOTAM) MAY BE ISSUED.
- ALL EQUIPMENT WORKING ON THE AIRPORT CONSTRUCTION SITE MUST HAVE A ROTATING BEACON AND/OR WARNING FLAG. THE VEHICLE WARNING FLAGS SHALL BE AS PER DETAIL ON SHEET. THE FLAG SHALL BE SECURELY ATTACHED TO THE HIGHEST POINT ON THE CONSTRUCTION EQUIPMENT OR VEHICLE AND BE VISIBLE AT ALL TIMES. AMBER FLASHING BEACONS MOUNTED ON THE HIGHEST POINT OF THE CONSTRUCTION EQUIPMENT OR VEHICLE ARE ALSO REQUIRED TO BE INSTALLED AND OPERATIONAL.
- VEHICULAR TRAFFIC LOCATED IN OR CROSSING ACTIVE MOVEMENT AREAS MUST HAVE A WORKING TWO-WAY RADIO CONTACT WITH AIRPORT OPERATIONS OR BE ESCORTED BY A PERSON IN RADIO CONTACT. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT ARE APPROACHING THE VEHICLES POSITION. CONSTRUCTION PERSONNEL MAY OPERATE IN A MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS.

HAUL ROUTES, TRAFFIC CONTROL & ACCESS CONTROL

- ALL TEMPORARY ACCESS, STORAGE/STAGING AREAS AND ROADS SHALL BE RESTORED TO ORIGINAL CONDITION, INCLUDING TOPSOILING, RESEEDING, IF NECESSARY, AFTER USE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL TRAFFIC CONTROL DEVICES AS NECESSARY.
- THIS LAYOUT IS A MINIMUM REQUIREMENT NECESSARY TO ASSIST THE CONTRACTOR IN DETERMINING THE COST FOR PROVIDING NECESSARY TRAFFIC CONTROL. THE CONTRACTOR MAY ADD ADDITIONAL WARNING DEVICES UPON APPROVAL OF THE ENGINEER.
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE OWNER A MINIMUM OF 72 HOURS IN ADVANCE OF ANY PROPOSED CONSTRUCTION WITHIN THE APRON OR TAXIWAY SAFETY AREAS, RUNWAY PROTECTION ZONES, APPROACH AREAS OR REQUIRED CLOSURE AREAS SO THAT THE APPROPRIATE NOTICE TO AIRMEN (NOTAM) MAY BE ISSUED. THE OWNER WILL ALSO ISSUE TIMELY NOTAMS WHICH SPECIFICALLY DETAIL THE CURRENT STATUS OF THE AIRPORT DURING CONSTRUCTION, INCLUDING CLOSURE STATUS. THE NOTAM SHALL INCLUDE THE PROPOSED LOCATION, TIME AND DATE OF COMMENCEMENT OF CONSTRUCTION.
- INSPECT FOR AND REMOVE FOREIGN OBJECT DEBRIS (FOD) ON OR NEAR AIRCRAFT MOVEMENT AREAS BY SWEEPING DAILY AT TIMES OF CONCURRENT CONSTRUCTION AND AIRCRAFT OPERATIONS. WASTE AND LOOSE MATERIAL MUST NOT BE PLACED IN ACTIVE MOVEMENT AREAS. MATERIALS TRACKED ONTO THESE AREAS MUST BE REMOVED CONTINUOUSLY DURING THE PROJECT. THE CONSTRUCTION SITE, INCLUDING THE STAGING AREA, SHALL BE KEPT CLEAN OF ALL PERSONNEL DEBRIS.
- THERE SHALL BE NO UNAUTHORIZED PERSONNEL ON AIRFIELD. CONTRACTOR SHALL USE THE DESIGNATED AIRPORT ACCESS ROUTE WHEN ENTERING AIRPORT PROPERTY. NO GATES ARE TO BE LEFT OPENED AND UNATTENDED.
- AT ALL TIMES, WHILE CONSTRUCTION IS IN PROGRESS, THE CONTRACTOR SHALL HAVE A DESIGNATED PERSON MONITORING THE UNICOM OR CTAF (122.7).
- PERSONAL VEHICLES SHALL NOT BE ALLOWED ON THE AIRFIELD. ALL PERSONAL VEHICLES SHOULD BE PARKED IN A DESIGNATED STAGING/STORAGE AREA OR ANOTHER AREA AS DESIGNATED BY THE AIRPORT MANAGER.
- WHEN ACCESS POINTS ARE CREATED IN THE SECURITY FENCING TO PERMIT THE PASSAGE OF CONSTRUCTION VEHICLES OR PERSONNEL, TEMPORARY GATES SHOULD BE EQUIPPED SO THEY CAN BE SECURELY CLOSED AND LOCKED TO PREVENT ACCESS BY ANIMALS AND PEOPLE.
- LIGHTED BARRIERS (FLASHERS) SHALL BE INSPECTED AT DUSK EACH DAY TO ENSURE ALL FLASHERS ARE PROPERLY WORKING.
- PROMINENTLY MARK OPEN TRENCHES, EXCAVATIONS AND STOCKPILED MATERIALS AND LIGHT THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS. CONSTRAIN STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.
- PRIOR TO OPENING OR RE-OPENING ANY CLOSED PAVEMENT AREA, THE CONTRACTOR, TOGETHER WITH THE AIRPORT OPERATOR SHALL INSPECT THE PAVEMENT, SAFETY AREAS AND PRIMARY SURFACE FOR ANY OBSTRUCTION OR FOD.
- WHEN THE AIRFIELD IS CLOSED FOR CONSTRUCTION (RUNWAY CLOSURES), THE BEACON SHALL BE DISENGAGED (TURNED-OFF).
- ALL AIRFIELD GUIDANCE SIGNS (INCLUDING HOLD SIGNS) SHALL BE COVERED OR OTHERWISE REMOVED FROM SERVICE IF THE PAVEMENT SAID SIGNS ARE IDENTIFYING ARE CLOSED FOR CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) PERSONNEL, MUTUAL AID PROVIDERS AND OTHER EMERGENCY SERVICES IF CONSTRUCTION REQUIRES SHUTTING OFF OR OTHERWISE DISTURPTING ANY WATER LINE OR FIRE HYDRANT ON THE AIRPORT OR ADJOINING AREAS AND IF CONTRACTORS WORK WITH HAZARDOUS MATERIAL ON THE AIRFIELD. NOTIFICATION MUST ALSO BE MADE WHEN THE WORK PERFORMED WILL CLOSE OR AFFECT ANY EMERGENCY ROUTES. ALSO MAKE NOTIFICATION WHEN SERVICES ARE RESTORED.

PROJECT NOTES:

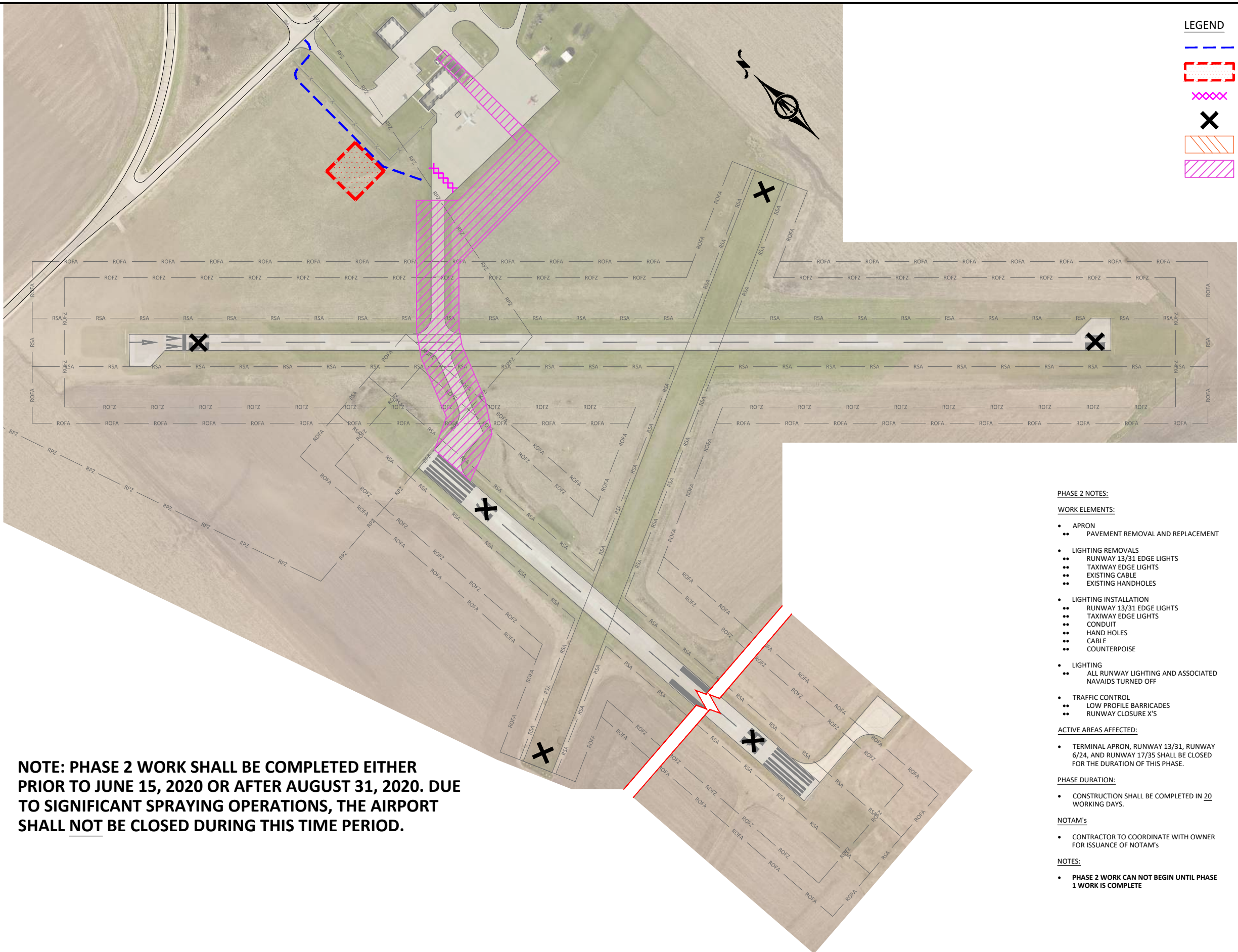
- PHASE 1 AND 2 CONSTRUCTION SHALL OCCUR THROUGH THE SUMMER AND FALL OF 2020. CONSTRUCTION DURATION OF THE RUNWAY 13/31 LIGHTING REPLACEMENT WILL BE EXPECTED TO BE COMPLETED DURING THE MONTHS RANGING MAY THROUGH SEPTEMBER. TOTAL WORKING DAYS FOR PHASE 1 AND 2 CONSTRUCTION SHALL BE 40 WORKING DAYS.
- CONTRACTOR SHALL PROVIDE A SAFETY COMPLIANCE DOCUMENT PRIOR TO ISSUE OF NOTICE TO PROCEED.
- A REPRESENTATIVE SHALL BE PROVIDED BY THE CONTRACTOR ON-CALL 24 HOURS A DAY FOR EMERGENCY MAINTENANCE OF AIRPORT TRAFFIC CONTROL DEVICES AND LIGHTING.
- CONTRACTOR, RESIDENT PROJECT REPRESENTATIVE, AND OWNER SHALL CONDUCT DAILY INSPECTIONS TO ENSURE CONFORMANCE TO CONSTRUCTION SAFETY PHASING PLAN.
- CONTRACTOR SHALL HAVE A SWEEPER ON-SITE AT ALL TIMES TO PICKUP DEBRIS FROM ACTIVE PAVEMENT AREA AS IT OCCURS.

GENERAL CONSTRUCTION SAFETY:

THE RESPONSIBILITY FOR ALL SAFETY SHALL FALL UPON THE CONTRACTOR(S) DURING CONSTRUCTION. THIS SAFETY PLAN SHALL BE REVIEWED BY THE FAA PRIOR TO CONSTRUCTION NOTICES. ANY ATTACHMENT, DEVIATIONS, OMISSIONS, OR CONTRADICTIONS TO THE FAA REGULATIONS DISCOVERED DURING REVIEW SHALL BE MADE PART OF THE SAFETY PLAN PRIOR TO CONSTRUCTION, AND HENCE BECOME PART OF THE CONTRACT CONDITIONS. THE CONTRACTOR SHALL CONFIRM PRIOR TO ENTERING INTO A CONSTRUCTION CONTRACT THAT NO MODIFICATIONS TO THIS SAFETY PLAN HAVE BEEN MADE. AT THE CONTRACTORS REQUEST, THE ENGINEER SHALL PROVIDE DOCUMENTATION THAT INDICATES NO MODIFICATIONS, REVISIONS, OR ADDITIONAL ITEMS BE INCLUDED IN THIS SAFETY PLAN.

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STORM LAKE MUNICIPAL AIRPORT		SHEET
RUNWAY 13/31 LIGHTING REPLACEMENT		G2.01
CONSTRUCTION SAFETY & PHASING PLAN		
GENERAL		



LEGEND

- CONTRACTORS ACCESS ROUTE
- CONSTRUCTION STAGING/STORAGE
- LOW PROFILE BARRICADES
- RUNWAY CLOSURE MARKER
- PHASE 1 CONSTRUCTION
- PHASE 2 CONSTRUCTION

NOTE: PHASE 2 WORK SHALL BE COMPLETED EITHER PRIOR TO JUNE 15, 2020 OR AFTER AUGUST 31, 2020. DUE TO SIGNIFICANT SPRAYING OPERATIONS, THE AIRPORT SHALL NOT BE CLOSED DURING THIS TIME PERIOD.

PHASE 2 NOTES:

WORK ELEMENTS:

- APRON
 - PAVEMENT REMOVAL AND REPLACEMENT
- LIGHTING REMOVALS
 - RUNWAY 13/31 EDGE LIGHTS
 - TAXIWAY EDGE LIGHTS
 - EXISTING CABLE
 - EXISTING HANDHOLES
- LIGHTING INSTALLATION
 - RUNWAY 13/31 EDGE LIGHTS
 - TAXIWAY EDGE LIGHTS
 - CONDUIT
 - HAND HOLES
 - CABLE
 - COUNTERPOISE
- LIGHTING
 - ALL RUNWAY LIGHTING AND ASSOCIATED NAVAIDS TURNED OFF
- TRAFFIC CONTROL
 - LOW PROFILE BARRICADES
 - RUNWAY CLOSURE X'S

ACTIVE AREAS AFFECTED:

- TERMINAL APRON, RUNWAY 13/31, RUNWAY 6/24, AND RUNWAY 17/35 SHALL BE CLOSED FOR THE DURATION OF THIS PHASE.

PHASE DURATION:

- CONSTRUCTION SHALL BE COMPLETED IN 20 WORKING DAYS.

NOTAM'S

- CONTRACTOR TO COORDINATE WITH OWNER FOR ISSUANCE OF NOTAM'S

NOTES:

- PHASE 2 WORK CAN NOT BEGIN UNTIL PHASE 1 WORK IS COMPLETE



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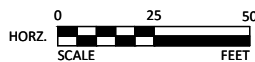
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
CONSTRUCTION SAFETY & PHASING PLAN
PHASE 2

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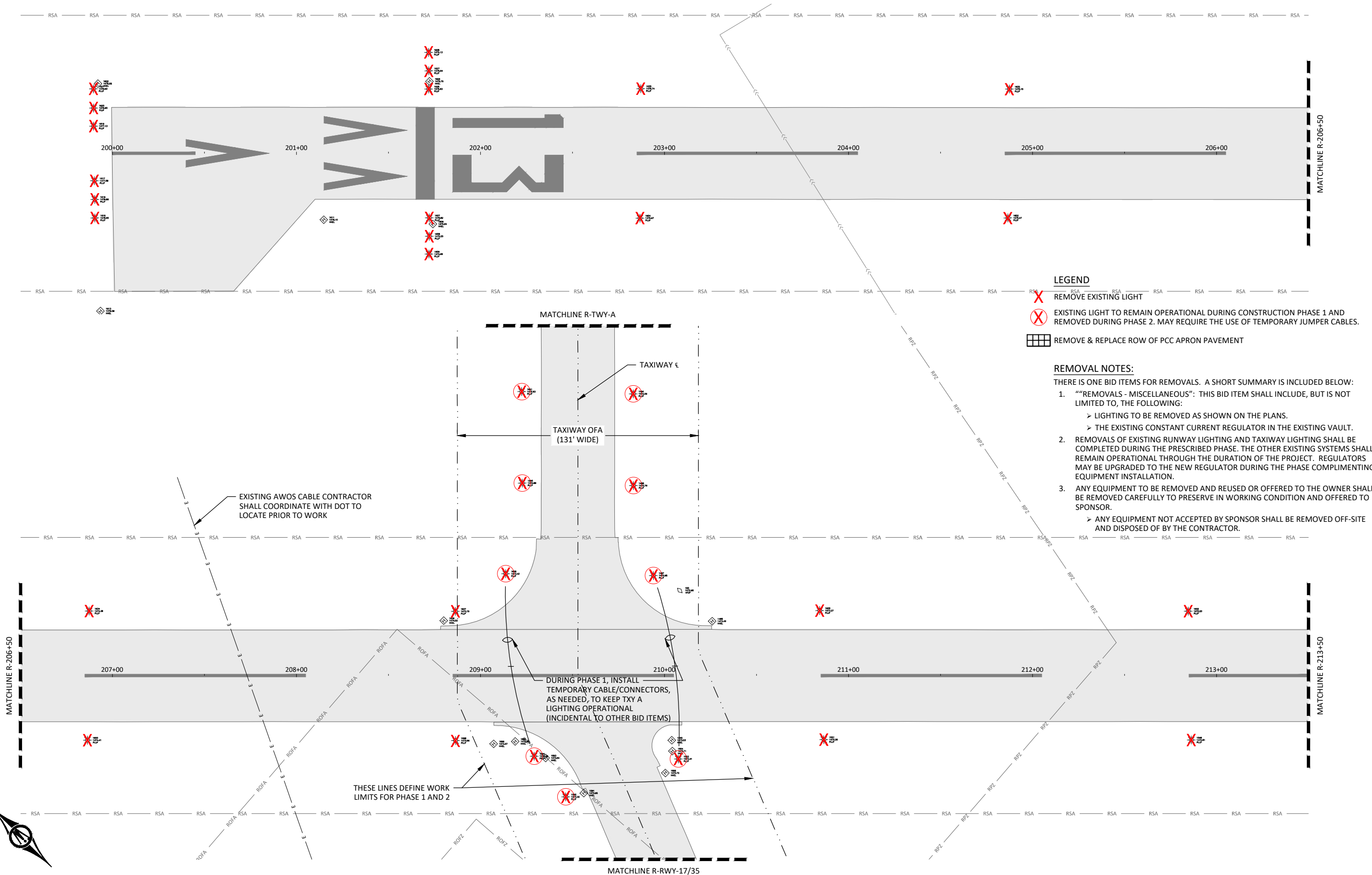
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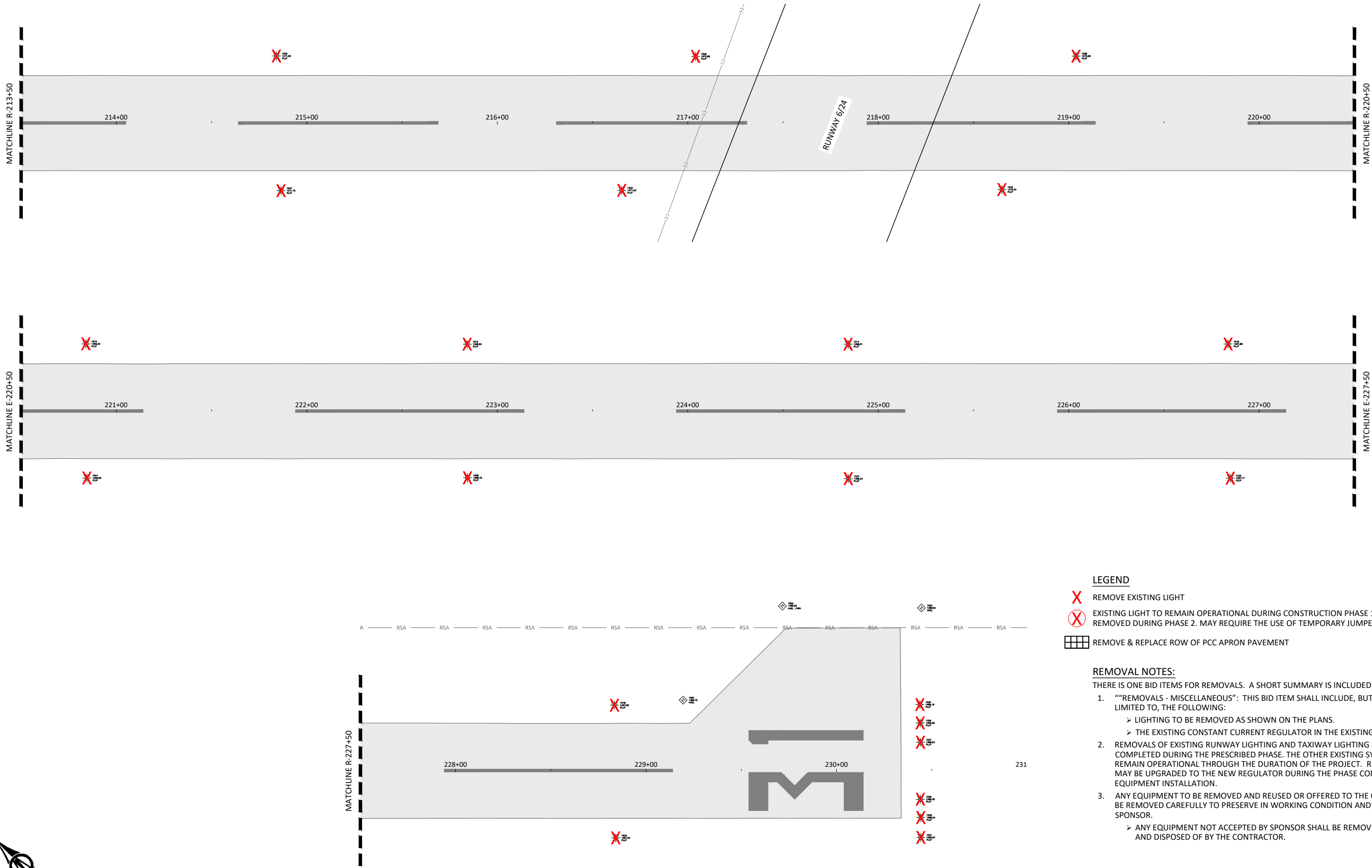
STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
EXISTING CONDITIONS & REMOVALS PLAN
RUNWAY STATION 199+50 TO STATION 213+50

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LEGEND

- REMOVE EXISTING LIGHT
- EXISTING LIGHT TO REMAIN OPERATIONAL DURING CONSTRUCTION PHASE 1 AND REMOVED DURING PHASE 2. MAY REQUIRE THE USE OF TEMPORARY JUMPER CABLES.
- REMOVE & REPLACE ROW OF PCC APRON PAVEMENT

REMOVAL NOTES:

THERE IS ONE BID ITEMS FOR REMOVALS. A SHORT SUMMARY IS INCLUDED BELOW:

- “REMOVALS - MISCELLANEOUS”: THIS BID ITEM SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING:
 - LIGHTING TO BE REMOVED AS SHOWN ON THE PLANS.
 - THE EXISTING CONSTANT CURRENT REGULATOR IN THE EXISTING VAULT.
- REMOVALS OF EXISTING RUNWAY LIGHTING AND TAXIWAY LIGHTING SHALL BE COMPLETED DURING THE PRESCRIBED PHASE. THE OTHER EXISTING SYSTEMS SHALL REMAIN OPERATIONAL THROUGH THE DURATION OF THE PROJECT. REGULATORS MAY BE UPGRADED TO THE NEW REGULATOR DURING THE PHASE COMPLEMENTING EQUIPMENT INSTALLATION.
- ANY EQUIPMENT TO BE REMOVED AND REUSED OR OFFERED TO THE OWNER SHALL BE REMOVED CAREFULLY TO PRESERVE IN WORKING CONDITION AND OFFERED TO SPONSOR.
 - ANY EQUIPMENT NOT ACCEPTED BY SPONSOR SHALL BE REMOVED OFF-SITE AND DISPOSED OF BY THE CONTRACTOR.



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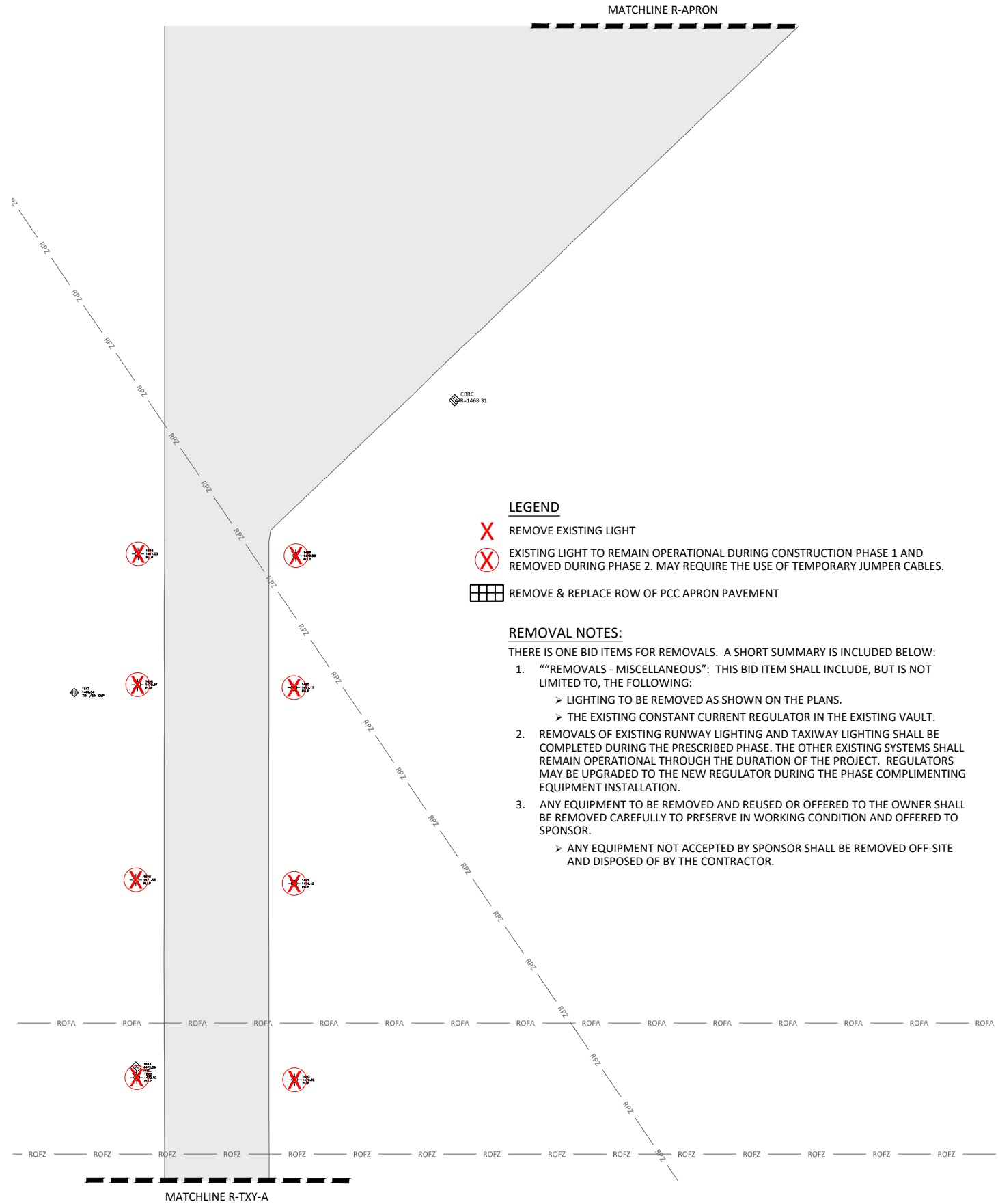
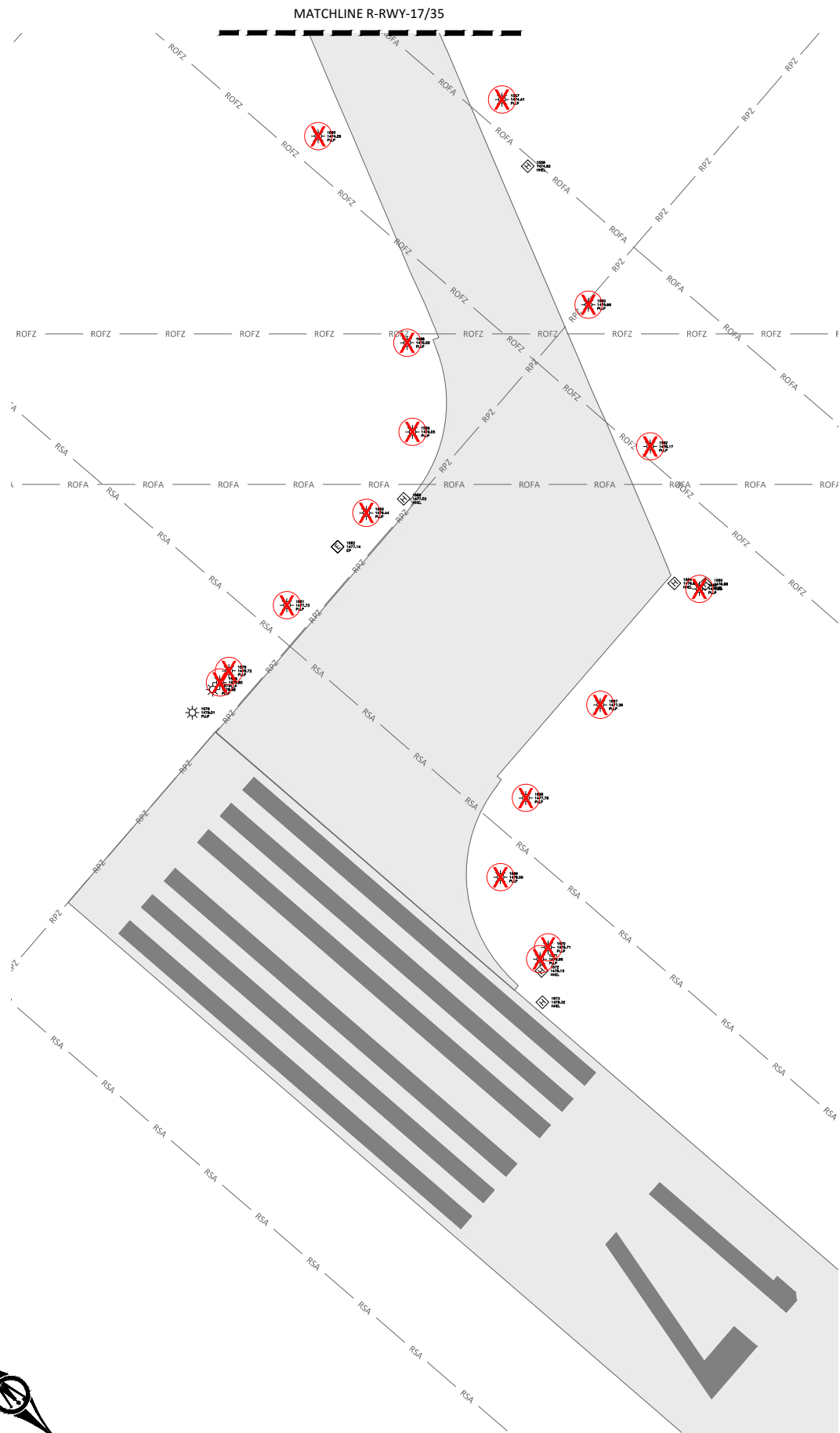
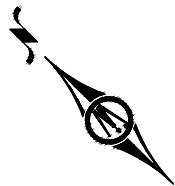
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
EXISTING CONDITIONS & REMOVALS PLAN
RUNWAY STATION 213+50 TO STATION 231+00

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LEGEND

- REMOVE EXISTING LIGHT
- EXISTING LIGHT TO REMAIN OPERATIONAL DURING CONSTRUCTION PHASE 1 AND REMOVED DURING PHASE 2. MAY REQUIRE THE USE OF TEMPORARY JUMPER CABLES.
- REMOVE & REPLACE ROW OF PCC APRON PAVEMENT

REMOVAL NOTES:

THERE IS ONE BID ITEMS FOR REMOVALS. A SHORT SUMMARY IS INCLUDED BELOW:

- “REMOVALS - MISCELLANEOUS”: THIS BID ITEM SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING:
 - LIGHTING TO BE REMOVED AS SHOWN ON THE PLANS.
 - THE EXISTING CONSTANT CURRENT REGULATOR IN THE EXISTING VAULT.
- REMOVALS OF EXISTING RUNWAY LIGHTING AND TAXIWAY LIGHTING SHALL BE COMPLETED DURING THE PRESCRIBED PHASE. THE OTHER EXISTING SYSTEMS SHALL REMAIN OPERATIONAL THROUGH THE DURATION OF THE PROJECT. REGULATORS MAY BE UPGRADED TO THE NEW REGULATOR DURING THE PHASE COMPLEMENTING EQUIPMENT INSTALLATION.
- ANY EQUIPMENT TO BE REMOVED AND REUSED OR OFFERED TO THE OWNER SHALL BE REMOVED CAREFULLY TO PRESERVE IN WORKING CONDITION AND OFFERED TO SPONSOR.
 - ANY EQUIPMENT NOT ACCEPTED BY SPONSOR SHALL BE REMOVED OFF-SITE AND DISPOSED OF BY THE CONTRACTOR.



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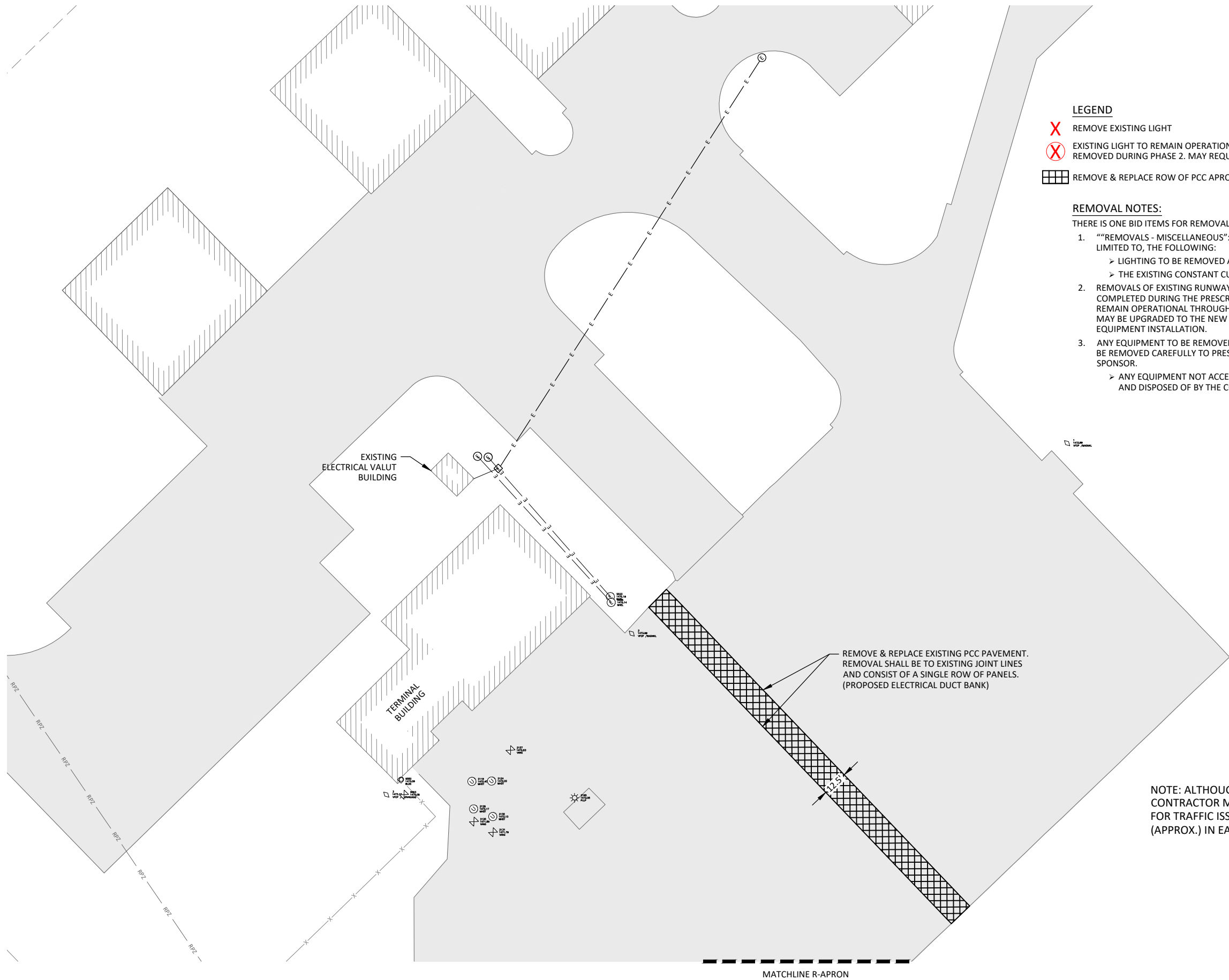
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
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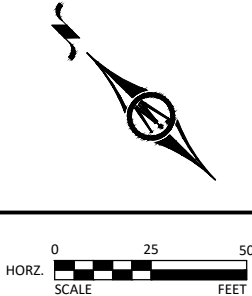
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- LEGEND**
- REMOVE EXISTING LIGHT
 - EXISTING LIGHT TO REMAIN OPERATIONAL DURING CONSTRUCTION PHASE 1 AND REMOVED DURING PHASE 2. MAY REQUIRE THE USE OF TEMPORARY JUMPER CABLES.
 - REMOVE & REPLACE ROW OF PCC APRON PAVEMENT
- REMOVAL NOTES:**
- THERE IS ONE BID ITEMS FOR REMOVALS. A SHORT SUMMARY IS INCLUDED BELOW:
- “REMOVALS - MISCELLANEOUS”: THIS BID ITEM SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING:
 - LIGHTING TO BE REMOVED AS SHOWN ON THE PLANS.
 - THE EXISTING CONSTANT CURRENT REGULATOR IN THE EXISTING VAULT.
 - REMOVALS OF EXISTING RUNWAY LIGHTING AND TAXIWAY LIGHTING SHALL BE COMPLETED DURING THE PRESCRIBED PHASE. THE OTHER EXISTING SYSTEMS SHALL REMAIN OPERATIONAL THROUGH THE DURATION OF THE PROJECT. REGULATORS MAY BE UPGRADED TO THE NEW REGULATOR DURING THE PHASE COMPLEMENTING EQUIPMENT INSTALLATION.
 - ANY EQUIPMENT TO BE REMOVED AND REUSED OR OFFERED TO THE OWNER SHALL BE REMOVED CAREFULLY TO PRESERVE IN WORKING CONDITION AND OFFERED TO SPONSOR.
 - ANY EQUIPMENT NOT ACCEPTED BY SPONSOR SHALL BE REMOVED OFF-SITE AND DISPOSED OF BY THE CONTRACTOR.

NOTE: ALTHOUGH THIS WORK IS SHOWN IN PHASE 2, CONTRACTOR MAY SEPARATE THIS WORK INTO 2 PARTS FOR TRAFFIC ISSUES IF DESIRED, WITH 1/2 OF LENGTH (APPROX.) IN EACH PHASE.

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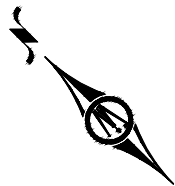
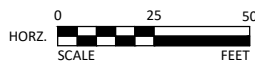
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
EXISTING CONDITIONS & REMOVALS PLAN
APRON & VAULT

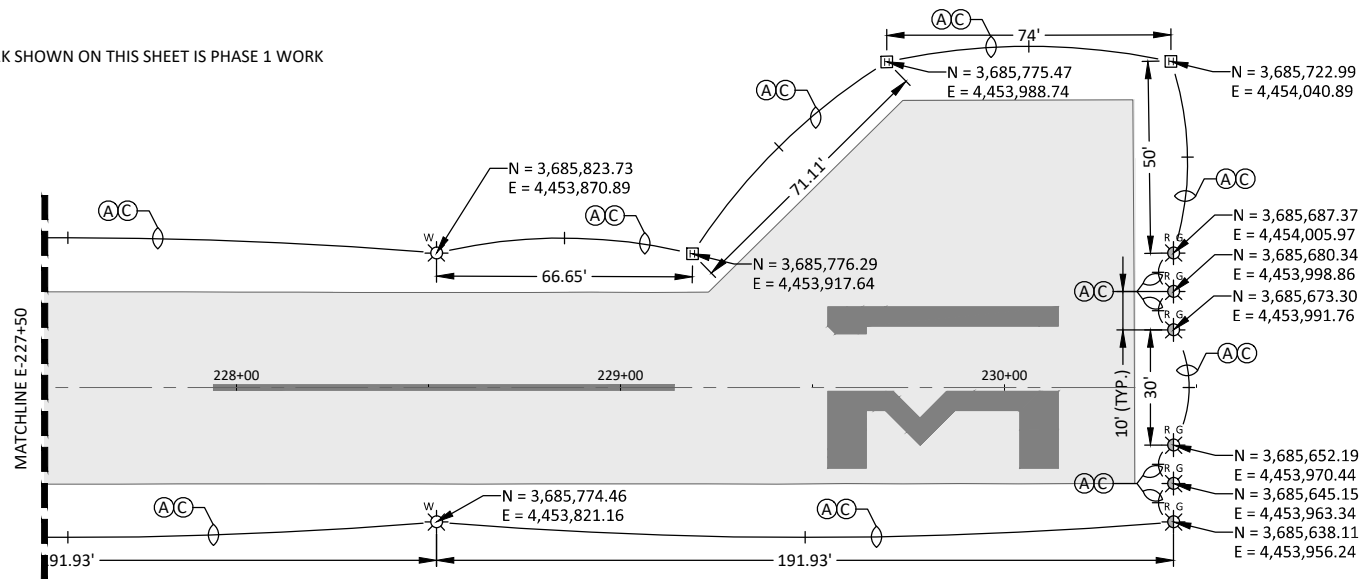
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ALL WORK SHOWN ON THIS SHEET IS PHASE 1 WORK



COLOR LEGEND

- R RED
G GREEN
Y YELLOW/AMBER
W WHITE

LIGHT LEGEND

- ☼ RUNWAY LIGHT (L-861 MIRL)
✱ TAXIWAY LIGHT (L-861 MITL)
☼☼ RUNWAY THRESHOLD LIGHT (L-861SE MIRL)

WIRE/CONDUIT LEGEND

- (A) 1 - 2" PVC CONDUIT WITH (1) #8 5KV L-824 CABLE
(B) 1 - 2" PVC CONDUIT WITH (2) #8 5KV L-824 CABLE
(C) 1 - DIRECT BURY #6 COUNTERPOISE & GROUND RODS
(D) 1 - 2" PVC CONDUIT (SPARE)
(E) 2 - 2" PVC CONDUIT (SPARES)
(F) 4 - 2" PVC CONDUIT (SPARES)
(G) 8 - 2" PVC CONDUIT (SPARES)
— ELECTRICAL CABLE
□ HAND HOLE



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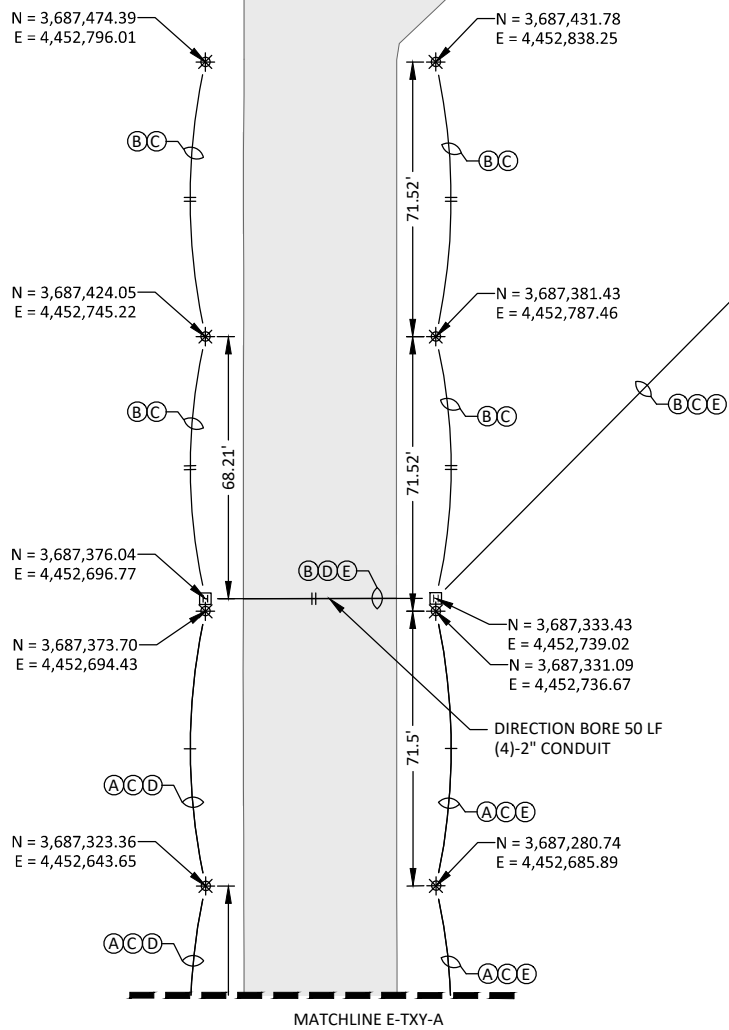
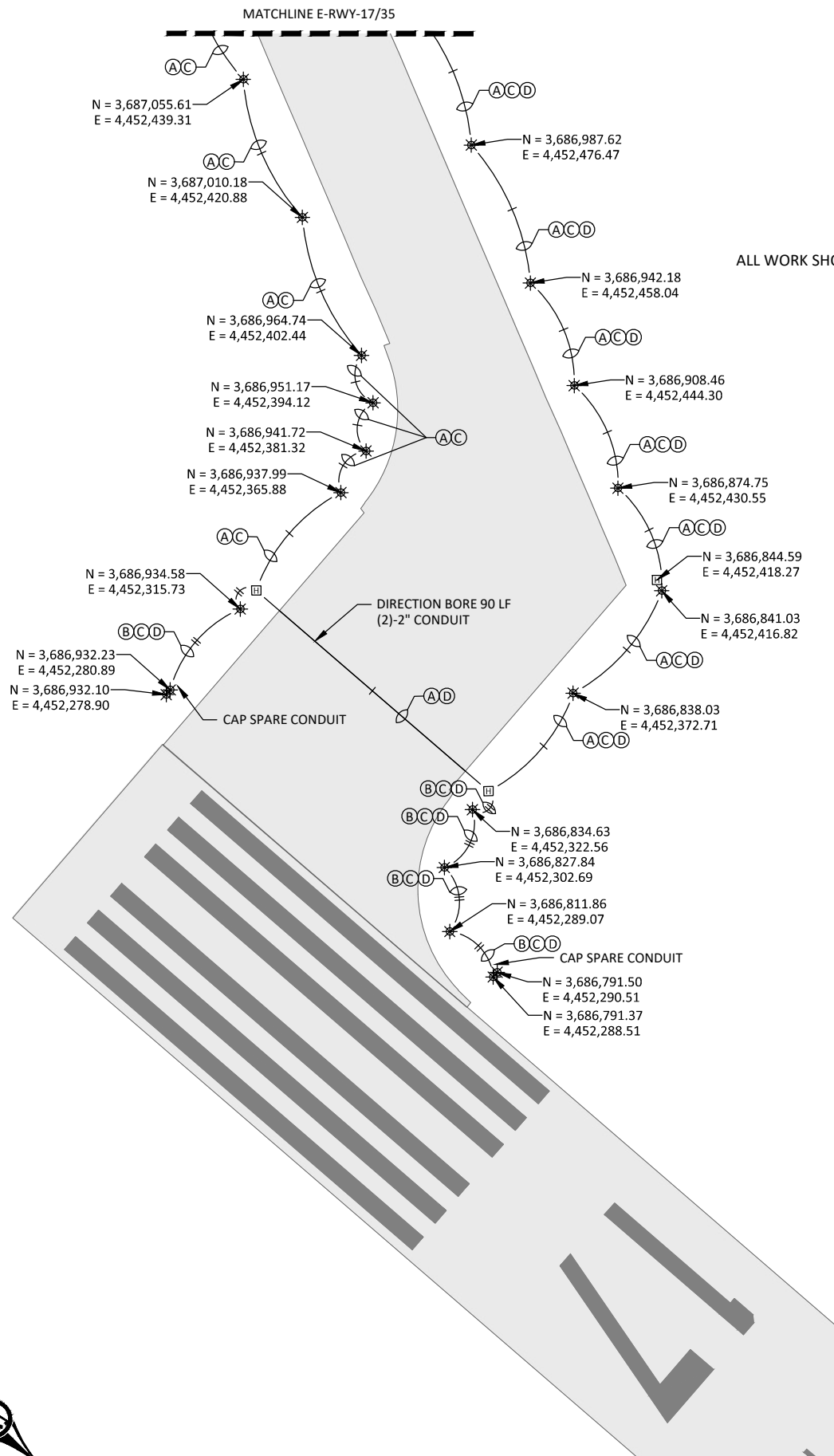
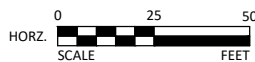
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
ELECTRICAL LAYOUT PLAN
RUNWAY STATION 213+50 TO STATION 231+00

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- COLOR LEGEND**
- R RED
 - G GREEN
 - Y YELLOW/AMBER
 - W WHITE
- LIGHT LEGEND**
- ☼ RUNWAY LIGHT (L-861 MIRL)
 - ✱ TAXIWAY LIGHT (L-861 MITL)
 - ☼☼ RUNWAY THRESHOLD LIGHT (L-861SE MIRL)
- WIRE/CONDUIT LEGEND**
- (A) 1 - 2" PVC CONDUIT WITH (1) #8 5KV L-824 CABLE
 - (B) 1 - 2" PVC CONDUIT WITH (2) #8 5KV L-824 CABLE
 - (C) 1 - DIRECT BURY #6 COUNTERPOISE & GROUND RODS
 - (D) 1 - 2" PVC CONDUIT (SPARE)
 - (E) 2 - 2" PVC CONDUIT (SPARES)
 - (F) 4 - 2" PVC CONDUIT (SPARES)
 - (G) 8 - 2" PVC CONDUIT (SPARES)
 - ELECTRICAL CABLE
 - HAND HOLE



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& MENK**

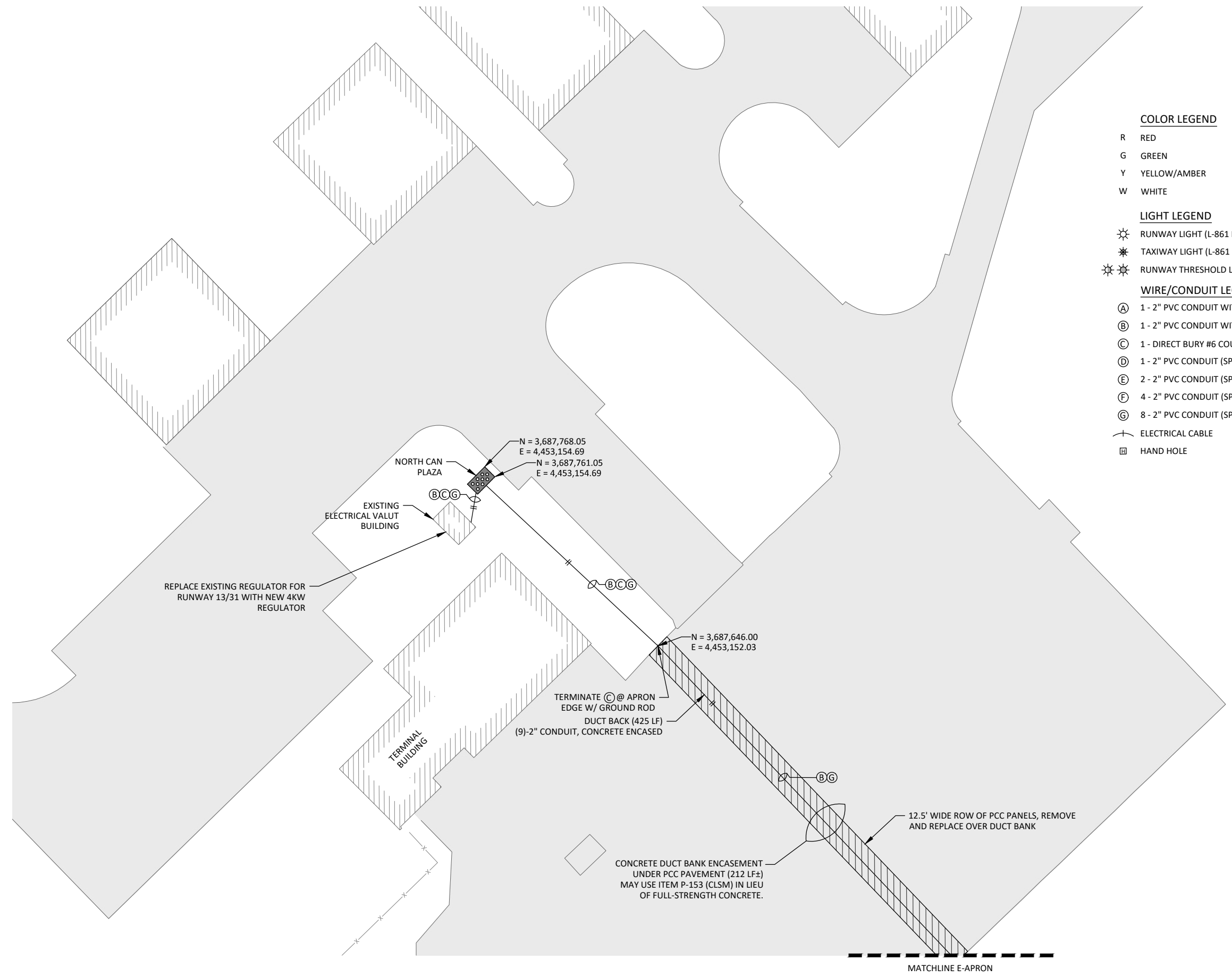
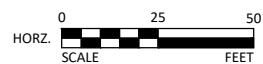
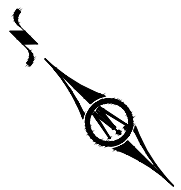
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
ELECTRICAL LAYOUT PLAN
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- COLOR LEGEND**
- R RED
 - G GREEN
 - Y YELLOW/AMBER
 - W WHITE
- LIGHT LEGEND**
- ☼ RUNWAY LIGHT (L-861 MIRL)
 - ✱ TAXIWAY LIGHT (L-861 MITL)
 - ☼☼ RUNWAY THRESHOLD LIGHT (L-861SE MIRL)
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- Ⓐ 1 - 2" PVC CONDUIT WITH (1) #8 5KV L-824 CABLE
 - Ⓑ 1 - 2" PVC CONDUIT WITH (2) #8 5KV L-824 CABLE
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 - Ⓓ 1 - 2" PVC CONDUIT (SPARE)
 - Ⓔ 2 - 2" PVC CONDUIT (SPARES)
 - Ⓕ 4 - 2" PVC CONDUIT (SPARES)
 - Ⓖ 8 - 2" PVC CONDUIT (SPARES)
 - ELECTRICAL CABLE
 - Ⓜ HAND HOLE

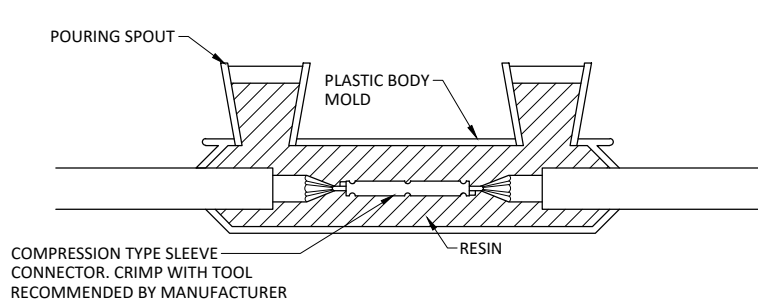


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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
ELECTRICAL LAYOUT PLAN
APRON & VAULT

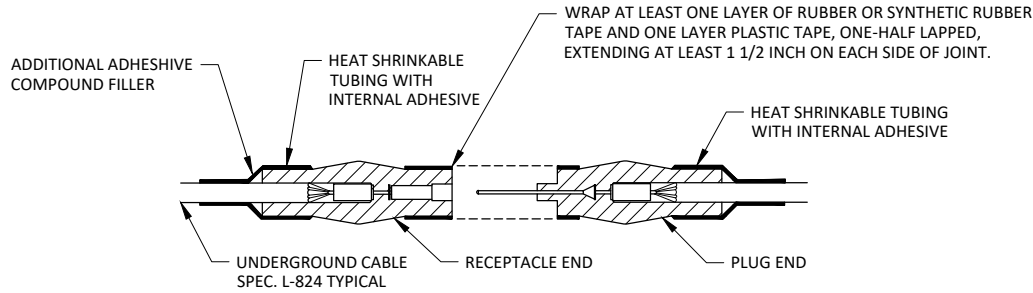
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NOTE:
CONNECTION OF CONDUCTORS MUST BE MADE BY USING CRIMP CONNECTORS AND A CRIMPING TOOL APPROVED BY THE CONNECTOR/LUG MANUFACTURER. THE TOOL MUST PRODUCE A COMPLETE CRIMP BEFORE IT CAN BE REMOVED. THE CRIMPING TOOL USED MUST BE LISTED BY THE L-823 KIT MANUFACTURER. MAKE THE NUMBER AND TYPE OF CRIMPS PER THE KIT MANUFACTURER'S INSTRUCTIONS.

FOR SPLICES IN HOMERUNS AND EXTENSIONS TO EXISTING CABLE ONLY

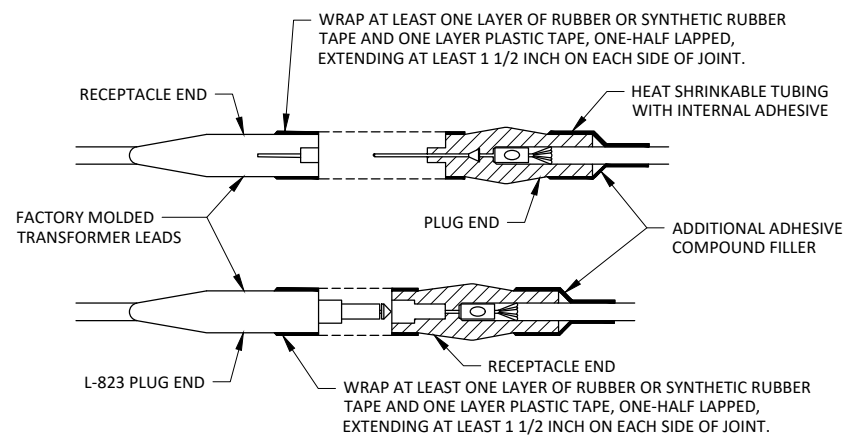
C
E1.01 TYPE A CONNECTION
NOT TO SCALE



NOTE:
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FOR SPLICED FOR USE AT JUNCTION OF HOMERUN WITH LOOP CIRCUIT

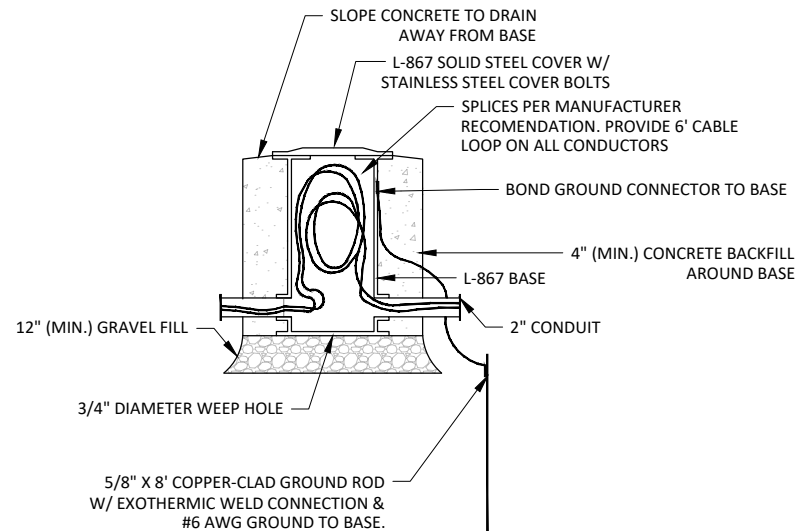
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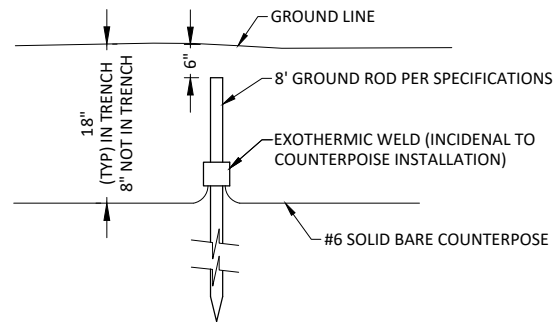
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FOR SPLICES AT TAXIWAY/RUNWAY LIGHTS

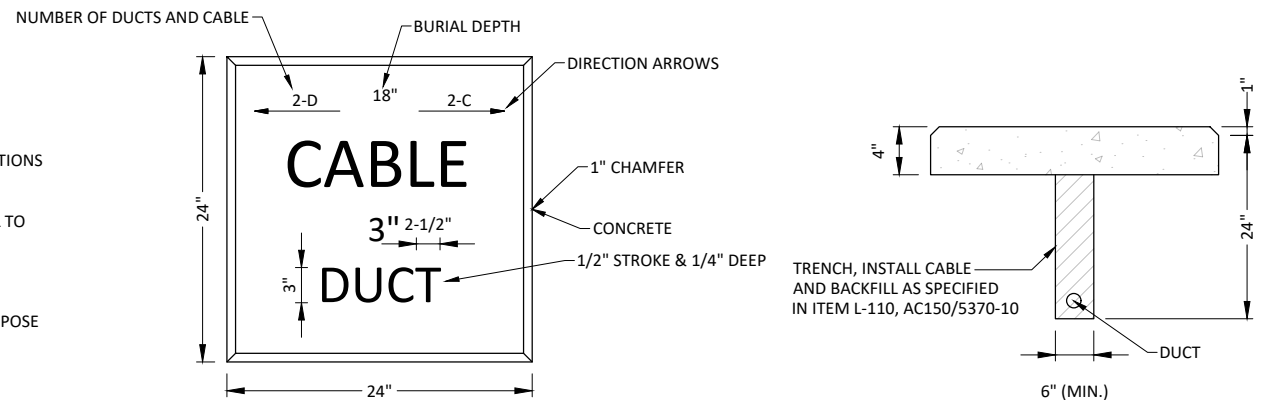
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E1.01 HANDHOLE (TYP.)
NOT TO SCALE

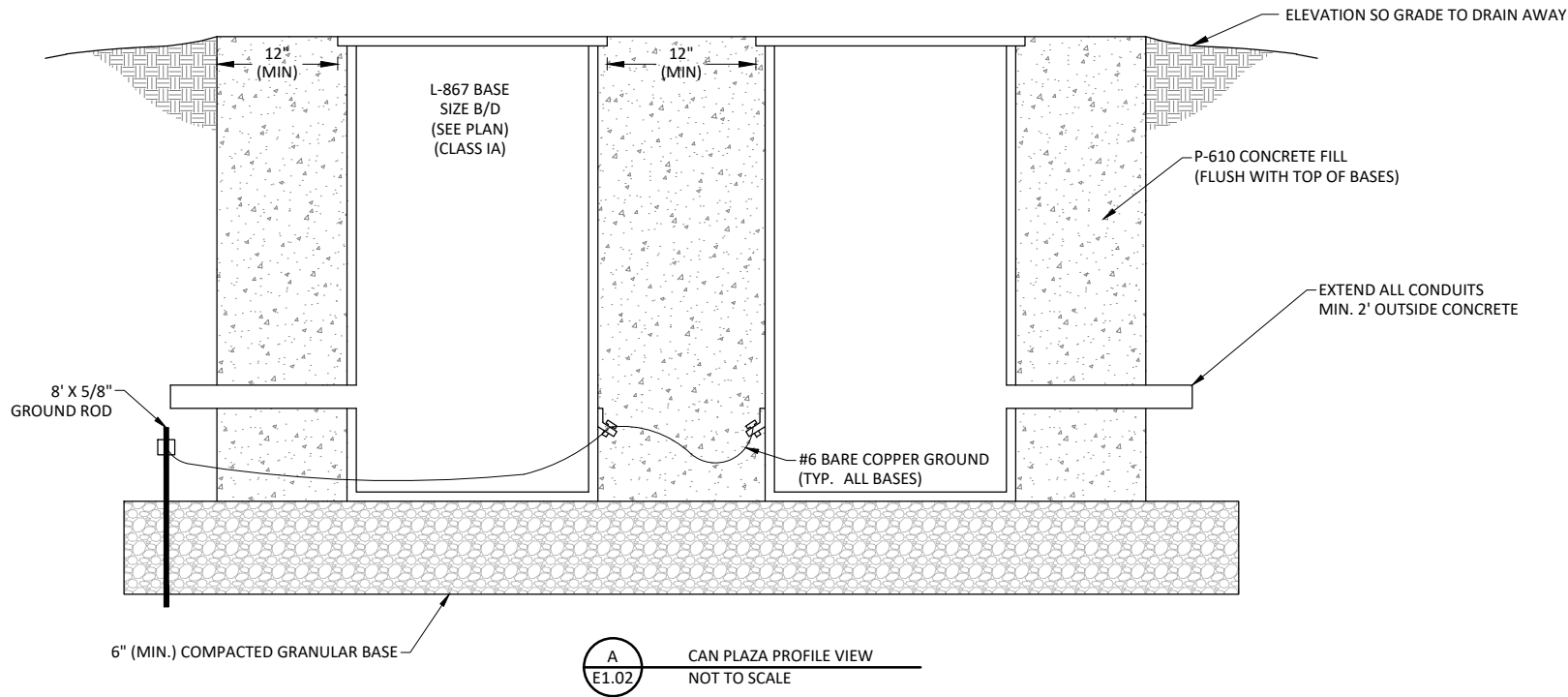


C
E1.01 GROUND ROD DETAIL
NOT TO SCALE



C
E1.01 CONCRETE MARKER DETAIL
NOT TO SCALE

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CAN PLAZA NOTES:

- 1) ALL BASES SHALL BE GROUNDED TOGETHER WITH A #6 SOLID COPPER GROUND AND A 5/8" x 8' COPPER-CLAD GROUND ROD CONCRETE SHALL EXTEND 12" (MIN.) BEYOND OUTER EDGES OF ALL BASES
- 2) CLEAR SPACE BETWEEN EDGES OF ALL BASE COVERS SHALL BE 12" (MIN.) IN ALL DIRECTIONS

GENERAL ELECTRICAL NOTES:

1. GENERAL ELECTRICAL REQUIREMENTS - ALL ELECTRICAL WORK SHALL MEET ALL LOCAL AND NATIONAL CODES. WORK SHALL BE COMPLETED BY CONTRACTORS MEETING RECENTLY UPDATED IOWA STATE REQUIREMENTS FOR USING QUALIFIED PERSONNEL FOR ELECTRICAL WORK. CONTRACTOR SHALL HAVE A CLASS A MASTER'S LICENSE AND A STATE OF IOWA CONTRACTOR'S LICENSE. ALL ELECTRICAL WORK SHALL BE INSPECTED AS NECESSARY BY APPROPRIATE INSPECTOR(S), AND ANY COSTS ASSOCIATED WITH INSPECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CURRENTLY, ELECTRICAL INSPECTIONS ARE CONDUCTED BY THE STATE OF IOWA, WITH A MINIMUM OF 72-HOUR NOTICE TO COMPLETE THE INSPECTION.

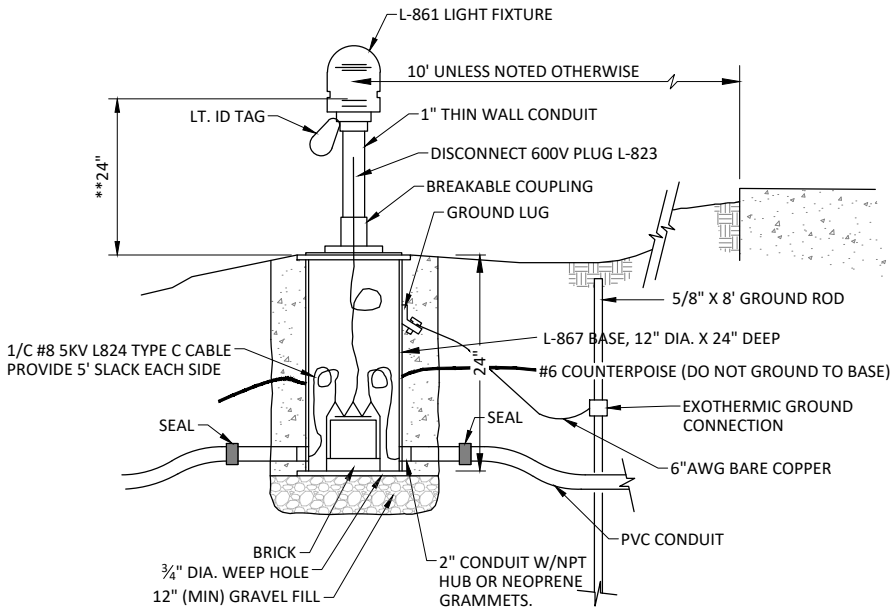
MEASUREMENT OF ANY CONDUIT SHALL END AT THE HANDHOLES AND/OR LIGHT BASES. CABLES SHALL BE MEASURED TO THE CENTER OF EACH HANDHOLE, BUT SLACK NECESSARY FOR SPLICES SHALL NOT BE MEASURED.

ALL WIRING SHALL BE COPPER. ALL UNDERGROUND CONDUIT WILL BE PVC (INCLUDING CONDUIT ENCASED IN CONCRETE), WITH THE EXCEPTION OF CONDUIT BORED UNDER PAVEMENT, WHICH SHALL BE SCHEDULE 80 HDPE. EXPOSED (ABOVE-GROUND) CONDUIT SHALL BE RGS, AND THE RGS SHALL EXTEND TO THE BOTTOM OF EACH SWEEP PRIOR TO TRANSITIONING TO PVC UNDERGROUND.

ALL ELECTRICAL EQUIPMENT INSTALLED IN THIS PROJECT SHALL MEET THE REQUIREMENTS OF THE MOST RECENT VERSION OF THE APPLICABLE FAA ADVISORY CIRCULAR (A.C.) RELATING TO THAT PIECE OF EQUIPMENT. SHOULD THE CONTRACTOR REQUIRE ADDITIONAL INFORMATION ON THE MOST RECENT APPLICABLE STANDARDS, THEY SHALL CONTACT THE ENGINEER FOR ASSISTANCE PRIOR TO ORDERING EQUIPMENT.

2. DUCT MARKERS - DUCT MARKERS, AS SHOWN ON THE PLANS, ARE REQUIRED AT EACH END OF BURIED CONDUITS (IF CONDUITS DON'T END AT HANDHOLES). MARKERS ARE CONSIDERED INCIDENTAL TO THE PRICE OF THE BURIED DUCT, AND NO SEPARATE BID ITEM IS INCLUDED FOR THEM.

3. RESTORATION - THE CONTRACTOR SHALL TOPSOIL, FERTILIZE, SEED, AND MULCH DISTURBED AREAS. COST OF THIS RESTORATION WORK IS CONSIDERED INCIDENTAL AND WILL NOT BE MEASURED FOR PAYMENT.



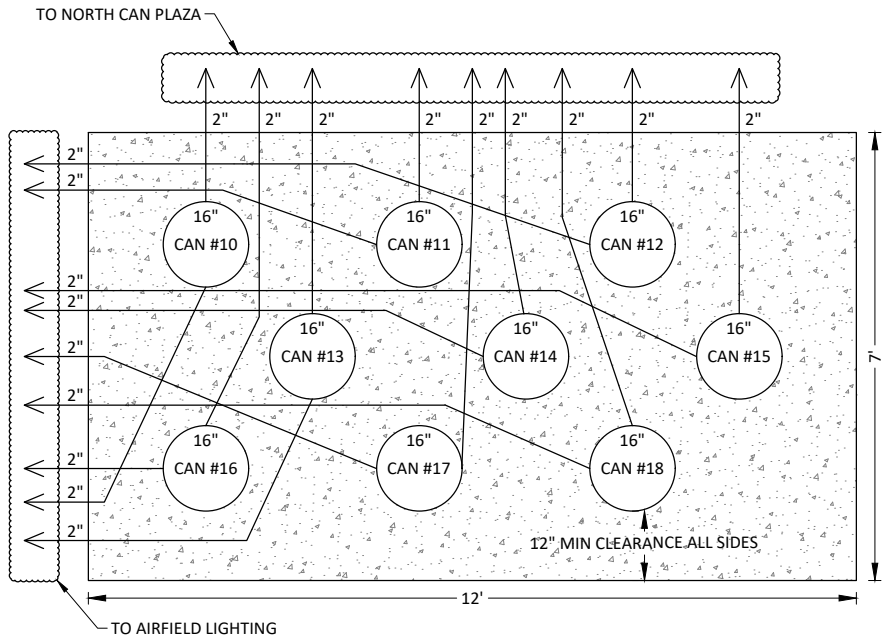
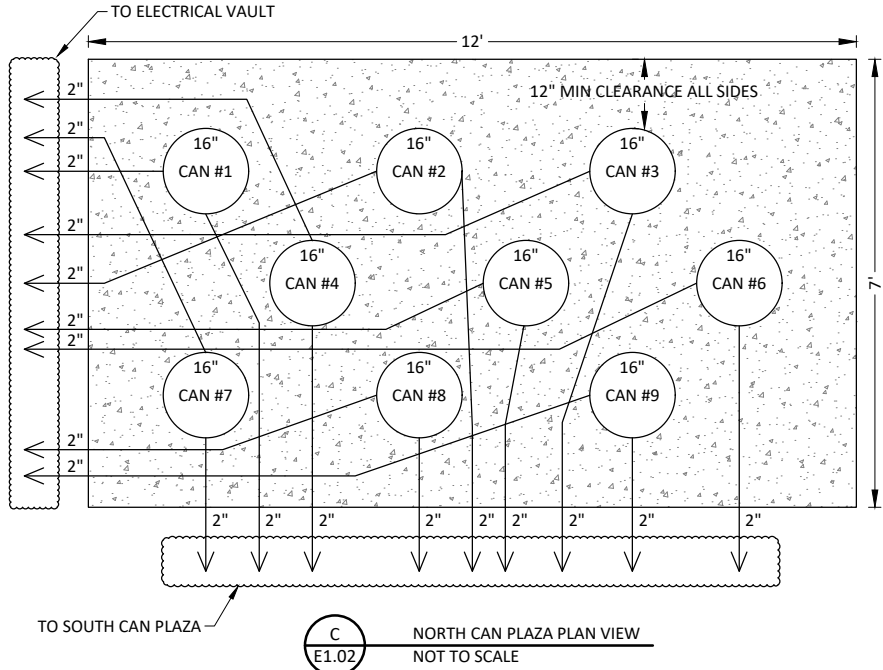
MIRL/MITL NOTE:

LIGHT I.D. TAG TO BE NON-CORROSIVE WITH ENGRAVED PERMANENT NUMBERS. LETTERS TO BE 1 1/2" MIN. HEIGHT. NUMBERING TO BE DETERMINED BY ENGINEER AND OWNER. ATTACH TAG TO LT. WITH NON-CORROSIVE METAL WIRE TIE, SO I.D. CAN BE READ FROM PAVEMENT.

EACH LIGHT SHALL BE GROUNDED BY THE FOLLOWING METHOD. METHOD (SHOWN) IS CONNECT EACH BASE TO A 5/8" X 8' (MIN.) GROUND ROD INSTALLED NEXT TO THE BASE WITH #6 AWG BARE COPPER JUMPER. GROUNDING SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE LIGHTS.

**TOP OF LIGHT SHALL BE 24" ABOVE ADJACENT EDGE OF PAVEMENT, BUT MORE THAN 30" ABOVE BASE COVER.

CAN PLAZA TABLE					
CAN #	CAN SIZE	VOLTAGE	CONDUIT SIZE	PROPOSED PURPOSE	FUTURE PURPOSE
1 & 16	16"	5 KV	2"	SPARE	TAXIWAYS
2 & 17	16"	600 V	2"	RWY 17 REIL	PAPI/REIL/WC 13
3 & 18	16"	600 V	2"	RWY 35 REIL	PAPI/REIL/WC 31
4 & 13	16"	5 KV	2"	RUNWAY 17/35	RUNWAY 17/35
5 & 14	16"	600 V	2"	WINDCONE (WC)	WINDCONE (WC)
6 & 15	16"	600 V	2"	SPARE	SPARE
7 & 10	16"	5 KV	2"	RUNWAY 13/31 & TXY	RUNWAY 13/31
8 & 11	16"	600 V	2"	RWY 17 PAPI	PAPI/REIL/WC 17
9 & 12	16"	600 V	2"	RWY 35 PAPI	PAPI/REIL/WC 35



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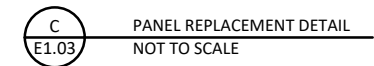
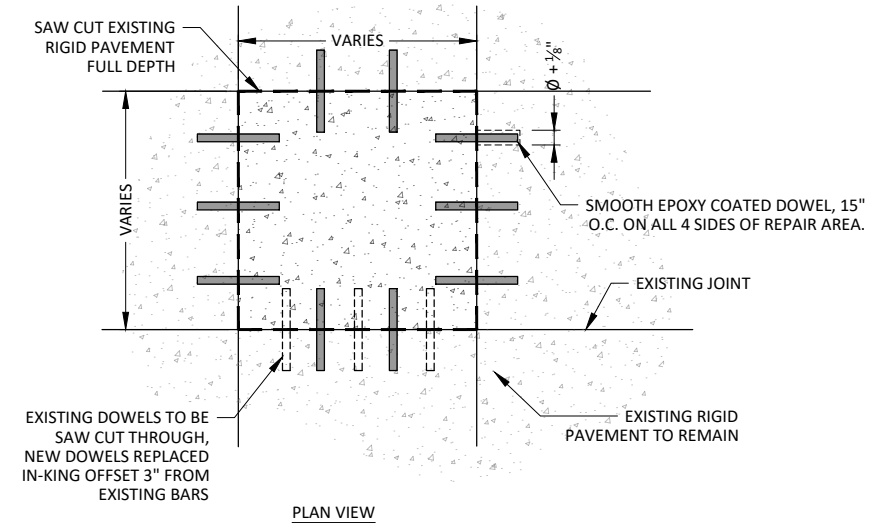
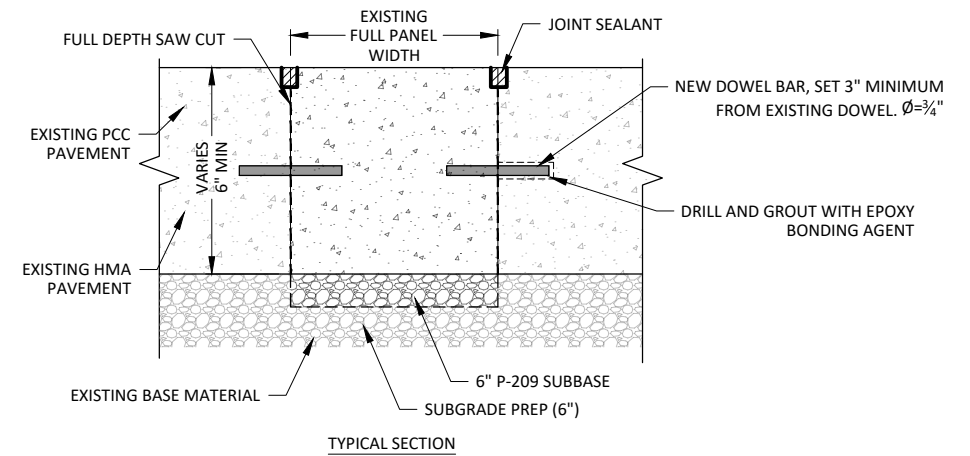
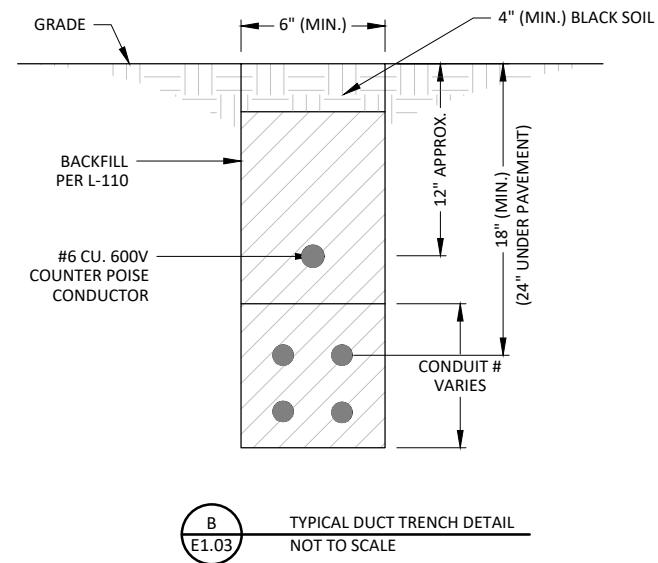
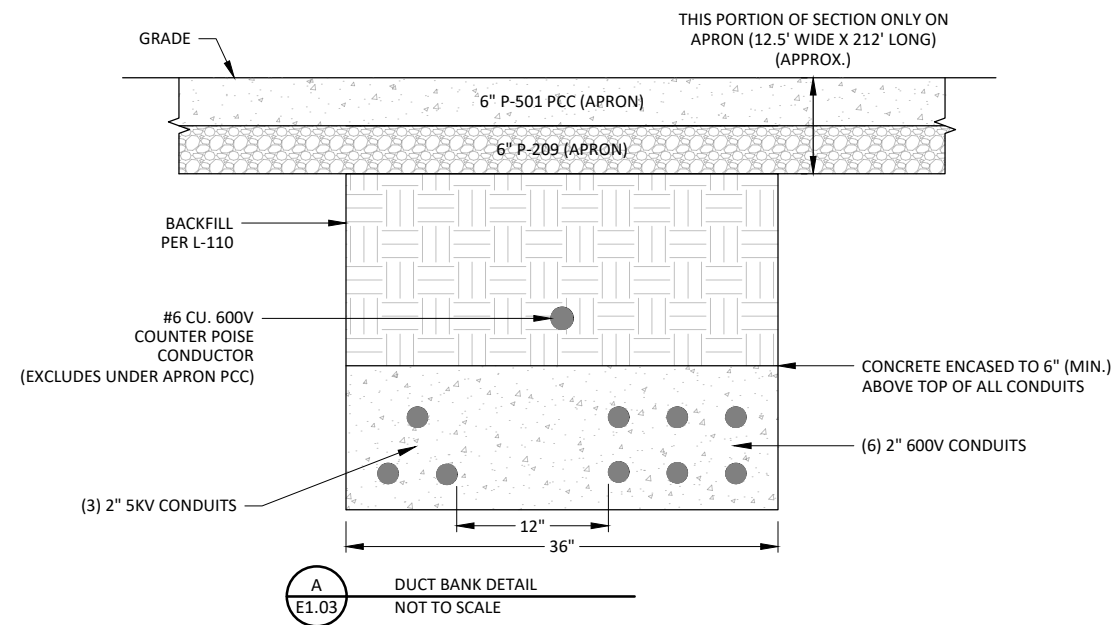
STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT

ELECTRICAL DETAILS & NOTES

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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT

ELECTRICAL DETAILS & NOTES

SHEET

E1.03

PROJECT MANUAL

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

City of Storm Lake

AIP #3-19-0088-014-2020

T51.119823



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CERTIFICATION

PROJECT MANUAL

for

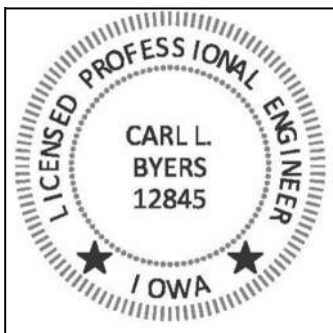
Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

City of Storm Lake

AIP #3-19-0088-014-2020

T51.119823

	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. <u>Carl L. Byers</u> Date: <u>3/10/2020</u> Carl L. Byers License No. 12845 My renewal date is December 31, 2021 Pages or sheets covered by this seal:
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Runway 13/31 Lighting Replacement

BMI # T51.119823

AIP #3-19-0088-014-2020

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PROJECT MANUAL:

Introductory Information, Bidding Requirements, Contract Forms and Conditions of Contract

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INSTRUCTIONS TO BIDDERS
ELECTRONIC/DIGITAL DOCUMENTS
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DISADVANTAGE BUSINESS ENTERPRISE
BUY AMERICAN CERTIFICATION
BID BOND
CONTRACT AGREEMENT
PERFORMANCE BOND
PAYMENT BOND

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Section 30 – AWARD AND EXECUTION OF CONTRACT
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Section 60 – CONTROL OF MATERIALS
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FAA Part 3 – Sitework

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P-152 – EXCAVATION, SUBGRADE, AND EMBANKMENT
P-153 – CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

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P-209 – CRUSHED AGGREGATE BASE COURSE

FAA Part 7 – Rigid Pavement

P-501 – CEMENT CONCRETE PAVEMENT

FAA Part 9 – Miscellaneous

P-605 – JOINT SEALANTS FOR PAVEMENTS

P-610 – CONCRETE FOR MISCELLANEOUS STRUCTURES

FAA Part 13 – Lighting Installation

L-108 – UNDERGROUND POWER CABLE FOR AIRPORTS

L-110 – AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND
CONDUITS

L-115 – ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

L-125 – INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DRAWINGS (UNDER SEPARATE COVER):

16 sheets numbered G0.01 through E1.03, inclusive, dated March 2020, and with each sheet bearing the following general title:

**Runway 13/31 Lighting Replacement
Storm Lake Municipal Airport**

APPENDICES

- Construction Safety and Phasing Plan (CSPP)
- Soil Report
- AC 150/5370-2G - Operational Safety on Airports During Construction

******END OF SECTION****

NOTICE TO BIDDERS

CITY OF STORM LAKE STORM LAKE MUNICIPAL AIRPORT

AIP Project No.: **3-19-0088-014-2020**

Sealed bids subject to the conditions and provisions presented herein will be received by the Owner until **3:00 p.m. CST on April 8, 2020** and then publicly opened and read at **City Hall**, for furnishing all labor, materials and equipment and performing all work necessary to complete: **Runway 13/31 Lighting Replacement**

Copies of the bid documents including project drawings and technical specifications are on file and may be inspected at:

1519 Baltimore Drive, Ames, IA 50010-0688, (515) 233-6100, fax (515)233-4430

TO OBTAIN BID DOCUMENTS: Complete digital project bidding documents are available at www.bolton-menk.com or www.questcdn.com. You may [view](#) the digital plan documents for [free](#) by entering **Quest project #6889482** on the website's Project Search page. Documents may be downloaded for \$0.00. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, viewing, downloading, and working with this digital project information. An optional paper set of project documents is also available for a refundable price of \$20.00 per set (refundable), which includes applicable sales tax and shipping. Any addendums will be mailed or faxed to all planholders. Please make your check to payable to Bolton & Menk, Inc. and send it to 1519 Baltimore Drive, Ames, IA 50010-8783, (515) 233-6100, fax (515) 233-4430

No prebid conference is scheduled for this project

Contract Work Items: This project will involve the following major work items and estimated quantities. Prospective bidders are hereby advised that the quantities indicated herein are approximate and are subject to change per the Section 40 of the General Provisions.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>UNIT</u>
1	MOBILIZATION	1	LS
2	TRAFFIC CONTROL	1	LS
3	PAVEMENT REMOVAL AND REPLACEMENT	294	SY
4	CRUSHED AGGREGATE BASE COURSE	294	SY
5	ELECTRICAL CONDUIT IN TRENCH	8,900	LF
6	CONCRETE ENCASED DUCT BANK	835	LF
7	ELECTRICAL CABLE AND COUNTERPOISE	18,660	LF
8	BORED DUCT	400	LF
9	CAN PLAZAS (HANDHOLES)	2	EA
10	RUNWAY AND TAXIWAY LIGHTS	94	LF
11	ELECTRICAL REGULATOR	1	EA

Contract Time

The owner has established a contract performance time of **40 Working** days from the date of the Notice-to-Proceed. All project work shall be substantially completed within the stated timeframe. This project is subject to liquidated damages as prescribed within the project manual.

Bid Security

Each proposal must be accompanied by a bid guaranty in the amount of **5%** of the total amount of the bid. The bid guaranty may be by certified check or bid bond made payable to **City of Storm Lake**.

Bonding Requirements

The successful bidder will be required to furnish separate performance and payment bonds each in the amount equal to 100% of the contract price at the time of contract execution.

Public Hearing

A public hearing will be held by the *City of Storm Lake* City Council on the proposed contract documents (plans, specifications and form of contract) and estimated cost for the improvement at its meeting at Storm Lake City Hall, 620 Erie Street, Storm Lake, IA 50588 on April 20th, 2020 @ 5:00pm.

Award of Contract

All proposals submitted in accordance with the instructions presented herein will be subject to evaluation. Bids may be held by the *City of Storm Lake* for a period not to exceed **60 (sixty)** days from the date of the bid opening for the purpose of conducting the bid evaluation.

The Owner will base the award of contract upon the lowest aggregate sum proposal submitted from those bidders the Owner confirms as being responsive and responsible. The right is reserved, as the *City of Storm Lake* may require, to reject any and all bids and to waive any informality in the bids received.

Prospective Bidders are hereby advised that award of contract is contingent upon the owner receiving Federal funding assistance under the Airport Improvement Program.

Federal Provisions

This project is subject to the following Federal provisions, statutes and regulations:

Equal Employment Opportunity - Executive Order 11246 and 41 CFR Part 60: The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth within the supplementary provisions. The successful Bidder shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin.

Goals for Minority and Female Participation – Executive Order 11246 and 41 CFR Part 60:

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth within the supplementary provisions.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables:

Goals for minority participation for each trade:	0.4%
Goals for female participation in each trade:	6.9%

These goals are applicable to all of the contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its Federally involved and non-federally involved construction.

Certification of Nonsegregated Facilities – 41 CFR Part 60: A certification of Nonsegregated Facilities must be submitted prior to the award of a federally-assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

Contractors receiving federally assisted construction contract awards exceeding \$10,000, which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause. The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Disadvantaged Business Enterprise – 49 CFR Part 26: The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contracts. In accordance with 49 CFR Part 26.45, the sponsor has established a contract goal of 0.0 percent participation for small business concerns owned and controlled by certified socially and economically disadvantaged enterprise (DBE). The bidder shall make and document good faith efforts, as defined in Appendix A of 49 CFR Part 26, to meet this established goal.

Davis-Bacon Act, as amended – 29 CFR Part 5: The Contractor is required to comply with wage and labor provisions and to pay minimum wages in accordance with the current schedule of wage rates established by the United States Department of Labor.

Debarment, Suspension, Ineligibility and Voluntary Exclusion – 49 CFR Part 29: The bidder certifies, by submission of a proposal or acceptance of a contract, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Individuals or companies listed in the General Services Administration's "Excluded Parties Listing System" will not be considered for award of contract.

Foreign Trade Restriction – 49 CFR Part 30

The Bidder and Bidder's subcontractors, by submission of an offer and/or execution of a contract, is required to certify that it:

- a. Is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. Has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
- c. Has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Buy American Certificate – Aviation Safety and Capacity Act of 1990:

This contract is subject to the "Buy American Preferences" of the Aviation Safety and Capacity Act of 1990. Per Title 49 U.S.C. Section 50101, all steel and manufactured products installed under an AIP assisted project must be produced in the United States unless the Federal Aviation Administration has granted a formal waiver.

As a condition of bid responsiveness, Bidders must complete and submit as part of their proposal the enclosed Buy American certification. Bidder must indicate whether it intends to meet Buy America preferences by only installing steel and manufactured products produced with the United State of America; or if it intends to seek a permissible waiver to the Buy America requirements.

ADDITIONAL PROVISIONS

Modification to the project documents may only be made by written addendum as issued by the Owner or Owner's authorized Representative.

The bidder's proposal must be made on the forms provided within the bound project manual. Bidders must supply all required information prior to the time of bid opening.

SUBMITTAL OF PROPOSALS

Additional information and instruction for submittal of a proposal are provided within the Instructions-to-Bidders. Envelopes containing bids must be sealed and addressed to:

Storm Lake City Hall
620 Erie Street
Storm Lake, IA 50588

The upper left hand corner of the sealed envelope must identify the following information:

CONTRACT PROPOSAL

Bid of _____
for construction improvements at the Storm Lake Municipal Airport
AIP Project No. : 3-19-0088-014-2020
To be opened at: 3:00 p.m. on April 8, 2020

INSTRUCTIONS TO BIDDERS

Owner and Owner's Representative

The Owner as stated herein refers to the following agency: **City of Storm Lake**.

The Owner's authorized representative as stated herein refers to the Owner's Consultant **Bolton & Menk** herein referred to as Engineer.

Bidder Representations

By submittal of a proposal (bid), the BIDDER represents the following:

- The Bidder has read and thoroughly examined the project documents
- The Bidder has a complete understanding of the terms and conditions required for the satisfactory performance of project work.
- The Bidder has fully informed themselves of the project site, the project site conditions and the surrounding area.
- The Bidder has familiarized themselves of the requirements of working on an operating airport and understands the site conditions that may in any manner affect cost, progress or performance of the work
- The Bidder has correlated their observations with that of the project documents.
- The Bidder has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.
- The Bidder is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.
- The Bidder has complied with all requirements of these instructions and the associated bid documents.

Bid Documents/Project Manual

The bid documents are comprised of the following; Notice-to-Bidders, Instructions-to-Bidders, General Provisions, Supplementary Provisions, Technical Specifications, Project Drawings, Construction Safety and Phasing Plan, Proposal Form with attachments, Form of Contract Agreement, any authorized addenda issued by the Owner and any document incorporated in whole or in part by reference therein.

All documents comprising the Bid Documents are complementary to one another and together establish the complete terms, conditions and obligations of the successful bidder.

Those individual elements of the Contract Documents that are bound together shall also be referred to as the Project Manual. No part of the project manual that is bound may be removed or detached.

Prospective bidders may obtain a copy of the project manual and project drawings from the designated office identified within the Notice-to-Bidders.

Modifications to Project Documents

Modifications to the project documents may only be made by written addendum issued by the Owner or the Engineer. Verbal explanations, interpretations or comments made by the Owner or Owner's representative shall not be binding. Addenda will be transmitted to all known official plan holders. Each bidder shall certify at the time of bid submittal that they acknowledge receipt of all issued addenda.

Errors and Discrepancies in Project Documents

Should Bidder find an error, discrepancy, ambiguity or omission in the project documents prior to submittal of a proposal, the Bidder is obligated to contact the Owner or Engineer with written notice of the error, discrepancy, ambiguity or omission. The written notice shall identify the nature and location of the error, discrepancy, ambiguity or omission. Corrections or modifications to the project documents will only be made by written

addendum as prescribed herein. By submittal of a Bid Proposal, Bidder represents that they have thoroughly reviewed the project documents and that they have not identified any error, discrepancy, ambiguity or omission that would affect cost, progress or performance of the project work.

Clarifications and Interpretations

A bidder requiring a clarification or interpretation of the project documents shall make a written request to the Owner or Engineer. The Owner or Engineer must receive the written request a minimum of seven (7) calendar days prior to the date of the bid opening.

Interpretations of Estimated Proposal Quantities

An estimate of quantities of work to be accomplished and materials to be furnished under these specifications is stated within the project manual. This estimate is a result of careful calculations and is believed to be correct. The estimated quantities are given only as a basis for comparison of proposals and the award of contract. The Owner does not expressly or impliedly agree that the actual quantities involved will correspond exactly with the estimated quantities.

The Bidder shall not plead misunderstandings or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as hereinafter provided in the subsection titled "Alteration of Work and Quantities" of the general provisions without in any way invalidating the unit bid prices.

Examination of Plans, Specifications and Site Conditions

As stated within the "Bidder Representations" and reaffirmed herein, the Bidder is expected to carefully examine the site of the proposed work, the proposal, drawings, specifications, terms and conditions of the proposed agreement and the form of agreement. The Bidder shall satisfy themselves as to the character, quality, and quantities of work to be performed, materials to be furnished and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans and specifications.

Boring logs and other records of subsurface investigations and tests, as appropriate may be available for inspection by the Bidder. It is understood and agreed that such subsurface information, whether included in the project drawings, specifications or otherwise made available to the Bidder, was obtained and is intended for the owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that Bidder is solely responsible for all assumptions, deductions, or conclusions which he or she may make from his or her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

Issuance of Proposal Forms

The Owner reserves the right to refuse to issue a proposal form to a prospective bidder should the bidder be in default for any of the following reasons:

- a. Failure to comply with any pre-qualification regulations of the owner, if such regulations are cited or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactory settle, all bills due for labor and materials on former contracts in force (with the owner) at the time the owner issues the proposal to a prospective bidder.
- c. Contractor default under previous contracts with the owner
- d. Unsatisfactory work on previous contracts with the owner

Form of Proposal

All bid proposals shall be made on the forms provided by the Owner within the bound Project Manual. No bidder may submit more than one proposal. All proposals are to be written in ink and shall be clearly legible. All blank spaces in the proposal forms shall be legibly completed for each and every bid item. The Bidder shall not qualify any bid item. The Bidder shall initial any erasures and alterations made on the proposal form by the bidder.

The Bidder shall state the price of their bid in U.S. dollars and cents in both written and numeral format. In the event of a discrepancy, the written value will take precedence.

Signature of Proposal

An authorized representative of the Bidder must sign and date the proposal. The Bidder's authorized representative shall use an ink pen when applying their signature to the proposal. The Bidder's representative shall have the legal authority to obligate and bind the Bidder to the terms and conditions of the contract. The Bidder shall legibly state the name of the Bidder's representative, the legal name of the Bidder, the address of the Bidder including City, State and Zip Code, and the telephone number of the Bidder.

- For bids by corporations, an officer of the corporation shall sign the bid; Bidder shall identify the State of incorporation and affix their corporate seal.
- For bids submitted by an agent, Bidder shall attach to the proposal evidence of the power of attorney.
- For bids submitted by a partnership or joint venture, the proposal shall identify the name of all firms and the authorized parties of all firms. The bidder shall attach a copy of the partnership/joint-venture agreement to the proposal.

Modification or Withdrawal of Bid Proposal

Bidder may modify or withdraw their proposal at any point up to the specified time and date identified for receipt of proposals. Any request for bid withdrawal or modification by the Bidder that is received after the specified time and date for receipt of proposals will be returned unopened to the sender.

Any modification a Bidder desires to make to their proposal, subject to the time constraint noted herein, must be made on the proposal forms contained in the project manual. The Bidder's authorized representative must sign the modification. The modification shall be placed in a sealed envelope and the statement "Modification to Proposal" shall be legibly marked in the upper left hand corner. Withdrawal of a proposal may be made, subject to the time constraint noted herein, only with written confirmation under signature of the Bidder.

Bid Guaranty

Each bid proposal must include a bid guaranty in the amount of five percent (5%) of the total amount of the bid. The bid guaranty may be by bid bond or certified check made payable to the Owner. The bid bond shall be from a responsible surety qualified to conduct business within the State of **Iowa**. If Bidder uses a certified check, the certified check must be issued from a responsible and solvent bank or trust company.

Buy America Preference

As a matter of bid responsiveness, Bidder must indicate within their proposal how they intend to comply with the Buy America preferences established by Title 49 USC 50101. The bidder may choose to certify it will comply with Buy America preferences by only installing steel and manufactured products that are 100% made in the United States; or the bidder may choose to certify that they cannot fully comply with Buy America preferences and thus requests a waiver to Buy America preferences.

A bidder that certifies they will meet Buy America preferences by requesting a waiver also agrees to prepare and submit a formal waiver request and the associated component cost calculation if selected by the owner as the bidder with the apparent low bid. The successful bidder must submit their formal waiver request and component cost calculation to the owner within the timeframe prescribed on the Buy America certification.

Disadvantage Business Enterprise (DBE)

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the City of Storm Lake, Iowa to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders, including those who qualify as a Disadvantaged Business Enterprise.

The Owner has established a DBE contract goal of **3.1%** percent for this contract. The Bidder/Offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26, to subcontract **3.1%** of the dollar value of the prime contract to certified DBE firms as defined in 49 CFR Part 26.

All bidders shall submit the following information with their proposal on the forms provided:

- (1) The names and addresses of DBE firms that will participate in the contract;
- (2) A description of the work that each DBE firm will perform;
- (3) The dollar amount of the participation of each DBE firm participating;
- (4) Written documentation of the Bidder/Offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal;
- (5) Evidence of good faith efforts undertaken by the bidder, as described in appendix A to 49 CFR Part 26.

The successful Bidder will be required to provide written confirmation from the participating DBE firms verifying their intent to participate as in the project. This written confirmation shall be submitted prior to execution of the contract.

Good Faith Efforts (DBE)

Bidder must demonstrate that they made good faith efforts to achieve participation with DBE firms. This requires that the bidder show that it took all necessary and reasonable steps to secure participation by certified DBE firms. The owner will not consider mere pro forma efforts as a good faith effort.

Actions constituting evidence of good faith efforts are described in appendix A to 49 CFR Part 26. Such actions include but are not limited to:

- Soliciting DBE participation through all reasonable and available means. This may include public advertisements and phone calls/faxes to known certified DBE firms.
- Consult State Department of Transportation office to obtain a list of certified DBE firms.
- Selecting portions of work that increases the likelihood that DBE firms will be available to participate
- Providing DBE firms with sufficient information and time to review the project plans and specifications.
- Documenting all contacts with DBE firms. This includes name, address, phone number, date of contact and record of conversation/negotiation.

Bidder Qualifications

Each Bidder shall furnish the owner satisfactory evidence of their competency and financial capability to perform the proposed work. The Bidder shall demonstrate that they are a responsible firm that possesses the skills, abilities, and integrity to faithfully perform the project work. To be determined responsible, a prospective contractor must:

- Have adequate resources (financial, technical, etc.) to perform the contract, or the ability to obtain them;
- Be able to comply with the required or proposed delivery or performance schedule, considering all existing business commitments;
- Have a satisfactory performance record;

- Have a satisfactory record of integrity and business ethics; and
- Be otherwise qualified and eligible to receive an award under applicable laws and regulations.

Evidence of competency shall consist of statements covering the Bidder's past experience on similar work, a listing of plant and equipment immediately available for use on the project, and a listing of key personnel that are available for the project. The listing for plant and equipment shall identify the type, the capacity and the present condition of the item.

Evidence of financial responsibility shall consist of a confidential statement or report of the Bidder's financial resources and liabilities as of the last calendar year. A public accountant must certify such statements and reports. If the Bidder is presently pre-qualified with the State Highway agency, evidence of this pre-qualification may serve as evidence of financial responsibility in lieu of the certified financial statements and reports.

Alternate Bids

Bidder shall complete all blanks provided on the proposal forms. When so permitted by the Owner, the Bidder shall legibly write the statement "No Bid" for those alternate bid options that the Bidder elects not to submit a proposal.

Submission of Bid Proposal

Prospective bidders must submit their proposal to arrive at the office location identified within the Notice-to-bidders at the specified time and date for receipt of bids. The owner will not give consideration to any proposal received after the specified time. Owner will return late proposals in an unopened manner to the return address identified on the envelope.

Prospective bidders shall enclose their proposal in a sealed opaque envelope. The upper left hand corner of the envelope shall be marked as follows:

Sealed Bid Proposal

Bid of _____

For construction improvements at **Storm Lake Municipal Airport**

AIP Project No.: **3-19-0088-014-2020**

To be opened at: **3:00 p.m. Central Time, on April 8, 2020**

For a modification to a previously submitted proposal, insert "Modification to Proposal" in place of "Sealed Bid Proposal"

Bid Protest Procedure

Any potential bidder wishing to file a protest concerning alleged improprieties with this solicitation must submit the protest in written format 72 hours prior to the specified time of the bid opening. The formal written protest must identify the name of vendor contesting the solicitation, the project name and number, and the specific grounds for the protest. All determinations made by the Owner are final. Bidders desiring a complete copy of the Owners protest procedures must make a written request to the Owner.

Bid Opening

The Owner or the Owner's representative will publicly open and read aloud all proposals submitted prior to the stated time and date for receipt of bids. Bidders, their authorized agents, and other interested parties may attend the bid opening. Owner will automatically reject any proposal without consideration that arrives after the stated time and date for receipt of bids. Owner will return late proposals in an unopened manner to the return address indicated on the envelope.

Evaluation of Proposals

The Owner reserves the rights to hold all proposals for purpose of review and evaluation by the Owner for a period not to exceed **Runway 13/31 Lighting Replacement** calendar days from the stated date for receipt of bids. The Owner will tabulate all bids and verify proper extension of unit costs. The Bidder shall honor their proposal for the duration of this period of review and evaluation. The bid guaranty will be held by the Owner until this period of review has expired or a contract has been formally executed or a purchase order has been issued.

Bid Informalities and Irregularities

The Owner reserves the right to waive any informality or irregularity discovered in any proposal, which in the owner's judgment best serves the Owner's interest. In the situation where an extension of a unit price is found to be incorrect, the stated unit price and correct extension will govern. In the event of a discrepancy between the written and numeral values, the written value shall take precedence.

Irregular Proposals

Proposals meeting the following criteria are subject to consideration as being irregular:

1. If the proposal is on a form other than that furnished by the Owner or Owner's representative.
2. If the form furnished by the Owner or Owner's representative is altered or detached from the original document.
3. If there are unauthorized additions, conditional or alternate pay items or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
4. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized pay items, for which the Bidder is not required to furnish a unit price.
5. If the proposal contains unit prices that are obviously unbalanced.
6. If the proposal is not accompanied by the bid guarantee specified herein.

Disqualification of Bid Proposals

The Owner reserves the right to reject any or all bids, as determined to be in the best interest of the Owner.

Causes for rejection of proposals include but are not limited to:

- Submittal of an irregular proposal;
- Submittal of more than one proposal from the same partnership, firm or corporation;
- Failure by Bidder to submit the bid prior to the stated time and date for receipt of bids;
- Failure by Bidder to furnish satisfactory bid guarantee;
- Failure by Bidder to provide all information required of the bid forms;
- Failure by Bidder to comply with the requirements of bid instructions;
- Failure by the Bidder to demonstrate good faith efforts in obtaining participation by certified DBE firms;
- Failure by the Bidder to certify how it intends to meet Buy America requirements (Buy America Certification);
- Determination by the Owner that Bidder is not qualified to accomplish the project work;
- Determination by the Owner that the Bidder has placed conditions on or qualified their proposal;
- Discovery of any alteration, interlineations or erasure of any project requirement by the Bidder;
- Inclusion of the Bidder on the "Excluded Parties Listing System" as maintained and published by the General Services Administration;
- Evidence of collusion among bidders.

Cancellation of Award

At any time prior to execution of a contract agreement, the Owner reserves the right to cancel the award for any reason without liability to the Bidder, with the exception of the return of the bid guaranty, at any time prior to execution of the contract.

Notice of Award of Contract

It is the intent of the Owner, after a period of review and evaluation, to award a contract to the responsible bidder that submits the lowest responsive proposal. The owner will notify the successful bidder their bid is acceptable through the Owner's issuance of a Notice-of-Award. The successful Bidder shall not construe issuance of the Notice-of-Award as a binding agreement. The proper execution of a contract agreement shall serve as the binding agreement.

Federal Funding Assistance

It is the intent of the Owner to seek Federal participation assistance for this project under the Airport Improvement Program (AIP). The Owner's Award of Contract is contingent upon the FAA concurrence with the award and the formal establishment of Federal assistance.

Award of Alternates

Unless specifically stated, the Owner reserves the right to accept alternates in any order or combination, which in the judgment of the Owner, best serves the Owner's interest.

Return of Bid Guaranty

The Owner will return the bid guaranty of the successful Bidder upon successful execution of the contract agreement or issuance of a purchase order. Failure by the successful Bidder to execute the contract documents or commence with the purchase order within the specified time shall result in forfeiture of the bid guaranty.

The Owner will retain the bid guaranty of the second and third lowest responsible bidders for a period of Sixty (60) days after bid opening pending the execution of the contract documents by the successful bidder or the acceptance of the purchase order. Except as noted above, the bid guaranty of unsuccessful bidders will be returned at the point the Owner rejects their proposal.

Contract Agreement

The successful Bidder shall execute the contract agreement in accordance with the accepted bid proposal within thirty (30) days of the date of the Notice-of-Award. Failure to execute the contract agreement within the specified time frame may result in the bid being awarded to the next low bidder and shall result in the forfeiture of the Bidder's bid guarantee as a liquidated damage.

Performance and Payment Bonds

The successful Bidder shall furnish separate performance and payment bonds each in the amount of 100% of the contract price. The bonds shall be made payable to the Owner as security for faithful performance of the contract and for the payment of all persons, firms or corporations to whom the Bidder may become legally indebted for labor, materials, tools, equipment or services in the performance of the project work. The form of the bond shall be that provided within the project manual. The current power of attorney for the person signing the bond as a representative of the surety shall be attached to the bonds.

The successful bidding must deliver the executed bonds to the Owner within fifteen (15) calendar days from the date of contract execution. Bonds should not be executed prior to execution of the contract agreement. Owner will only accept bonds issued by a solvent Surety, which is certified to operate within the State the project work is located and which is listed in the current issue of the U.S. Treasury Circular 570. If specifically requested by the Owner, the successful Bidder shall obtain and submit information on the surety's financial strength rating.

Certificates of Insurance

The successful Bidder shall furnish to the Owner all required certificates of insurance as specified with the project manual.

DBE Affirmation

If not submitted with the proposal, the successful Bidder shall furnish, prior to execution of the contract agreement, written affirmation from each identified Disadvantaged Business Enterprise (DBE) firm of their intent to participate in the project.

Buy America Waiver

If the successful bidder submits a Buy America Certification that indicates they can only meet AIP Buy America preference by requesting a waiver, the bidder must submit to the owner a formal waiver request that indicates the specific percentage of components and subcomponents produced in the United States and whether final assembly occurs within the United States. The successful bidder must also attach to the waiver request a copy of the component cost calculation that demonstrates how the bidder derived the noted percentage value.

Approval of the Contract

The Owner will not enter into a contract with the successful bidder until Owner approves the Bidder's proposed DBE participation and the FAA concurs with any waiver request to Buy America preferences made by the Bidder

Upon receipt of the Contract Agreement, Contract Bonds and Certificate of Insurance as executed from the successful Bidder, the Owner will complete execution of the contract conditioned upon the Owner's judgment that it remains in their best interest to enter into the Agreement.

Delivery of the fully executed Contract Agreement to the successful Bidder shall constitute the Owner's approval to be bound by the successful Bidder's proposal and all terms and conditions of the Contract Agreement. Upon satisfactory execution of the contract by the successful Bidder and the Owner, all references to "Bidder" in the bid documents become equivalent to the term "Contractor".

ELECTRONIC/DIGITAL DOCUMENTS

PART 1 -- GENERAL

1.1 SUMMARY

- A. The Owner or Engineer may elect to provide copies of the contract documents or supplemental information to the Contractor in electronic/digital media format. This section governs the availability, use and limitations of information provided in electronic/digital format.

1.2 FORMAT OF DOCUMENTS AND CONTROLLING CRITERIA

- A. The Agreement identifies the contract documents upon which the Bidder or Contractor may rely. The General Conditions set forth the provisions governing the intent, interpretation and use of the contract documents. This section is intended to augment the Agreement and General Conditions and to clarify limitations on the use of electronic/digital documents.
- B. “Hard Copies” of the Contract Documents consist of complete sets of those documents specifically listed in the Agreement including the version of the plans and specifications that are signed and sealed with original signature (or unalterable and legally acceptable facsimile copy of said signature) denoting the designer’s final intent for bidding purposes. Electronic/digital files in the “Native File Format” are saved in the default file format used by a specific software application. The native file format of an application is proprietary and these types of files are not meant to be transferred to other applications. Electronic/digital files in the native file format may be altered and may not be representative of the paper copies of the documents
- C. For bidding purposes only, Hard Copies of the Contract Documents shall be construed to include electronic/digital files of the Bidding Documents (as defined in Section 00200), prepared by Engineer and provided under direction of Engineer in a Portable Document Format (PDF) format or other file format that is intended by the Engineer and Owner to be unalterable and exactly representative of the information contained in the paper copies of the documents.
- D. The project plans graphically set forth design requirements for the project. These plans are a two-dimensional representation of three-dimensional existing conditions and proposed improvements. Because it is generally impossible to economically or graphically duplicate real world conditions on a two-dimensional plan format, certain approximations, graphical simplifications, intentional or unintentional inaccuracies must generally be used to adequately describe the existing conditions and work to be done on the plans. Because of these graphical compromises, certain dimensions and other supplementary notes and information may be added to the plans to control the specific requirements of the design. Electronic/digital versions of the plans in PDF format, native file format or other electronic file format may imply a spatial accuracy that exceeds the graphical limitations of the original plan set. This is also true of supplementary electronic/digital information developed from the plans or underlying support data (such as layers, hidden lines, survey points or topographic computational networks).
- E. In the event of a conflict between an electronic/digital version of a Contract Document and the Hard Copy of the document, the Hard Copy shall be deemed to govern. Bidders, by submitting a bid, and the Contractor by executing the contract, acknowledge these graphical limitations to the plan development process and accept the controlling nature of the Hard Copies of all project documents as set forth in the General Conditions.

1.3 AVAILABILITY AND USE OF DIGITAL/ELECTRONIC DOCUMENTS

- A. When the Advertisement for Bids or Project Manual indicate that electronic/digital copies of the Plans and Specifications are available, such documents shall be made available to the Bidder or Contractor upon request in PDF format or other file format that is intended by the Engineer and Owner to be unalterable and exactly representative of the information contained in the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of electronic/digital

documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that electronic/digital versions and reproductions prepared from those versions are identical in every manner to the paper copies.

- B. Except as otherwise advised, the Bidder may use and rely upon complete sets of the PDF or other electronic/digital version of the Bidding Documents, prepared by the Engineer and provided under direction of the Engineer, for preparation of its bid. However, Contractor assumes all risks associated with differences arising from transmission/receipt of electronic/digital versions and reproductions prepared from those versions and, further, assumes all risks, costs and responsibility associated with use of the electronic/digital versions to derive information that is not explicitly contained in the paper copies of the documents and for Bidder's reliance upon such derived information.
- C. When using PDF versions of the bidding documents, the Contractor shall prepare its Bid on a printed paper copy of the Bid Form from the PDF file; submit its bid together with all required submittals; and deliver the Bid in the manner described in the bidding documents. The printed copy of the Bid Form shall be clearly legible, printed on 8 ½ inch by 11 inch paper and as closely identical in appearance to the PDF Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the Hard Copy of the Bid Form, providing that all required information and submittals are included with the bid.
- D. After a Contract is awarded, the Owner may provide or direct the Engineer to provide for the use of the Contractor such electronic/digital copies of the contract documents or other support documents in native file formats as may have been previously developed as part of the Project design process. Release of such information, if available, shall be deemed to be solely for the convenience of the Contractor. Unless the Contract Documents explicitly identify that such information shall be available to the successful Bidder, nothing herein shall create an obligation on the part of the Owner or Engineer to provide or create such information and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital data is appropriate and adequate for the Contractor's specific purposes. In no case shall the Contractor be entitled to extra compensation or adjustment in contract time due to claims arising from any differences between the Hard Copies of the Contract Documents and electronic/digital data.
- E. Release of all electronic/digital information requested by the Contractor shall be at the sole discretion of the Owner or Engineer and a separate charge will be made to the Contractor for creation or preparation of such information.
- F. Release of electronic/digital data shall be subject to the herein accompanying form, entitled "REQUEST TO PROJECT ENGINEER FOR ELECTRONIC/DIGITAL DATA AND CONDITIONS OF USE," together with such other limitations as the Owner or Engineer may deem appropriate for the Project. In the event of questions, conflicts, inconsistencies between any the electronic/digital data, the Hard Copies of the Contract Documents shall govern unless otherwise directed in writing by the Owner and Engineer.
- G. In the event that Owner elects to provide or directs the Engineer to provide to the Contractor any Contractor-requested electronic/digital data that is not explicitly identified in the Contract Documents as being available to the successful bidder, the Engineer shall be reimbursed by the Contractor on an hourly basis (at \$120 per hour) for all engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by the Engineer.

******END OF SECTION******

REQUEST TO PROJECT ENGINEER (BOLTON & MENK, INC. "BMI")
FOR ELECTRONIC/DIGITAL DATA AND CONDITIONS OF USE

Project Contractor ("USER"):

Project Owner

Project Name

Description of Data/Files To
Be Provided

City of Storm Lake

Runway 13/31 Lighting Replacement

A. The electronic/digital data covered by this Request was prepared by BMI as an internal working document for its purposes solely and is being provided to USER on an "AS IS" basis without any warranties of any kind, including, but not limited to implied warranties of fitness for any purpose. As such, the USER is advised and acknowledges that the information may not be suitable for the USER's application or may require substantial modification and independent verification by the USER. Information may include intentional or unintentional inaccuracies, approximations, graphical simplifications, undocumented intermediate revisions and other devices that may affect subsequent reuse.

B. The electronic/digital data may not accurately reflect the printed products (also known as Hard Copies) that are signed or sealed by BMI. In the case of conflicts between the signed or sealed documents and electronic/digital data, the Hard Copies shall control. Files in electronic/digital media format of text, data, graphics, or of other types that are provided by BMI to USER are only for convenience of USER. Any conclusion or information obtained or derived from such electronic/digital data will be at the USER's sole risk and the USER waives any claims against BMI or PROJECT OWNER arising from use of electronic/digital data.

C. USER shall indemnify and hold harmless PROJECT OWNER and BMI and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from USER's use, adaptation or distribution of any electronic/digital data provided under this Request.

D. All Documents provided in electronic/digital format are instruments of service and, unless otherwise specifically identified in the Contract between the USER and PROJECT OWNER, are not Contract Documents. BMI shall retain all ownership, copyrights and property interests therein, subject to any agreement between BMI and the PROJECT OWNER. Nothing herein shall be deemed to be a transfer of the ownership rights of BMI or those of the PROJECT OWNER to the USER and USER's rights regarding any information shall be limited those explicitly described in this Request.

E. Although BMI may advise the USER of known errors or required updates in electronic/digital data provided to the USER upon discovery by BMI or notice to BMI of such conditions, the USER agrees that BMI and PROJECT OWNER are under no obligation to notify USER or correct, revise, update or otherwise maintain any electronic/digital data provided to the USER, nor shall the USER be entitled to make any claim for extra compensation or other consideration on account of using such data.

F. USER agrees not to sell, copy, transfer, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of BMI, unless such distribution is specifically identified in this request and is limited to USER's subcontractors. USER warrants that subsequent use by USER'S subcontractors shall comply with all terms of this Request.

G. Provision of this information does not include any license of software or other systems necessary to read, use or reproduce the information. USER assumes all responsibility to obtain any necessary software and appropriate licenses to utilize the information in any format or application.

H. The USER shall compensate BMI in the amount of \$120.00/per hour for all labor and expenses associated with the handling, processing and delivery of the information in an "as is" form or to adapt such information into a form which BMI, in its sole discretion, deems to reasonably reflect the limits of the accuracy or usability of the information. USER acknowledges such compensation shall be deemed to be a data processing fee and is not a design fee or part of the design fees paid by the PROJECT OWNER to BMI.

Accepted by: USER

Printed Name of "USER"

Date

Name and Title of Authorized Representative of USER

Approved: Project Engineer:
(BMI)

Signature of Authorized Representative of USER

Signature of Project Engineer's Representative

Version 04/11/0

Items to be Submitted With the Bid

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

T51.119823

3-19-0088-014-2020

City of Storm Lake

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PROPOSAL FORM
AIP Project: 3-19-0088-014-2020

TO: City Manager
City of **Storm Lake, Iowa**

The undersigned, in compliance with the request for bids for construction of the following Project:

Runway 13/31 Lighting Replacement

hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment to faithfully perform all work required for construction of the Project in accordance with the project manual, project drawings and issued Addenda within the specified time of performance for the following prices:

ITEM	ITEM	UNIT	QUANT	UNIT PRICE	EXTENSION
1	Mobilization	LS	1	\$	\$
2	Traffic Control	LS	1	\$	\$
3	Construction Survey	LS	1	\$	\$
4	Removals - Miscellaneous	LS	1	\$	\$
5	Pavement Removal and Replacement, 6" PCC, with P-209 Granular Base	SY	294	\$	\$
6	No. 8 AWG, 5KV, L-824, Type C Cable, Installed in Trench, Duct Bank, or Conduit	LF	10,135	\$	\$
7	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above Duct Bank or Conduit, Including Ground Rods and Ground Connectors	LF	8,546	\$	\$
8	Locate, Identify, & Mark Existing Airfield Wiring	LS	1	\$	\$
9	Trenching	LF	7,840	\$	\$
10	Concrete Encased Electrical Duct Bank, with (3) 2" Conduits	LF	395	\$	\$
11	Concrete Encased Electrical Duct Bank, with (9) 2" Conduits	LF	440	\$	\$
12	Bored Duct, with (1) 2" Conduits, Complete, in Place	LF	69	\$	\$
13	Bored Duct, with (2) 2" Conduits, Complete, in Place	LF	221	\$	\$
14	Bored Duct, with (4) 2" Conduits, Complete, in Place	LF	50	\$	\$
15	Bored Duct, with (6) 2" Conduits, Complete, in Place	LF	60	\$	\$
16	Non-Encased Electrical Conduit, 2" PVC, in Trench	LF	8,904	\$	\$
17	North Can Plaza, Complete	LS	1	\$	\$
18	South Can Plaza, Complete	LS	1	\$	\$
19	Electrical Handhole, L-867, Size B	EA	15.0	\$	\$
20	L-861T LED Taxiway Edge Light (MITL), Base-Mounted	EA	50.0	\$	\$
21	L-861 LED Runway Edge Light (MIRL), Base-Mounted	EA	26	\$	\$
22	L-861SE LED Runway Threshold Light (MIRL), Base-Mounted	EA	18	\$	\$
23	L-828 Constant Current Regulator, 4 KW, Complete, in Place	EA	1	\$	\$

TOTAL BASE BID (Numeral Format): _____

TOTAL BASE BID (Written Format): _____

ACKNOWLEDGEMENTS BY BIDDER

- a. By submittal of a proposal, the BIDDER acknowledges and accepts that the quantities established by the OWNER are an approximate estimate of the quantities required to fully complete the Project and that the estimated quantities are principally intended to serve as a basis for evaluation of bids. The BIDDER further acknowledges and accepts that payment under this contract will be made only for actual quantities and that quantities will vary in accordance with the General Provisions subsection entitled "Alteration of Work and Quantities".
- b. The BIDDER acknowledges and accepts that the Bid Documents are comprised of the documents identified within the Instructions to Bidders. The BIDDER further acknowledges that each the individual documents that comprise the Bid Documents are complementary to one another and together establishes the complete terms, conditions and obligations of the successful BIDDER.
- c. As evidence of good faith in submitting this proposal, the undersigned encloses a bid guaranty in the form of a certified check or bid bond in the amount of 5% of the bid price. The BIDDER acknowledges and accepts that refusal or failure to accept award and execute a contract within the terms and conditions established herein will result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- d. The BIDDER acknowledges and accepts the OWNER'S right to reject any or all bids and to waive any minor informality in any Bid or solicitation procedure.
- e. The BIDDER acknowledges and accepts the OWNER'S right to hold all Proposals for purposes of review and evaluation and not issue a notice-of-award for a period not to exceed **Runway 13/31 Lighting Replacement** calendar days from the stated date for receipt of bids.
- f. The undersigned agrees that upon written notice of award of contract, he or she will execute the contract within thirty (30) days of the notice-of-award and furthermore and provide executed payment and performance bonds within fifteen (15) days from the date of contract execution. The undersigned accepts that failure to execute the contract and provide the required bonds within the stated timeframe shall result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- g. Time of Performance: By submittal of this proposal, the undersigned acknowledges and agrees to commence work within ten (10) calendar days of the date specified in the written "Notice-to-Proceed" as issued by the OWNER. The undersigned further agrees to complete the Project within **15 Working** days from the commencement date specified in the Notice-to-Proceed.
- h. The undersigned acknowledges and accepts that for each and every Calendar/Working day the project remains incomplete beyond the contract time of performance, the Contractor shall pay the non-penal amount of Runway 13/31 Lighting Replacement per Calendar/Working day as a liquidated damage to the OWNER.
- i. The BIDDER acknowledges that the OWNER has established a contract Disadvantaged Business Enterprise goal of 0.0% for this project. The BIDDER acknowledges and accepts the requirement to apply and document good faith efforts, as defined in Appendix A, 49 CFR Part 26, for subcontracting a portion of the prime contract to certified Disadvantaged Business Enterprises (DBE), as defined in 49 CFR Part 26 for purposes of meeting the OWNER'S established goal. The BIDDER, in complying with this requirement, proposes participation by Disadvantaged Business Enterprises as stated on the attached forms, "Utilization Statement" and "Letter of Intent"
- j. The BIDDER, by submission of a proposal, acknowledges that award of this contract is subject to the provisions of the Davis-Bacon Act. The BIDDER accepts the requirement to pay prevailing wages for each classification and type of worker as established in the attached wage rate determination as issued by the United States Department of Labor. The BIDDER further acknowledges and accepts their requirement to incorporate the provision to pay the established prevailing wages in every subcontract agreement entered into by the Bidder under this project.
- k. Compliance Reports (41 CFR Part 60-1.7): Within 30 days after award of this contract, the Contractor/Subcontractor shall file a compliance report (Standard Form 100) if s/he has not submitted a complete compliance report within 12 months proceeding the date of award. This report is required if the Contractor/Subcontractor meets all of the following conditions:
 1. Contractors/Subcontractors are not exempt based on 41 CFR 60-1.5.
 2. Has 50 or more employees.
 3. Is a prime contractor or first tier subcontractor.
 4. There is a contract, subcontract, or purchase order amounting to \$50,000 or more
- l. The undersigned acknowledges receipt of the following addenda:

Addendum Number ____ dated _____	Received _____
Addendum Number ____ dated _____	Received _____
Addendum Number ____ dated _____	Received _____

a. REPRESENTATIONS BY BIDDER

By submittal of a proposal (bid), the BIDDER represents the following:

- a. The BIDDER has read and thoroughly examined the bid documents including all authorized addenda.
- b. The BIDDER has a complete understanding of the terms and conditions required for the satisfactory performance of project work.
- c. The BIDDER has fully informed themselves of the project site, the project site conditions and the surrounding area.
- d. The BIDDER has familiarized themselves of the requirements of working on an operating airport and understands the conditions that may in any manner affect cost, progress or performance of the work
- e. The BIDDER has correlated their observations with that of the project documents.
- f. The BIDDER has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.
- g. The BIDDER is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.
- h. The BIDDER has complied with all requirements of these instructions and the associated project documents.

b. CERTIFICATIONS BY BIDDER

- a. The undersigned hereby declares and certifies that the only parties interested in this proposal are named herein and that this proposal is made without collusion with any other person, firm or corporation. The undersigned further certifies that no member, officer or agent of OWNER'S has direct or indirect financial interest in this proposal.
- b. **Certification of Non-Segregated Facilities: (41 CFR Part 60-1.8)**
The BIDDER, as a potential federally-assisted construction contractor, certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The BIDDER certifies that it will not maintain or provide, for its employees, segregated facilities at any of its establishments and that it will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause, which is to be incorporated in the contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The Bidder agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that it will retain such certifications in its files.

c. Trade Restriction Certification: (49 CFR Part 30)

The Bidder, by submission of an offer certifies that it:

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
2. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
3. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

d. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion: (49 CFR Part 29)

The Bidder certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

e. Buy American Certification: (Title 49 U.S.C. Chapter 501)

As a condition of bid responsiveness, the bidder must how it intend to comply with the Buy American preferences established under Title 49 U.S.C. Section 50101. Bidder must complete the attached Buy American certification. If the bidder requests a permissible waiver to the Buy America requirements, the Bidder identified as with the successful bid must submit a formal waiver request and component cost calculation within the prescribed time identified on the Buy America certification.

c. ATTACHMENTS TO THIS BID

The following documents are attached to and made a part of this Bid:

1. Bid Guaranty in the form of _____;
2. Evidence of BIDDER'S qualifications per the requirements of the Instructions-to-Bidders.

d. SIGNATURE OF BIDDER

IF AN INDIVIDUAL:

Name: _____

By: _____
(Signature of Individual)

Doing Business as: _____

Business Address: _____

Telephone Number: _____

IF A PARTNERSHIP:

Partnership Name: _____

By: _____
(Authorized Signature)
(Attach Evidence of Authority to sign as a Partnership)

Name and Title: _____

Business Address: _____

Telephone Number: _____

IF A CORPORATION:

Corporation Name: _____

By: _____
(Authorized Signature)
(Attach Evidence of Authority to sign)

Name and Title: _____

Business Address: _____

(CORPORATE SEAL)

Telephone Number: _____

ATTEST:

By: _____
(Authorized Signature)

Name and Title: _____

IF A JOINT VENTURE: *(Attach copy of Joint Venture Agreement)*

Joint Venture Name: _____

By: _____
(Authorized Signature)
(Attach Evidence of Authority to sign)

Name and Title: _____

Business Address: _____

Telephone Number: _____

Joint Venture Name: _____

By: _____
(Authorized Signature)
(Attach Evidence of Authority to sign)

Name and Title: _____

Business Address: _____

Telephone Number: _____

Buy America Waiver Request

Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

Type of Waiver Request:

The bidder may request a waiver subject to the provisions of Section 50101(b)(3) or Section 50101(b)(4). The bidder may not request a waiver under Section 50101(b)(1) or Section 50101(b)(2). Bidder is hereby advised that the Owner's approval with the bidder's waiver request is contingent upon FAA approval. The bidder must select one of the following applicable waiver provisions:

- ☐ **Section 50101(b)(3):** Bidder hereby requests a waiver to Buy America preferences based upon Section 50101(b)(3) for the equipment identified below. The bidder certifies that _____ % of the cost of components and subcomponents comprising the equipment are produced in the United States and that final assembly occurs within the United States. *(Bidder must attach a copy of the component cost calculation table)*

Equipment: _____

- ☐ **Section 50101(b)(4):** Bidder hereby requests a waiver to Buy America preferences based upon Section 50101(b)(4). The bidder asserts provision of domestic material increases the cost of the overall project by more than 25%. *(Note: This type of waiver is very rare)*

Certification Signature

In accordance with Section 50101(b), we request a waiver to the Buy America provisions based on the above certification and attached documentation.

Bidder's Firm Name

Date

Signature

e. Instructions for Section 50101(b)(3) Waiver:

1. "Equipment" in Section 50101 shall mean the following:
 - a) Individual type "L" items (Airfield Lighting Equipment) as listed in FAA Advisory Circular 150/5345-53.
 - b) Individual bid items as established within FAA Advisory Circular 150/5370-10. The bid item application may not be applied for the type "L" items listed in AC 150/5345-53.
 - c) A waiver request may only address one specific equipment item. Submit separate requests for each equipment item for which a waiver.
 - d) Items listed under the Nationwide Waiver do not require further review. Please refer to the following webpage:
http://www.faa.gov/airports/aip/procurement/federal_contract_provisions/media/buy_american_waiver.xls
2. The bidder must base the U.S. percentage upon the value that results from completing a component cost calculation table similar to the attached format. Bidder shall avoid mere pro forma efforts to establish the waiver request percentage. The Bidder must submit the component cost calculation table as an attachment to the waiver request.
3. Components/subcomponents are the material and products composing the "equipment".
4. The final assembly of the AIP-funded "equipment" must be within the USA (*Section 50101(b)(3)(B)*). Final assembly is the substantial transformation of the components and subcomponents into the end product.
5. All steel used in the "Equipment" must be produced in the United States.
6. The Buy American requirements apply to all tier contractors and subcontractors. All contractors/subcontractors are required to provide appropriate documentation that indicates origin of manufacturer and percentage of domestic made product.
7. The bidder is hereby advised there is no implied or expressed guarantee that a requested waiver will be issued by the Federal Aviation Administration (FAA). Less than 60% USA component/subcomponent proposed for this facility CANNOT be waived. Products made with foreign steel are not eligible for a waiver.

f. Instructions for Section 50101(b)(4) Waiver:

1. The 25% cost increase waiver is rarely applicable. Consult Owner before making this request.

g. North America Free Trade Act (NAFTA)

The NAFTA **does not** apply to the AIP. Products and material made in Canada or Mexico must be considered as foreign made products.

COMPONENT COST CALCULATION TABLE

- In lieu of completing this table, bidder may prepare a spreadsheet that addresses the same information and calculations as presented herein.
- An authorized person shall attest under signature and date that the submitted information is accurate and complete.
- The bidder/contractor shall submit the signed component cost calculation table to the Owner as an attachment to the waiver request
- The component breakout shall be along major components of the equipment.
- Submit separate calculation for each different equipment types. Do not combine the component cost calculations of different types of equipment.
- For Airfield development projects, equipment is defined as the "L" items (Airfield Lighting Equipment) as listed in FAA Advisory Circular 150/5345-53 and the b) individual bid items as established within FAA Advisory Circular 150/5370-10. The individual bid item method may not be applied to the "L" type items.

Equipment Type: _____

Component/Subcomponents	Name of Manufacturer	Country of Origin	Cost of Foreign Manufactured Components/Subcompon ents	Cost of USA Manufactured Components/Subcom ponents

Sum of US Manufactured Component/Subcomponent Costs: _____

Sum of all Equipment Components and Subcomponents: _____

Percentage of Equipment Components Manufactured in the United States: _____

Place of Final Assembly: _____

Certification Signature

I hereby certify the above information is accurate and complete.

Bidder's Firm Name

Date

Signature

Buy America Conformance Listing
Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

- *Preparation of a Component Cost Calculation Table is not necessary for equipment listed on the FAA national listing: http://www.faa.gov/airports/aip/procurement/federal_contract_provisions/media/buy_american_waiver.xls*
- *Bidder shall submit a listing of equipment it proposes to install on the project that is included on the current National Buy American conformance list.*

Equipment Type	Name of Manufacturer	Product Number

Certification Signature:

Bidder hereby certifies that the above listed equipment, which we propose for installation on the subject project, are on the current National Buy America Conformance list on the website listed above.

I hereby certify the above information is accurate and complete.

Bidder's Firm Name

Date

Signature

UTILIZATION STATEMENT

Disadvantage Business Enterprise

The undersigned bidder/offeror has satisfied the requirements of the bid specification in the following manner. *(Please mark the appropriate box)*

- ☐ The bidder/offeror is committed to a minimum of _____% DBE utilization on this contract.
- ☐ The bidder/offeror, while unable to meet the DBE goal of 3.4%, hereby commits to a minimum of _____% DBE utilization on this contract and also submits documentation, as an attachment demonstrating good faith efforts (GFE).

The undersigned hereby further assures that the information included herein is true and correct, and that the DBE firm(s) listed herein have agreed to perform a commercially useful function in the work items noted for each firm. The undersigned further understands that no changes to this statement may be made without prior approval from the Civil Right Staff of the Federal Aviation Administration.

Bidder's/Offeror's Firm Name

Signature

Date

DBE UTILIZATION SUMMARY

<u>Percentage</u>	<u>Contract Amount</u>	<u>DBE Amount</u>	<u>Contract</u>
DBE Prime Contractor	\$ _____ x 1.00 =	\$ _____	_____ %
DBE Subcontractor	\$ _____ x 1.00 =	\$ _____	_____ %
DBE Supplier	\$ _____ x 0.60 =	\$ _____	_____ %
DBE Manufacturer	\$ _____ x 1.00 =	\$ _____	_____ %
Total Amount DBE		\$ _____	_____ %
DBE Goal		\$ _____	_____ %

Note: If the total proposed DBE participation is less than the established DBE goal, Bidder must provide written documentation of the good faith efforts as required by 49 CFR Part 26.

LETTER OF INTENT
Disadvantage Business Enterprise
(This page shall be submitted for each DBE firm)

Bidder/Offer

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

DBE Firm:

DBE Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

DBE Contact Person:

Name: _____ Phone: (____) _____

DBE Certifying Agency:

_____ Expiration Date: _____

Each DBE Firm shall submit evidence (such as a photocopy) of their certification status.

Classification:
Venture

☐ Prime Contractor

☐ Subcontractor

☐ Joint

☐ Manufacturer

☐ Supplier

Work item(s) to be performed by DBE	Description of Work Item	Quantity	Total

The bidder/offeror is committed to utilizing the above-named DBE firm for the work described above. The estimated participation is as follows:

DBE contract amount: \$ _____ Percent of total contract: _____%

AFFIRMATION:

The above-named DBE firm affirms that it will perform the portion of the contract for the estimated dollar value as stated above.

By: _____
(Signature) (Title)

Note: In the event the bidder/offeror does not receive award of the prime contract, any and all representations in this Letter of Intent and Affirmation shall be null and void.

IDENTITY OF BIDDER

The bidder shall indicate whether the bid is Submitted by a/an:

☐ Individual,
Sole Proprietorship

Bidder

☐ Partnership

Signature

☐ Corporation

By

Name (Print/Type)

☐ Limited Liability Company

Title

☐ Joint-venture; all parties must join-in and
execute all documents

Street Address

☐ Other

City, State, Zip Code

The bidder shall enter its Public
Registration Number ____ - ____
issued by the Iowa Commissioner of Labor
Pursuant Section 91C.5 of the Iowa Code.

Telephone Number

**Type or print the name and title of the company's
owner, president, CEO, etc. if a different person
than entered above**

Failure to provide said Registration
Number shall result in the bid being read
under advisement. A contract will not be
executed until the Contractor is registered.

Name

Title

**NOTE: The signature on this proposal must be an original signature in ink; copies, facsimiles, or
electronic signatures will not be accepted.**

All bidders must submit the following completed form to the governmental body requesting bids per 875 Iowa Administrative Code Chapter 156.

Bidder Status Form

To be completed by all bidders

Part A

Please answer "Yes" or "No" for each of the following:

- ☐ Yes ☐ No My company is authorized to transact business in Iowa.
(To help you determine if your company is authorized, please review the worksheet on the next page).
- ☐ Yes ☐ No My company has an office to transact business in Iowa.
- ☐ Yes ☐ No My company's office in Iowa is suitable for more than receiving mail, telephone calls, and e-mail.
- ☐ Yes ☐ No My company has been conducting business in Iowa for at least 3 years prior to the first request for bids on this project.
- ☐ Yes ☐ No My company is not a subsidiary of another business entity or my company is a subsidiary of another business entity that would qualify as a resident bidder in Iowa.
- If you answered "Yes" for each question above, your company qualifies as a resident bidder. Please complete Parts B and D of this form.
- If you answered "No" to one or more questions above, your company is a non-resident bidder. Please complete Parts C and D of this form.

To be completed by resident bidders

Part B

My company has maintained offices in Iowa during the past 3 years at the following addresses:

Dates: _____ to _____ Address: _____
(mm/dd/yyyy) City, State, Zip: _____

Dates: _____ to _____ Address: _____
(mm/dd/yyyy) City, State, Zip: _____

Dates: _____ to _____ Address: _____
(mm/dd/yyyy) City, State, Zip: _____

You may attach additional sheet(s) if needed.

To be completed by non-resident bidders

Part C

1. Name of home state or foreign country reported to the Iowa Secretary of State: _____
2. Does your company's home state or foreign country offer preferences to bidders who are residents? ☐ Yes ☐ No
3. If you answered "Yes" to question 2, identify each preference offered by your company's home state or foreign country and the appropriate legal citation.

You may attach additional sheet(s) if needed.

To be completed by all bidders

Part D

I certify that the statements made on this document are true and complete to the best of my knowledge and I know that my failure to provide accurate and truthful information may be reason to reject my bid.

Firm Name: _____
Signature: _____ Date: _____

WORKSHEET: AUTHORIZATION TO TRANSACT BUSINESS

This worksheet may be used to help complete Part A of the Resident Bidder Status form. If at least one of the following describes your business, you are authorized to transact business in Iowa.

- ☐ Yes ☐ No My business is currently registered as a contractor with the Iowa Division of Labor.
- ☐ Yes ☐ No My business is a sole proprietorship and I am an Iowa resident for Iowa income tax purposes.
- ☐ Yes ☐ No My business is a general partnership or joint venture. More than 50 percent of the general partners or joint venture parties are residents of Iowa for Iowa income tax purposes
- ☐ Yes ☐ No My business is an active corporation with the Iowa Secretary of State and has paid all fees required by the Secretary of State, has filed its most recent biennial report, and has not filed articles of dissolution.
- ☐ Yes ☐ No My business is a corporation whose articles of incorporation are filed in a state other than Iowa, the corporation has received a certificate of authority from the Iowa Secretary of State, has filed its most recent biennial report with the Secretary of State, and has neither received a certificate of withdrawal from the Secretary of state nor had its authority revoked.
- ☐ Yes ☐ No My business is a limited liability partnership which has filed a statement of qualification in this state and the statement has not been canceled.
- ☐ Yes ☐ No My business is a limited liability partnership which has filed a statement of qualification in a state other than Iowa, has filed a statement of foreign qualification in Iowa and a statement of cancellation has not been filed.
- ☐ Yes ☐ No My business is a limited partnership or limited liability limited partnership which has filed a certificate of limited partnership in this state, and has not filed a statement of termination.
- ☐ Yes ☐ No My business is a limited partnership or a limited liability limited partnership whose certificate of limited partnership is filed in a state other than Iowa, the limited partnership or limited liability limited partnership has received notification from the Iowa Secretary of state that the application for certificate of authority has been approved and no notice of cancellation has been filed by the limited partnership or the limited liability limited partnership.
- ☐ Yes ☐ No My business is a limited liability company whose certificate of organization is filed in Iowa and has not filed a statement of termination.
- ☐ Yes ☐ No My business is a limited liability company whose certificate of organization is filed in a state other than Iowa, has received a certificate of authority to transact business in Iowa and the certificate has not been revoked or canceled.

Runway 13/31 Lighting Replacement

BID BOND

Runway 13/31 Lighting Replacement
City of Storm Lake
Storm Lake, Iowa

KNOW ALL BY THESE PRESENTS:

That we, _____, as Principal, and

_____, as Surety, are held and firmly bound unto, City of Storm Lake as Obligee, (hereinafter referred to as "the Jurisdiction"), in the penal sum of _____ dollars (\$ _____), lawful money of the United States, for which payment said Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas the Principal has submitted to the Jurisdiction a certain proposal, in a separate envelope, and hereby made a part hereof, to enter into a contract in writing, for the following described improvements;

PROJECT DESCRIPTION: Apron and Taxiway Rehabilitation

The Surety hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Jurisdiction may accept such bid or execute such Contract; and said Surety does hereby waive notice of any such extension.

In the event that any actions or proceedings are initiated with respect to this Bond, the parties agree that the venue thereof shall be Buena Vista County, State of Iowa. If legal action is required by the Jurisdiction against the Surety or Principal to enforce the provisions of the bond or to collect the monetary obligation incurring to the benefit of the Jurisdiction, the Surety or Principal agrees to pay the Jurisdiction all damages, costs, and attorney fees incurred by enforcing any of the provisions of this Bond. All rights, powers, and remedies of the Jurisdiction hereunder shall be cumulative and not alternative and shall be in addition to all rights, powers and remedies given to the Jurisdiction, by law. The Jurisdiction may proceed against Surety for any amount guaranteed hereunder whether action is brought against Principal or whether Principal is joined in any such action or actions or not.

NOW, THEREFORE, if said proposal by the Principal be accepted, and the Principal shall enter into a contract with Jurisdiction in accordance with the terms of such proposal, including the provision of insurance and of a bond as may be specified in the contract documents, with good and sufficient surety for the faithful performance of such contract, for the prompt payment of labor and material furnished in the prosecution thereof, and for the maintenance of said improvements as may be required therein, then this obligation shall become null and void; otherwise, the Principal shall pay to the Jurisdiction the full amount of the bid bond, together with court costs, attorney's fees, and any other expense of recovery.

Signed and sealed this _____ day of _____, 20____.

SURETY:

PRINCIPAL:

By

Surety Company

Signature Attorney-in-Fact/Officer

Name of Attorney-in-Fact/Officer

Company Name

Company Address

City, State, Zip Code

Company Telephone Number

By

Bidder

Signature

Name (Print/Type)

Title

Address

City, State, Zip Code

Telephone Number

NOTE: All signatures on this bid bond must be original signatures in ink; copies or facsimile of any signature will not be accepted. This bond must be sealed with the Surety's raised, embossing seal or official adhesive seal. The Certificate or Power of Attorney accompanying this bond must be valid on its face and sealed with the Surety's raised, embossing seal or official adhesive seal.

Items to be Executed After Award of Contract

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

T51.119823

3-19-0088-014-2020

Storm Lake, Iowa

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**Form of
CONTRACT AGREEMENT
Runway 13/31 Lighting Replacement
AIP Project No.: 3-19-0088-014-2020**

THIS AGREEMENT, made as of _____ is

BY AND BETWEEN

the OWNER: *The City of Storm Lake, 620 Erie Street, Storm Lake, Iowa*

And the CONTRACTOR: _____

WITNESSETH:

WHEREAS it is the intent of the Owner to make improvements at City of Storm Lake generally described as follows;

Runway 13/31 Lighting Replacement

hereinafter referred to as the Project.

NOW THEREFORE in consideration of the mutual covenants hereinafter set forth, OWNER and CONTRACTOR agree as follows:

Article 1 - Work

It is hereby mutually agreed that for and in consideration of the payments as provided for herein to the CONTRACTOR by the OWNER, CONTRACTOR shall faithfully furnish all necessary labor, equipment, and material and shall fully perform all necessary work to complete the Project in strict accordance with this Contract Agreement and the Contract Documents.

Article 2 – Contract Documents

CONTRACTOR agrees that the Contract Documents consist of the following: this Agreement, General Provisions, Supplementary Provisions, Specifications, Drawings, all issued addenda, Notice-to-Bidders, Instructions-to-Bidders, Proposal and associated attachments, Performance Bond, Payment Bond, Wage Rate Determination, Insurance certificates, documents incorporated by reference, documents incorporated by attachment, and all OWNER authorized change orders issued subsequent to the date of this agreement. All documents comprising the Contract Documents are complementary to one another and together establish the complete terms, conditions and obligations of the CONTRACTOR. All said Contract Documents are incorporated by reference into the Contract Agreement as if fully rewritten herein or attached thereto.

Article 3 – Contract Price

In consideration of the faithful performance and completion of the Work by the CONTRACTOR in accordance with the Contract Documents, OWNER shall pay the CONTRACTOR an amount equal to:

\$ _____ (\$ _____)
(Amount in Written Words) (Amount in Numerals)

subject to the following:

- a. Said amount is based on the schedule of prices and estimated quantities stated in CONTRACTOR'S Bid Proposal, which is attached to and made a part of this Agreement;
- b. Said amount is the aggregate sum of the result of the CONTRACTOR'S stated unit prices multiplied by the associated estimated quantities;
- c. CONTRACTOR and OWNER agree that said estimated quantities are not guaranteed and that the determination of actual quantities is to be made by the OWNER'S ENGINEER;
- d. Said amount is subject to modification for additions and deductions as provided for within the Contract General Provisions.

Article 4 – Payment

Upon the completion of the work and its acceptance by the OWNER, all sums due the CONTRACTOR by reason of faithful performance of the work, taking into consideration additions to or deductions from the Contract price by reason of alterations or modifications of the original Contract or by reason of "Extra Work" authorized under this Contract, will be paid to the CONTRACTOR by the OWNER after said completion and acceptance.

The acceptance of final payment by the CONTRACTOR shall be considered as a release in full of all claims against the OWNER, arising out of, or by reason of, the work completed and materials furnished under this Contract.

OWNER shall make progress payments to the CONTRACTOR in accordance with the terms set forth in the General Provisions. Progress payments shall be based on estimates prepared by the ENGINEER for the value of work performed and materials completed in place in accordance with the Contract Drawings and Specifications.

Progress payments are subject to retainage requirements as set forth in the General Provisions.

Article 5 – Contract Time

The CONTRACTOR agrees to commence work within ten (10) calendar days of the date specified in the OWNER'S Notice-to-Proceed. CONTRACTOR further agrees to complete said work within **40 Working Days** of the commencement date stated within the Notice-to-Proceed.

It is expressly understood and agreed that the stated Contract Time is reasonable for the completion of the Work, taking all factors into consideration. Furthermore, extensions of the Contract Time may only be permitted by execution of a formal modification to this Contract Agreement in accordance with the General Provisions and as approved by the OWNER.

Article 6 – Liquidated Damages

The CONTRACTOR and OWNER understand and agree that time is of essence for completion of the Work and that the OWNER will suffer additional expense and financial loss if said Work is not completed within the authorized Contract Time. Furthermore, the CONTRACTOR and OWNER recognize and understand the difficulty, delay, and expense in establishing the exact amount of actual financial loss and additional expense. Accordingly, in place of requiring such proof, the CONTRACTOR expressly agrees to pay the OWNER as liquidated damages the non-penal sum of \$500 per day for each Working day required in excess of the authorized Contract Time.

Furthermore, the CONTRACTOR understands and agrees that;

- a. the OWNER has the right to deduct from any moneys due the CONTRACTOR, the amount of said liquidated damages;
- b. the OWNER has the right to recover the amount of said liquidated damages from the CONTRACTOR, SURETY or both.

Article 7 – CONTRACTOR'S Representations

The CONTRACTOR understands and agrees that all representations made by the CONTRACTOR within the Proposal shall apply under this Agreement as if fully rewritten herein.

Article 8 – CONTRACTOR'S Certifications

The CONTRACTOR understands and agrees that all certifications made by the CONTRACTOR within the Proposal shall apply under this Agreement as if fully rewritten herein. The CONTRACTOR further certifies the following;

a. Certification of Eligibility (29 CFR Part 5.5)

- i. By Entering into this contract, the CONTRACTOR certifies that neither he or she nor any person or firm who has an interest in the CONTRACTOR'S firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1);
- ii. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1);
- iii. The penalty for making false statements is prescribed in the U.S. Criminal Code 18 U.S.C.

b. Certification of Non-Segregated Facilities (41 CFR Part 60-1.8)

The federally-assisted construction CONTRACTOR, certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The BIDDER certifies that it will not maintain or provide, for its employees, segregated facilities at any of its establishments and that it will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause, which is to be incorporated in the contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The Bidder agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that it will retain such certifications in its files.

Article 9 – Miscellaneous

- a. CONTRACTOR understands that it shall be solely responsible for the means, methods, techniques, sequences and procedures of construction in connection with completion of the Work;
- b. CONTRACTOR understands and agrees that it shall not accomplish any work or furnish any materials that are not covered or authorized by the Contract Documents unless authorized in writing by the OWNER or ENGINEER;
- c. The rights of each party under this Agreement shall not be assigned or transferred to any other person, entity, firm or corporation without prior written consent of both parties;
- d. OWNER and CONTRACTOR each bind itself, their partners, successors, assigns and legal representatives to the other party in respect to all covenants, agreements, and obligations contained in the Contract Documents.

Article 10 – OWNER'S Representative

The OWNER'S Representative, herein referred to as ENGINEER, is defined as follows:

*BOLTON & MENK INC
1519 Baltimore
AMES, IA 50010*

Said ENGINEER will act as the OWNER'S representative and shall assume all rights and authority assigned to the ENGINEER as stated within the Contract Documents in connection with the completion of the Project Work.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have executed five (5) copies of this Agreement on the day and year first noted herein.

OWNER

Name: _____

Address: _____

By: _____

Signature

Title of Representative

ATTEST

By: _____

Signature

Title

CONTRACTOR

Name: _____

Address: _____

By: _____

Signature

Title of Representative

ATTEST

By: _____

Signature

Title

PERFORMANCE BOND

Bond Number

PRINCIPAL *(Legal Name and Business Address)*

STATE OF INCORPORATION

SURETY *(Legal Name and Business Address)*

CONTRACT NO.

CONTRACT DATE

PENAL SUM OF BOND *(Expressed in words and numerals)*

OBLIGATION

KNOW ALL PERSONS BY THESE PRESENTS, that the above named PRINCIPAL, hereinafter referred to and called CONTRACTOR, and the above named SURETY hereby bind themselves unto **The City of Storm Lake, 620 Erie Street, Storm Lake, Iowa** as OBLIGEE, hereinafter referred to and called OWNER, in the penal sum stated above, in lawful money of the United States of America to be paid to OWNER. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has entered into the written contract agreement identified hereinabove with the OWNER for the following project:

Project Name: **Runway 13/31 Lighting Replacement**

Project Location: **Storm Lake Municipal Airport**

which said contract and associated contract documents, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

CONDITION

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly and faithfully perform all undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extensions thereof that are granted by the OWNER, with or without notice to the SURETY, and during the period of any guarantee or warranties required under the Contract, and if CONTRACTOR shall perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of the Contract that hereafter are made, then this obligation shall be void; otherwise it shall remain in full force and effect subject to the following additional conditions:

1. SURETY, for value received, hereby stipulates and agrees that no change, extension of time, modification, omission, addition or change in or to the Contract, or the work performed thereunder or the specifications accompanying the same, shall in any way affect the SURETY'S obligation on this bond; and SURETY hereby agrees to waive notice of any and all such extensions, modifications, omissions, alterations, and additions to the terms of the Contract, work or specifications.
2. Whenever CONTRACTOR shall be and declared by the OWNER to be in default under the Contract, the Surety shall promptly and at the SURETY'S expense remedy the default by implementing one or more of the following actions:
 - a. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or
 - b. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - c. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract; arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER'S concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract; and make available as work progresses (even though there

should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the penal sum of the bond. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by OWNER to CONTRACTOR under the Contract and any amendments thereto, disbursed at the rate provided in the original contract, less the amount properly paid by OWNER to CONTRACTOR.

- d. With written consent of the OWNER, SURETY may waive its right to perform and complete, arrange for completion or obtain a new contractor and with reasonable promptness, investigate and determine the amount the SURETY is liable to the OWNER and tender payment therefor to the OWNER.

3. CONTRACTOR and SURETY agree that if in connection with the enforcement of this Bond, the OWNER is required to engage the services of an attorney, that reasonable attorney fees incurred by the OWNER, with or without suit, are in addition to the balance of the contract price.

4. No right of action shall accrue on this bond to or for the use of any person or corporation other than the OWNER named herein or the successors or assigns of the OWNER.

WITNESS

In witness whereof, this instrument is executed this the _____ day of _____, 20____.

INDIVIDUAL PRINCIPAL:

Company Name: _____

Signature: _____

Name and Title: _____

CORPORATE PRINCIPAL:

ATTEST:

Corporate Name: _____

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

(Affix Corporate Seal)

SURETY:

ATTEST:

Surety Name: _____

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

(Affix Seal)

(Attach Power of Attorney)

OWNER ACCEPTANCE

The OWNER approves the form of this Performance Bond.

Date: _____

Signature: _____

Name and Title: _____

ATTEST:

Signature: _____

Name and Title: _____

(Affix Seal)

PAYMENT BOND

Bond Number

PRINCIPAL *(Legal Name and Business Address)*

STATE OF INCORPORATION

SURETY *(Legal Name and Business Address)*

CONTRACT NO.

CONTRACT DATE

PENAL SUM OF BOND *(Expressed in words and numerals)*

OBLIGATION

KNOW ALL PERSONS BY THESE PRESENTS, that the above named PRINCIPAL, hereinafter referred to and called CONTRACTOR, and the above named SURETY hereby bind themselves unto **The City of Storm Lake, 620 Erie Street, Storm Lake, Iowa** as OBLIGEE, hereinafter referred to and called OWNER, in the penal sum stated above, in lawful money of the United States of America to be paid to OWNER. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has entered into the written contract agreement identified hereinabove with the OWNER for the following project:

Project Name: **Runway 13/31 Lighting Replacement**

Project Location: **Storm Lake Municipal Airport**

which said contract and associated contract documents, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

CONDITION

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly make payment to all employees, persons, firms or corporations for all incurred indebtedness and just claims for labor, supplies, materials and services furnished for or used in connection with the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect subject to the following additional conditions:

1. CONTRACTOR and SURETY indemnify and hold harmless the OWNER for all claims, demands, liens or suits that arise from performance of the Contract
2. SURETY, for value received, hereby stipulates and agrees that no change, extension of time, modification, omission, addition or change in or to the Contract, or the work performed thereunder or the specifications accompanying the same, shall in any way affect the SURETY'S obligation on this bond; and SURETY hereby agrees to waive notice of any and all such extensions, modifications, omissions, alterations, and additions to the terms of the Contract, work or specifications.
3. No final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
4. The amount of this bond shall be reduced by and to the extent of any payments made in good faith hereunder.
5. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the SURETY under this Bond, subject to the OWNER'S priority to use the funds for the completion of the project.

WITNESS

In witness whereof, this instrument is executed this the _____ day of _____, 20____.

INDIVIDUAL PRINCIPAL:

Company Name: _____

Signature: _____

Name and Title: _____

CORPORATE PRINCIPAL:

ATTEST:

Signature: _____

Name and Title: _____

(Affix Corporate Seal)

Corporate Name: _____

Signature: _____

Name and Title: _____

SURETY:

ATTEST:

Signature: _____

Name and Title: _____

(Affix Seal)

Surety Name: _____

Signature: _____

Name and Title: _____

(Attach Power of Attorney)

OWNER ACCEPTANCE

The OWNER approves the form of this Payment Bond.

Date: _____

Signature: _____

Name and Title: _____

ATTEST:

Signature: _____

Name and Title: _____

(Affix Seal)

FAA SPECIAL PROVISIONS

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

T51.119823

FAA AIP No. 3-19-0088-014-2020

Storm Lake, IA

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SUPPLEMENTARY PROVISIONS

PART A - FEDERAL CONTRACT PROVISIONS FOR CONSTRUCTION AND EQUIPMENT CONTRACTS

APPLICATION OF REFERENCES

ALL REFERENCES MADE HEREIN TO “CONTRACTOR”, “BIDDER”, AND “OFFEROR” SHALL PERTAIN TO THE PRIME CONTRACTOR. ALL REFERENCES MADE HEREIN TO “SUBCONTRACTOR” SHALL PERTAIN TO ANY AND ALL SUBCONTRACTORS UNDER CONTRACT WITH THE PRIME CONTRACTOR OR A SUBCONTRACTOR.

ALL REFERENCES MADE HEREIN TO “CONSULTANT” SHALL PERTAIN TO ARCHITECT/ENGINEER (A/E) UNDER CONTRACT WITH THE SPONSOR. ALL REFERENCES MADE HEREIN TO “SUBCONSULTANT” SHALL PERTAIN TO ANY AND ALL SUBCONSULTANTS UNDER CONTRACT WITH THE A/E.

ALL REFERENCES MADE HEREIN TO “SPONSOR” AND “OWNER” SHALL PERTAIN TO THE STATE, CITY, AIRPORT AUTHORITY OR OTHER PUBLIC ENTITY EXECUTING CONTRACTS WITH THE PRIME CONTRACTOR AND/OR THE A/E.

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PROVISIONS APPLICABLE TO ALL CONTRACTS

ACCESS TO RECORDS AND REPORTS

Reference: 2 CFR § 200.333, 2 CFR § 200.336, and FAA Order 5100.38

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Aviation Administration, and the Comptroller General of the United States or any of their duly authorized representatives, access to any books, documents, papers, and records of the Contractor, which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

BUY AMERICAN PREFERENCE

Reference: 49 USC § 50101

The Contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration (FAA) has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

A Bidder or Offeror must complete and submit the Buy America certification included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include a completed Certificate of Buy American Compliance.

CIVIL RIGHTS – GENERAL

Reference: 49 USC § 47123

The Contractor agrees that it will comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

CIVIL RIGHTS – TITLE VI ASSURANCES

Title VI Solicitation Notice

The Sponsor, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in

response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Compliance with Nondiscrimination Requirements

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees as follows:

1. **Compliance with Regulations:** The Contractor (hereinafter includes Consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor’s obligations under this contract and the Nondiscrimination Acts And Authorities on the grounds of race, color, or national origin.
4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts And Authorities and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a Contractor’s noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
 - a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such

provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR Part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

DISADVANTAGED BUSINESS ENTERPRISE

Reference: 49 CFR Part 26

Solicitation Language (Project Goal)

Information Submitted as a matter of bidder responsiveness:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

As a condition of bid responsiveness, the Bidder or Offeror must submit the following information with their proposal on the forms provided herein:

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1)
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal;
- 5) If Bidder or Offeror cannot meet the advertised project DBE goal; evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR Part 26.

Information submitted as a matter of bidder responsibility:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

The successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in its commitment within five (5) days after bid opening.

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1)
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and
- 5) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

Race/Gender Neutral

The requirements of 49 CFR Part 26 apply to this contract. It is the policy of the Owner to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

Contract Assurance (§ 26.13)

The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of U.S. Department of Transportation-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Owner deems appropriate, which may include, but is not limited to:

- 1) Withholding monthly progress payments;
- 2) Assessing sanctions;
- 3) Liquidated damages; and/or
- 4) Disqualifying the Contractor from future bidding as non-responsible.

Prompt Payment (§26.29)

The Prime Contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than thirty (30) calendar days from the receipt of each payment the Prime Contractor receives from the Owner. The Prime Contractor agrees further to return retainage payments to each subcontractor within thirty (30) calendar days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Owner. This clause applies to both DBE and non-DBE subcontractors.

ENERGY CONSERVATION REQUIREMENTS

Reference: 2 CFR § 200 Appendix II(H)

Contractor and Subcontractor(s) agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201 et seq).

FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

Reference: 29 USC § 201, et seq.

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR Part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

Reference: 20 CFR Part 1910

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). The employee must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

RIGHT TO INVENTIONS

Reference: 2 CFR § 200 Appendix II(F) and 37 CFR §401

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 CFR Part 401, Rights to Inventions Made by Non-profit Organizations and Small Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified within in the 37 CFR §401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental or research work.

SEISMIC SAFETY

Reference: 49 CFR Part 41

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

TAX DELINQUENCY AND FELONY CONVICTIONS

Reference: Sections 415 and 416 of Title IV, Division L of the Consolidated Appropriations Act, 2014 (Pub. L. 113-76) and DOT Order 4200.6

The Contractor certifies:

- 1) It is not a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

- 2) It is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months. A felony conviction is a conviction within the preceding twenty four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

The Contractor agrees to incorporate the above certification in all lower tier subcontracts.

TRADE RESTRICTION CERTIFICATION

Reference: 49 USC § 50104 and 49 CFR Part 30

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror:

- 1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (U.S.T.R.);
- 2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the U.S.T.R; and
- 3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the U.S.T.R.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

- 1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the U.S.T.R. or
- 2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such U.S.T.R. list or
- 3) who incorporates in the public works project any product of a foreign country on such U.S.T.R. list;

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge

and information of a Contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by U.S.T.R, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the Federal Aviation Administration.

VETERAN'S PREFERENCE

Reference: 49 USC § 47112(c)

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$2,000

COPELAND "ANTI-KICKBACK" ACT

Reference: 2 CFR § 200 Appendix II(D) and 29 CFR Parts 3 and 5

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 U.S.C. 874 and 40 U.S.C. 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

DAVIS-BACON REQUIREMENTS

Reference: 2 CFR § 200 Appendix II(D) and 29 CFR Part 5

1. Minimum Wages

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided* that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(ii) (A) thru (D)

(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under

the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within thirty (30) days of receipt and so advise the contracting officer or will notify the contracting officer within the thirty (30)-day period that additional time is necessary.

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within thirty (30) days of receipt and so advise the contracting officer or will notify the contracting officer within the thirty (30)-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program: *Provided*, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and that show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) thru (D)

(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The Prime

Contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a Prime Contractor to require a subcontractor to provide addresses and social security numbers to the Prime Contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) The payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i) and that such information is correct and complete;
- (2) Each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;
- (3) Each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees

(i) Apprentices

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first ninety (90) days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination.

Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination.

Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the

full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal Employment Opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act Requirements

The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

6. Subcontracts

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

7. Contract Termination: Debarment

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes Concerning Labor Standards

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of Eligibility

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$3,500

DISTRACTED DRIVING

Reference: Executive Order 13513 and DOT Order 3902.10

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 "Text Messaging While Driving" (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or sub-grant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500 and involve driving a motor vehicle in performance of work activities associated with the project.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$10,000

AFFIRMATIVE ACTION REQUIREMENT

Reference: 41 CFR Part 60-4 and Executive Order 11246

1. The Bidder's or Offeror's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables:	Goal:
Goals for minority participation for each trade:	
Goals for female participation in each trade:	6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within ten (10) working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is:

State	County	City

EQUAL EMPLOYMENT OPPORTUNITY (EEO)

Reference: 2 CFR 200, Appendix II(C), 41 CFR § 60-1.4, 41 CFR § 60-4.3, and Executive Order 11246

Equal Opportunity Clause

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identify or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

Standard Federal Equal Employment Opportunity Construction Contract Specifications

1. As used in these specifications:

- a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
- b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
- c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
- d. "Minority" includes:

- (1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin);
- (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
- (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7.a through 7.p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the Contractor during the training

period and the Contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or female sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff,

termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7.a through 7.p). The efforts of a Contractor association, joint Contractor union, Contractor community, or other similar groups of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7.a through 7.p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the

program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally), the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

PROCUREMENT OF RECOVERED MATERIALS

Reference: 2 CFR § 200.322, 40 CFR Part 247, and Solid Waste Disposal Act

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

- a) The contract requires procurement of \$10,000 or more of a designated item during the fiscal year; or,
- b) The Contractor has procured \$10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at:

<https://www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products>

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the Contractor can demonstrate the item is:

- a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
- b) Fails to meet reasonable contract performance requirements; or
- c) Is only available at an unreasonable price.

PROHIBITION OF SEGREGATED FACILITIES

Reference: 41 CFR § 60

(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

(b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

TERMINATION OF CONTRACT

Reference: 2 CFR § 200 Appendix II(B) and FAA Advisory Circular 150/5370-10, Section 80-09

Termination for Convenience (Construction & Equipment Contracts)

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.
2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
3. Discontinue orders for materials and services except as directed by the written notice.
4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.
5. Complete performance of the work not terminated by the notice.
6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

- 1) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
- 2) documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
- 3) reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- 4) reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

Termination for Default (Construction)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes conditions, rights and remedies associated with Owner termination of this contract due to default of the Contractor.

Termination for Default (Equipment)

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract if the Contractor:

1. Fails to commence the Work under the Contract within the time specified in the Notice- to-Proceed;
2. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
3. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
4. Fails to comply with material provisions of the Contract;
5. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements; or
6. Becomes insolvent or declares bankruptcy;

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within ten (10) days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment, such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the Work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience the Owner.

The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this contract.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$25,000

DEBARMENT AND SUSPENSION

Reference: 2 CFR Part 180 (Subpart C), 2 CFR Part 1200, DOT Order 4200.5

Certification of Bidder/Offerer Regarding Debarment

By submitting a bid/proposal under this solicitation, the Bidder or Offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

Certification of Lower Tier Contractors Regarding Debarment

The successful Bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”, must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful Bidder will accomplish this by:

1. Checking the System for Award Management at website: <https://www.sam.gov>.
2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract

If the Federal Aviation Administration (FAA) later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$100,000

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

Reference: 2 CFR § 200 Appendix II (E)

1. Overtime Requirements.

No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for

liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

4. Subcontractors.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

Reference: 31 U.S.C. § 1352 – Byrd Anti-Lobbying Amendment, 2 CFR part 200, Appendix II(J), and 49 CFR part 20, Appendix A

CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- 1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- 2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts

under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING \$150,000

BREACH OF CONTRACT TERMS

Reference: 2 CFR § 200 Appendix II(A)

Any violation or breach of terms of this contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

CLEAN AIR AND WATER POLLUTION CONTROL

References: 2 CFR § 200 Appendix II(G)

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 U.S.C. § 740-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

The Contractor agrees to incorporate the above certification in all lower tier subcontracts that exceed \$150,000.

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PREDETERMINED WAGE RATE

General Decision Number: IA20200081 01/03/2020

Superseded General Decision Number: IA20190081

State: Iowa

Construction Types: Heavy and Highway

Counties: Adair, Adams, Allamakee, Appanoose, Audubon, Benton, Black Hawk, Boone, Bremer, Buchanan, Buena Vista, Butler, Calhoun, Carroll, Cass, Cedar, Cerro Gordo, Cherokee, Chickasaw, Clarke, Clay, Clayton, Clinton, Crawford, Dallas, Davis, Decatur, Delaware, Des Moines, Dickinson, Dubuque, Emmet, Fayette, Floyd, Franklin, Fremont, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Harrison, Henry, Howard, Humboldt, Ida, Iowa, Jackson, Jasper, Jefferson, Johnson, Jones, Keokuk, Kossuth, Lee, Linn, Louisa, Lucas, Lyon, Madison, Mahaska, Marion, Marshall, Mills, Mitchell, Monona, Monroe, Montgomery, Muscatine, O'Brien, Osceola, Page, Palo Alto, Plymouth, Pocahontas, Polk, Pottawattamie, Poweshiek, Ringgold, Sac, Shelby, Sioux, Story, Tama, Taylor, Union, Van Buren, Wapello, Warren, Washington, Wayne, Webster, Winnebago, Winneshiek, Woodbury, Worth and Wright Counties in Iowa.

EXCLUDES SCOTT COUNTY

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date

0 01/03/2020

* SUIA2019-001 10/18/2017

Rates Fringes

CARPENTER & PILEDRIVERMEN

ZONE 1	\$ 27.92	\$ 13.28
ZONE 2	\$ 26.03	\$ 13.38
ZONE 3	\$ 26.03	\$ 13.38
ZONE 4	\$ 25.55	\$ 10.80
ZONE 5**	\$ 24.45	\$ 9.20

CONCRETE FINISHER

ZONE 1	\$ 27.50	\$ 7.10
ZONE 2	\$ 27.50	\$ 7.10
ZONE 3	\$ 27.50	\$ 7.10
ZONE 4	\$ 24.85	\$ 6.10
ZONE 5	\$ 23.80	\$ 6.10

**ELECTRICIAN (STREET AND
HIGHWAY LIGHTING AND TRAFFIC
SIGNALS)**

ZONE 1, 2, AND 3.....	\$ 24.45	\$ 6.50
ZONE 4	\$ 23.15	\$ 6.50
ZONE 5	\$ 21.00	\$ 6.50

**IRONWORKER (SETTING OF
STRUCTURAL STEEL)**

ZONE 1	\$ 30.50	\$ 10.70
ZONE 2	\$ 28.41	\$ 10.70
ZONE 3	\$ 28.41	\$ 11.00
ZONE 4	\$ 26.35	\$ 9.50
ZONE 5**	\$ 24.50	\$ 9.05

LABORER**ZONE 1, 2 AND 3**

GROUP A	\$ 23.15	\$ 9.18
GROUP AA	\$ 25.53	\$ 9.18
GROUP B	\$ 21.30	\$ 9.18
GROUP C	\$ 18.22	\$ 9.18

ZONE 4

GROUP A	\$ 20.82	\$ 8.63
GROUP B	\$ 19.50	\$ 8.63
GROUP C	\$ 16.62	\$ 8.63

ZONE 5

GROUP A	\$ 21.32	\$ 7.18
GROUP B	\$ 18.82	\$ 7.18
GROUP C	\$ 17.97	\$ 7.18

POWER EQUIPMENT OPERATOR**ZONE 1**

GROUP A	\$ 31.75	\$ 14.55
GROUP B	\$ 30.20	\$ 14.55
GROUP C	\$ 27.70	\$ 14.55
GROUP D	\$ 27.70	\$ 14.55

ZONE 2

GROUP A	\$ 31.05	\$ 14.55
GROUP B	\$ 29.45	\$ 14.55
GROUP C	\$ 26.90	\$ 14.55
GROUP D	\$ 26.90	\$ 14.55

ZONE 3

GROUP A	\$ 29.05	\$ 23.30
GROUP B	\$ 27.25	\$ 23.30
GROUP C	\$ 26.25	\$ 23.30
GROUP D	\$ 26.25	\$ 23.30

ZONE 4

GROUP A	\$ 30.55	\$ 11.65
GROUP B	\$ 29.41	\$ 11.65
GROUP C	\$ 27.33	\$ 11.65
GROUP D	\$ 27.33	\$ 11.65

ZONE 5

GROUP A	\$ 27.37	\$ 9.60
GROUP B	\$ 26.33	\$ 9.60
GROUP C	\$ 24.60	\$ 9.60
GROUP D	\$ 23.60	\$ 9.60

TRUCK DRIVER (AND PAVEMENT MARKING DRIVER/SWITCHPERSON)

ZONE 1	\$ 23.85	\$ 10.85
ZONE 2	\$ 23.85	\$ 10.85
ZONE 3	\$ 23.85	\$ 10.85
ZONE 4	\$ 23.85	\$ 6.65
ZONE 5	\$ 21.90	\$ 6.65

ZONE DEFINITIONS

ZONE 1: The Counties of Polk, Warren, and Dallas for all Crafts, and Linn County Carpenters only.

ZONE 2: The Counties of Dubuque for all Crafts and Linn County for all Crafts except Carpenters.

ZONE 3: The Cities of Burlington, Clinton, Fort Madison, Keokuk, and Muscatine (and abutting municipalities of any such cities).

ZONE 4: Story, Black Hawk, Cedar, Jasper, Jones, Jackson, Louisa, Madison, and Marion Counties; Clinton County (except the City of Clinton), Johnson County, Muscatine County (except the City of Muscatine), the City of Council Bluffs, Lee County and Des Moines County.

ZONE 5: All areas of the state not listed above.

LABORER CLASSIFICATIONS - ALL ZONES

GROUP AA - {Skilled pipelayer (sewer, water and conduits) and tunnel laborers; asbestos abatement worker} (Zones 1, 2 and 3).

GROUP A - Carpenter tender on bridges and box culverts; curb machine (without a seat); deck hand; diamond & core drills; drill operator on air tracs, wagon drills and similar drills; form setter/stringman on paving work; gunnite nozzle man; joint sealer kettleman; laser operator; powderman tender; powderman/blaster; saw operator; {pipelayer (sewer, water, and conduits); sign erector*; tunnel laborer; asbestos abatement worker (Zones 4 and 5)}, sign erector.

GROUP B - Air, gas, electric tool operator; barco hammer; carpenter tender; caulker; chain sawman; compressor (under 400 cfm); concrete finisher tender; concrete processing materials and monitors; cutting torch on demolition; drill tender; dumpmen; electric drills; fence erectors; form line expansion joint assembler; form tamper; general laborer; grade checker; handling and placing metal mesh, dowel bars, reinforcing bars and chairs; hot asphalt laborer; installing temporary traffic control devices; jackhammerman; mechanical grouter; painter (all except stripers); paving breaker; planting trees, shrubs and flowers; power broom (not self-propelled); power buggyman; rakers; rodman (tying reinforcing steel); sandblaster; seeding and mulching; sewer utility topman/bottom man; spaders; stressor or stretcherman on pre or post tensioned concrete; stringman on re/surfacing/no grade control; swinging stage, tagline, or block and tackle; tampers; timberman; tool room men and checkers; tree climber; tree groundman; underpinning and shoring caissons over twelve feet deep; vibrators; walk behind trencher; walk behind paint stripers; walk behind vibrating compactor; water pumps (under three inch); work from bosun chair.

GROUP C - Scale weigh person; traffic control/flagger, surveillance or monitor; water carrier.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS - ALL ZONES

GROUP A - All terrain (off road) forklift; asphalt breakdown roller (vibratory); asphalt laydown machine; asphalt plant; asphalt screed; bulldozer (finish); central mix plant; concrete pump; crane; crawler tractor pulling scraper; directional drill (60,000 (lbs) pullback and above); dragline and power shovel; dredge engineer; excavator (over ½ cu. yd.); front end loader (4 cy and over); horizontal boring machine; master mechanic; milling machine (over 350 hp); motor grader (finish); push cat; rubber tired backhoe (over ½ cu. yd.); scraper (12 cu. yd. and over or finish); Self-propelled rotary mixer/road reclaimer; sidebroom tractor; slipform portland concrete paver; tow or push boat; trenching machine (Cleveland 80 or similar)

GROUP B - Articulated off road hauler, asphalt heater/planer; asphalt material transfer vehicle; asphalt roller; belt loader or similar loader; bulldozer (rough); churn or rotary drill; concrete curb machine; crawler tractor pulling ripper, disk or roller; deck hand/oiler; directional drill (less than 60,000 (lbs) pullback); distributor; excavator (1/2 cu. yd. and under); form riding concrete paver; front end loader (2 to less than 4 cu. yd.); group equipment greaser; mechanic; milling machine (350 hp. and less); paving breaker; portland concrete dry batch plant; rubber tired backhoe (1/2 cu. yd. and under); scraper (under 12 cu. yd.); screening, washing and crushing plant (mobile, portable or stationary); shoulder machine; skid loader (1 cu. yd. and over); subgrader or trimmer; trenching machine; water wagon on compaction.

GROUP C - Boom & winch truck; concrete spreader/belt placer; deep wells for dewatering; farm type tractor (over 75 hp.) pulling disc or roller; forklift; front end loader (under 2 cu. yd.); motor grader (rough); pile hammer power unit; pump (greater than three inch diameter); pumps on well points; safety boat; self-propelled roller (other than asphalt); self-propelled sand blaster or shot blaster, water blaster or stripping grinder/remover; skid loader (under 1 cu. yd.); truck mounted post driver.

GROUP D - Boiler; compressor; cure and texture machine; dow box; farm type or utility tractor (under 75 hp.) pulling disk, roller or other attachments; group greaser tender; light plants; mechanic tender; mechanical broom; mechanical heaters; oiler; pumps (under three inch diameter); tree chipping machine; truck crane driver/oiler.

**** CARPENTERS AND PILEDRIVERMEN, or IRONWORKERS (ZONE 5)**

Setting of structural steel; any welding incidental to bridge or culvert construction; setting concrete beams.

*** ADDED CRAFT - SIGN ERECTOR**

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

- 2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

- 3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

- 4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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Part 1 – General Contract Provisions

Section 10 – Definition of Terms

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).

Paragraph Number	Term	Definition
10-09	Award	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	Bidder	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	Building Area	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	Calendar Day	Every day shown on the calendar.
10-13	Certificate of Analysis (COA)	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	Certificate of Compliance (COC)	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	Change Order	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	Contract	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	Contract Item (Pay Item)	A specific unit of work for which a price is provided in the contract.
10-18	Contract Time	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.

Paragraph Number	Term	Definition
10-19	Contractor	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	Contractors Quality Control (QC) Facilities	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	Contractor Quality Control Program (CQCP)	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	Control Strip	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	Construction Safety and Phasing Plan (CSPP)	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	Drainage System	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	Engineer	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	Equipment	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	Extra Work	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.

Paragraph Number	Term	Definition
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	Force Account	a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. b. Owner Force Account - Work performed for the project by the Owner's employees.
10-31	Intention of Terms	Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.
10-32	Lighting	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	Major and Minor Contract Items	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

Paragraph Number	Term	Definition
10-34	Materials	Any substance specified for use in the construction of the contract work.
10-35	Modification of Standards (MOS)	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	Notice to Proceed (NTP)	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	Owner	The term “Owner” shall mean the party of the first part or the contracting agency signatory to the contract. Where the term “Owner” is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is the City of Storm Lake, Iowa.
10-38	Passenger Facility Charge (PFC)	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	Pavement Structure	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	Payment bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	Performance bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	Plans	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'

Paragraph Number	Term	Definition
10-43	Project	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	Proposal	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	Proposal guaranty	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	Quality Assurance (QA)	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	Quality Control (QC)	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	Quality Assurance (QA) Inspector	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	Quality Assurance (QA) Laboratory	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	Resident Project Representative (RPR)	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	Runway	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.

Paragraph Number	Term	Definition
10-53	Safety Plan Compliance Document (SPCD)	Details how the Contractor will comply with the CSPP.
10-54	Specifications	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	Sponsor	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	Structures	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	Subgrade	The soil that forms the pavement foundation.
10-58	Superintendent	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	Supplemental Agreement	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	Surety	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	Taxilane	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.

Paragraph Number	Term	Definition
10-62	Taxiway	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	Taxiway/Taxilane Safety Area (TSA)	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	Work	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	Working day	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66	Owner Defined terms	None for this project.

END OF SECTION 10

Section 20 – Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). The Owner, or their authorized agent, shall publish the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement shall state the time and place for submitting sealed proposals; a description of the proposed work; instructions to bidders as to obtaining proposal forms, plans, and specifications; proposal guaranty required; and the Owner's right to reject any and all bids. If the Owner prequalifies bidders, they shall publish the advertisement at such places and at such times as are required by local law or ordinances.

20-2 Qualification of bidders. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-3 Contents of proposal forms. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

Mobilization is limited to 10 percent of the total project cost.

20-4 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

- c. Documented record of Contractor default under previous contracts with the Owner.
- d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-5 Interpretation of estimated proposal quantities. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

20-6 Examination of plans, specifications, and site. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from their own examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-7 Preparation of proposal. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-8 Responsive and responsible bidder. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-9 Irregular proposals. Proposals shall be considered irregular for the following reasons:

- a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.
- b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.
- d. If the proposal contains unit prices that are obviously unbalanced.
- e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.
- f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 Bid guarantee. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

20-11 Delivery of proposal. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-12 Withdrawal or revision of proposals. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 Public opening of proposals. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 Disqualification of bidders. A bidder shall be considered disqualified for any of the following reasons:

- a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.
- b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.
- c. If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, *Issuance of Proposal Forms*, of this section.

20-15 Discrepancies and Omissions. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than **seven (7) calendar** days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

Section 30 – Award and Execution of Contract

30-1 Consideration of proposals. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

- a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.
- b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-2 Award of contract. The award of a contract, if it is to be awarded, shall be made within **Ninety (90)** calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

For AIP contracts, unless otherwise specified in this subsection, no award shall be made until the FAA has reviewed the Owner's recommendation to make such award in accordance with 2 CFR 200.324.

30-3 Cancellation of award. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

30-4 Return of proposal guaranty. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds*.

30-5 Requirements of contract bonds. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

The Owner shall require separate performance and payment bonds in the full amount of the awarded contract.

30-6 Execution of contract. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 15 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-7 Approval of contract. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-8 Failure to execute contract. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *Execution of Contract*, of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

END OF SECTION 30

Section 40 – Scope of Work

40-1 Intent of contract. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-2 Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement.

Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

Refer to the following website for applicable federal contract provisions for procurement and contracting under AIP: www.faa.gov/airports/aip/procurement/federal_contract_provisions/

40-3 Omitted items. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item.

Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

40-4 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-5 Maintenance of traffic. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

40-6 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-7 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

- a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the RPR; or
- c. Use such material for the Contractor's own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-8 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40

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Section 50 – Control of Work

50-1 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-2 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

For Airport Improvement Program (AIP) contracts, the Owner must keep the FAA advised of the Engineer's determinations as to acceptance of work that is not in reasonably close conformity to the contract, plans, and specifications.

All change orders, supplemental agreements, and contract modifications must eventually be reviewed by the FAA. Unless specifically requested by the FAA, the Owner does not have to obtain prior FAA approval for contract changes except for the Buy American review, if required. However, if an Owner proceeds with contract changes without FAA approval, it is at the Owner's risk.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-3 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-4 List of Special Provisions.

- **Supplementary Provisions** Part A – Federal Contract Provisions for Construction and Equipment Contracts
- **Federal Wage Rates** **Predetermined Wage Rate: IA 20200081 (1/3/2020)**

50-5 Cooperation of Contractor. The Contractor shall be supplied with five hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-6 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-7 Construction layout and stakes. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): **Electronic. This shall be applicable to all survey(s) throughout these specifications.**

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

50-8 Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-9 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 Load restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

Various measures such as videotape or photographs may be required to document existing conditions prior to start of construction. Construction traffic should be kept off airport pavements to the extent possible.

50-12 Maintenance during construction. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 Partial acceptance. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

50-17 Value Engineering Cost Proposal. This section shall not be used on this project.

~~The provisions of this paragraph will apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.~~

~~On projects with original contract amounts in excess of \$100,000, the Contractor may submit to the RPR, in writing, proposals for modifying the plans, specifications or other requirements of the contract for the sole purpose of reducing the cost of construction. The value engineering cost proposal shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design and safety standards. This provision shall not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a value engineering proposal.~~

~~Not eligible for value engineering cost proposals are changes in the basic design of a pavement type, runway and taxiway lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the project.~~

~~As a minimum, the following information shall be submitted by the Contractor with each proposal:~~

- ~~a. — A description of both existing contract requirements for performing the work and the proposed changes, with a discussion of the comparative advantages and disadvantages of each.~~
- ~~b. — An itemization of the contract requirements that must be changed if the proposal is adopted.~~
- ~~c. — A detailed estimate of the cost of performing the work under the existing contract and under the proposed changes.~~
- ~~d. — A statement of the time by which a change order adopting the proposal must be issued.~~
- ~~e. — A statement of the effect adoption of the proposal will have on the time for completion of the contract.~~
- ~~f. — The contract items of work affected by the proposed changes, including any quantity variation attributable to them.~~

~~The Contractor may withdraw, in whole or in part, any value engineering cost proposal not accepted by the RPR, within the period specified in the proposal. The provisions of this subsection shall not be construed to require the RPR to consider any value engineering cost proposal that may be submitted.~~

~~The Contractor shall continue to perform the work in accordance with the requirements of the contract until a change order incorporating the value engineering cost proposal has been issued. If a change order has not been issued by the date upon which the Contractor's value engineering cost proposal specifies that a decision should be made, or such other date as the Contractor may subsequently have requested in writing, such value engineering cost proposal shall be deemed rejected.~~

~~The RPR shall be the sole judge of the acceptability of a value engineering cost proposal and of the estimated net savings from the adoption of all or any part of such proposal. In determining the estimated net savings, the RPR may disregard the contract bid prices if, in the RPR's judgment such prices do not represent a fair measure of the value of the work to be performed or deleted.~~

~~The Owner may require the Contractor to share in the Owner's costs of investigating a value engineering cost proposal submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall acknowledge acceptance of it in writing. Such acceptance shall constitute full authority for the Owner to deduct the cost of investigating a value engineering cost proposal from amounts payable to the Contractor under the contract.~~

~~If the Contractor's value engineering cost proposal is accepted in whole or in part, such acceptance will be by a contract change order that shall specifically state that it is executed pursuant to this paragraph. Such change order shall incorporate the changes in the plans and specifications which are necessary to permit the value~~

~~engineering cost proposal or such part of it as has been accepted and shall include any conditions upon which the RPR's approval is based. The change order shall also set forth the estimated net savings attributable to the value engineering cost proposal. The net savings shall be determined as the difference in costs between the original contract costs for the involved work items and the costs occurring as a result of the proposed change. The change order shall also establish the net savings agreed upon and shall provide for adjustment in the contract price that will divide the net savings equally between the Contractor and the Owner.~~

~~The Contractor's 50% share of the net savings shall constitute full compensation to the Contractor for the value engineering cost proposal and the performance of the work.~~

~~Acceptance of the value engineering cost proposal and performance of the work shall not extend the time of completion of the contract unless specifically provided for in the contract change order.~~

END OF SECTION 50

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Section 60 – Control of Materials

60-1 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work.

Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

60-2 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests ~~in accordance with Item C-100 Contractor Quality Control Program (CQCP).~~ **For this project, a CQCP is not required.**

60-3 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by “brand name or equal” and the Contractor elects to furnish the specified “or equal,” the Contractor shall be required to furnish the manufacturer’s certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed “or equal” is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-4 Plant inspection. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

- a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-5 Engineer/ Resident Project Representative (RPR) field office. For this project, an Engineer/RPR field office is not required.

60-6 Storage of materials. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor’s plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner’s permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-7 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-8 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

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Section 70 – Legal Regulations and Responsibility to Public

70-1 Laws to be observed. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-2 Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-3 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-4 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows:

NONE AT THIS TIME

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-5 Federal Participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-6 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-7 Public convenience and safety. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-8 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheet(s) G2.01, G2.02, and G2.03 of the project plans, and is also included as an Appendix to these project specifications.

70-9 Use of explosives. The use of explosives is not permitted on this project.

70-10 Protection and restoration of property and landscape. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 Responsibility for damage claims. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the

Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 Third party beneficiary clause. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 Opening sections of the work to traffic. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such “phasing” of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

PHASING IS ADDRESSED IN DETAIL IN THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), LOCATED AS AN APPENDIX ITEM IN THIS SPECIFICATION.

THE MOST CURRENT VERSION OF A.C. 150/5370-2, *OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION*, IS AN APPENDIX ITEM IN THIS SPECIFICATION.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained in AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor’s responsibility for work. Until the RPR’s final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

NONE KNOWN; HOWEVER, THE CONTRACTOR SHALL NOTIFY IOWA ON-CALL, THE AIRPORT MANAGER, AND THE ENGINEER AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

AT THIS TIME, NO KNOWN FAA FACILITIES OR CABLE RUNS EXIST WITHIN THE LIMITS OF THIS PROJECT

~~a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.~~

~~b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point of Contact through the airport Owner or manager a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.~~

~~c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point of Contact a minimum of 72 hours prior to the time of the required outage.~~

~~d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.~~

~~e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point of Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point of Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is shall furnish and install a sufficient length of new cable that eliminates the need for any splice.~~

70-16 Furnishing rights-of-way. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 Personal liability of public officials. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 No waiver of legal rights. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 Environmental protection. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

END OF SECTION 70

Section 80 – Execution and Progress

80-1 Subletting of contract. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least **Twenty-Five percent (25%)** of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-2 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within **ten (10)** days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-3 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-4 Limitation of operations. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

**CLOSED AREAS AND LIMITATIONS IN ANY GIVEN AREA ARE ADDRESSED IN DETAIL
IN THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), LOCATED AS AN
APPENDIX IN THIS SPECIFICATION.**

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner **and coordinated with the FAA**. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-5 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-6 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for

consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-7 Determination and extension of contract time. The time for completion (stated as number of Calendar Days, number of Working Days, or based on a specified Completion Date) shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-7.1 Contract time based on Working Days. Contract time based on working days shall be calculated weekly by the Resident Project Representative (RPR). The RPR will furnish the Contractor a copy of their weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved Change Orders or Supplemental Agreements covering Extra Work).

The weekly statement of contract time charged is based on the following considerations:

(1) Time will be charged for days on which the Contractor could proceed with scheduled work under construction at the time for at least six (6) hours with the normal work force employed on such items. When normal work force is a double-shift, use 12 hours; and when the normal work force is on a triple-shift, use 18 hours. Conditions beyond the Contractor's control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the scheduled work items under construction or temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.

(2) The RPR will not make charges against the contract time prior to the effective date of the notice to proceed.

(3) The RPR will begin charges against the contract time on the first working day after the effective date of the notice to proceed.

(4) The RPR will not make charges against the contract time after the date of final acceptance as defined in Section 50, paragraph 50- 14, *Final Acceptance*.

(5) The Contractor will be allowed one (1) week in which to file a written protest setting forth their own objections to the RPR's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

The contract time (stated in the proposal) is based on the originally estimated quantities as described in the Section 20, paragraph 20-05, *Interpretation of Estimated Proposal Quantities*. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.

80-8 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

Schedule	Liquidated Damages Cost	Allowed Construction Time
Base Bid – Phase 1	\$250 / Working Day	20 Working Days
Base Bid – Phase 2	\$500 / Working Day	20 Working Days
Base Bid – Total	\$250 / Working Day	40 Working Days

The maximum construction time allowed for **both Phase 1 and Phase 2** will be the sum of time allowed for individual schedules but not more than **40 Working Days**. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

Liquidated Damages (LD's) may be cumulative: For example, if total work is beyond 40 Working Days and Phase 2 work is also beyond 20 Working Days, LD's would be \$750/Working Day (\$500 for Phase 2 and \$250 for Total). Total project length and Phase 1 work has less impact on airport operations than Phase 2. For that reason, Liquidated Damages are twice the cost for Phase 2.

80-9 Default and termination of contract. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without

violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

Section 90 – Measurement and Payment

90-1 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term “lump sum” when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term “ton” will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.

Term	Description
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the

Term	Description
	scale, but not less than one pound (454 grams). The use of spring balances will not be permitted. In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%. In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-2 Scope of payment. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-3 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-4 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items*, the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-5 Payment for extra work. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-6 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 5% (five percent) of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

- (1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-03. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.**
- (2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.**

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily

completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-7 Payment for materials on hand. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-8 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

- a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.
- b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.
- c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.
- d. The Contractor shall obtain the written consent of the surety to such agreement.

90-9 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

- a. In addition to other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures, with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

The Owner and Engineer shall perform a warranty inspection with the Contractor approximately three (3) months before the end of the one year warranty period.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

- j. Project Operation and Maintenance (O&M) Manual(s).
- k. Security for Construction Warranty.
- l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

Part 2 – General Construction Items

Item C-105 – Mobilization

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to **10 percent of the total project cost.**

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105 Mobilization – per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP) Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

Part 3 – Sitework

Item P-101 – Preparation/Removal of Existing Pavements

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. If the material is to be wasted on the airport site, it shall be reduced to a maximum size of 30 pounds (14 kg). Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. If the material is to be wasted on the airport site it shall be broken to a maximum size of 2 inches.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks (over 1-1/2 inch wide (38 mm)), along with soft or sunken spots, indicate that the pavement or the pavement base should be repaired or replaced as stated below.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Gradation

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 µm)	40-60
No. 50 (300 µm)	25-42
No. 100 (150 µm)	15-30
No. 200 (75 µm)	10-20

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural sand without approval in writing from the RPR.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches (+0 to -3 mm) of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed.

101-3.3 Removal of Foreign Substances/contaminates prior to remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction. Chemicals, high-pressure water, heater scarifier (asphaltic concrete only), cold milling, rotary grinding, or sandblasting may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep.

If it is deemed by the RPR that damage to the existing pavement is caused by operational error such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair.

a. Repair of concrete spalls in areas to be overlaid with asphalt. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the RPR until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

b. Asphalt pavement repair. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 Cold milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property unless otherwise noted. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet (2 m) and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport, unless otherwise specified.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

- a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.
- b. Repair joints and cracks in accordance with paragraph 101-3.2.
- c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.
- d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the joint and does not damage the joint.

101-3.8.1 Removal of Existing Joint Sealant. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face.

Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 Cleaning prior to sealing. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing.

Joint surfaces will be surface-dry prior to installation of sealant.

101-3.8.3 Joint sealant. Joint material and installation will be in accordance with Item P-605.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with router or random crack saw by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by routing or random crack saw. Following routing/sawing, any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557 or D698. (Use same compaction requirements as specified in Item P-152.)

b. Removal of Inlets/Manholes. Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557 or D698, when outside of paved areas must be compacted to 95% of ASTM D698. (Use same compaction requirements as specified in Item P-152.)

METHOD OF MEASUREMENT

101-4.1 Lump sum. No separate measurement for payment will be made. The work covered by this section shall be considered as a subsidiary obligation of the Contractor and covered under the other contract items.

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal. **On this project, this item shall not be paid for separately, but shall be included in the bid item for “Pavement Removal and Replacement, 6” PCC, with P-209 Granular Base”, which is included for payment in section P-501.**

101-4.2 Joint and crack repair. Not required on this project.

101-4.3 Removal of Foreign Substances/contaminates. Not required on this project.

101-4.4 Spalled and failed asphalt pavement repair. Not required on this project.

101-4.5 Concrete Spall Repair. Not required on this project.

101-4.6 Cold milling. Not required on this project.

101-4.7 Removal of Pipe and other Buried Structures. Not required on this project.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P 101-5.1 **Pavement Removal – N/A this Project**

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only

Advisory Circulars (AC)

AC 150/5380-6 Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

Item P-152 – Excavation, Subgrade, and Embankment

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature which is not otherwise classified and paid for under one of the following items.

b. Drainage excavation. Drainage excavation shall consist of all excavation made for the primary purpose of drainage and includes drainage ditches, such as intercepting, inlet or outlet ditches; temporary levee construction; or any other type as shown on the plans.

c. Borrow excavation. Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas designated by the Resident Project Representative (RPR) within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport boundaries.

d. Other.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be either disposed of at locations shown on the plans or disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for **unclassified excavation**. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas are not required.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches (300 mm) of subgrade shall be compacted to not less than [100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM **D698**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within $\pm 2\%$ of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698/D 1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every **3,000 square yards** of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by **ASTM D698**. Under all areas to be paved, the embankments shall be compacted to a depth of **12 inches** and to a density of not less than **95%** percent of the maximum density as determined by **ASTM D698**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches (100 mm) which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556/ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re- compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. Both before start of embankment, and after compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi in the presence of the RPR. Apply a minimum of **75%** coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 100 percent of the maximum dry density as determined by **ASTM D1557/D698**. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within $\pm 2\%$ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D698/ASTM D1557 or procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of **1,000 S.Y.** of subgrade. All quality assurance testing shall be done by the RPR.

The in-place field density shall be determined in accordance with ASTM D1556/ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than $\pm 1/2$ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within ± 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard (cubic meter) shall be computed by the average end areas of design cross sections or the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR. **N/A this project.**

152-3.1 The quantity of unclassified excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed. **N/A this project.**

152-3.2 The quantity of embankment in place shall be the number of cubic yards (cubic meters) measured in its final position. **On this project, this item shall not be paid for separately, but is included only to specify preparation of disturbed subgrade during pavement removal on the pavement apron for the duct bank. Work required to prepare the subgrade for replacement of granular base and pavement shall be included in the bid item for "Pavement Removal and Replacement, 6" PCC, with P-209 Granular Base", which is included for payment in section P-501.**

152-3.3 Stockpiled material shall not be measured for payment in the stockpiled position. **N/A this project.**

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For embankment in place, payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 Stockpiled material shall be paid for on the basis of the number of cubic yards (cubic meters) measured in the stockpiled position.

Payment will be made under:

Item P-152-4.1 Unclassified Excavation – **N/A this Project**

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2700 kN-m/m³))

ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2 Operational Safety on Airports During Construction Software Software

FAARFIELD FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item P-153 – Controlled Low-Strength Material (CLSM)

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. Cement. Cement shall conform to the requirements of ASTM **C150 Type I or C595, Type IS/IP.**

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 µm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 Measurement.

No separate measurement for payment shall be made for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract. **On this project, CLSM shall be considered incidental to any portion of the bid item for “Concrete Encased Duct Bank, with (9) 2” Conduits” that is under the PCC apron pavement.**

BASIS OF PAYMENT

153-6.1 Payment.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

Controlled low-strength material (CLSM) shall be paid for at the contract unit price per cubic yard (cubic meter). Payment shall be full compensation for all materials, equipment, labor, and incidentals required to complete the work as specified.

Payment will be made under:

Item P-153-6.1 Controlled low-strength material (CLSM) –N/A this Project

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates ASTM C150 Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

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Part 4 –Base Courses

Item P-209 – Crushed Aggregate Base Course

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone or crushed gravel and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone or gravel that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 100% with at least one fractured face ¹	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles ²	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight Passing	Contractor's Final Gradation	Job Control Grading Band Tolerances ¹ (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 ² (425 µm)	10-30		±5
No. 200 ² (75 µm)	0-5		±3

¹ The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

² The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 Separation Geotextile. Not used on this project.**CONSTRUCTION METHODS**

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557/D698. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM D698. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yds (1000 m²). Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

~~209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of square yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities. N/A this project.~~

~~209-4.2 Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring. N/A this project.~~

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per square yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item. **On this project, this item shall not be paid for separately, but is included only to specify replacement of granular base disturbed or removed during pavement removal on the pavement apron for the duct bank. Work required for replacement of granular base under the replacement PCC pavement shall be included in the bid item for “Pavement Removal and Replacement, 6” PCC, with P-209 Granular Base”, which is included for payment in section P-501.**

~~209-5.2 Payment shall be made at the contract unit price per square yard for separation geotextile. The price shall be full compensation for furnishing all labor, equipment, material, anchors, and incidentals necessary. N/A this project.~~

Payment will be made under:

Item P-209-5.1 Crushed Aggregate Base Course – **N/A this Project**

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications
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END OF ITEM P-209

Part 7 – Rigid Pavement

Item P-501 – Cement Concrete Pavement

DESCRIPTION

501-1.1 This work shall consist of pavement composed of cement concrete without reinforcement (**except for specified areas shown on the plans**) constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans. The terms cement concrete, hydraulic cement concrete, and concrete are interchangeable in this specification. **Item P-610, Structural Concrete shall be used for sign bases and other formed concrete structures.**

MATERIALS

501-2.1 Aggregates.

a. Reactivity. Fine and Coarse aggregates to be used in PCC on this project shall be tested and evaluated by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Tests must be representative of aggregate sources which will be providing material for production. ASTM C1260 and ASTM C1567 tests may be run concurrently.

(1) Coarse aggregate and fine aggregate shall be tested separately in accordance with ASTM C1260, however, the length of test shall be extended to 28 days (30 days from casting). Tests must have been completed within 6 months of the date of the concrete mix submittal.

(2) The combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

(3) If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662 in lieu of ASTM C1567. If lithium nitrate admixture is used, it shall be nominal 30% $\pm$ 0.5% weight lithium nitrate in water. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

b. Fine aggregate. Grading of the fine aggregate, as delivered to the mixer, shall conform to the requirements of ASTM C33 and the parameters identified in the fine aggregate material requirements below. Fine aggregate material requirements and deleterious limits are shown in the table below.

Fine Aggregate Material Requirements		
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Sand Equivalent	45 minimum	ASTM D2419
Fineness Modulus (FM)	$2.50 \leq FM \leq 3.40$	ASTM C136
Limits for Deleterious Substances in Fine Aggregate for Concrete		
Clay lumps and friable particles	1.0% maximum	ASTM C142
Coal and lignite	0.5% using a medium with a density of Sp. Gr. of 2.0	ASTM C123
Total Deleterious Material	1.0% maximum	

c. Coarse aggregate. The maximum size coarse aggregate shall be one inch.

Aggregates delivered to the mixer shall be clean, hard, uncoated aggregates consisting of crushed stone, crushed or uncrushed gravel, air-cooled iron blast furnace slag, crushed recycled concrete pavement, or a combination. The aggregates shall have no known history of detrimental pavement staining. Steel blast furnace slag shall not be permitted. Coarse aggregate material requirements and deleterious limits are shown in the table below; washing may be required to meet aggregate requirements.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 for any size group coarser than 3/8 (9.5 mm) sieve ¹	ASTM D4791
Bulk density of slag ²	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29
D-cracking (Freeze-Thaw) ³	Durability factor ≥ 95	ASTM C666

¹ A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

² Only required if slag is specified.

³ Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions

without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

The amount of deleterious material in the coarse aggregate shall not exceed the following limits:

Limits for Deleterious Substances in Coarse Aggregate

Deleterious material	ASTM	Percentage by Mass
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than No. 200 sieve (75 µm)	ASTM C117	1.0 ¹
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Chert ² (less than 2.40 Sp Gr.)	ASTM C123 using a medium with a density of Sp. Gr. of 2.40)	0.1 ³

¹ The limit for material finer than 75-µm is allowed to be increased to 1.5% for crushed aggregates consisting of dust of fracture that is essentially free from clay or shale. Test results supporting acceptance of increasing limit to 1.5% with statement indicating material is dust of fracture must be submitted with Concrete mix. Acceptable techniques to characterizing these fines include methylene blue adsorption or X-ray diffraction analysis.

² Chert and aggregates with less than 2.4 specific gravity.

³ The limit for chert may be increased to 1.0 percent by mass in areas not subject to severe freeze and thaw.

d. Combined aggregate gradation. This specification is targeted for a combined aggregate gradation developed following the guidance presented in United States Air Force Engineering Technical Letter (ETL) 97-5: Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements. Base the aggregate grading upon a combination of all the aggregates (coarse and fine) to be used for the mixture proportioning. Three aggregate sizes may be required to achieve an optimized combined gradation that will produce a workable concrete mixture for its intended use. Use aggregate gradations that produce concrete mixtures with well-graded or optimized aggregate combinations. The Contractor shall submit complete mixture information necessary to calculate the volumetric components of the mixture. The combined aggregate grading shall meet the following requirements:

(1) The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in paragraph 501-2.1d(4) below, the point thus determined shall fall within the parallelogram described therein.

(2) The CF shall be determined from the following equation:

$$CF = (\text{cumulative percent retained on the } 3/8 \text{ in. (9.5 mm) sieve})(100) / (\text{cumulative percent retained on the No. 8 (2.36 mm) sieve})$$

- (3) The WF is defined as the percent passing the No. 8 (2.36 mm) sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds (42 kg) of cementitious material per cubic meter yard greater than 564 pounds per cubic yard (335 kg per cubic meter).
- (4) A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF- 75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate used and the proportions selected shall be changed as necessary. The point determined by the plotting of the CF and WF may be adjusted during production ± 3 WF and ± 5 CF. Adjustments to gradation may not take the point outside of the parallelogram.

e. Contractors combined aggregate gradation. The Contractor shall submit their combined aggregate gradation using the following format:

Contractor's Combined Aggregate Gradation

Sieve Size	Contractor's Concrete mix Gradation (Percent passing by weight)
2 inch (50 mm)	*
1-1/2 inch (37.5 mm)	*
1 inch (25.0 mm)	*
3/4 inch (19.0 mm)	*
1/2 inch (12.5 mm)	*
3/8 inch (9.5 mm)	*
No. 4 (4.75 mm)	*
No. 8 (2.36 mm)	*
No. 16 (1.18 mm)	*
No. 30 (600 μ m)	*
No. 50 (300 μ m)	*
No. 100 (150 μ m)	*

501-2.2 Cement. Cement shall conform to the requirements of **ASTM C150 Type I, or ASTM C595 for Blended Types IP or IS.**

501-2.3 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total alkali content less than 3% per ASTM C311. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the Resident Project Representative (RPR).

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

c. Raw or calcined natural pozzolan. Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6%. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a total available alkali content less than 3%.

d. Ultrafine fly ash and ultrafine pozzolan. UltraFine Fly Ash (UFFA) and UltraFine Pozzolan (UFP) shall conform to ASTM C618, Class F or N, and the following additional requirements:

- (1) The strength activity index at 28 days of age shall be at least 95% of the control specimens.
- (2) The average particle size shall not exceed 6 microns.

501-2.4 Joint seal. The joint seal for the joints in the concrete pavement shall meet the requirements of Item P-605 and shall be of the type specified in the plans.

501-2.5 Isolation joint filler. Premolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 or ASTM D1752 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the RPR. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to the RPR.

501-2.6 Steel reinforcement. Reinforcing shall consist of **welded wire steel fabric (epoxy-coated)** conforming to the requirements of ASTM A185. **Welded wire shall be furnished in flat sheets only.**

501-2.7 Dowel and tie bars. Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete.

a. Dowel Bars. Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils. Patched ends are not required for Type 1 coated dowels. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.

b. Tie Bars. Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

501-2.8 Water. Water used in mixing or curing shall be potable. If water is taken from other sources considered non-potable, it shall meet the requirements of ASTM C1602.

501-2.9 Material for curing concrete. Curing materials shall conform to one of the following specifications:

- a.** Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A, or Class B.
- b.** White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.
- c.** White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.
- d.** Waterproof paper for curing concrete shall conform to the requirements of ASTM C171.

501-2.10 Admixtures. Admixtures shall conform to the following specifications:

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entraining agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D.

c. Other admixtures. The use of set retarding and set-accelerating admixtures shall be approved by the RPR prior to developing the concrete mix. Retarding admixtures shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating admixtures shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

d. Lithium Nitrate. The lithium admixture shall be a nominal 30% aqueous solution of Lithium Nitrate, with a density of 10 pounds/gallon (1.2 kg/L), and shall have the approximate chemical form as shown below:

Lithium Admixture

Constituent	Limit (Percent by Mass)
LiNO ₃ (Lithium Nitrate)	30 ±0.5
SO ₄ (Sulfate Ion)	0.1 (max)
Cl (Chloride Ion)	0.2 (max)
Na (Sodium Ion)	0.1 (max)
K (Potassium Ion)	0.1 (max)

The lithium nitrate admixture dispensing and mixing operations shall be verified and certified by the lithium manufacturer's representative.

501-2.11 Epoxy-resin. All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application temperature to be encountered, except that in addition, the materials shall meet the following requirements:

a. Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.

b. Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.

c. Material for use for injecting cracks shall be Type IV, Grade 1.

d. Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

501-2.12 Bond Breaker. Not required.

CONCRETE MIX

501-3.1. General. No concrete shall be placed until an acceptable concrete mix has been submitted to the RPR for review and the RPR has taken appropriate action. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

501-3.2 Concrete Mix Laboratory. The laboratory used to develop the concrete mix shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix must be

included in the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

501-3.3 Concrete Mix Proportions. Develop the mix using the procedures contained in Portland Cement Association (PCA) publication, "Design and Control of Concrete Mixtures." Concrete shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of **650** psi per ASTM C78.

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 470 pounds per cubic yard (280 kg per cubic meter). The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall be between 0.38 – 0.45 by weight.

Flexural strength test specimens shall be prepared in accordance with ASTM C192 and tested in accordance with ASTM C78. At the start of the project, the Contractor shall determine an allowable slump as determined by ASTM C143 not to exceed 2 inches (50 mm) for slip-form placement. For fixed-form placement, the slump shall not exceed 3 inches (75 mm). For hand placement, the slump shall not exceed 4 inches (100 mm).

When the flexural design strength in paragraph 501-3.3 is to be accepted on the basis of compressive strength, the following procedure establishes the correlation between compressive and flexural strength for the concrete mix. Each concrete mix will require a separate correlation.

Cylinders/Beams

a. Fabricate all beams and cylinders for each mixture from the same batch or blend of batches. Fabricate and cure all beams and cylinders in accordance with ASTM C192, using 6 × 6-inch (150 × 150 mm) steel beam forms and 6 × 12-inch (150 × 300 mm) single-use cylinder forms.

b. Cure test beams from each mixture for 3, 7, 14, 28 and 90-day flexural tests; three (3) beams to be tested per age.

c. Cure test cylinders from each mixture for 3, 7, 14, 28 and 90- day compressive strength tests; three (3) cylinders to be tested per age.

d. Test beams in accordance with ASTM C78, cylinders in accordance with ASTM C39.

e. Using the average strength for each age, plot all results on separate graphs for each w/c versus:

- 3-day flexural strength
- 7-day flexural strength
- 14-day flexural strength
- 28-day flexural strength
- 3-day compressive strength
- 7-day compressive strength
- 14-day compressive strength
- 28-day compressive strength

f. From the above expected strengths for the selected mixture determine the following Correlation Ratios:

- (1) Ratio of the 14-day compressive strength of the selected mixture to the 28-day flexural strength of the mixture (for acceptance).
- (2) Ratio of the 7-day compressive strength of the selected mixture to the 28-day flexural strength of the mixture (for Contractor QC control).

g. If there is a change in materials, additional mixture design studies shall be made using the new materials and new Correlation Ratios shall be determined.

h. No concrete pavement shall be placed until the Engineer has approved the Contractor's mixture proportions. The approved water-cementitious materials ratio shall not exceed the maximum value specified.

The results of the concrete mix shall include a statement giving the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a one cubic yard (meter) basis.

Aggregate quantities shall be based on the mass in a saturated surface dry condition.

If a change in source(s) is made, or admixtures added or deleted from the mix, a new concrete mix must be submitted to the RPR for approval.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

501-3.4 Concrete Mix submittal. The concrete mix shall be submitted to the RPR at least [30] days prior to the start of operations. The submitted concrete mix shall not be more than 180 days old and must use the materials to be used for production for the project. Production shall not begin until the concrete mix is approved in writing by the RPR.

Each of the submitted concrete mixes (i.e, slip form, side form machine finish and side form hand finish) shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items and quantities as a minimum:

- Certified material test reports for aggregate in accordance with paragraph 501-2.1. Certified reports must include all tests required; reporting each test, test method, test result, and requirement specified (criteria).
- Combined aggregate gradations and analysis; and including plots of the fine aggregate fineness modulus.
- Reactivity Test Results.
- Coarse aggregate quality test results, including deleterious materials.
- Fine aggregate quality test results, including deleterious materials.
- Mill certificates for cement and supplemental cementitious materials.
- Certified test results for all admixtures, including Lithium Nitrate if applicable.
- Specified flexural strength, slump, and air content.
- Recommended proportions/volumes for proposed mixture and trial water-cementitious materials ratio, including actual slump and air content.
- Flexural and compressive strength summaries and plots, including all individual beam and cylinder breaks.

- Correlation ratios for acceptance testing and Contractor QC testing, when applicable.
- Historical record of test results documenting production standard deviation, when applicable.

501-3.5 Cementitious materials.

a. Fly ash. When fly ash is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If fly ash is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement may be used. The slag cement, or slag cement plus fly ash if both are used, may constitute between 25 to 55% of the total cementitious material by weight.

c. Raw or calcined natural pozzolan. Natural pozzolan may be used in the concrete mix. When pozzolan is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If pozzolan is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

d. Ultrafine fly ash (UFFA) and ultrafine pozzolan (UFP). UFFA and UFP may be used in the concrete mix with the RPR's approval. When UFFA and UFP is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 7% and 16% by weight of the total cementitious material.

501-3.6 Admixtures.

a. Air-entraining admixtures. Air-entraining admixture are to be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. **The percentage of air in the mix shall be as shown in the table below, based on the final mix design aggregate size.** Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

Recommended Air Content (Percent)

Exposure Level	Maximum Size Aggregate inch (mm)				
	2 inch	1-1/2 inch	1 inch	3/4 inch	1/2 inch
Moderate	4.0%	4.5%	4.5%	5.0%	5.5%

1. Moderate exposure - Service in a climate where freezing is expected but where the concrete will not be continually exposed to moisture or free water for long periods prior to freezing and will not be exposed to deicing agents or other aggressive chemicals.

b. Water-reducing admixtures. Water-reducing admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

c. Other admixtures. Set controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

d. Lithium nitrate. Lithium nitrate shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements in accordance with paragraph 501-2.10d.

CONSTRUCTION METHODS

501-4.1 Control Strip. The control strip(s) shall be to the next planned joint after the initial 250 feet of each type of pavement construction (slip-form pilot lane, slip-form fill-in lane, or fixed form). The Contractor shall demonstrate, in the presence of the RPR, that the materials, concrete mix, equipment, construction processes, and quality control processes meet the requirements of the specifications. The concrete mixture shall be extruded from the paver meeting the edge slump tolerance and with little or no finishing. Pilot, fill-in, and fixed-form control strips will be accepted separately. Minor adjustments to the mix design may be required to place an acceptable control strip. The production mix will be the adjusted mix design used to place the acceptable control strip. Upon acceptance of the control strip by the RPR, the Contractor must use the same equipment, materials, and construction methods for the remainder of concrete paving. Any adjustments to processes or materials must be approved in advance by the RPR. The acceptable control strip shall be paid for in accordance with paragraph 501-6.6.

501-4.2 Equipment. The Contractor is responsible for the proper operation and maintenance of all equipment necessary for handling materials and performing all parts of the work to meet this specification.

a. Plant and equipment. The plant and mixing equipment shall conform to the requirements of ASTM C94 and/or ASTM C685. Each truck mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. The truck mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch (19 mm) or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

Equipment for transferring and spreading concrete from the transporting equipment to the paving lane in front of the finishing equipment shall be provided. The equipment shall be specially manufactured, self-propelled transfer equipment which will accept the concrete outside the paving lane and will spread it evenly across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

b. Finishing equipment.

(1) Slip-form. The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed and operated to spread, consolidate, screed, and finish the freshly placed concrete in one complete pass of the machine so that the end result is a dense and homogeneous pavement which is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements.

(2) Fixed-form. On projects requiring less than 10,000 cubic yards of concrete pavement or irregular areas at locations inaccessible to slip-form paving equipment, concrete pavement may be placed with equipment specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR. Hand screeding and float finishing may only be used on small irregular areas as allowed by the RPR.

c. Vibrators. Vibrator shall be the internal type. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation or voids. The number, spacing, and frequency shall be as necessary to provide a dense and homogeneous pavement and meet the recommendations of American Concrete Institute (ACI) 309R, Guide for Consolidation of Concrete. Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases. The Contractor shall provide an electronic or mechanical means to monitor vibrator status. The checks on vibrator status shall occur a minimum of two times per day or when requested by the RPR.

Hand held vibrators may only be used in irregular areas and shall meet the recommendations of ACI 309R, Guide for Consolidation of Concrete.

d. Concrete saws. The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.

e. Fixed forms. Straight side fixed forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the RPR. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when approved by the RPR. The forms shall extend the full depth of the pavement section.

501-4.3 Form setting. Forms shall be set to line and grade as shown on the plans, sufficiently in advance of the concrete placement, to ensure continuous paving operation. Forms shall be set to withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the concrete placement.

501-4.4 Base surface preparation prior to placement. Any damage to the prepared base, subbase, and subgrade shall be corrected full depth by the Contractor prior to concrete placement. The underlying surface shall be entirely free of frost when concrete is placed. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete. Bond breaker shall be applied in accordance with 501-2.12.

501-4.5 Handling, measuring, and batching material. Aggregate stockpiles shall be constructed and managed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant.

Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Store and maintain all aggregates at a uniform moisture content prior to use. A continuous supply of materials shall be provided to the work to ensure continuous placement.

501-4.6 Mixing concrete. The concrete may be mixed at the work site, in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials are placed into the drum until the drum is emptied into the truck. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94 or ASTM C685.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is discharged from the truck should not exceed 30 minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. In no case shall the temperature of the concrete when placed exceed 90°F (32°C). Retempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified is not exceeded.

501-4.7 Weather Limitations on mixing and placing. No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

a. Cold weather. Unless authorized in writing by the RPR, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F (4°C) and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F (2°C).

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50°F (10°C) at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150°F (66°C). The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

Curing during cold weather shall be in accordance with paragraph 501-4.13d.

b. Hot weather. During periods of hot weather when the maximum daily air temperature exceeds 85°F (30°C), the following precautions shall be taken.

The forms and/or the underlying surface shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 90°F (32°C). The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

The concrete placement shall be protected from exceeding an evaporation rate of 0.2 psf (0.98 kg/m² per hour) per hour. When conditions are such that problems with plastic cracking can be expected, and particularly if any plastic cracking begins to occur, the Contractor shall immediately take such additional measures as necessary to protect the concrete surface. If the Contractor's measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped.

Curing during hot weather shall be in accordance with paragraph 501-4.13e.

c. Temperature management program. Prior to the start of paving operation for each day of paving, the Contractor shall provide the RPR with a Temperature Management Program for the concrete to be placed to assure that uncontrolled cracking is avoided. (Federal Highway Administration HIPERPAV 3 is one example of a temperature management program.) As a minimum, the program shall address the following items:

- (1) Anticipated tensile strains in the fresh concrete as related to heating and cooling of the concrete material.

- (2) Anticipated weather conditions such as ambient temperatures, wind velocity, and relative humidity; and anticipated evaporation rate using Figure 19-9, PCA, Design and Control of Concrete Mixtures.
- (3) Anticipated timing of initial sawing of joint.
- (4) Anticipated number and type of saws to be used.

d. Rain. The Contractor shall have available materials for the protection of the concrete during inclement weather. Such protective materials shall consist of rolled polyethylene sheeting at least 4 mils (0.1 mm) thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

501-4.8 Concrete Placement. At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet (1 m). The finished concrete product must be dense and homogeneous, without segregation and conforming to the standards in this specification. Backhoes and grading equipment shall not be used to distribute the concrete in front of the paver. Front end loaders will not be used. All concrete shall be consolidated without voids or segregation, including under and around all load-transfer devices, joint assembly units, and other features embedded in the pavement. Hauling equipment or other mechanical equipment can be permitted on adjoining previously constructed pavement when the concrete strength reaches a compressive strength of 3,100 psi, based on the average of four field cured specimens per 2,000 cubic yards (1,530 cubic meters) of concrete placed. The Contractor must determine that the above minimum strengths are adequate to protect the pavement from overloads due to the construction equipment proposed for the project.

The Contractor shall have available materials for the protection of the concrete during cold, hot and/or inclement weather in accordance with paragraph 501-4.7.

a. Slip-form construction. The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well-defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 9 inches (23 cm) for slipform and at the end of the dowels for the fill-in lanes. The spacing of internal units shall be uniform and shall not exceed 18 inches (0.5 m).

The term internal vibration means vibrating units located within the specified thickness of pavement section. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without, segregation, voids, or vibrator trails and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit and for a distance of at least one foot (30 cm). The frequency of vibration or amplitude should be adjusted proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible and all operations of mixing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the paver, the vibratory and

tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

When concrete is being placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

Not more than 15% of the total free edge of each 500-foot (150 m) segment of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch (6 mm), and none of the free edge of the pavement shall have an edge slump exceeding 3/8 inch (9 mm). (The total free edge of 500 feet (150 m) of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; that is, 500 feet (150 m) of paving lane originally constructed as a separate lane will have 1,000 feet (300 m) of free edge, 500 feet (150 m) of fill-in lane will have no free edge, etc.). The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches (0.5 m) from the edge.

When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump will be removed the full width of the slip form lane and replaced at the expense of the Contractor as directed by the RPR.

b. Fixed-form construction. Forms shall be drilled in advance of being placed to line and grade to accommodate tie bars / dowel bars where these are specified.

Immediately in advance of placing concrete and after all subbase operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delay in placing.

Side forms shall remain in place at least 12 hours after the concrete has been placed, and in all cases until the edge of the pavement no longer requires the protection of the forms. Curing compound shall be applied to the concrete immediately after the forms have been removed.

Side forms shall be thoroughly cleaned and coated with a release agent each time they are used and before concrete is placed against them.

Concrete shall be spread, screed, shaped and consolidated by one or more self-propelled machines.

These machines shall uniformly distribute and consolidate concrete without segregation so that the completed pavement will conform to the required cross-section with a minimum of handwork.

The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to that of concrete delivery. The equipment must be specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR.

Concrete for the full paving width shall be effectively consolidated by internal vibrators. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation, voids, or leaving vibrator trails.

Power to vibrators shall be connected so that vibration ceases when forward or backward motion of the machine is stopped.

c. Consolidation. Concrete shall be consolidated with the specified type of lane-spanning, gang-mounted, mechanical, immersion type vibrating equipment mounted in front of the paver, supplemented, in rare instances as specified, by hand-operated vibrators. The vibrators shall be inserted into the concrete to a depth that will provide the best full-depth consolidation but not closer to the underlying material than 2 inches (50 mm). Vibrators shall not be used to transport or spread the concrete. For each paving train, at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators shall be

maintained at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) or over-consolidation (vibrator trails, segregation, or any other evidence) shall require the immediate stopping of the paving operation and adjustment of the equipment or procedures as approved by the RPR.

If a lack of consolidation of the hardened concrete is suspected by the RPR, referee testing may be required. Referee testing of hardened concrete will be performed by the RPR by cutting cores from the finished pavement after a minimum of 24 hours curing. The RPR shall visually examine the cores for evidence of lack of consolidation. Density determinations will be made by the RPR based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated-surface dry condition. When required, referee cores will be taken at the minimum rate of one for each 500 cubic yards (382 m²) of pavement, or fraction. The Contractor shall be responsible for all referee testing cost if they fail to meet the required density.

The average density of the cores shall be at least 97% of the original concrete mix density, with no cores having a density of less than 96% of the original concrete mix density. Failure to meet the referee tests will be considered evidence that the minimum requirements for vibration are inadequate for the job conditions. Additional vibrating units or other means of increasing the effect of vibration shall be employed so that the density of the hardened concrete conforms to the above requirements.

501-4.9 Strike-off of concrete and placement of reinforcement. Following the placing of the concrete, it shall be struck off to conform to the cross-section shown on the plans and to an elevation that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off to such length and depth that the sheet of reinforcing steel fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off, and screed. If any portion of the bottom layer of concrete has been placed more than 30 minutes without being covered with the top layer or if initial set has taken place, it shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete by mechanical or vibratory means after spreading.

Reinforcing steel, at the time concrete is placed, shall be free of mud, oil, or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable ASTM specification requirements.

501-4.10 Joints. Joints shall be constructed as shown on the plans and in accordance with these requirements. All joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Joints shall not vary more than 1/2-inch (12 mm) from their designated position and shall be true to line with not more than 1/4-inch (6 mm) variation in 10 feet (3 m). The surface across the joints shall be tested with a 12-foot (3 m) straightedge as the joints are finished and any irregularities in excess of 1/4 inch (6 mm) shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

a. Construction. Longitudinal construction joints shall be slip-formed or formed against side forms as shown in the plans.

Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

b. Contraction. Contraction joints shall be installed at the locations and spacing as shown on the plans. Contraction joints shall be installed to the dimensions required by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened. When the groove is formed in plastic concrete the sides of the grooves shall be finished even and smooth with an edging tool. If an insert material is used, the installation and edge finish shall be according to the manufacturer's instructions. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch (3 mm) wide and to the depth shown on the plans.

c. Isolation (expansion). Isolation joints shall be installed as shown on the plans. The premolded filler of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint. The filler shall be fastened uniformly along the hardened joint face with no buckling or debris between the filler and the concrete interface, including a temporary filler for the sealant reservoir at the top of the slab. The edges of the joint shall be finished and tooled while the concrete is still plastic.

d. Dowels and Tie Bars for Joints

(1) Tie bars. Tie bars shall consist of deformed bars installed in joints as shown on the plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on the plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth and within the tolerances in paragraph 501-4.10(f.). When tie bars extend into an unpaved lane, they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, greased, or enclosed in sleeves. When slip- form operations call for tie bars, two-piece hook bolts can be installed.

(2) Dowel bars. Dowel bars shall be placed across joints in the proper horizontal and vertical alignment as shown on the plans. The dowels shall be coated with a bond-breaker or other lubricant recommended by the manufacturer and approved by the RPR. Dowels bars at longitudinal construction joints shall be bonded in drilled holes.

(3) Placing dowels and tie bars. Horizontal spacing of dowels shall be within a tolerance of $\pm 3/4$ inch (19 mm). The vertical location on the face of the slab shall be within a tolerance of $\pm 1/2$ inch (12 mm). The method used to install dowels shall ensure that the horizontal and vertical alignment will not be greater than 1/4 inch per foot (6 mm per 0.3 m), except for those across the crown or other grade change joints. Dowels across crowns and other joints at grade changes shall be measured to a level surface. Horizontal alignment shall be checked perpendicular to the joint edge. The portion of each dowel intended to move within the concrete or expansion cap shall be wiped clean and coated with a thin, even film of lubricating oil or light grease before the concrete is placed. Dowels shall be installed as specified in the following subparagraphs.

(a) Contraction joints. Dowels and tie bars in longitudinal and transverse contraction joints within the paving lane shall be held securely in place by means of rigid metal frames or basket assemblies of an approved type. The basket assemblies shall be held securely in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

At the Contractor's option, dowels and tie bars in contraction joints may be installed by insertion into the plastic concrete using approved equipment and procedures per the paver manufacturer's design. Approval of installation methods will be based on the results of the control strip showing that the dowels and tie bars are installed within specified tolerances as verified by cores or non-destructive rebar location devices approved by the RPR.

(b) Construction joints. Install dowels and tie bars by the cast-in-place or the drill-and-dowel method. Installation by removing and replacing in preformed holes will not be permitted. Dowels and tie bars shall be prepared and placed across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms.

(c) Joints in hardened concrete. Install dowels in hardened concrete by bonding the dowels into holes drilled into the concrete. The concrete shall have cured for seven (7) days or reached a minimum compressive strength of 3100 psi before drilling begins. Holes 1/8 inch (3 mm) greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur. Spalling beyond the limits of the grout retention ring will require modification of the equipment and operation. Depth of dowel hole shall be within a tolerance of $\pm 1/2$ inch (12 mm) of the dimension shown on the drawings. On completion of the drilling operation, the dowel hole shall be blown out with oil-free, compressed air. Dowels shall be bonded in the drilled holes using epoxy resin. Epoxy resin shall be injected at the back of the hole before installing the dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel will not be permitted. The dowels shall be held in alignment at the collar of the hole by means of a suitable metal or plastic grout retention ring fitted around the dowel.

e. Sawing of joints. Sawing shall commence, without regard to day or night, as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs and shall continue without interruption until all joints have been sawn. All slurry and debris produced in the sawing of joints shall be removed by vacuuming and washing. Curing compound or system shall be reapplied in the initial saw-cut and maintained for the remaining cure period.

Joints shall be cut in locations as shown on the plans. The initial joint cut shall be a minimum 1/8 inch (3 mm) wide and to the depth shown on the plans. Prior to placement of joint sealant or seals, the top of the joint shall be widened by sawing as shown on the plans.

501-4.11 Finishing. Finishing operations shall be a continuing part of placing operations starting immediately behind the strike-off of the paver. Initial finishing shall be provided by the transverse screed or extrusion plate. The sequence of operations shall be transverse finishing, longitudinal machine floating if used, straightedge finishing, edging of joints, and then texturing. Finishing shall be by the machine method. The hand method shall be used only on isolated areas of odd slab widths or shapes and in the event of a breakdown of the mechanical finishing equipment. Supplemental hand finishing for machine finished pavement shall be kept to an absolute minimum. Any machine finishing operation which requires appreciable hand finishing, other than a moderate amount of straightedge finishing, shall be immediately stopped and proper adjustments made or the equipment replaced. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Compensation shall be made for surging behind the screeds or extrusion plate and settlement during hardening and care shall be taken to ensure

that paving and finishing machines are properly adjusted so that the finished surface of the concrete (not just the cutting edges of the screeds) will be at the required line and grade. Finishing equipment and tools shall be maintained clean and in an approved condition. At no time shall water be added to the surface of the slab with the finishing equipment or tools, or in any other way. Fog (mist) sprays or other surface applied finishing aids specified to prevent plastic shrinkage cracking, approved by the RPR, may be used in accordance with the manufacturers requirements.

a. Machine finishing with slipform pavers. The slipform paver shall be operated so that only a very minimum of additional finishing work is required to produce pavement surfaces and edges meeting the specified tolerances. Any equipment or procedure that fails to meet these specified requirements shall immediately be replaced or modified as necessary. A self-propelled non-rotating pipe float may be used while the concrete is still plastic, to remove minor irregularities and score marks. Only one pass of the pipe float shall be allowed. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Remove excessive slurry from the surface with a cutting straightedge and wipe off the edge. Any slurry which does run down the vertical edges shall be immediately removed by hand, using stiff brushes or scrapers. No slurry, concrete or concrete mortar shall be used to build up along the edges of the pavement to compensate for excessive edge slump, either while the concrete is plastic or after it hardens.

b. Machine finishing with fixed forms. The machine shall be designed to straddle the forms and shall be operated to screed and consolidate the concrete. Machines that cause displacement of the forms shall be replaced. The machine shall make only one pass over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, the operation shall be immediately stopped and the equipment, mixture, and procedures adjusted as necessary.

c. Other types of finishing equipment. Clary screeds, other rotating tube floats, or bridge deck finishers are not allowed on mainline paving, but may be allowed on irregular or odd-shaped slabs, and near buildings or trench drains, subject to the RPR's approval.

Bridge deck finishers shall have a minimum operating weight of 7500 pounds (3400 kg) and shall have a transversely operating carriage containing a knock-down auger and a minimum of two immersion vibrators. Vibrating screeds or pans shall be used only for isolated slabs where hand finishing is permitted as specified, and only where specifically approved.

d. Hand finishing. Hand finishing methods will not be permitted, except under the following conditions: (1) in the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade and (2) in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical.

e. Straightedge testing and surface correction. After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a 12-foot (3.7-m) finishing straightedge swung from handles capable of spanning at least one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch (3 mm) thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross-section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

501-4.12 Surface texture. The surface of the pavement shall be finished as designated below for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. The texture shall be uniform in appearance and approximately 1/16 inch (2 mm) in depth. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the RPR.

a. Brush or broom finish. Shall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface.

b. Burlap drag finish. Burlap, at least 15 ounces per square yard (555 grams per square meter), will typically produce acceptable texture. To obtain a textured surface, the transverse threads of the burlap shall be removed approximately one foot (30 cm) from the trailing edge. A heavy buildup of grout on the burlap threads produces the desired wide sweeping longitudinal striations on the pavement surface.

c. Artificial turf finish. Shall be applied by dragging the surface of the pavement in the direction of concrete placement with an approved full-width drag made with artificial turf. The leading transverse edge of the artificial turf drag will be securely fastened to a lightweight pole on a traveling bridge. At least 2 feet (60 cm) of the artificial turf shall be in contact with the concrete surface during dragging operations. Approval of the artificial turf will be done only after it has been demonstrated by the Contractor to provide a satisfactory texture. One type that has provided satisfactory texture consists of 7,200 approximately 0.85-inch-long polyethylene turf blades per square foot.

501-4.13 Curing. Immediately after finishing operations are completed and bleed water is gone from the surface, all exposed surfaces of the newly placed concrete shall be cured for a 7-day cure period in accordance with one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period.

When a two-saw-cut method is used to construct the contraction joint, the curing compound shall be applied to the saw-cut immediately after the initial cut has been made. The sealant reservoir shall not be sawed until after the curing period has been completed. When the one cut method is used to construct the contraction joint, the joint shall be cured with wet rope, wet rags, or wet blankets. The rags, ropes, or blankets shall be kept moist for the duration of the curing period.

a. Impervious membrane method. Curing with liquid membrane compounds should not occur until bleed and surface moisture has evaporated. All exposed surfaces of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of the concrete has taken place. The curing compound shall not be applied during rainfall. Curing compound shall be applied by mechanical sprayers under pressure at the rate of one gallon (4 liters) to not more than 150 square feet (14 sq m). The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted. When hand spraying is approved by the RPR, a double application rate shall be used to ensure coverage. Should the film become damaged from any cause, including sawing operations, within the required curing period, the damaged portions shall be repaired immediately with additional compound or other approved means. Upon removal of side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.

b. White burlap-polyethylene sheets. The surface of the pavement shall be entirely covered with the sheeting. The sheeting used shall be such length (or width) that it will extend at least twice the thickness of the pavement beyond the edges of the slab. The sheeting shall be placed so that the entire surface and both edges of the slab are completely covered. The sheeting shall be placed and weighted to remain in contact with the surface covered, and the covering shall be maintained fully saturated and in position for seven (7) days after the concrete has been placed.

c. Water method. The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for seven (7) days. When the forms are stripped, the vertical walls shall also be kept moist. It shall be the responsibility of the Contractor to prevent ponding of the curing water on the subbase.

d. Concrete protection for cold weather. Maintain the concrete at a temperature of at least 50°F (10°C) for a period of 72 hours after placing and at a temperature above freezing for the remainder of the 7-day curing period. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather; and any concrete damaged shall be removed and replaced at the Contractor's expense.

e. Concrete protection for hot weather. Concrete should be continuous moisture cured for the entire curing period and shall commence as soon as the surfaces are finished and continue for at least 24 hours. However, if moisture curing is not practical beyond 24 hours, the concrete surface shall be protected from drying with application of a liquid membrane-forming curing compound while the surfaces are still damp. Other curing methods may be approved by the RPR.

501-4.14 Removing forms. Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing. After the forms have been removed, the sides of the slab shall be cured in accordance with paragraph 501-4.13.

If honeycombed areas are evident when the forms are removed, materials, placement, and consolidation methods must be reviewed and appropriate adjustments made to assure adequate consolidation at the edges of future concrete placements. Honeycombed areas that extend into the slab less than approximately 1 inch (25 mm), shall be repaired with an approved grout, as directed by the RPR. Honeycombed areas that extend into the slab greater than a depth of 1 inch (25 mm) shall be considered as defective work and shall be removed and replaced in accordance with paragraph 501-4.19.

501-4.15 Saw-cut grooving. If shown on the plans, grooved surfaces shall be provided in accordance with the requirements of Item P-621.

501-4.16 Sealing joints. The joints in the pavement shall be sealed in accordance with **Item P-605**.

501-4.17 Protection of pavement. The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents until accepted by the RPR. This shall include watchmen to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, crossovers, and protection of unsealed joints from intrusion of foreign material, etc. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

Aggregates, rubble, or other similar construction materials shall not be placed on airfield pavements. Traffic shall be excluded from the new pavement by erecting and maintaining barricades and signs until the concrete is at least seven (7) days old, or for a longer period if directed by the RPR.

In paving intermediate lanes between newly paved pilot lanes, operation of the hauling and paving equipment will be permitted on the new pavement after the pavement has been cured for seven (7) days, the joints are protected, the concrete has attained a minimum field cured flexural strength of 450 psi (3100 kPa), and the slab edge is protected.

All new and existing pavement carrying construction traffic or equipment shall be kept clean and spillage of concrete and other materials shall be cleaned up immediately.

Damaged pavements shall be removed and replaced at the Contractor's expense. Slabs shall be removed to the full depth, width, and length of the slab.

501-4.18 Opening to construction traffic. The pavement shall not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 450 pounds per square inch (3100 psi compressive strength) when tested in accordance with ASTM C78 (or ASTM C39 for compressive strength). If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening the pavement to construction traffic, all joints shall either be sealed or protected from damage to the joint edge and intrusion of foreign materials into the joint. As a minimum, backer rod or tape may be used to protect the joints from foreign matter intrusion.

501-4.19 Repair, removal, or replacement of slabs. New pavement slabs that are broken or contain cracks or are otherwise defective or unacceptable as defined by acceptance criteria in paragraph 501-6.6 shall be removed and replaced or repaired, as directed by the RPR, at the Contractor's expense. Spalls along joints shall be repaired as specified. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full width of the slab, and the limit of removal shall be normal to the paving lane and to each original transverse joint. The RPR will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking.

Such cores shall have a diameter of 2 inches (50 mm) to 4 inches (100 mm), shall be drilled by the Contractor and shall be filled by the Contractor with a well consolidated concrete mixture bonded to the walls of the hole with a bonding agent, using approved procedures. Drilling of cores and refilling holes shall be at no expense to the Owner. Repair of cracks as described in this section shall not be allowed if in the opinion of the RPR the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of cracks shall be allowed in any panel that demonstrates segregated aggregate with an absence of coarse aggregate in the upper 1/8 inch (3 mm) of the pavement surface.

a. Shrinkage cracks. Shrinkage cracks which do not exceed one-third of the pavement depth shall be cleaned and either high molecular weight methacrylate (HMWM) applied; or epoxy resin (Type IV, Grade 1) pressure injected using procedures recommended by the manufacturer and approved by the RPR. Sandblasting of the surface may be required following the application of HMWM to restore skid resistance. Care shall be taken to ensure that the crack is not widened during epoxy resin injection. All epoxy resin injection shall take place in the presence of the RPR. Shrinkage cracks which exceed one-third the pavement depth shall be treated as full depth cracks in accordance with paragraphs 501-4.19b and 501-19c.

b. Slabs with cracks through interior areas. Interior area is defined as that area more than 6 inches (150 mm) from either adjacent original transverse joint. The full slab shall be removed and replaced at no cost to the Owner, when there are any full depth cracks, or cracks greater than one-third the pavement depth, that extend into the interior area.

c. Cracks close to and parallel to joints. All full-depth cracks within 6 inches (150 mm) either side of the joint and essentially parallel to the original joints, shall be treated as follows.

(1) Full depth cracks and original joint not cracked. The full-depth crack shall be treated as the new joint and the original joint filled with an epoxy resin.

i. Full-depth crack. The joint sealant reservoir for the crack shall be formed by sawing to a depth of 3/4 inches (19 mm), $\pm 1/16$ inch (2 mm), and to a width of 5/8 inch (16 mm), $\pm 1/8$ inch (3 mm). The crack shall be sawed with equipment specially designed to follow random cracks. Any equipment or procedure which causes raveling or spalling along the crack shall be modified or replaced to prevent raveling or spalling. The joint shall be sealed with sealant in accordance with P-605 or as directed by the RPR.

ii. Original joint. If the original joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures.

Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

(2) Full depth cracks and original joint cracked. If there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced.

d. Removal and replacement of full slabs. Make a full depth cut perpendicular to the slab surface along all edges of the slab with a concrete saw cutting any dowels or tie-bars. Remove damaged slab protecting adjacent pavement from damage. Damage to adjacent slabs may result in removal of additional slabs as directed by the RPR at the Contractor's expense.

The underlying material shall be repaired, re-compacted and shaped to grade.

Dowels of the size and spacing specified for other joints in similar pavement on the project shall be installed along all four (4) edges of the new slab in accordance with paragraph 501-4.10d.

Placement of concrete shall be as specified for original construction. The joints around the new slab shall be prepared and sealed as specified for original construction.

e. Spalls along joints.

(1) Spalls less than one inch wide and less than the depth of the joint sealant reservoir, shall be filled with joint sealant material.

(2) Spalls larger than one inch and/or deeper than the joint reservoir, but less than 1/2 the slab depth, and less than 25% of the length of the adjacent joint shall be repaired as follows:

i. Make a vertical saw cut at least one inch (25 mm) outside the spalled area and to a depth of at least 2 inches (50 mm). Saw cuts shall be straight lines forming rectangular areas surrounding the spalled area.

ii. Remove unsound concrete and at least 1/2 inch (12 mm) of visually sound concrete between the saw cut and the joint or crack with a light chipping hammer.

iii. Clean cavity with high-pressure water jets supplemented with compressed air as needed to remove all loose material.

iv. Apply a prime coat of epoxy resin, Type III, Grade I, to the dry, cleaned surface of all sides and bottom of the cavity, except any joint face.

v. Fill the cavity with low slump concrete or mortar or with epoxy resin concrete or mortar.

vi. An insert or other bond-breaking medium shall be used to prevent bond at all joint faces.

vii. A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints.

(3) Spalls deeper than 1/2 of the slab depth or spalls longer than 25% of the adjacent joint require replacement of the entire slab.

f. Diamond grinding of Concrete surfaces. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding of the hardened concrete should not be performed until the concrete is at least 14 days old and has achieved full minimum strength. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The depth of diamond grinding shall not exceed 1/2 inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified.

Diamond grinding shall be performed with a machine specifically designed for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with sufficient number of flush cut blades that create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The Contractor shall determine the number and type of blades based on the hardness of the aggregate.

Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. All grinding shall be at the expense of the Contractor.

CONTRACTOR QUALITY CONTROL (CQC)

501-5.1 Quality control program. The Contractor shall develop a Quality Control Program in accordance with Item C-100. No partial payment will be made for materials that are subject to specific quality control requirements without an approved quality control program.

501-5.2 Contractor Quality Control (CQC). The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures.

When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

501-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to this specification and as set forth in the CQCP. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content. A QC Testing Plan shall be developed and approved by the RPR as part of the CQCP.

The RPR may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

a. Fine aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C70 or ASTM C566.

(3) Deleterious substances. Fine aggregate as delivered to the mixer shall be tested for deleterious substances in fine aggregate for concrete as specified in paragraph 501-2.1b, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

b. Coarse Aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C566.

(3) Deleterious substances. Coarse aggregate as delivered to the mixer shall be tested for deleterious substances in coarse aggregate for concrete as specified in paragraph 501-2.1c, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

c. Slump. One test shall be made for each subplot. Slump tests shall be performed in accordance with ASTM C143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

d. Air content. One test shall be made for each subplot. Air content tests shall be performed in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

e. Unit weight and Yield. One test shall be made for each subplot. Unit weight and yield tests shall be in accordance with ASTM C138. The samples shall be taken in accordance with ASTM C172 and at the same time as the air content tests.

f. Temperatures. Temperatures shall be checked at least four times per lot at the job site in accordance with ASTM C1064.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues.

The Contractor may use a 12-foot (3.7 m) “straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day’s production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day’s production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 501-4.19f or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 501-6.6.

Control charts shall be kept to show area of each day’s placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor’s machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day’s production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade will be evaluated prior to and after placement of the concrete surface.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR within 48 hours, or no later than by the end of the following working day.

Areas with humps or depression that that exceed grade or smoothness and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. If these areas cannot be corrected with grinding then the slabs that are retaining water must be removed and replaced in accordance with paragraph 501-4.19d. Grinding shall be in accordance with paragraph 501-4.19f. All corrections will be at the Contractors expense.

501-5.4 Control charts. The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, and air content. The Contractor shall also maintain a control chart plotting the coarseness factor/workability factor from the combined gradations in accordance with paragraph 501-2.1d.

Control charts shall be posted in a location satisfactory to the RPR and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the RPR may halt production or acceptance of the material.

a. Fine and coarse aggregate gradation. The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Superimposed on the control charts shall be the action and suspension limits. Gradation tests shall be performed by the Contractor per ASTM C136. The Contractor shall take at least [two] samples per lot to check the final gradation. Sampling shall be per ASTM D75 from the flowing aggregate stream or conveyor belt.

b. Slump and air content. The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.

c. Combined gradation. The Contractor shall maintain a control chart plotting the coarseness factor and workability factor on a chart in accordance with paragraph 501-2.1d.

Control Chart Limits¹

Control Parameter	Individual Measurements	
	Action Limit	Suspension Limit
Gradation ²	*3	*3
Coarseness Factor (CF)	±3.5	±5
Workability Factor (WF)	±2	±3
Slump	+0.5 to -1 inch (+13 to -25 mm)	+1 to -1.5 inch (+25 to -38 mm)
Air Content	±1.5%	±2.0%

¹ Control charts shall developed and maintained for each control parameter indicated.

² Control charts shall be developed and maintained for each sieve size.

³ Action and suspension limits shall be determined by the Contractor.

501-5.5 Corrective action at Suspension Limit. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of control. The CQCP shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

a. Fine and coarse aggregate gradation. When two consecutive averages of five tests are outside of the suspension limits, immediate steps, including a halt to production, shall be taken to correct the grading.

b. Coarseness and Workability factor. When the CF or WF reaches the applicable suspension limits, the Contractor, immediate steps, including a halt to production, shall be taken to correct the CF and WF.

c. Fine and coarse aggregate moisture content. Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher and water batcher shall be adjusted.

d. Slump. The Contractor shall halt production and make appropriate adjustments whenever:

(1) one point falls outside the Suspension Limit line for individual measurements

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

e. Air content. The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

(1) one point falls outside the Suspension Limit line for individual measurements

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

MATERIAL ACCEPTANCE

501-6.1 Quality Assurance (QA) Acceptance sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section, with the exception of coring for thickness determination, will be performed by the RPR. The Contractor shall provide adequate facilities for the initial curing of beams. The Contractor shall bear the cost of providing initial curing facilities and coring and filling operations, per paragraph 501-6.5b(1).

The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60° to 80°F (16° to 27°C), and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather, or in heavyweight closed plastic bags, or using other suitable methods, provided the temperature and moisture loss requirements are met.

501-6.2 Quality Assurance (QA) testing laboratory. Quality assurance testing organizations performing these acceptance tests will be accredited in accordance with ASTM C1077. The quality assurance laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods will be submitted to the RPR prior to start of construction.

501-6.3 Lot size. Concrete will be accepted for strength and thickness on a lot basis. A lot will consist of a day's production not to exceed 2,000 square yards. Each lot will be divided into approximately equal sublots with individual sublots between 400 to 600 square yards. Where three sublots are produced, they will constitute a lot.

Daily pours of small areas (short runs and/or radius areas) shall be considered as one subplot if less than 500 square yards. Daily pour sizes shall be broken into sublots as defined below:

Daily Pour (SY)	Sublots
0 – 500	1
501 - 1000	2
1001 – 1500	3
1501 - 2000	4

Where one or two sublots are produced, they will be incorporated into the previous or next lot. Where more than one plant is simultaneously producing concrete for the job, the lot sizes will apply separately for each plant.

501-6.4 Partial lots. When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot or for overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they will constitute a lot. Where one or two sublots have been produced, they will be incorporated into the next lot or the previous lot and the total number of sublots will be used in the acceptance criteria calculation, that is, $n=5$ or $n=6$.

501-6.5 Acceptance Sampling and Testing.

a. Strength.

(1) Sampling. One sample will be taken for each subplot from the concrete delivered to the job site. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. The concrete will be sampled in accordance with ASTM C172.

(2) Test Specimens. The RPR will be responsible for the casting, initial curing, transportation, and curing of specimens in accordance with ASTM C31. Two (2) specimens will be made from each sample and slump, air content, unit weight, and temperature tests will be conducted for each set of strength specimens. Within 24 to 48 hours, the samples will be transported from the field to the laboratory while in the molds. Samples will be cured in saturated lime water.

The strength of each specimen will be determined in accordance with ASTM C39/ASTM C78. The strength for each subplot will be computed by averaging the results of the two test specimens representing that subplot.

(3) Acceptance. Acceptance of pavement for strength will be determined by the RPR in accordance with paragraph 501-6.6b(1). All individual strength tests within a lot will be checked for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and the remaining test values will be used to determine acceptance in accordance with paragraph 501-6.5b.

b. Pavement thickness.

(1) Sampling. One core will be taken by the Contractor for each subplot in the presence of the RPR. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. Areas, such as thickened edges, with planned variable thickness, will be excluded from sample locations.

Cores shall be a minimum 4 inch (100 mm) in diameter neatly cut with a core drill. The Contractor will furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes will be filled by the Contractor with a non-shrink grout approved by the RPR within one day after sampling.

(2) Testing. The thickness of the cores will be determined by the RPR by the average caliper measurement in accordance with ASTM C174. Each core shall be photographed and the photograph included with the test report.

(3) Acceptance. Acceptance of pavement for thickness will be determined by the RPR in accordance with paragraph 501-6.6.

501-6.6 Acceptance criteria.

a. General. Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501-6.5b:

- (1) Strength**
- (2) Thickness**
- (3) Grade**
- (4) Profilograph – Not used.**
- (5) Adjustments for repairs**

Profilograph smoothness and acceptance adjustment paragraphs only apply when the overall project is a new and/or reconstructed runway(s) and/or taxiway(s) greater than 500 feet (152 m) in length.

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively.

Production quality must achieve 90 PWL or higher to receive full payment.

Strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating PWL. Production quality must achieve 90 PWL or higher to receive full pavement. The PWL will be determined in accordance with procedures specified in Item C-110.

The lower specification tolerance limit (L) for strength and thickness will be:

Lower Specification Tolerance Limit (L)

Strength	0.93 x Strength specified in paragraph 501-3.3
Thickness	Lot Plan Thickness in inches, - 0.50 in.

b. Acceptance criteria.

(1) Strength. The strength for each subplot shall be computed by averaging the results of that subplot. When subplot strength equals or exceeds the strength as specified in paragraph 501-3.3, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(2) Thickness. If subplot thickness is not be less than ½ inch (12 mm) from plan thickness, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(3) Grade. The final finished surface of the pavement of the completed project will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally. The documentation, stamped and signed by a licensed surveyor shall be in accordance with paragraph 501-5.3h. Payment for sublots that do not meet grade for over 25% of the sublot shall be reduced by 5% and not be more than 95%.

(4) Profilograph roughness for QA Acceptance. Not used.

(5) Adjustments for repair. Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

(6) Adjustment for grinding. For sublots with grinding over 25% of a sublot, payment will be reduced 5%.

METHOD OF MEASUREMENT

501-7.1 Concrete pavement shall be measured by the number of square yards of either plain or reinforced pavement as specified in-place, completed and accepted. Reinforced pavement, as shown on the project plans, will not be measured separately for payment. Reinforcement of panels shall be considered incidental to the unit price bid. Should reinforced pavement be added/deleted to change the ratio of non-reinforced pavement in the total project, adjustments to payment may be examined and adjusted as necessary.

For this project, this item (P-501) alone shall not be paid for separately, but work in this section is included as the major portion of the bid item for “Pavement Removal and Replacement, 6” PCC, with P-209 Granular Base”, which is to include all pavement removed during work on the terminal apron for the duct bank, as shown on the project plans. Work included in this pay item, measured by the square yard, shall include, but is not limited to the following:

- **Removal of single row of existing PCC apron to existing joints, in accordance with Item P-101**
- **Repair of any disturbed subgrade in removal areas in accordance with Item P-152**
- **Furnishing and installing granular base over electrical duct bank, and repair of disturbed remaining granular base, all in accordance with Item P-209**
- **Replacement of PCC pavement, 6” thick, for row of panels. This shall include all restoration of joints and new transverse pavement joints, and PCC materials and placement shall meet the requirements of this Item P-501**
- **Sealing of all joints in accordance with Item P-605**

BASIS OF PAYMENT

501-8.1 Payment. Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501-6.6. Acceptance Criteria shall be based on results of strength, smoothness, and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed **100% (one-hundred percent)** of the product of the contract unit price and the total number of square yards of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings. **Payment for this item shall include all items noted in paragraph 501-7.1 above, per square yard.**

a. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both strength and thickness. The lot pay factor shall be the higher of the two values when calculations for both strength and thickness are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either strength or thickness is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both strength and thickness are less than 100%.

Price Adjustment Schedule¹

Percentage of Materials Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	106
90 – 95	PWL + 10
75 – 90	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501-8.1.

² The lot shall be removed and replaced unless, after receipt of FAA concurrence, the Owner and Contractor agree in writing that the lot will remain; the lot paid at 50% of the contract unit price; and the total project payment limitation reduced by the amount withheld for that lot.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 501-8.1. Payment in excess of 100% for accepted lots of concrete pavement shall be used to offset payment for accepted lots of concrete pavement that achieve a lot pay factor less than 100%; except for rejected lots which remain in place and/or sublots with adjustments for repairs.

b. Adjusted payment for repairs. The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots which contain repairs in accordance with paragraph 501-4.19 on more than 20% of the slabs within the subplot. Payment factors greater than 100 percent for the strength and thickness cannot be used to offset adjustments for repairs.

c. Adjusted payment for grinding. The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots with grinding over 25% of a subplot.

d. Profilograph Roughness. Not used.

e. Payment. Payment shall be made under:

Item P-501-8.1 Pavement Removal and Replacement, 6" PCC, with P-209 Granular Base – per Square Yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars ASTM A884 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1035	Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1078	Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement
ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement ASTM C117 Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C123	Standard Test Method for Lightweight Particles in Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates ASTM C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete ASTM C150 Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement- Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete ASTM C295 Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete ASTM C566 Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064	Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement

ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials ASTM D4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Concrete Institute (ACI)

ACI 305R	Guide to Hot Weather Concreting
ACI 306R	Guide to Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete Advisory Circulars (AC)
AC 150/5320-6	Airport Pavement Design and Evaluation Federal Highway Administration (FHWA)

HIPERPAV 3, version 3.2 Portland Concrete Association (PCA)

PCA	Design and Control of Concrete Mixtures, 16 th Edition
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U.S. Army Corps of Engineers (USACE) Concrete Research Division (CRD)

CRD C662	Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method)
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United States Air Force Engineering Technical Letter (ETL)

ETL 97-5	Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements
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END ITEM P-501

Part 9– Miscellaneous

Item P-605 – Joint Sealants for Pavements

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of **either material listed below.**

- **ASTM D5893** Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.
- **ASTM D6690** Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be $25\% \pm 5\%$ larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

If the pavement must be opened to traffic prior to placement of the sealant, this paragraph should be modified to require the Contractor to temporarily fill the joint with a jute or nylon rope immediately after the joint is sawed. The rope should be slightly larger than the joint and should be forced into the joint so that the top of the rope is 1/8 inch (3 mm) below the pavement surface. The rope shall be removed immediately prior to cleaning.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 5 days prior to use on the project.

a. Tractor-mounted routing tool. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V- shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. Concrete saw. Provide a self-propelled power saw, with water- cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. Sandblasting equipment. Sandblasting is not allowed.

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by tractor-mounted routing equipment, concrete saw, or waterblaster as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be cleaned. Cleaning shall be accomplished in a minimum of two passes. One pass per

joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch $\pm$ 1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids.

Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material shall not be measured, but shall be considered incidental to the pavement being placed.

BASIS OF PAYMENT

605-5.1 Payment for joint sealing material shall be incidental to placement of pavement. The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-605-5.1 N/A for this project

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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END ITEM P-605

Item P-610 – Concrete for Miscellaneous Structures

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 General. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
3/4 inch (19 mm)	67
1/2 inch (12.5 mm)	7

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking. Not used.

Coarse aggregate may only be accepted from sources that have a 20- year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 Cement. Cement shall conform to the requirements below:

- **ASTM C150 - Type I**
- **ASTM C595 - Type IP, IS**

The chemical requirements for all cement types specified should meet suitable criteria for deleterious activity. Low alkali cements (less than 0.6% equivalent alkalies. Total Alkalies (Na₂O and K₂O) of the cement secured for the production of concrete shall be independently verified in accordance with ASTM C114 or ASTM C1365.

610-2.5 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall consist of **either reinforcing steel or welded steel wire fabric** conforming to the requirements below:

Reinforcing Steel	ASTM A615, ASTM A706, ASTM A775, ASTM A934
Welded Steel Wire Fabric	ASTM A1064, ASTM A884

610-2.11 Materials for curing concrete. Curing materials shall conform to requirements below:

White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309
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CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of **4000 psi in 28 days** as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports.

The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items.

The embedding of wood shall not be allowed.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85°F (30 °C), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Concrete shall be considered incidental to bid items for which the concrete is used, and no separate measurement shall be made. Reinforcing steel used in the concrete will also be considered incidental and no measurement shall be made.

BASIS OF PAYMENT

610-6.1 No separate payment items shall be included for either structural Portland cement concrete nor reinforcing steel. They shall be considered incidental to other bid items constructed using the concrete and steel.

Payment will be made under:

Item P-610-6.1 N/A (Incidental to other work items)

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

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Part 13 – Lighting Installation

Item L-108 – Underground Power Cable for Airports

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. **The Contractor's submittals shall be electronically submitted in pdf format.** The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation

resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

Only Third Party certified manufacturers, listed in AC 150/5345-53, Appendix 3 Addendum (as required) and meeting the BUY AMERICAN preference requirements can provide equipment and materials specified in the Contract Documents. Documentation certifying compliance with the BUY AMERICAN preference rules for Airport Improvement Program (AIP) cited in 49 USC §50101) shall be included with each equipment and material submittal.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with ethylene propylene insulation or cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with ethylene propylene insulation or cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type RHW-2, 75°C for installation in conduit or for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, RHW-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of RHW-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be solid stainless steel or copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than [8 feet (2.4 m) long and 5/8 inch (16 mm) in diameter.

108-2.4 Cable connections. In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3MTM Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

108-2.5 Splicer qualifications. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. If P-610 is not used elsewhere on the project, concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 General. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

Markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling, fertilizing, seeding, and mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 Cable markers for direct-buried cable. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

108-3.5 Splicing. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces.

Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.][not used]

b. Isolation. Not used.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 Counterpoise installation above multiple conduits and duct banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 Counterpoise installation at existing duct banks. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

- a.** All slag shall be removed from welds.
- b.** Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.
- c.** If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3MTM ScotchkoteTM, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 Testing. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

d. That all affected circuits (existing and new) are free from unspecified grounds.

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than **50** megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

i. That the impedance to ground of each ground rod does not exceed **25** ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved “repair” procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 Trenching shall be measured by the linear feet (meters) of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory. When specified, separate measurement shall be made for trenches of various specified widths.

108-4.2 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item [] shall not include additional quantities required for slack. **Cable and counterpoise slack is considered incidental to this item and is included in the Contractor's unit price. No separate measurement or payment will be made for cable or counterpoise slack."**

108-4.3 No separate payment will be made for ground rods. Ground rods are considered incidental to counterpoise cable, complete and in place.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-5.1	Trenching – per Linear Foot
Item L-108-5.2	No. 8 AWG, 5 KV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit – per Linear Foot
Item L-108-5.3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Connections/Terminations and Ground Rods – per Linear Foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic ASTM International (ASTM)
ASTM B3	Standard Specification for Soft or Annealed Copper Wire

ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive National Fire Protection Association (NFPA)
NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)
ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment
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Item L-110 – Airport Underground Electrical Duct Banks and Conduits

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10

mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 Plastic conduit. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II—Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. If P-610 is not used elsewhere on the project, concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 Markers. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period’s construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling, fertilizing, seeding, and mulching shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Ownership of removed cable. On this project, cable is not planned for removal. Any removed cable shall become the property of the Contractor and removed from the site, or disposed of off-site.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

- | | |
|-----------------------|---|
| Item L-110-5.1 | Concrete Encased Electrical Duct Bank, with (3) 2” Conduits – per Linear Foot |
| Item L-110-5.2 | Concrete Encased Electrical Duct Bank, with (9) 2” Conduits – per Linear Foot |
| Item L-110-5.3 | Bored Duct, with (1) 2” Conduit, Complete, in Place – per Linear Foot |
| Item L-110-5.4 | Bored Duct, with (2) 2” Conduit, Complete, in Place – per Linear Foot |

- Item L-110-5.5** Bored Duct, with (4) 2" Conduit, Complete, in Place – per Linear Foot
Item L-110-5.6 Bored Duct, with (6) 2" Conduit, Complete, in Place – per Linear Foot
Item L-110-5.7 Non-Encased Electrical Conduit, 2" PVC, in Trench – per Linear Foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

- AC 150/5340-30 Design and Installation Details for Airport Visual Aids AC 150/5345-53
Airport Lighting Equipment Certification Program

ASTM International (ASTM)

- ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for
Concrete Reinforcement

National Fire Protection Association (NFPA)

- NFPA-70 National Electrical Code (NEC) Underwriters Laboratories (UL)
UL Standard 6 Electrical Rigid Metal Conduit - Steel UL Standard 514B Conduit,
Tubing, and Cable Fittings
UL Standard 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers UL Standard
1242 Electrical Intermediate Metal Conduit Steel
UL Standard 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

Item L-115 – Electrical Manholes and Junction Structures

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

EQUIPMENT AND MATERIALS

115-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 Concrete structures. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand **60,000** lb aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 Junction boxes. Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 Mortar. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 Concrete. All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

115-2.7 Frames and covers. The frames shall conform to one of the following requirements:

- a. ASTM A48 Gray iron castings
- b. ASTM A47 Malleable iron castings
- c. ASTM A27 Steel castings
- d. ASTM A283, Grade D Structural steel for grates and frames
- e. ASTM A536 Ductile iron castings
- f. ASTM A897 Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of **200** psi & maximum load of **60,000** lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 Ladders. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 Reinforcing steel. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 Bedding/special backfill. Bedding or special backfill shall be as shown on the plans.

115-2.11 Flowable backfill. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 Cable trays. Cable trays shall be of galvanized steel or aluminum. Cable trays shall be located as shown on the plans.

115-2.13 Plastic conduit. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 Conduit terminators. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 Pulling-in irons. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 Ground rods. Ground rods shall be one piece, solid stainless steel or copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 Unclassified excavation. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid

for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 Concrete structures. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 Precast unit installations. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 Placement and treatment of castings, frames and fittings. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 Installation of ladders. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 Removal of sheeting and bracing. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with

selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 Backfilling. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 Connection of duct banks. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 Grounding. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 Cleanup and repair. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 Restoration. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 Inspection. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 Manhole elevation adjustments. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 Duct extension to existing ducts. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering;; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115-5.1	North Can Plaza, Complete – per Lump Sum
Item L-115-5.2	South Can Plaza, Complete – per Lump Sum
Item L-115-5.3	Electrical Handhole, L-867, Size B – per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids AC 150/5345-53 Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
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ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings ASTM A48 Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings ASTM C144 Standard Specification for Aggregate for Masonry Mortar ASTM C150 Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts
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Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
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National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
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END OF ITEM L-115

Item L-125 – Installation of Airport Lighting Systems

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics.” Obstruction lighting warranty is set by the individual manufacturer.

EQUIPMENT AND MATERIALS

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Not required.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights

Type	Mounting	Mode	Lamp	Color	Option	Heater Required	Mounting Height
L-861	Base-Mounted	1 (6.6A)	LED	White/Clear	Mounting Hardware	No	24"
L-861T	Base-Mounted	1 (6.6A)	LED	Blue	Mounting Hardware	No	24"
L-861SE	Base-Mounted	1 (6.6A)	LED	Red/Green or Red/Red	Mounting Hardware	No	24"

125-2.8 Runway and Taxiway Signs. Not Required.

125-2.9 Runway End Identifier Light (REIL). Not Required.

125-2.10 Precision Approach Path Indicator (PAPI). Not Required.

125-2.11 Circuit Selector Cabinet. Not Required.

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 1A, Size B or D (as shown on the plans) shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.14 Constant Current Regulator. Shall conform to the requirements of AC 150/5345-10, Class 1, Style 1, and shall include an internal Series Cutout. Shall be 4KW, 3-step, and shall replace the current CCR for Runway 13/31.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached initial set.

METHOD OF MEASUREMENT

125-4.1 Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Regulator shall be measured by each type as installed complete units, in place, ready for operation, and accepted by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Item L-125-5.1	L-861T LED Taxiway Edge Light (MITL), Base-Mounted – per Each
Item L-125-5.2	L-861 LED Runway Edge Light (MIRL), Base-Mounted – per Each
Item L-125-5.3	L-861SE LED Runway Threshold Light (MIRL), Base-Mounted – per Each
Item L-125-5.4	L-828 Constant Current Regulator, 4 KW, Complete, in Place – per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
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END OF ITEM L-125

APPENDICES

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport

T51.119823

FAA AIP No. 3-19-0088-014-2020

Storm Lake, IA

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Real People. Real Solutions.

STORM LAKE MUNICIPAL AIRPORT (SLB)

CONSTRUCTION SAFETY & PHASING PLAN (CSPP) RUNWAY 13/31 LIGHTING REPLACEMENT

MARCH 2020

Submitted by:

Bolton & Menk, Inc.
855 Wright Brothers Blvd SW
Suite 2A
Cedar Rapids, IA 52404
P: 319-362-3219

Certification

Construction Safety & Phasing Plan (CSPP)

For

Runway 13/31 Lighting Replacement

Storm Lake Municipal Airport (SLB)

City of Storm Lake, Iowa

T51.119823

March 2020

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa.

By: _____
Carl L. Byers, P.E.
License No. 12845

Date: _____

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Appendix

Appendix A: Construction Safety & Phasing Plan (CSPP)

Appendix B: Safety Inspection Checklist

Appendix C: Safety Plan Compliance Document (SPCD) Requirements

I. OVERVIEW

This document presents the Construction Safety and Phasing Plan (CSPP) for the proposed Runway 13/31 Lighting Replacement project at the Storm Lake Municipal Airport being performed under the Federal Aviation Administration (FAA) Airport Improvement Program (AIP). The City anticipates authorizing onsite work to commence on or about July of 2020, pending execution and approval of the grant documents by the FAA. Final completion of the project is expected to be in Fall of 2020 or early 2021, depending on weather.

The objective of this CSPP is to provide a general outline of the construction safety and phasing provisions for working in or near the Air Operations Area (AOA) contained in the bid documents (Project Plans and Specifications), and to explain how those provisions will be implemented during construction.

II. PURPOSE

The Plan provides single source procedural information for all key project personnel to use during construction. The CSPP defines the specific responsibilities of the Airport Operator, the Contractor, Airport tenants, and the Project Engineer.

Requirements for maintaining operational safety during construction are in conformance with FAA Advisory Circular 150/5370-2G, "Operational Safety on Airports During Construction". The project specific Construction Safety and Phasing Plan for the project is shown on the CSPP plan sheet and is attached to this report as Appendix A.

III. CONSTRUCTION SAFETY & PHASING RESPONSIBILITIES

A. Airport Operator

The Airport Operator is responsible for operational safety on the Airport at all times. The City of Storm Lake is the Airport Operator. The City will issue Notice to Airmen (NOTAMS) whenever construction activities occur in the AOA. The City will provide oversight of all construction activities and coordinate those activities with the Airport users (pilots) and Airport tenants. The City will hold bi-weekly construction progress and safety meetings. During those meetings operational safety will be reviewed, and an action plan will be developed as needed to address any discrepancies in safety that need to be corrected. The City will require and approve a Safety Plan Compliance Document (SPCD) from the Contractor prior to the Notice to Proceed. The SPCD outline is attached to this report as Appendix C.

B. Construction Contractor

The Contractor will be required to attend scheduled progress and safety meetings and to correct any discrepancies found in safety. The Contractor is required to submit a completed SPCD to the City for approval prior to the Notice to Proceed.

C. Airport Tenants

The City will notify Airport tenants of all pending construction activities that impact them and advise the tenants of planned pavement closures and other activities in the AOA that will affect aircraft operations.

D. Project Engineer

As part of the Project Construction Management, Inspection, and Quality Assurance process, the Project Engineer will monitor construction safety on a daily basis, utilizing the “Construction Project Daily Safety Inspection Checklist” (see Appendix B) to ensure an appropriate level of priority is given to safety. Any discrepancies in safety will be immediately brought to the Contractor’s and City’s attention for corrective action implementation.

IV. CONSTRUCTION SAFETY & PHASING

A. Coordination

A preconstruction conference will be held as soon as practicable after the contract has been awarded and before issuance of the notice to proceed. The preconstruction conference participants should include, but not be limited to, the sponsor’s engineer, resident engineer, airport management, testing laboratory representative, contactor and subcontractor(s), contractor’s project superintendent, contractor’s project clerk, airport users, utility companies, federal, state, or local agencies affected by the proposed construction, and FAA representative.

Contractor progress meetings will be held as needed or at an agreed upon frequency for the duration of construction. Operational safety will be a standing agenda item for discussion during progress meetings throughout the project. Date, time, and location of the progress meetings will be determined at the pre-construction meeting.

Scope or schedule changes for the project may necessitate revisions to the CSPP and may require review and approval by the City and the FAA.

B. Construction Phasing

The project will be split into 2 phases. Details of each phase are listed below.

1. Phase 1

During this phase airports operations for Runway 17/35 and the apron will not be affected but the majority of Runway 13/31 will be closed. Work will be completed on Runway 13/31 outside of the Taxiway OFA (TOFA) on both ends of the runway, including all threshold lights and the majority of the Runway 13/31 edge lighting.

- Scope of Work
 - Remove existing Runway 13/31 lighting and handholes outside of the Taxiway Object Free Area (TOFA)
 - Install conduit, handholes, light cans, and lights for Runway 13/31 in all areas outside of the TOFA
- Runway 13/31 and Runway 6/24 will be closed
- Taxiway and Runway 17/35 will remain open
- Duration – 20 Working Days
- Emergency vehicle access routes – Not affected
- Construction staging area – See CSPP plan sheet

- Construction access and haul route – See CSPP plan sheet
- Impacts to NAVAIDs – No Impact
- Lighting and marking changes – No Impact
- Required hazard marking and lighting – Low profile barricades per plans
- Lead times for required notification – 72 hours

2. Phase 2

During this phase, the entire airport will be closed. Work will be completed on the apron, the taxiway, and the portion of Runway 13/31 within the TOFA. This work will include the remainder of the Runway 13/31 edge lights, all taxiway edge lights, and the power extension (duct bank) under the apron.

- Scope of Work
 - Remove existing Runway 13/31 lighting, taxiway lighting, and handholes inside the Taxiway Object Free Area (TOFA), remove all taxiway and apron lighting, from Runway 17/35 to the apron, and install new homerun duct bank under apron
 - Install conduit, handholes, light cans, and lights for Runway 13/31 in all areas inside the TOFA
 - Install conduit, handholes, light cans, and lights for taxiway and apron edge as shown
 - Install duct bank and “can plazas” for homerun from vault to taxiway
- Airport will be closed, as Runway 13/31, Runway 6/24, and Runway 17/35 will all be closed
- Taxiway and apron will be closed
- Duration – 20 Working Days
- Emergency vehicle access routes – Not affected
- Construction staging area – See CSPP plan sheet
- Construction access and haul route – See CSPP plan sheet
- Impacts to NAVAIDs – All navaids will be turned off and NOTAM’d off
- Beacon will be turned off and NOTAM’d off
- Required hazard marking and lighting – Low profile barricades per plans
- Lead times for required notification – 72 hours

3. Construction Safety Drawings

Drawings specifically indicating construction operations and safety have been developed for each schedule and phase. These drawings have been included in Attachment A and can also be found in the contract drawing bid package.

C. Areas & Operations Affected by Construction Activities

Refer to the table below to view the affected airport elements during the different phases on the project.

Operational Impacts			
AREA	EXISTING	PHASE 1	PHASE 2
Runway 17/35	Open	Open	Closed
Runway 13/31	Open	Closed	Closed
Runway 6/24	Open	Closed	Closed
Taxiway / Apron	Open	Open	Closed

D. Protection of Navigational Aids (NAVAIDs)

No NAVAIDs will be affected by this project.

E. Contractor Access

1. Location of Stockpiled Construction Materials

Location of stockpiled materials and equipment storage must be in the staging area or as approved by the City.

Stockpiling materials and equipment outside the staging areas must receive prior approval from the City and will be subjected to restrictions described in this paragraph. Stockpiled materials and equipment storage are not permitted within the RSA, ROFZ, or the ROFA of an operational runway. See Section 17 – Protection of Runway and Taxiway Safety Areas for requirements of stockpiled materials inside the ROFA.

Stockpiles must be restricted to a maximum height of 15 feet.

2. Vehicle & Pedestrian Operations

a) Construction Site Parking

Employees' vehicles must be parked in the staging area designated on the plans or in the airport parking lot in spots approved by the airport manager. No employee vehicles will be allowed into the worksite beyond the staging area limits.

b) Construction Equipment Parking

Contractor employees must park/service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees must park construction vehicles outside the OFA when not in use by construction personnel (overnight, on weekends, or during other periods when construction is not active).

c) Access & Haul Roads

The contractor will be restricted to use the haul route(s) shown on the drawings. Right-of-way must be given to all emergency vehicles.

d) Marking & Lighting of Vehicles

Only marked Contractor-owned or operated vehicles required for the proper execution of the work will be allowed in the work area. All vehicles and equipment must have an omni-directional amber flashing light and/or 3-foot by 3-foot flag having a checkered pattern of international orange and white squares at least one foot on each side. All vehicles and equipment must be equipped with an omni-directional amber flashing light for all airfield activities between sunset and sunrise or when visibility is low. Vehicles within the airfield environment must display company identification markings on both sides of the vehicle. Non-motorized equipment must have a reflective device displayed on the front, back and sides. All supervisory and survey personnel vehicles which operate within the airfield environment but outside the work area must have a company vehicle with an amber flashing light mounted on the roof of the cab and identifying markings, visible from 300 feet, mounted on both sides of the vehicle. FAA Advisory Circular (A.C.) 150/5210-5D, "Painting, Marking, and Lighting of Vehicles Used on an Airport" shall be referenced for requirements.

e) Required Escorts

Escorts will not be required on this project.

f) Situational Awareness

While driving or working on the airfield environment, there must be no devices in or on ears other than those used to protect hearing or communicate company business. Yield right-of-way to emergency vehicles displaying rotating beacons and/or using sirens and other audible emergency signals. In the event of an emergency, be prepared to move workers, vehicles, and equipment immediately at the direction of the City.

g) Two-Way Radio Communication Procedures

All activities within aircraft movement areas will require two-way radio communication. In the event the contractor needs to access a movement area, all radio communications will be performed by the City using the Common Traffic Advisory Frequency (CTAF). Frequency that will be used by City personnel is:

CTAF – 122.70 MHz

h) Maintenance of the Secured Area of the Airport

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people.

F. Wildlife Management

1. Trash

Receptacles must be provided by the contractor and equipped with metal, canvas, or plastic covers. Food scraps or other trash may not be disposed on the ground and must be collected and placed in the covered receptacles as to not attract wildlife.

2. Standing Water

Staging areas, stockpile areas, and the work area must be graded to drain to avoid attracting wildlife

3. Tall Grass & Seeds

The use of low-quality seed mixtures that contain seeds of plants (such as clover) will attract wildlife and must not be used. Grass and weeds must be managed, or cut if necessary, within work areas to avoid attracting wildlife.

4. Disruption of Existing Wildlife Habitat

Contractor personnel should immediately notify the airport operator of wildlife sighting.

G. Foreign Object Debris (FOD) Management

The contractor will be required to ensure the airfield environment is kept continuously free of construction debris, equipment and/or materials that might endanger or be ingested by an aircraft. Take extreme care to ensure no work-related debris or other loose items can be blown by wind or aircraft engine blast. The Contractor must be responsible for any resulting damage to aircraft engines and/or other property arising from failure to secure and/or protect debris, tools, supplies, or other loose items. In areas that may result in the tracking of soil, sediments, or hazardous materials on the wheels of hauling equipment outside the area that are enclosed by erosion and silt/sediment control devices, the Contractor must provide the means and methods to remove these materials prior to the vehicle exiting the controlled area. Equipment operated on haul routes over existing pavements must always be kept free of material spillage and foreign matter. Standby equipment is always required to be onsite and operational throughout the project and must include, at a minimum, a self-propelled regenerative air sweeper and a water truck always kept loaded.

H. Hazardous Materials (HAZMAT) Management

HAZMAT procedures will be developed by the Contractor prior to issuance of the Notice-to-Proceed (NTP), including, but not limited to:

1. Fuel Storage Locations
2. Locations for Fueling and/or Servicing of Equipment
3. Spill Procedures
4. MSDS

For additional information and requirements on airports, reference FAA A.C. 150/5320-15, "Management of Airport Industrial Waste".

I. Notification of Construction Activities

1. Responsible representatives/points of contact

Points of Contact			
NAME	REPRESENTING	PHONE	EMAIL
Keri Navratil	City of Storm Lake	712-732-8000	navratil@stormlake.org
Carl Byers	Bolton & Menk, Inc.	515-520-3631	Carl.Byers@bolton-menk.com
Devin Mashek	Bolton & Menk, Inc.	563-380-7947	Devin.Mashek@bolton-menk.com

2. Notices to Airmen (NOTAMs)

Only the City may initiate or cancel a NOTAM on airport conditions and is the only entity that can close or open a runway. Points of contact for issuing NOTAMS are as follows:
Main Contact – Jim Bartholomew – (712)732-6494

3. Emergency Notification Procedures

- Emergency – DIAL 911
- City of Storm Lake– 712-732-8000 (Keri Navratil – City Manager)
- CTAF radio emergency – 122.70 MHz
- Storm Lake Police Department – 712-732-8010
- Storm Lake Fire Department – 712-732-8010
- Hospital – Buena Vista Regional Medical Center – 712-732-4030
- Iowa Poison Control – 800-222-1222

4. Notification to the FAA

a) Part 77

The project will affect navigable airspace. Therefore, the City will file an FAA 7460-1, Notice of Proposed Construction or Alteration, for the project. Any equipment, (cranes, graders, other equipment) used by the contractor that exceed the 15' height limitation must also have a 7460-1 airspace evaluation and determination prior to use.

J. Inspection Requirements

1. Daily inspections

Inspections should be conducted by the Contractor at least daily, but more frequently if necessary, to ensure conformance with the CSPP. The City will have the final authority in determining if the area is suitable for aircraft use. Appendix B contains a safety inspection checklist that may be used by the Contractor or City. Any deficiencies, whether caused by negligence, oversight, or project scope change, are to be addressed immediately.

2. Final inspection

An inspection must be conducted by the City prior to the commissioning of any newly constructed areas open to air traffic. The City will have the final authority in determining if the area is suitable for aircraft use. Appendix B contains a safety inspection checklist that may be used by the Contractor or City.

K. Underground Utilities

Notify Iowa One Call and owners of underground utilities within the construction area or within affected public rights-of-way or easements, via the “one-call” notification system (1-800-222-1222) in advance of the commencement of excavation activities. Notify the City when the “one-call” request is being initiated. Contractor must not cross electrical or communication cables unless protected by approved means. In the event of interruption to field-located utility services as a result of the work, promptly notify the City first, and then the proper authority. Cooperate with said authority in restoring service as promptly as possible. If required, the Contractor must install suitable temporary service until permanent repair is completed. Refer to General Provisions, Section 70.

L. Penalties

The Contractor is responsible for compliance with the CSPP as detailed herein. Violations will be cause for the project to be stopped and project safety procedures evaluated. Contractor working days will continue to be charged, even if the City ceases construction operations. The City will decide if and when work will continue. Enforcement of these regulations will be by the City. Refer to General Provision Section 80-06, Temporary Suspension of the Work, for further details. Failure to comply with the CSPP is a failure on the part of the contractor to carry out orders given or perform any provisions of the contract.

M. Special Conditions

An aircraft in distress may require the Contractor to immediately move equipment. The City will notify the Contractor in the unlikely event of an aircraft in distress. The Contractor will be required to comply with all City and/or Air Traffic instructions, and all equipment directed to be moved shall be relocated to the Staging Area.

Various circumstances, such as an aircraft accident, security breach, or other unforeseen event may require suspension of the construction. The City will notify the Contractor when suspension of the work will be required. See Section H – Emergency Notification Procedures for emergency contact information.

A VPD (vehicle/pedestrian deviation) is any entry or movement on the movement area by a vehicle or pedestrian that has not been authorized by the City. In the event of a VPD, the City reserves the right to suspend the work or any portion thereof and continue suspension until the completion of any investigation or evaluation by the City and full compliance with any corrective measures which the City may reasonably require. In addition, the City may require the Contractor to provide to the City a written plan, satisfactory to the City, to demonstrate the Contractor’s ability to prevent future violations. See Section E – Contractor Access for vehicle and pedestrian operations and two-way radio communication requirements.

N. Runway & Taxiway Visual Aids

1. General

Temporary airport markings must be clearly visible to pilots, not misleading, confusing, or deceptive. All temporary markings must be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

The nature of the construction project and duration of closures will not require temporary lighting, signs, or visual NAVAIDs to be incorporated into this project.

2. Markings

a) Temporarily Closed Runway

Temporarily closed runways are identified on the Construction Safety & Phasing Plan and identified in Section C – Areas & Operations Affected by Construction Activities. Temporarily closed runway at runway/taxiway intersections must have low-profile barricades placed outside the ROFZ.

b) Temporary Closed Taxiway

Temporarily closed taxiways are identified on the Construction Safety & Phasing Plan and identified in Section C – Areas & Operations Affected by Construction Activities. Temporarily closed taxiways at runway/taxiway intersections must have low-profile barricades placed outside the ROFZ and the small X located 10 feet from the runway edge per Figure 2-4 in FAA A.C. 150/5370-2G.

3. Lighting and visual VISAIDs

Visual aids will not be affected during phase one of project. Runway and taxiway lights will be covered or turned off during phase two.

4. Signs

Any time a sign does not serve its normal function; it must be covered, turned off, or removed to prevent misdirecting pilots.

O. Markings & Signs for Access Routes

The Contractor must place traffic control signs and/or devices, as appropriate, to advise other road users of construction operations and hauling. Signs and/or devices must conform with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), 2009 edition. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23.

P. Hazard Marking & Lighting

Before starting work, the contractor must provide and have available all signs, barricades, and lights necessary for protection of the work. Install and maintain adequate warning signs and lighted barricades to protect property and personnel in the work area. Barricades must be weighted or anchored to prevent overturning from wind or aircraft engine blast.

Barricades are not permitted in any active safety area. Barricades located within a runway or taxiway object free area and/or on aprons must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights. Barricades must be spaced according to the function. For aircraft movement areas barricades must be placed at 10' on center. For vehicle movement areas barricades must be placed at 4' on center. For personnel movement area barricades must be placed with 0' spacing.

The Contractor must have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information as information included in their SPCD. Lighting must be checked for proper operation at least once per day, preferably at dusk.

Open trenches, excavations, or obstructions not being actively worked must be marked with lighted and weighted barricades which can be seen from a reasonable distance. Contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the City, and light them with red lights during hours of restricted visibility or darkness.

Q. Protection of Safety Areas

1. Runway Safety Area (RSA)

No construction may occur within the existing RSA while the runway is open for aircraft operations. Open trenches or excavations are not permitted within the RSA while the runway is open. If possible, backfill trenches before the runway is opened.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting the occasional passage of aircraft without causing structural damage to the aircraft.

Grading tolerances inside the safety area must be 5% maximum grade with no humps/depressions/drop-offs greater than 3-inches. The RSA is depicted on the Construction Safety & Phasing Plan contained in Appendix A. The dimension for the Runway 13/31 RSA is 75-FT each side of centerline and 300-FT beyond each runway end.

2. Runway Obstacle Free Zone (ROFZ)

Personnel, material, and/or equipment may not penetrate the OFZ while the runway is open to aircraft operations. The runway OFZ is depicted on the Construction Safety & Phasing Plan contained in Appendix A. The dimension for Runway 13/31 ROFZ is 200-FT each side of centerline and 200-FT beyond each runway end.

3. Runway Object Free Area (ROFA)

Construction, including excavations, may be permitted within the ROFA. However, equipment must be removed from the ROFA when not in use and material shall not be stockpiled in the ROFA. The dimension for the Runway 13/31 ROFA is 250-FT each side of centerline and 300-FT beyond each runway end.

4. Taxiway Safety Area (TSA)

No construction may occur in the TSA while the taxiway is open to aircraft operations. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Backfill trenches before the taxiway is opened.

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting the occasional passage of aircraft without causing structural damage to the aircraft.

Grading tolerances inside the safety area must be 5% maximum grade with no humps/depressions/drop-offs greater than 3-inches. For this project, the TSA will be 39.5-FT each side of centerline for all taxiways.

5. Taxiway Object Free Area (TOFA)

No construction will be allowed within the taxiway object free area while the taxiway is open to aircraft operations. For this project, the TOFA will be 65.5-FT each side of centerline for all taxiways.

6. Runway approach/departure surfaces

All personnel, material, and/or equipment must remain clear of approach/departure surfaces.

R. Other Limitations on Construction

1. Prohibitions

- a) Open flame welding or torches are prohibited unless fire safety precautions are provided, and the airport has approved their use.
- b) The use of flare pots is prohibited within the Airport Operations Area (AOA).
- c) No smoking will be allowed within the airfield environment.

Appendix A: Construction Safety & Phasing Plan (CSPP)



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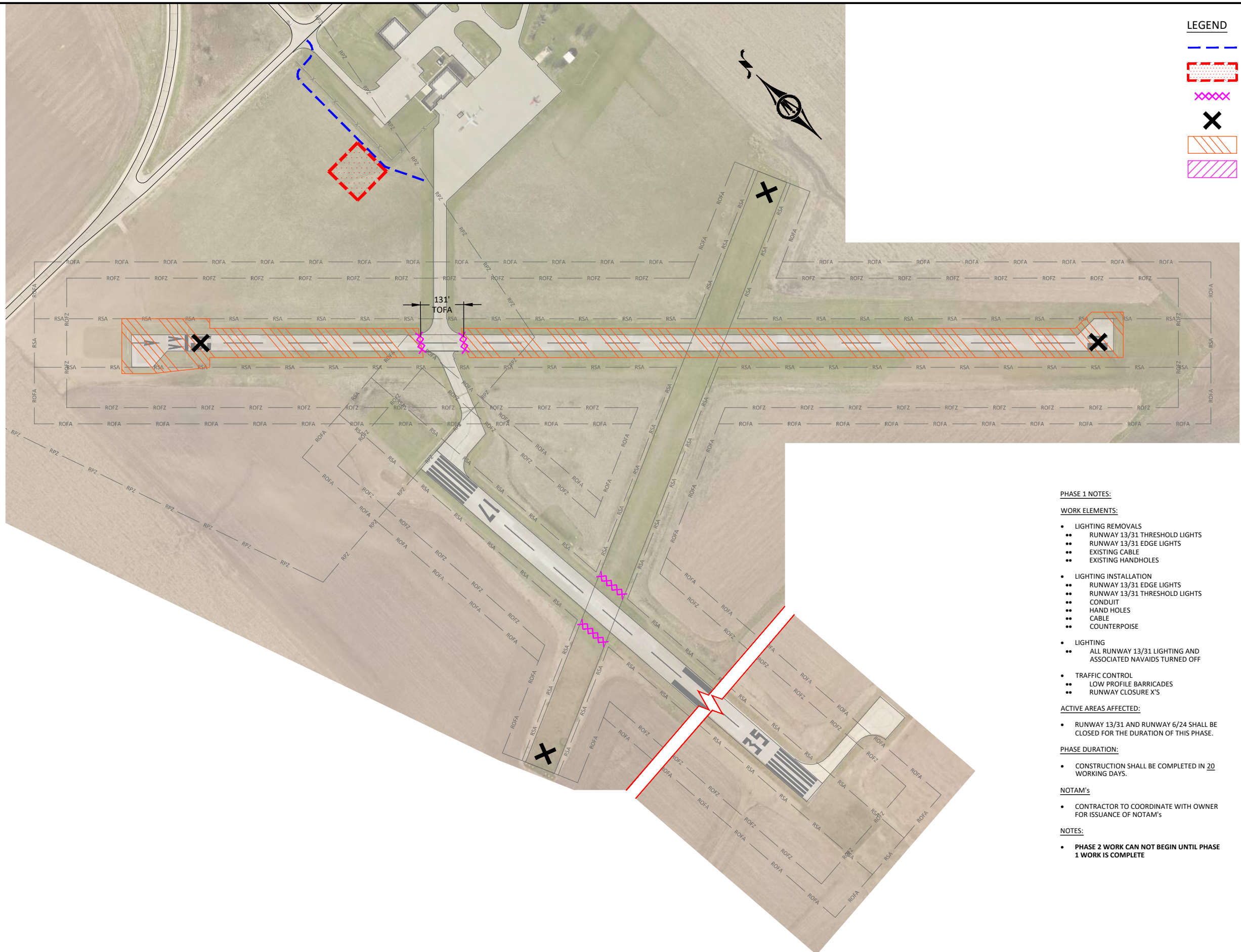
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
CONSTRUCTION SAFETY & PHASING PLAN
PHASE 1

SHEET

G2.02



LEGEND

- CONTRACTORS ACCESS ROUTE
- CONSTRUCTION STAGING/STORAGE
- LOW PROFILE BARRICADES
- RUNWAY CLOSURE MARKER
- PHASE 1 CONSTRUCTION
- PHASE 2 CONSTRUCTION

PHASE 1 NOTES:

WORK ELEMENTS:

- LIGHTING REMOVALS
 - RUNWAY 13/31 THRESHOLD LIGHTS
 - RUNWAY 13/31 EDGE LIGHTS
 - EXISTING CABLE
 - EXISTING HANDHOLES
- LIGHTING INSTALLATION
 - RUNWAY 13/31 EDGE LIGHTS
 - RUNWAY 13/31 THRESHOLD LIGHTS
 - CONDUIT
 - HAND HOLES
 - CABLE
 - COUNTERPOISE
- LIGHTING
 - ALL RUNWAY 13/31 LIGHTING AND ASSOCIATED NAVAIDS TURNED OFF
- TRAFFIC CONTROL
 - LOW PROFILE BARRICADES
 - RUNWAY CLOSURE X'S

ACTIVE AREAS AFFECTED:

- RUNWAY 13/31 AND RUNWAY 6/24 SHALL BE CLOSED FOR THE DURATION OF THIS PHASE.

PHASE DURATION:

- CONSTRUCTION SHALL BE COMPLETED IN 20 WORKING DAYS.

NOTAM's

- CONTRACTOR TO COORDINATE WITH OWNER FOR ISSUANCE OF NOTAM'S

NOTES:

- PHASE 2 WORK CAN NOT BEGIN UNTIL PHASE 1 WORK IS COMPLETE

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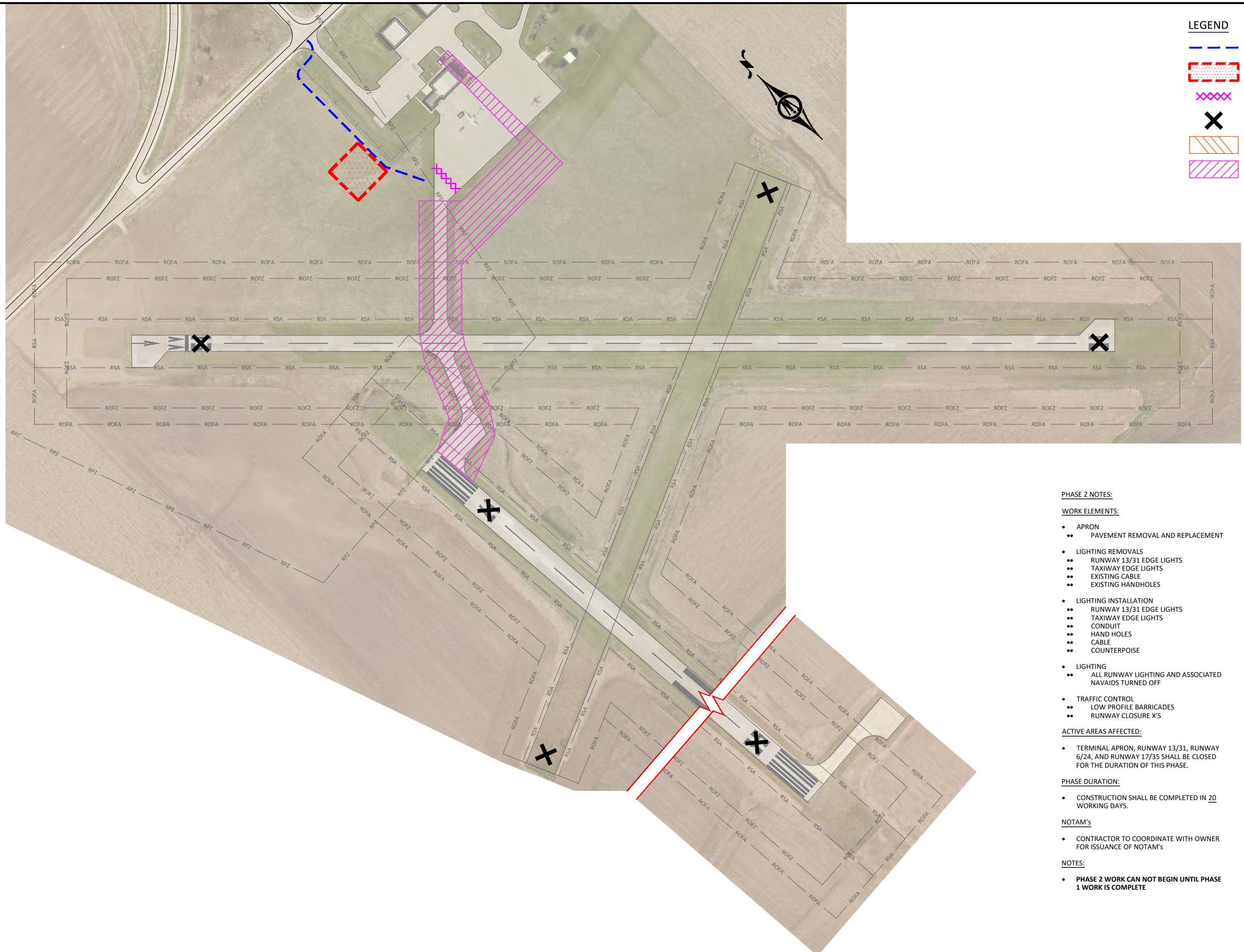
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STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 LIGHTING REPLACEMENT
CONSTRUCTION SAFETY & PHASING PLAN
PHASE 2

SHEET

G2.03



LEGEND

- CONTRACTORS ACCESS ROUTE
- CONSTRUCTION STAGING/STORAGE
- LOW PROFILE BARRICADES
- RUNWAY CLOSURE MARKER
- PHASE 1 CONSTRUCTION
- PHASE 2 CONSTRUCTION

PHASE 2 NOTES:

WORK ELEMENTS:

- APRON
 - PAVEMENT REMOVAL AND REPLACEMENT
- LIGHTING REMOVALS
 - RUNWAY 13/31 EDGE LIGHTS
 - TAXIWAY EDGE LIGHTS
 - EXISTING CABLE
 - EXISTING HANDHOLES
- LIGHTING INSTALLATION
 - RUNWAY 13/31 EDGE LIGHTS
 - TAXIWAY EDGE LIGHTS
 - CONDUIT
 - HAND HOLES
 - CABLE
 - COUNTERPOISE
- LIGHTING
 - ALL RUNWAY LIGHTING AND ASSOCIATED NAVAIDS TURNED OFF
- TRAFFIC CONTROL
 - LOW PROFILE BARRICADES
 - RUNWAY CLOSURE X'S

ACTIVE AREAS AFFECTED:

- TERMINAL APRON, RUNWAY 13/31, RUNWAY 6/24, AND RUNWAY 17/35 SHALL BE CLOSED FOR THE DURATION OF THIS PHASE.

PHASE DURATION:

- CONSTRUCTION SHALL BE COMPLETED IN 20 WORKING DAYS.

NOTAM'S

- CONTRACTOR TO COORDINATE WITH OWNER FOR ISSUANCE OF NOTAM'S

NOTES:

- PHASE 2 WORK CAN NOT BEGIN UNTIL PHASE 1 WORK IS COMPLETE

Appendix B: Safety Inspection Checklist

Construction Project Daily Safety Inspection Checklist

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project

Potentially Hazardous Conditions

ITEM	ACTION REQUIRED	NONE
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		☐
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		☐
Runway resurfacing projects resulting in lips exceeding 3 in (7.6 cm) from pavement edges and ends.		☐
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		☐
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		☐
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.		☐
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		☐
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		☐
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		☐
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		☐
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		☐

Obliterated or faded temporary markings on active operational areas.		☐
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		☐
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		☐
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		☐
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		☐
Lack of radio communications with construction vehicles in airport movement areas.		☐
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		☐
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		☐
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		☐
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		☐
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		☐
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		☐
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		☐
Site burning, which can cause possible obscuration.		☐
Construction work taking place outside of designated work areas and out of phase.		☐

Appendix C: Safety Plan Compliance Document (SPCD) Requirements

Safety Plan Compliance Document

The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, "I, Name of Contractor, have read the Title of Project CSPP, approved on Date, and will abide by it as written and with the following additions as noted:"). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

- (1) **Coordination.** Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
- (2) **Phasing.** Discuss proposed construction schedule elements, including:
 - (a) Duration of each phase.
 - (b) Daily start and finish of construction, including "night only" construction.
 - (c) Duration of construction activities during:
 - (i) Normal runway operations.
 - (ii) Closed runway operations.
 - (iii) Modified runway "Aircraft Reference Code" usage.
- (3) **Areas and operations affected by the construction activity.** These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
- (4) **Protection of NAVAIDs.** Discuss specific methods proposed to protect operating NAVAIDs.
- (5) **Contractor access.** Provide the following:
 - (a) Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
 - (b) Listing of individuals requiring driver training (for certificated airports and as requested).
 - (c) Radio communications.
 - (i) Types of radios and backup capabilities.
 - (ii) Who will be monitoring radios.
 - (iii) Whom to contact if the ATCT cannot reach the contractor's designated person by radio.
 - (d) Details on how the contractor will escort material delivery vehicles.
- (6) **Wildlife management.** Discuss the following:
 - (a) Methods and procedures to prevent wildlife attraction.
 - (b) Wildlife reporting procedures.
- (7) **Foreign Object Debris (FOD) management.** Discuss equipment and methods for control of FOD, including construction debris and dust.
- (8) **Hazardous material (HAZMAT) management.** Discuss equipment and methods for responding to hazardous spills.
- (9) **Notification of construction activities.** Provide the following:
 - (a) Contractor points of contact.

- (b) Contractor emergency contact.
 - (c) Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
 - (d) Batch plant details, including 7460-1 submittal.
- (10) **Inspection requirements.** Discuss daily (or more frequent) inspections and special inspection procedures.
- (11) **Underground utilities.** Discuss proposed methods of identifying and protecting underground utilities.
- (12) **Penalties.** Penalties should be identified in the CSPP and should not require an entry in the SPCD.
- (13) **Special conditions.** Discuss proposed actions for each special condition identified in the CSPP.
- (14) **Runway and taxiway visual aids.** Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
 - (a) Equipment and methods for covering signage and airfield lights.
 - (b) Equipment and methods for temporary closure markings (paint, fabric, other).
 - (c) Types of temporary Visual Guidance Slope Indicators (VGSI).
- (15) **Marking and signs for access routes.** Discuss proposed methods of demarcating access routes for vehicle drivers.
- (16) **Hazard marking and lighting.** Discuss proposed equipment and methods for identifying excavation areas.
- (17) **Protection of runway and taxiway safety areas.** Including object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
 - (a) Equipment and methods for maintaining Taxiway Safety Area standards.
 - (b) Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
- (18) **Other limitations on construction** should be identified in the CSPP and should not require an entry in the SPCD.



GEOTECHNICAL INVESTIGATION
FOR
STORM LAKE MUNICIPAL AIRPORT
RUNWAY 13/31 PAVEMENT REHABILITATION
STORM LAKE, IOWA

Prepared For:

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August 6, 2013

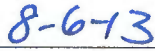
	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.	
		
	Sybil K. Ferrier, P.E. License No. 20479	Date
	My License renewal date is December 31, 2014 .	
	Pages or sheets covered by this seal: <u>All Pages.</u>	

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GEOTECHNICAL ENGINEERING REPORT

Storm Lake Municipal Airport

Runway 13/31 Pavement Rehabilitation

Storm Lake, Iowa

August 6, 2013

INTRODUCTION

Bolton & Menk is assisting the Storm Lake Municipal Airport in rehabilitating the pavement sections of Runway 13/31 and associated taxiway and apron pavements. Nine soil borings and nine pavement cores were completed around the site to evaluate the current pavement conditions. The soil borings were conducted to a depth of 5 feet below existing grades to evaluate the subgrade soil conditions. Individual Boring Logs and a Site Plan are included in the attachments of this report showing the findings and locations of the borings.

The purposes of this report are to describe the subsurface conditions encountered in the borings, analyze and evaluate the test data, and provide geotechnical recommendations regarding the design, construction, and rehabilitation of the pavements.

FIELD EXPLORATION

Field exploration was conducted on July 15th, 2013. The soil boring and pavement core locations were selected by Bolton & Menk and located in the field by CMT. A Site Plan indicating the approximate locations is enclosed in the appendix of this report.

The borings were drilled with a truck-mounted drill rig using continuous flight augers to advance the boreholes. Representative samples were obtained at various intervals using augers and split spoon samplers in general accordance with ASTM procedures. Field logs of each boring were recorded by the drill crew during drilling operations. These logs contain visual classifications of the materials encountered as well as the driller's interpretation of the subsurface conditions between samples during drilling. Soil samples were sealed and returned to the laboratory for further testing and classification. The final Boring Logs (see attached) represent an interpretation of the field logs and include modifications based on laboratory observations and test results for the samples.

SITE AND SUBSURFACE CONDITIONS

Site Description

The site is located on the southwest side of Storm Lake and this geologic region of Iowa is on the border of the Des Moines Glacial Lobe and Northwest Iowa Plains soil profiles. After the last glacier advanced through Iowa, it left behind a poorly drained landscape consisting of pebbly deposits striated with sand and gravel seams from glacial meltwater streams. Many of the natural soils present consist of Wisconsinan glacial till, loess and Pre-Illinoian glacial till underlain by the Pennsylvanian bedrock system. Wisconsinan glacial till typically consists of a lower sand content glacial till, generally mixed with sand seams and layers. The upper more weathered portion of the Pre-Illinoian glacial till, referred to as paleosol, is typically a higher clay content soil.

Soil Conditions

Specific subsurface soil conditions at each boring location are presented on the individual Boring Logs, enclosed in the appendix. The stratification boundaries shown on the Boring Logs represented the approximate boundary lines where changes in soil formations may occur. In-situ the transition between materials is more gradual than what is presented on the Boring Logs. Based on the borings, the subsurface conditions can be generalized as follows:

The borings consisted of approximately three feet of very dark brown to very dark gray lean clay (CL) topsoil in a damp to moist condition. This was underlain by loess soils comprised of very dark brown, very dark gray to brown and gray lean clay (CL), with some traces of sand. These loess soils were moist to very moist. Near a depth of 4 ft below existing grades, the loess graded to some localized pockets of glacial outwash soils, consisting of gray clayey sand (SP) and brown fine to coarse sand (SP). The glacial outwash soils were in a moist condition. The borings terminated near a depth of 5 feet below existing grades.

Groundwater Observations

No groundwater accumulation was noted during drilling operations, however very high soil moisture contents were observed. Based on boring data, past groundwater levels may have been as high as 3 feet below existing ground surface and have the potential to return to that level, should weather conditions allow. These short term observations are not necessarily an accurate indication of normal groundwater levels. Long-term observations would be required to better define the natural groundwater level. Fluctuations in groundwater can occur from varying amounts of precipitation, changes in surface coverage (i.e. adding pavements or vegetation), irrigation practices, etc. Brown-gray coloring is an indication of potential groundwater levels. The groundwater levels observed during site exploration can be seen on the attached Boring Logs in the appendix.

PROCEDURES

Laboratory Testing

The soil samples were classified in the laboratory based on visual observations, moisture content and soil strength tests. The soil descriptions and group symbols presented on the Boring Logs for native soils are in general accordance with the Unified Soil Classification System (USCS).

In addition to obtaining continuous samples in the field, a calibrated hand penetrometer was used to estimate the compressive strength of several cohesive soil samples. The calibrated hand penetrometer has been correlated with unconfined compressive tests and provides a better estimate of soil strength than visual examination alone. The results of the laboratory tests are shown on the boring logs attached to this report.

ENGINEERING ANALYSIS AND RECOMMENDATIONS

Exterior Pavement Rehabilitation Design Considerations

Nine pavement cores were taken from within the existing runway and apron. Eight of the cores were obtained from Runway 13/31 and one core was taken from the south side of the fuel station on the apron. Locations of these cores can be seen on the attached site map. On average, the pavement tested consisted of 5 inches of Portland Cement concrete (PCC) underlain by 4 to 5 inches of hot mix asphalt (HMA). In two locations (Core Nos. 2 and 9), no HMA was noted. These two cores were taken in Taxiway 01 and the apron pavement around the fueling station. The core cross sections can be summarized as follows:

Core No.	PCC Length, inches	HMA Length, inches	Total Length, inches
1	5.75	5.25	11.00
2	5.50	0.00	5.50
3	5.75	4.50	10.50
4	5.00	4.00	9.00
5	5.00	4.50	9.50
6	5.50	4.00	9.50
7	5.75	3.75	9.50
8	5.50	2.50	8.00
9	6.25	0.00	6.25

Soils at this site were deemed non-expansive and high soil moisture contents were observed in several borings with the top six feet of the existing ground surface. Typically, moisture contents between 20-30% in these types of soils will reduce soil strength dramatically. This can also cause severe frost heave if the frost occurs when moisture contents are near this level. The soils immediately beneath the pavements are capable of providing adequate strength and bearing pressures to support the proposed traffic loads, however, fluctuating moisture contents create an unstable soil subgrade. As a result of fluctuating moisture contents and a lack of drainable subbase, joint deterioration has occurred and will continue to be a concern.

At the southeast end of Runway 13/31, a large number of voids are present which extend either completely through or partially through the concrete overlay. These voids appear to be caused by contamination of the aggregate stockpiles during production. Based on the localized locations of the voids at the end of the runway, it appears that during initial construction of the concrete overlay, this area may have been near the final stage of construction. When a project nears completion, aggregate stockpiles are at a minimal level and it is not uncommon for operators to inadvertently pick up soils when nearing the bottom of the stockpiles, thus contaminating the aggregate supply. This manifests itself as the voids being observed when the soil expands and

breaks the surface cream of the concrete and is then further exposed to moisture infiltration and freeze/thaw cycles.

Based on the current pavement materials and the relatively shallow water table, a large scale milling or remove/replace operation is not recommended at this time. The shallow water table creates high moistures and low strength soils within a few feet of the pavements. The smoothness of the pavement has been compromised by panel settling, deterioration of joints, and deleterious material contamination. In addition, there are small areas of D-cracking in panels which are candidates for a complete remove/replace operation.

For immediate rehabilitation, route and seal operations along with very limited remove/replace operations could be conducted, which would provide an acceptable short term solution.

For short term rehabilitation, there are two construction techniques which can be applied for correcting pavement distress. First, it is recommended to remove and replace any full panels or partial panels showing signs of settlement, D-cracking or deleterious material contamination. Most of the deleterious material contamination is occurring at the southeast end of Runway 13/31. Photographs of the cores removed from this area can be seen in the appendix of this report. For this construction method, the panels would be sawed out and the pavement sections removed. The replacement panel would need to be doweled into the adjacent panels to assist in proper load transfer across the joints. The subgrade in these areas would need to be tested for compaction/bearing and soil moisture content prior to replacing paving. These tests would also indicate if any additional measures are necessary, such as utilizing a granular subbase beneath the new pavement panels. The pavement could then be replaced with an IDOT C4WRC20 concrete mix or an FAA P-501 concrete mix with a target air content of 6 percent. This part of the design would have a life expectancy between 10-15 years. The second phase of the short term rehabilitation would be to address the observed joint deterioration. Panels which are suffering severe joint deterioration should be routed and sealed. These areas may require minimal grinding to avoid localized elevation changes. The route and seal technique will require maintenance and typically has a life expectancy of 5-10 years.

The short term rehabilitation option could also be coupled with subdrains or edge drains, which would extend the life expectancy of the rehabilitation efforts. The edge drains are designed to stabilize the moisture content of the subgrade within three feet of the bottom of the subbase, helping to provide consistent pavement support. Subdrains are typically a small investment at the time of construction and can enhance the life expectancy of any pavement dramatically.

For long term rehabilitation, based on the soil structure and the available in-place materials, it is recommended to recycle the existing pavement materials into a suitable subbase gradation and re-use the material for a granular subbase. The runway could then be reconstructed using a FAA P-501 mix placed at a thickness of 6 inches. Additional thickness could be added to the design if larger aircraft loads are anticipated in the future. The final phase to this rehabilitation would be the installation of edge drains along both sides of the runway. This design would be the most expensive, however it would have a life expectancy in excess of 30 years.

GENERAL CONSTRUCTION PRACTICES

Site Preparation

Site preparation will include the stripping of any organic or loose material, such as the existing pavement sections present near the surface. If encountered, any mature vegetation, roots, or other large areas of organic materials, should be removed from under the pavements and properly backfilled prior to further grading or construction operations. Topsoil could be stockpiled for re-use at a later date during construction operations.

During the initial site exploration, the moisture contents of the natural soils were generally above to well above the recommended moisture content for compaction. Adjustment of the moisture content will likely be required during grading operations to achieve the desired amount of compaction at the preferred moisture content. Weather permitting, soil farming is a very economical way to lower the moisture content of the soils. If farming is not a feasible option, chemical stabilization can be conducted with fly ash or quick lime.

Earthwork Considerations

It is anticipated that minor grading operations will be required to achieve the desired final grades across the site. The on-site natural soils would be suitable for general grading applications. It is recommended that any fill or borrow material needed consist of a non-expansive (CL) cohesive material, free of organics and rubble, or a granular material. Cohesive material should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-698 (Standard Proctor Test) at a moisture content of -1 to +4 percent of optimum. No fill should be placed in lifts greater than one foot in thickness. A non-expansive cohesive fill material should exhibit a Liquid Limit less than 45 and a Plasticity Index less than 23 when tested in compliance with ASTM D-4318. All fill materials, cohesive or granular, should be pre-approved prior to placement.

Areas of increased sand content or sand pockets were identified during drilling operations. Sand seams or layers will not support trenching operations, especially if water is flowing freely through the excavation. All excavations should be adequately sloped or braced for safety if it is necessary for personnel to enter excavations. If moisture seepage is encountered during excavations, it can typically be controlled by allowing it to drain into temporary sumps and pumped outside the excavations. Excavation side slopes should be constructed and maintained in accordance with all local, state and federal requirements, including OSHA 29 CFR, part 1926.

Additional earthwork considerations will be completed through the plan development process. We recommend personnel be on-site during construction to verify compaction, bearing capacity or material suitability during the construction process.

GENERAL COMMENTS

The analysis and recommendations presented in this report are based upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations, which may occur between borings. If, during construction, the nature and extent of such variations appear evident; it will be necessary to reevaluate the recommendations of this report.

The scope of service for this project does not include either specifically or by implication any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied are intended or made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid, unless the changes are reviewed and the conclusions of this report are modified or verified in writing by the geotechnical engineer.

Sincerely,



Sybil K. Ferrier, P.E.
Principal Engineer



Doug Clement
President/CEO



APPENDIX

GENERAL NOTES - BORING LOG DESCRIPTIONS

Soil descriptions stated on the Boring Logs are based on the Unified Soil Classification System as stated in ASTM Designations D-2487 and D-2488. The Unified Soil Classification group symbol listed in the table below correlate to the group symbols listed on the Boring Logs. The classification is mainly based on visual observations to define the soil characteristics. If a more detailed soil description is required, additional soil testing will be conducted to better define the soil characteristics.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
SW	Well-graded Sand	GW	Well-graded Gravel	CL	Lean Clay	CH	Fat Clay
SP	Poorly-graded Sand	GP	Poorly-graded Gravel	ML	Silt	MH	Elastic Silt
SM	Silty Sand	GM	Silty Gravel	OL or OH	Organic Silt	Pt	Peat
SC	Clayey Sand	GC	Clayey Gravel		Organic Clay		

RELATIVE DENSITY OF COARSE-GRAINED SOILS		CONSISTENCY OF FINE-GRAINED SOILS		
<i>SPT, bpf</i>	<i>Relative Density</i>	<i>Unconfined Compressive Strength, Q_{10} psf</i>	<i>Consistency</i>	<i>SPT, bpf</i>
0-3	Very Loose	< 500	Very Soft	0 - 2
4-9	Loose	500 - 1,000	Soft	2 - 4
10-29	Medium Dense	1,001 - 2,000	Medium Stiff	4 - 8
30-49	Dense	2,001 - 4,000	Stiff	8 - 15
50-80	Very Dense	4,001 - 8,000	Very Stiff	15 - 30
80+	Extremely Dense	8,001 - 16,000	Hard	30 - 100
		>16,000	Very Hard	>100

GRAIN SIZE TERMINOLOGY		RELATIVE PROPORTIONS		
<i>Major Component of Sample</i>	<i>Size Range</i>	<i>Descriptive Terms(s) (of components also present in sample)</i>	<i>Fines Percent of Dry Weight</i>	<i>Sand and Gravel Percent of Dry Weight</i>
Cobbles	12 in. to 3 in. (300 mm to 75 mm)	Trace	< 5	< 15
Gravel	3 in. to #4 sieve (75 mm to 4.75 mm)	With	5 - 12	15 - 29
Sand	#4 to #200 sieve (4.75 mm to 0.074 mm)	Modifier	> 12	> 30
Silt or Clay	Passing #200 sieve (> 0.074 mm)			

DRILLING AND SAMPLING ABBREVIATIONS

Drilling Methods

CFA – Continuous Flight Auger; typically, 4, 6, or 8 inches in diameter (ASTM D 1452)

HSA – Hollow Stem Auger; 6 or 8 inches in diameter, continuous flight auger remains in bore hole with undisturbed soil samples obtained from center of auger.

HA – Hand Auger; typically with a 4 inch or less diameter auger

Sample Types

SS - Split Spoon; samples obtained with a 140 lb manual hammer in accordance with ASTM D1586.

SSA – Split Spoon; samples obtained with a 140 lb automatic hammer in accordance with ASTM D 1586.

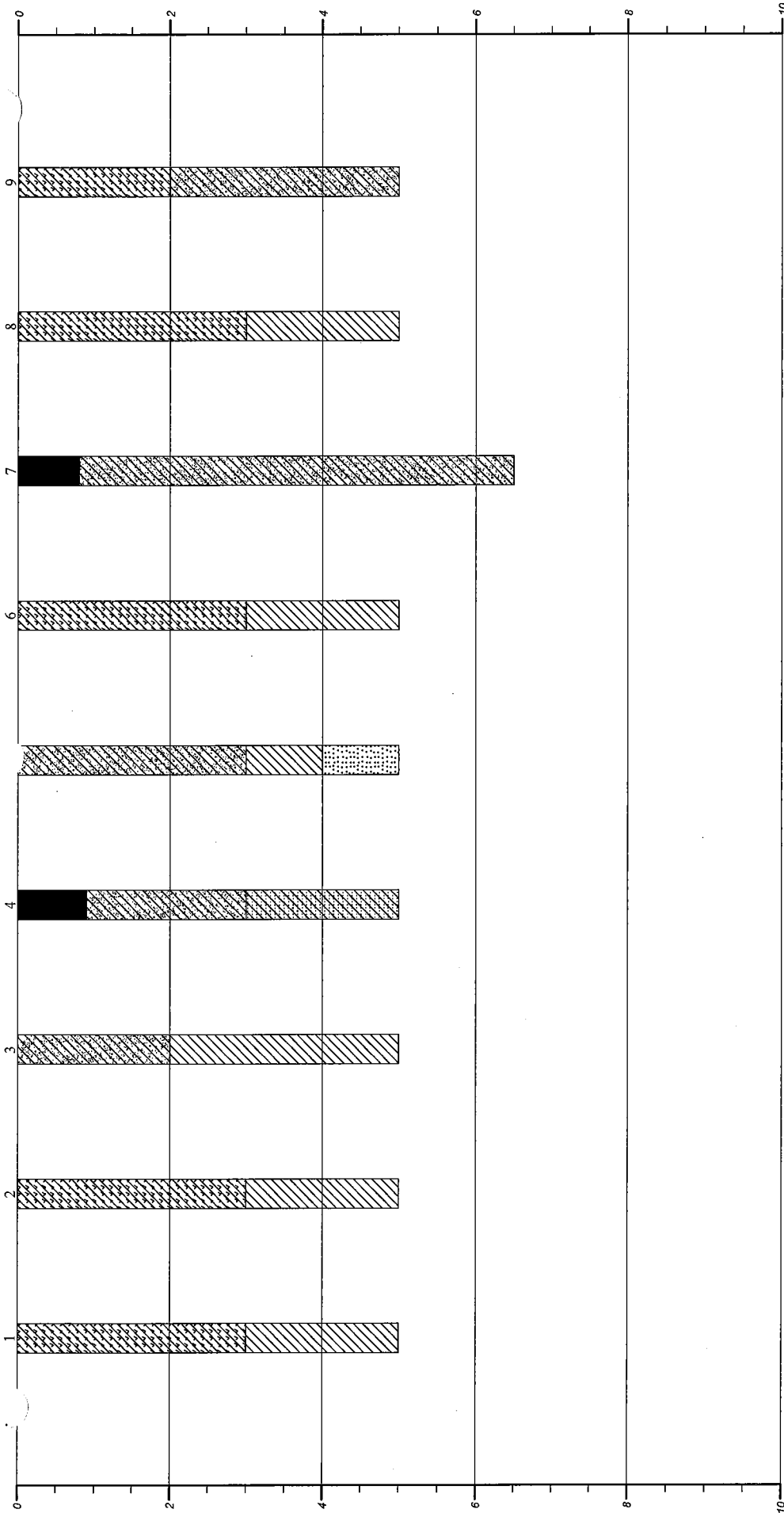
ST – Shelby Tube; thin walled tube samples, typically for cohesive soils, in accordance with ASTM D1587.

SPT- Standard Penetration Test: The number of blows required to drive a sampler, either split spoon or drive cone, into the soil with a 140 lb mass dropped a distance of 30 inches, in accordance with ASTM D 1586, and the number of blows are recorded in each 6 inch interval over a distance of 18 inches. Blow counts are reported for each 6 inch interval or the sum of the last two intervals is reported. The sum of the last two intervals is referred to as N, in blows per foot.

BS – Bulk Disturbed Sample

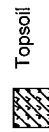
CPT – Cone Penetration Test; A device in which a 60° cone is pushed continuously into the soil and the cone end resistance is measured for skin friction and end bearing (ASTM D3441).

Depth in Feet



Depth in Feet

Strata symbols



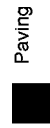
Topsoil



Lean clay



Sandy lean clay



Paving

Clayey sand



Poorly graded sand



CONSTRUCTION MATERIALS TESTING
GENERALIZED SOIL PROFILE

HORIZONTAL
SCALE: 1"=2'

DRAWN BY/APPROVED BY

DATE DRAWN

8/6/2013

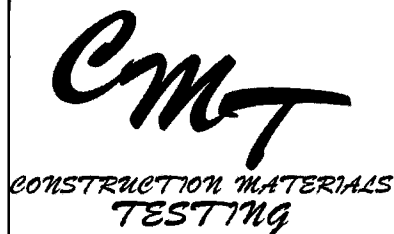
VERTICAL
SCALE: 1"=2'

Runway 13/31 & Taxiway Rehabilitation

Storm Lake Municipal Airport

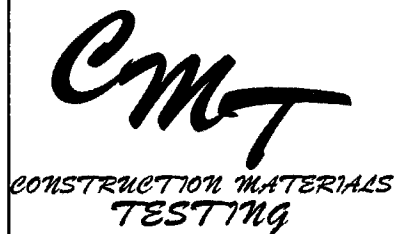
PROJECT NO.

FIGURE NUMBER



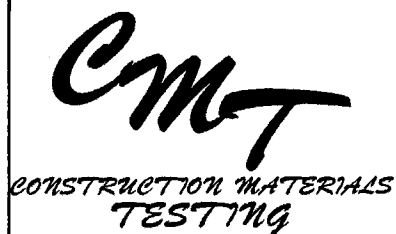
Project Runway 13/31 & Taxiway Rehabilitation
Boring # 1
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown clay, moist	CL	
2	1	CS		21.3		1,500**		TOPSOIL		
4	2	CS		26.3		1,000**		Gray lean clay, moist to very moist LOESS	CL	
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										



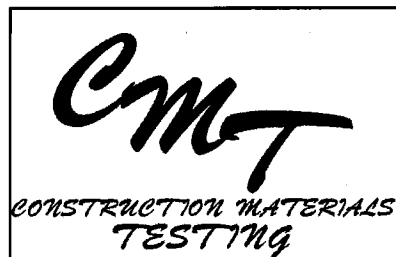
Project Runway 13/31 & Taxiway Rehabilitation
Boring # 2
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown clay, damp	CL	
2	1	CS		13.7		2,000**		TOPSOIL		
4	2	CS		28.3		500**		Brown lean clay, very moist LOESS	CL	
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										



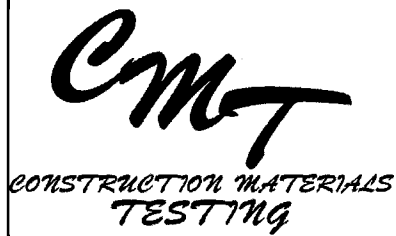
Project Runway 13/31 & Taxiway Rehabilitation
Boring # 3
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Brown very sandy clay, traces of pea gravel, dry	CL	
								TOPSOIL		
2	1	CS		5.0		3,000**		Dark brown lean clay, trace pea gravel, moist	CL	
								LOESS		
4	2	CS		21.2		1,500**		Brown after 4 feet		
								End of Boring		
6								**Estimated using calibrated penetrometer		
								No groundwater noted during drilling operations.		
8										
10										
12										



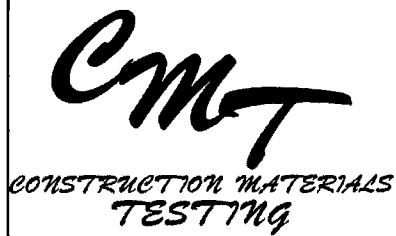
Project Runway 13/31 & Taxiway Rehabilitation
Boring # 4
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								± 10.5 inches Pavement		
								Very dark gray lean clay with sand, moist to very moist	CL	
2	1	CS		29.2		500**		LOESS Gray after 2 feet		
								Gray clayey sand, moist	SC	
4	2	CS		16.0		2,000**		GLACIAL OUTWASH		
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										



Project Runway 13/31 & Taxiway Rehabilitation
Boring # 5
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy clay, dry to moist	CL	
2	1	CS		19.8		2,000**		TOPSOIL		
4	2	CS		27.0		500**		Brown lean clay, very moist	CL	
								LOESS		
								Brown fine to coarse sand, very moist	SP	
								GLACIAL OUTWASH		
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										



Project Runway 13/31 & Taxiway Rehabilitation
Boring # 6
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark gray lean clay, moist	CL	
2	1	CS		20.8		1,500**		TOPSOIL		
4	2	CS		27.0		1,000**		Brown lean clay, very moist LOESS	CL	
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										

CMT

CONSTRUCTION MATERIALS
TESTING

Project Runway 13/31 & Taxiway Rehabilitation
Storm Lake Municipal Airport

Boring # 7

Client Bolton & Menk

Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								± 9.5 inches Pavement		
2	1	CS		30.9		500**		Very dark gray lean clay with sand, moist to very moist Gray after 1 foot	CL	
4	2	CS		20.7		1,500**		LOESS Very dark gray after 3 feet		
6	3	CS		29.9		500**		Wet after 5 feet		
8								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
10										
12										



CONSTRUCTION MATERIALS
TESTING

Project Runway 13/31 & Taxiway Rehabilitation
Storm Lake Municipal Airport
Boring # 8
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark gray lean clay, damp to moist	CL	
2	1	CS		24.1		1,000**		TOPSOIL		
4	2	CS		28.0		500**		Very dark gray lean clay, very moist LOESS	CL	
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										

CMT

CONSTRUCTION MATERIALS
TESTING

Project Runway 13/31 & Taxiway Rehabilitation
Storm Lake Municipal Airport
Boring # 9
Client Bolton & Menk
Surface Elev. Ground Surface

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy clay, moist	CL	
								TOPSOIL		
2	1	CS		23.7		1,500**		Brown lean clay with sand, moist	CL	
								LOESS		
4	2	CS		17.4		2,000**		Increasing sand content near 4 feet.		
6								End of Boring **Estimated using calibrated penetrometer No groundwater noted during drilling operations.		
8										
10										
12										



Storm Lake Municipal Airport

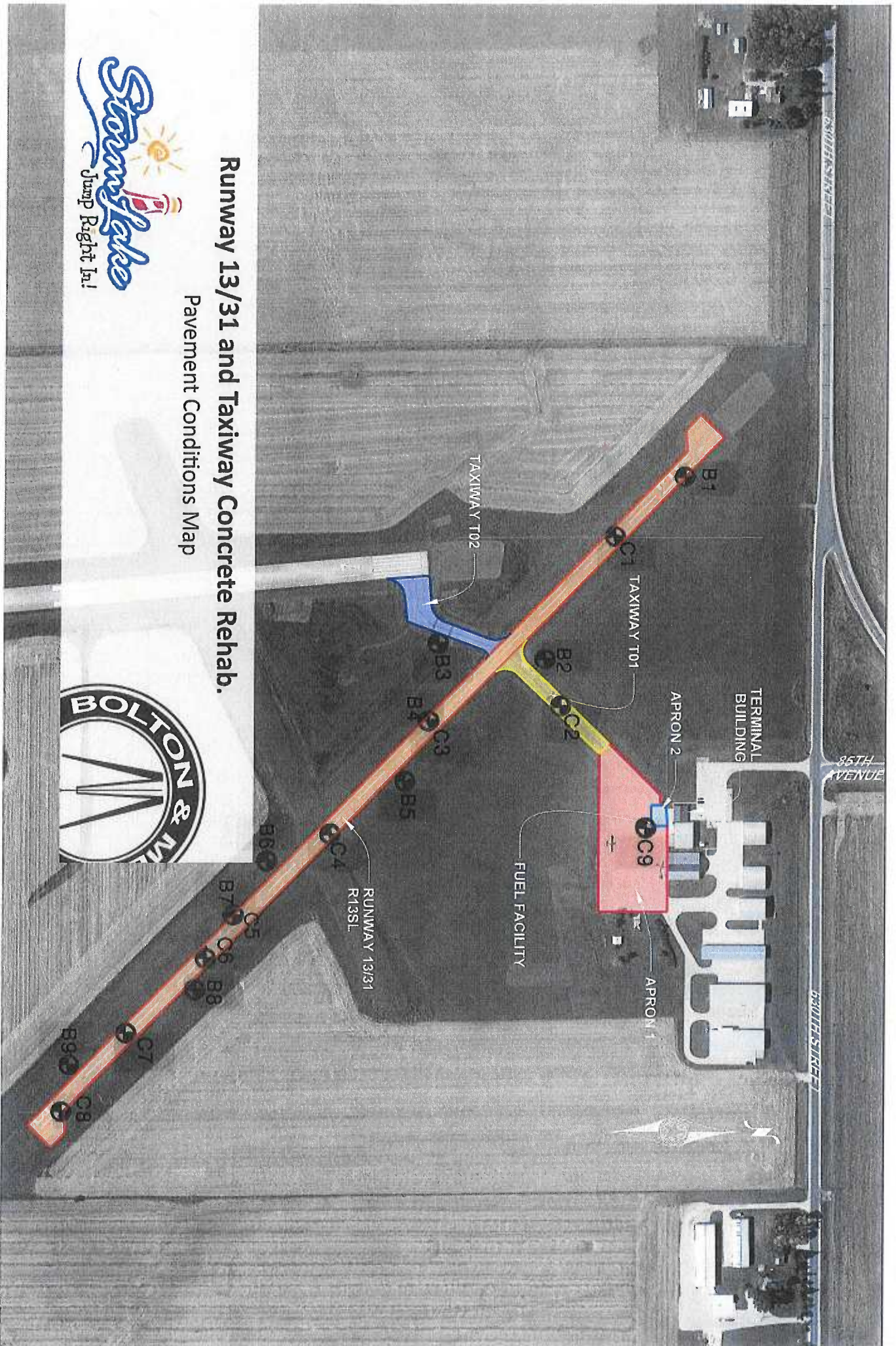
Runway 13/31 Rehabilitation



Core No. 6



Core No. 8



Runway 13/31 and Taxiway Concrete Rehab.

Pavement Conditions Map





U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Operational Safety on
Airports During Construction

Date: 12/13/2017

AC No: 150/5370-2G

Initiated By: AAS-100

Change:

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “←” keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

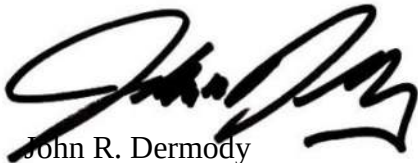
7 **Where to Find this AC.**

You can view a list of all ACs at

http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)¹ for each affected taxiway; designated approach visibility minimums;

¹ Find Taxiway Design Group information in AC 150/5300-13, Airport Design.

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 **Who Is Responsible for Safety During Construction?**

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

- 1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.
- 1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.
- 1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects. (Note “FAA” refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)
- 1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.
- 1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.
- 1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.
- 1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.
- 1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.
- 1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.
- 1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.
- 1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

- 1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
 - 1.4.2.13 Take immediate action to resolve safety deficiencies.
 - 1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.
 - 1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).
 - 1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.
 - 1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.
 - 1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.
- 1.4.3 Define Construction Contractor's Responsibilities.
- The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

- 1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.
- 1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.
- 1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.
- 1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
- 1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
- 1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.
- 1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.
- 1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

- 1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.
- 1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 **Meet CSPP Requirements.**

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
 - a. Contractor progress meetings.
 - b. Scope or schedule changes.
 - c. FAA ATO coordination.
2. Phasing.
 - a. Phase elements.
 - b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
 - a. Identification of affected areas.
 - b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
 - a. Location of stockpiled construction materials.
 - b. Vehicle and pedestrian operations.
6. Wildlife management.
 - a. Trash.
 - b. Standing water.
 - c. Tall grass and seeds.
 - d. Poorly maintained fencing and gates.
 - e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

- a. Maintenance of a list of responsible representatives/ points of contact.
 - b. NOTAM.
 - c. Emergency notification procedures.
 - d. Coordination with ARFF Personnel.
 - e. Notification to the FAA.
10. Inspection requirements.
- a. Daily (or more frequent) inspections.
 - b. Final inspections.
11. Underground utilities.
12. Penalties.
13. Special conditions.
14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.
- a. General.
 - b. Markings.
 - c. Lighting and visual NAVAIDs.
 - d. Signs, temporary, including orange construction signs, and permanent signs.
15. Marking and signs for access routes.
16. Hazard marking and lighting.
- a. Purpose.
 - b. Equipment.
17. Work zone lighting for nighttime construction (if applicable).
18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.
- a. Runway Safety Area (RSA).
 - b. Runway Object Free Area (ROFA).
 - c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.
 - d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.
 - e. Obstacle Free Zone (OFZ).
 - f. Runway approach/departure surfaces.
19. Other limitations on construction.
- a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, “I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
 - a. Duration of each phase.
 - b. Daily start and finish of construction, including “night only” construction.
 - c. Duration of construction activities during:
 - i. Normal runway operations.
 - ii. Closed runway operations.
 - iii. Modified runway “Aircraft Reference Code” usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
 - a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
 - b. Listing of individuals requiring driver training (for certificated airports and as requested).
 - c. Radio communications.
 - i. Types of radios and backup capabilities.
 - ii. Who will be monitoring radios.
 - iii. Who to contact if the ATCT cannot reach the contractor’s designated person by radio.

- d. Details on how the contractor will escort material delivery vehicles.
- 6. Wildlife management. Discuss the following:
 - a. Methods and procedures to prevent wildlife attraction.
 - b. Wildlife reporting procedures.
- 7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
- 8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
- 9. Notification of construction activities. Provide the following:
 - a. Contractor points of contact.
 - b. Contractor emergency contact.
 - c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
 - d. Batch plant details, including 7460-1 submittal.
- 10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
- 11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
- 12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
- 13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
- 14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
 - a. Equipment and methods for covering signage and airfield lights.
 - b. Equipment and methods for temporary closure markings (paint, fabric, other).
 - c. Temporary orange construction signs.
 - d. Types of temporary Visual Guidance Slope Indicators (VGSI).
- 15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
- 16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
- 17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
 - a. Equipment and methods for maintaining Taxiway Safety Area standards.
 - b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
 - c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

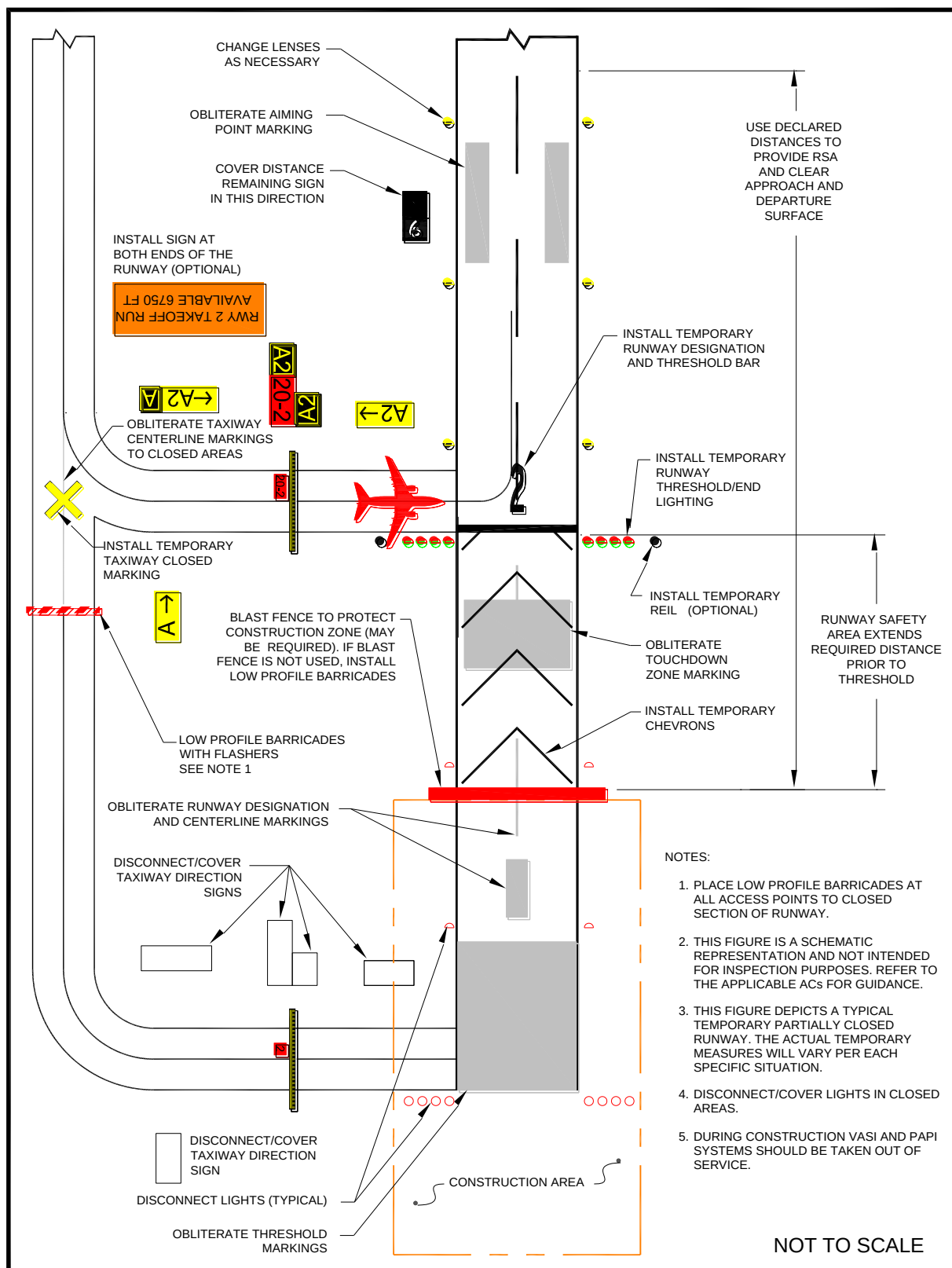
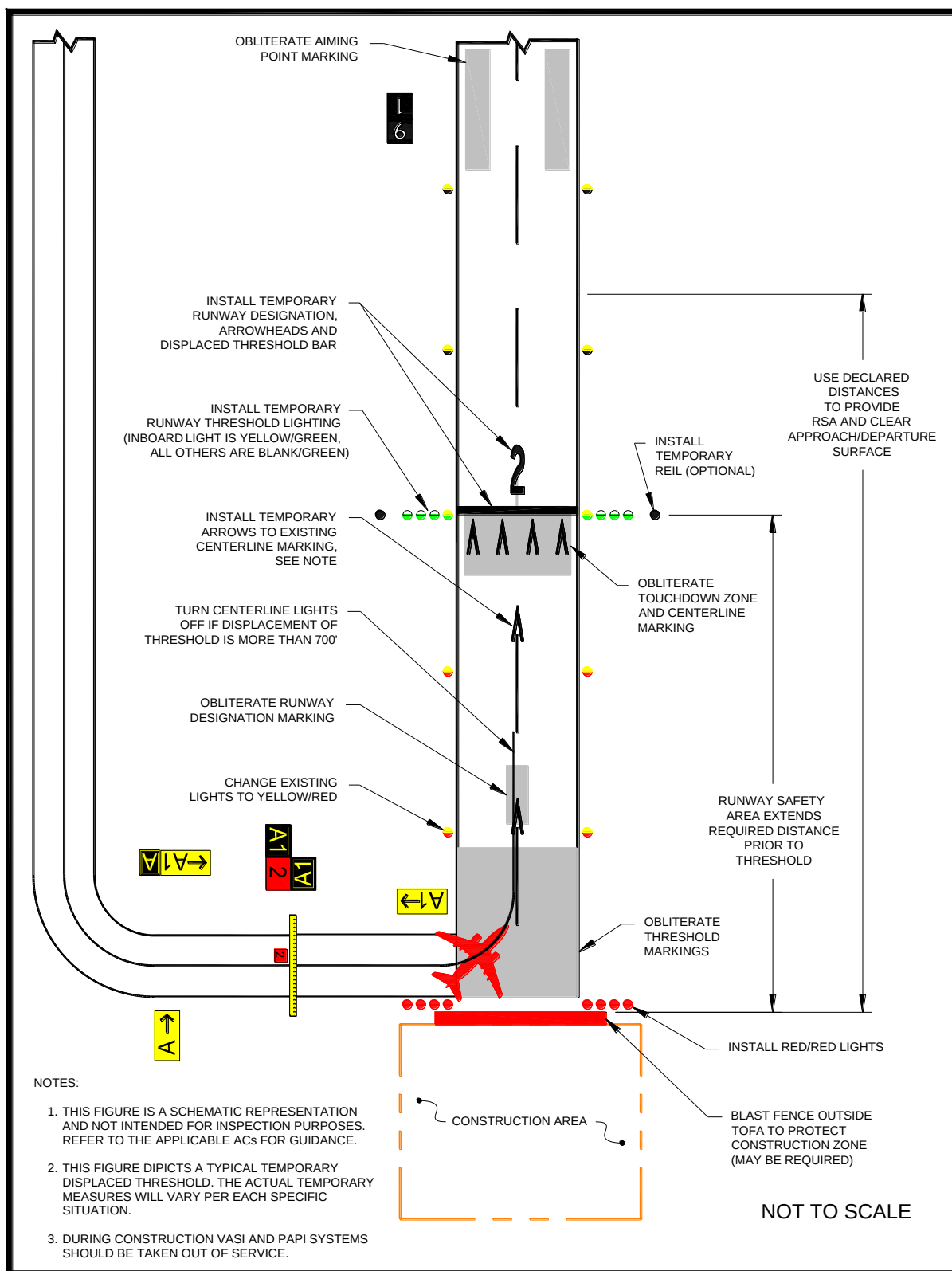
Figure 2-1. Temporary Partially Closed Runway

Figure 2-2. Temporary Displaced Threshold



Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

- 2.7.2.1 Temporary changes to runway and/or taxi operations.
- 2.7.2.2 Detours for ARFF and other airport vehicles.
- 2.7.2.3 Maintenance of essential utilities.
- 2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 **Navigation Aid (NAVAID) Protection.**

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2.). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 **Contractor Access.**

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

- 2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.
- 2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.
- 2.9.2.6 Required escorts.
- 2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.
- 2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.
- 2.9.2.9 **Two-Way Radio Communication Procedures.**
- 2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

 1. Airport operations
 2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and “shortened” runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings.” This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see “Signs & Markings Vehicle Dashboard Sticker”) or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 **Wildlife Management.**

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife*. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports*, Item T-901, Seeding. Contact the local office of the United States Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

2.11 Foreign Object Debris (FOD) Management.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management*.

2.12 Hazardous Materials (HAZMAT) Management.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste*.

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators*, for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, *Notice of Landing Area Proposal*, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 **Inspection Requirements.**

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, Airport Safety Self-Inspection. Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

2.15 Underground Utilities.

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “One Call” or “Miss Utility” services do not include FAA ATO/Technical Operations.

2.16 Penalties.

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 Special Conditions.

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 Runway and Taxiway Visual Aids.

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 General.

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 Closed Runways and Taxiways.

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

Figure 2-3. Markings for a Temporarily Closed Runway

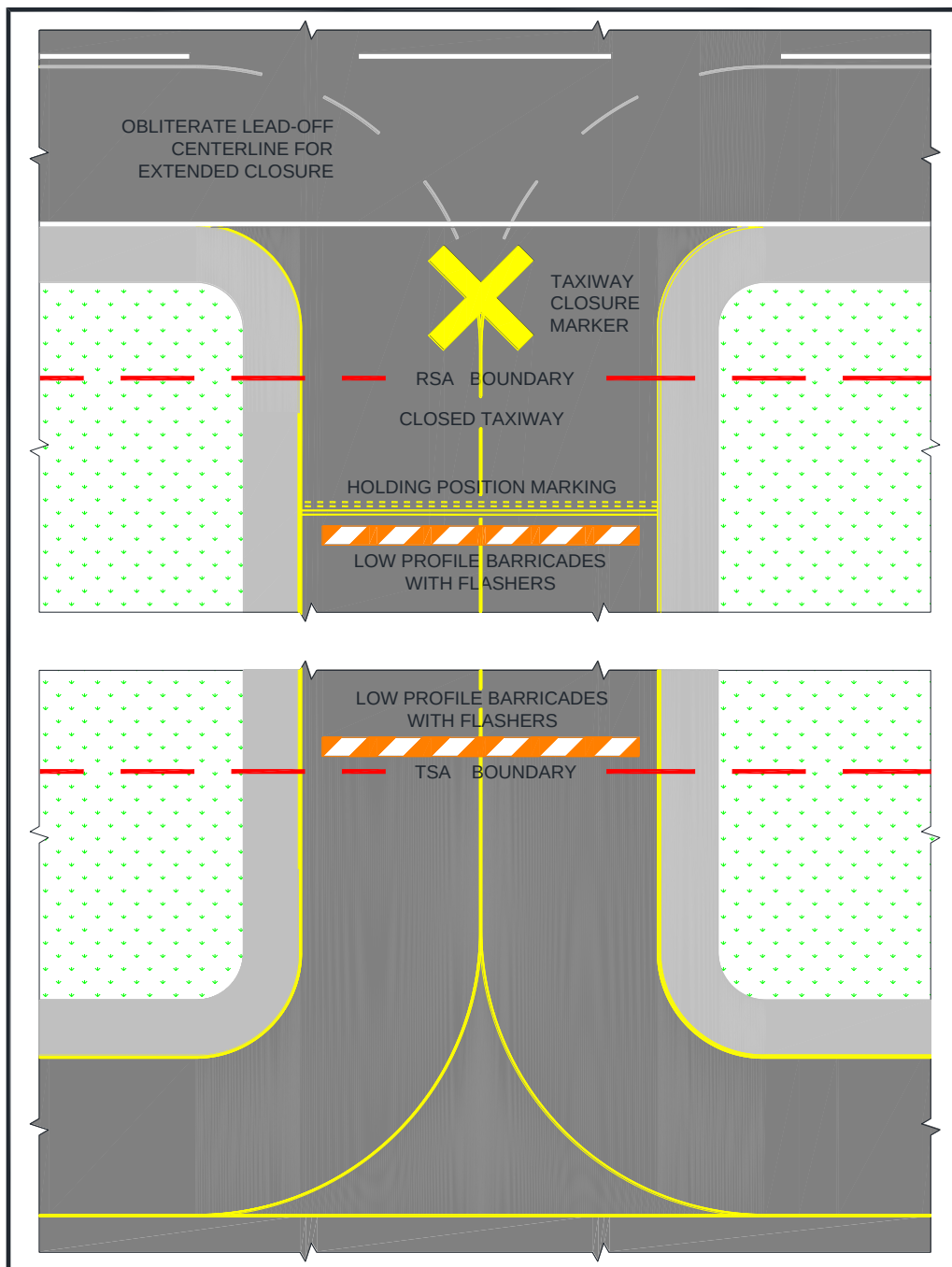


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-4](#).
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See [AC 150/5340-1](#). Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-2](#).

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 Airport Design, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

- 2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

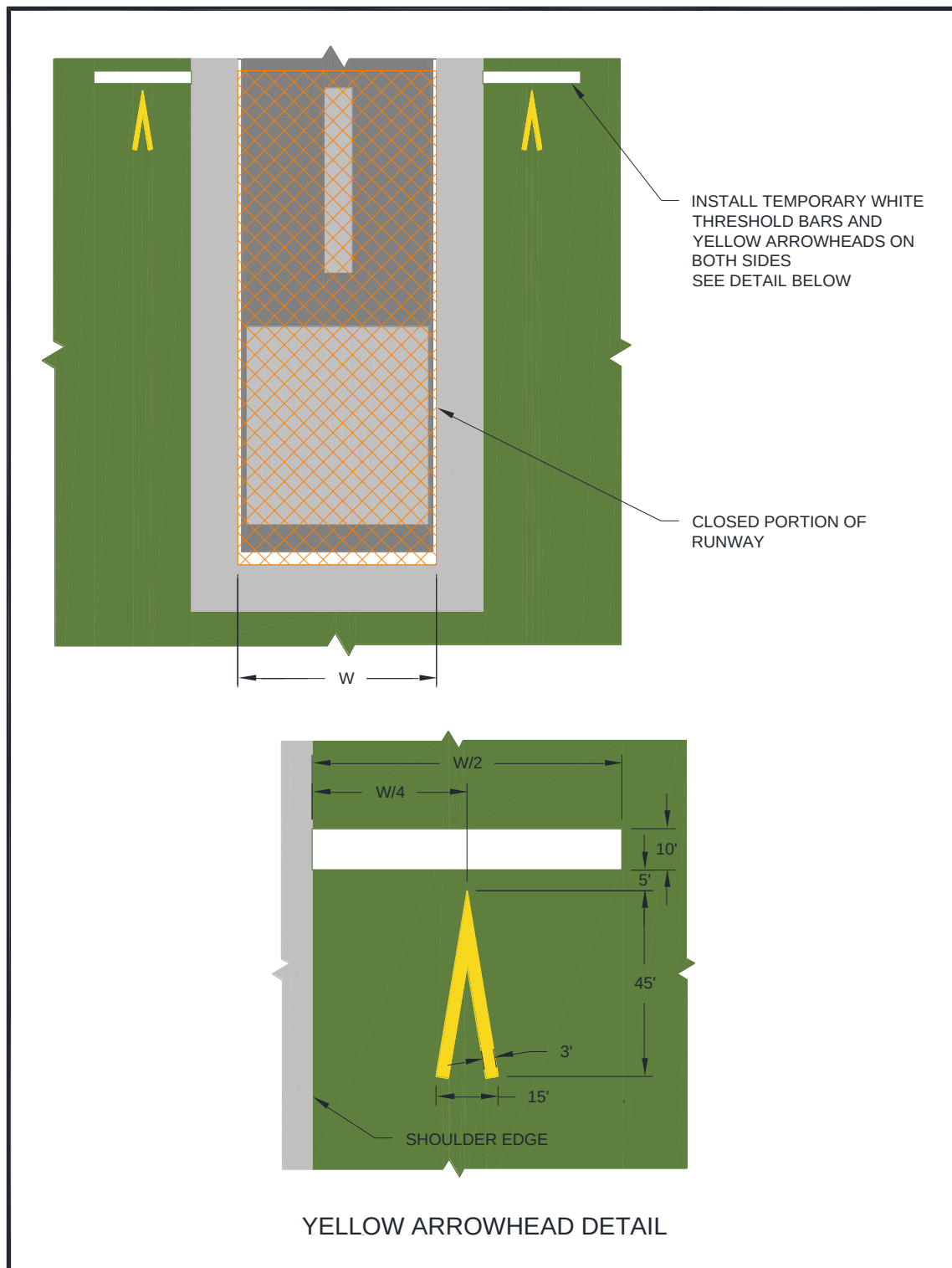
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

- 2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, “temporary outboard white threshold bars and yellow arrowheads”, see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

- 2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, Standards for Airport Markings, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*, and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights*. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*. For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

Figure 2-6. Lighted X in Daytime**Figure 2-7. Lighted X at Night**

2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, Specification for L-853, Runway and Taxiway Retroreflective Markers.

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

- 2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.
- 2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems*, for installation criteria for FAA owned and operated NAVAIDs.
- 2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.
- 2.18.3.4 **Temporarily Closed Taxiways.**
If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems*.

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot “information overload,” the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs*. Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs*, are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections*, which may require modification to size and height guidance in the MUTCD.

2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

2.20.2.4 Air Operations Area – General.

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades



Figure 2-9. Low Profile Barricades**2.20.2.5 Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 Air Operations Area – Other.

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 Maintenance.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to [AC 150/5370-10](#) for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 **Protection of Runway and Taxiway Safety Areas.**

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

- 2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.
- 2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.
- 2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

2.22.1.4 Excavations.

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 Erosion Control.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
 - a. Taxiing speed is limited to 10 mph.
 - b. Appropriate NOTAMs are issued.
 - c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
 - d. Low mass, low-profile lighted barricades are installed.
 - e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

- 2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.
- 2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.
- 2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:
 - 2.22.4.3.1 Taxiing speed is limited to 10 mph.
 - 2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.
 - 2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
 - 2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.
 - 2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.
 - 2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

2.23.1 Prohibitions.

- 2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
- 2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.
- 2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

- 2.23.2.1 Construction suspension required during specific airport operations.
- 2.23.2.2 Areas that cannot be worked on simultaneously.
- 2.23.2.3 Day or night construction restrictions.
- 2.23.2.4 Seasonal construction restrictions.
- 2.23.2.5 Temporary signs not approved by the airport operator.
- 2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: “The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.” All other applicable sections should include a reference to 2.4.2.11: “ILS cables shall be identified and protected as described in 2.4.2.11” or “See 2.4.2.11 for ILS cable identification and protection requirements.” Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent (“as-built”) features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should be identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 **Airport Security.**

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 **Wildlife Management.**

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 **FOD Management.**

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 **HAZMAT Management.**

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 **Notification of Construction Activities.**

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 Inspection Requirements.

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 Underground Utilities.

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 Penalties.

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 Special Conditions.

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 Runway and Taxiway Visual Aids.

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDS required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDS that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDS such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings*; AC 150/5340-18, *Standards for Airport Sign Systems*; and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDS.

3.20 Marking and Signs for Access Routes.

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 Hazard Marking and Lighting.

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 Work Zone Lighting for Nighttime Construction.

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator's representative each time lights are relocated or repositioned.

3.23 Protection of Runway and Taxiway Safety Areas.

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 Other Limitations on Construction.

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at <http://www.faa.gov/airports/>.

Table A-1. FAA Publications

Number	Title and Description
<u>AC 150/5200-28</u>	<i>Notices to Airmen (NOTAMs) for Airport Operators</i> Guidance for using the NOTAM System in airport reporting.
<u>AC 150/5200-30</u>	<i>Airport Field Condition Assessments and Winter Operations Safety</i> Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
<u>AC 150/5200-33</u>	<i>Hazardous Wildlife Attractants On or Near Airports</i> Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
<u>AC 150/5210-5</u>	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport</i> Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
<u>AC 150/5210-20</u>	<i>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</i> Guidance to airport operators on developing ground vehicle operation training programs.
<u>AC 150/5300-13</u>	<i>Airport Design</i> FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
<u>AC 150/5210-24</u>	<i>Airport Foreign Object Debris (FOD) Management</i> Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
<u>AC 150/5320-15</u>	<i>Management of Airport Industrial Waste</i> Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
<u>AC 150/5340-1</u>	<i>Standards for Airport Markings</i> FAA standards for the siting and installation of signs on airport runways and taxiways.
<u>AC 150/5340-18</u>	<i>Standards for Airport Sign Systems</i> FAA standards for the siting and installation of signs on airport runways and taxiways.
<u>AC 150/5345-28</u>	<i>Precision Approach Path Indicator (PAPI) Systems</i> FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
<u>AC 150/5340-30</u>	<i>Design and Installation Details for Airport Visual Aids</i> Guidance and recommendations on the installation of airport visual aids.
<u>AC 150/5345-39</u>	<i>Specification for L-853, Runway and Taxiway Retroreflective Markers</i>
<u>AC 150/5345-44</u>	<i>Specification for Runway and Taxiway Signs</i> FAA specifications for unlighted and lighted signs for taxiways and runways.
<u>AC 150/5345-53</u>	<i>Airport Lighting Equipment Certification Program</i> Details on the Airport Lighting Equipment Certification Program (ALECP).
<u>AC 150/5345-50</u>	<i>Specification for Portable Runway and Taxiway Lights</i> FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
<u>AC 150/5345-55</u>	<i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i>

Number	Title and Description
<u>AC 150/5370-10</u>	<i>Standards for Specifying Construction of Airports</i> Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
<u>AC 150/5370-12</u>	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<u>FAA Airports (ARP) Safety Management System (SMS)</u> Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	<i>Grasses Attractive to Hazardous Wildlife</i> Guidance on grass management and seed selection.
FAA Form 7460-1	<u>Notice of Proposed Construction or Alteration</u>
FAA Form 7480-1	<u>Notice of Landing Area Proposal</u>
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at <http://www.ecfr.gov/>.

Table A-2. Code of Federal Regulation

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.

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APPENDIX B. TERMS AND ACRONYMS**Table B-1. Terms and Acronyms**

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at https://oeaaa.faa.gov .) The form may be downloaded at http://www.faa.gov/airports/resources/forms/ , or filed electronically at: https://oeaaa.faa.gov .
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. The form may be downloaded at http://www.faa.gov/airports/resources/forms/ .
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Term	Definition
	the authority of 14 CFR Part 139, <i>Certification of Airports</i> .
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See <u>AC 150/5300-13</u> for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to <u>AC 150/5300-13</u> for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with <u>AC 150/5300-13</u> .
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with <u>AC 150/5300-13</u> .
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See <u>AC 150/5300-13</u> for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <u>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</u> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator’s FOD management procedures are addressed.	<u>2.11</u>				
Hazardous Materials Management					
The airport operator’s hazardous materials management procedures are addressed.	<u>2.12</u>				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1</u> , <u>2.22.3.1</u>				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	<u>2.22.1.2</u> , <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

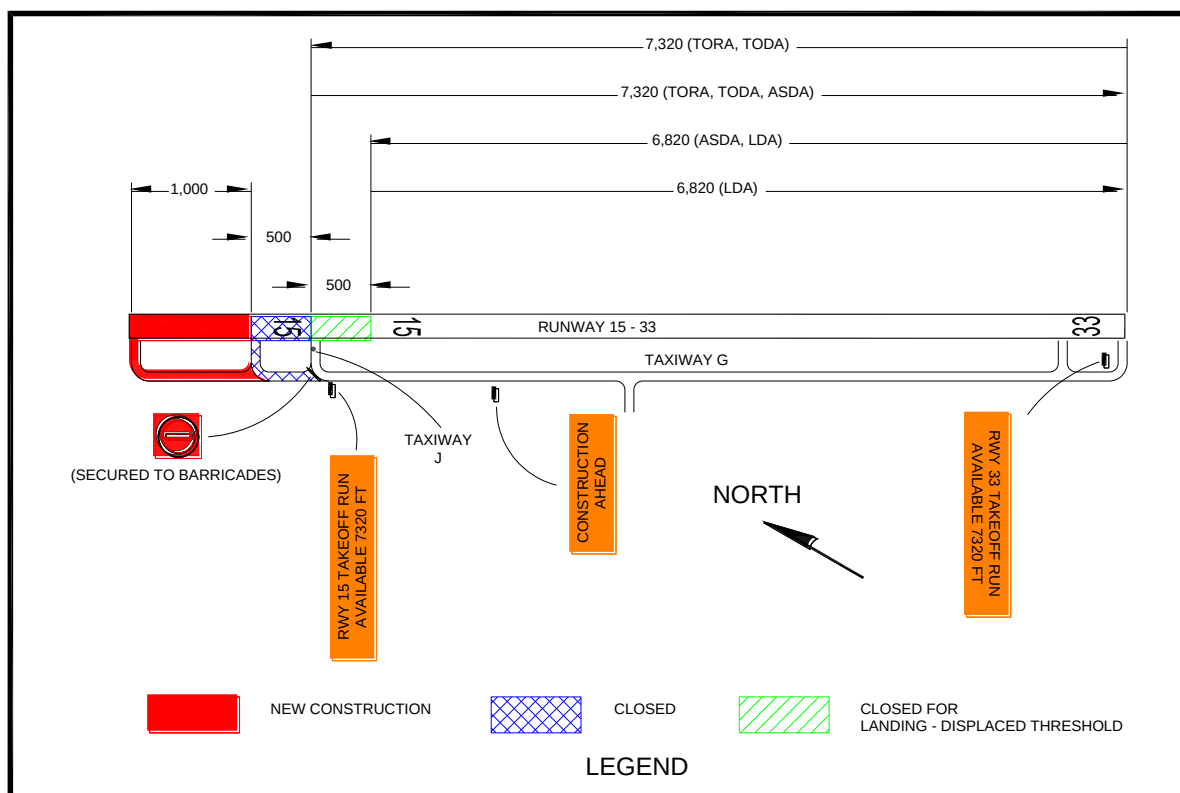
Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**E.1 Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

- E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See [Figure E-1](#).

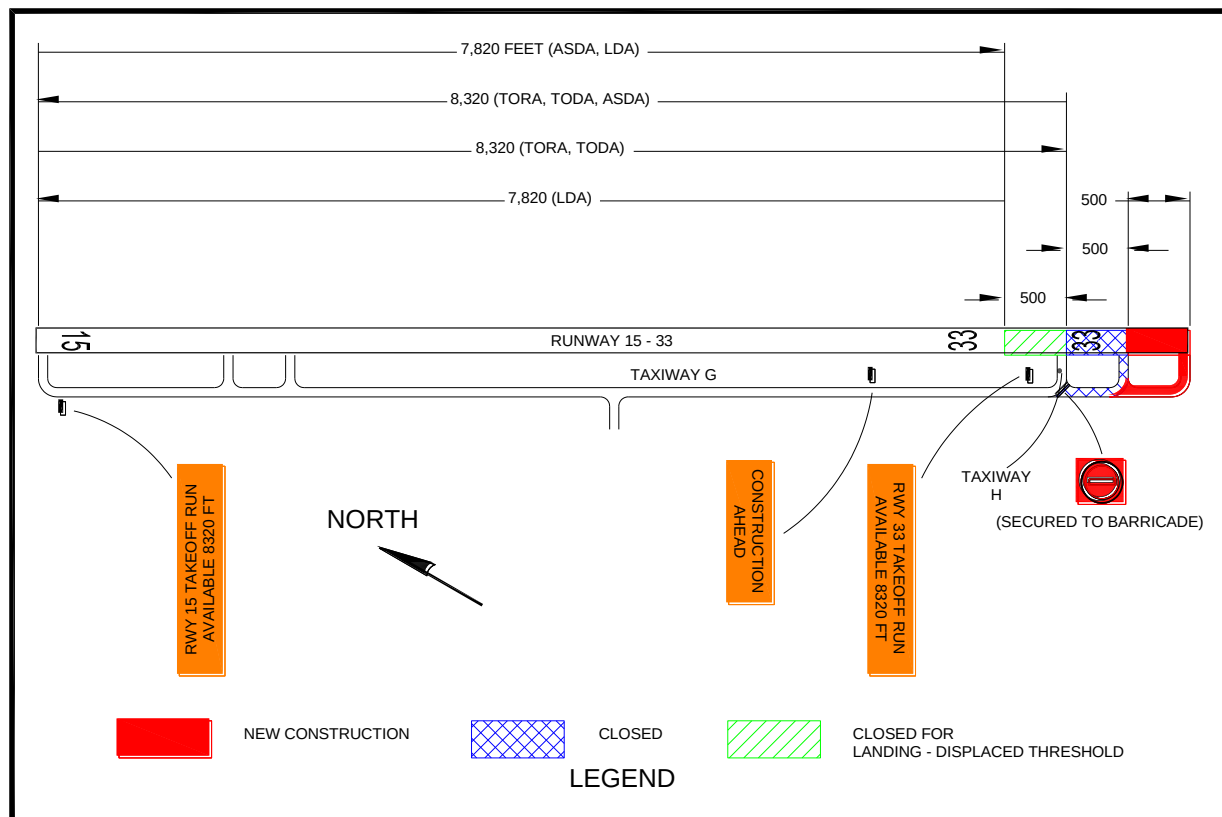
Figure E-1. Phase I Example

Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See [Figure E-2](#).

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

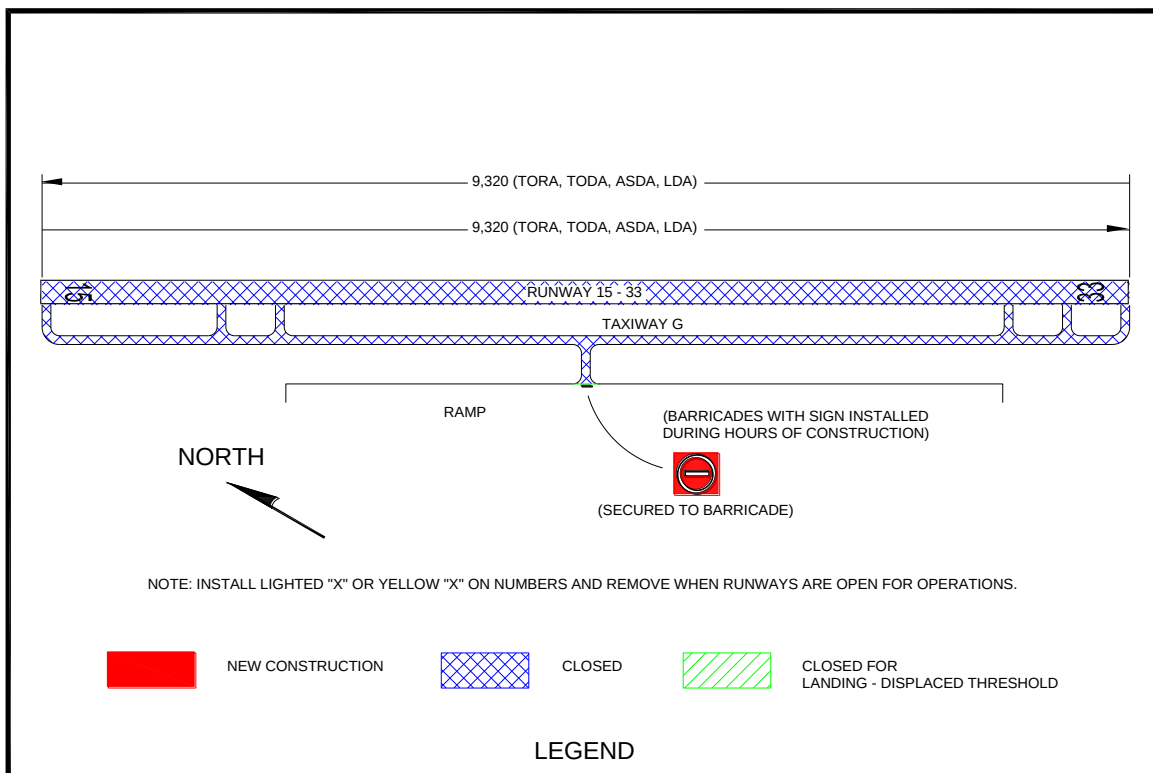


Table E-1. Operational Effects Table

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	Safety Area Width in Feet Divided by 2*

*See [AC 150/5300-13](#) to complete the chart for a specific runway/taxiway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Table E-3. Protection Prior to Runway Threshold

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
				ft	: 1
				ft	: 1
				ft	: 1
				ft	: 1

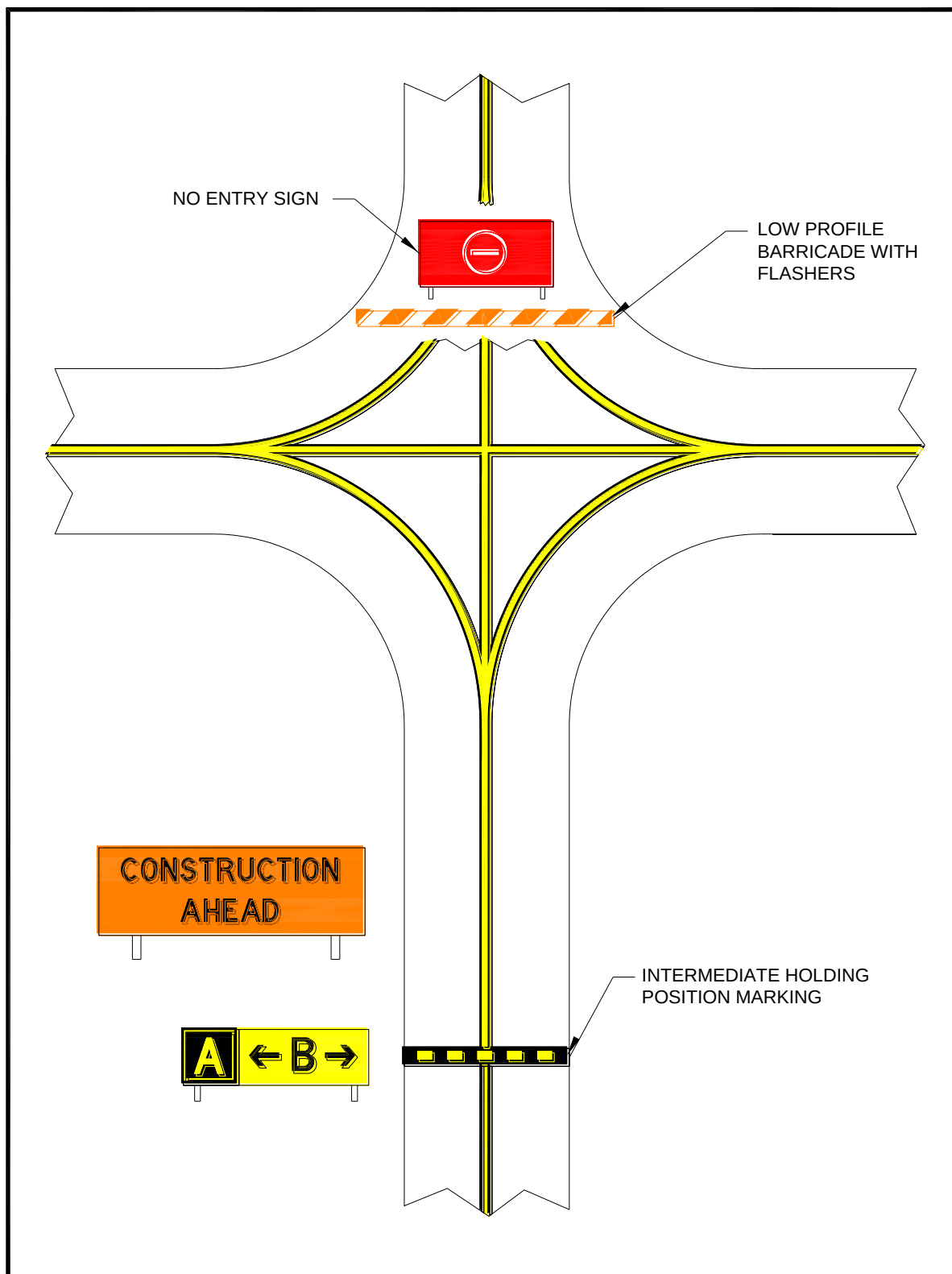
*See AC 150/5300-13 to complete the chart for a specific runway.

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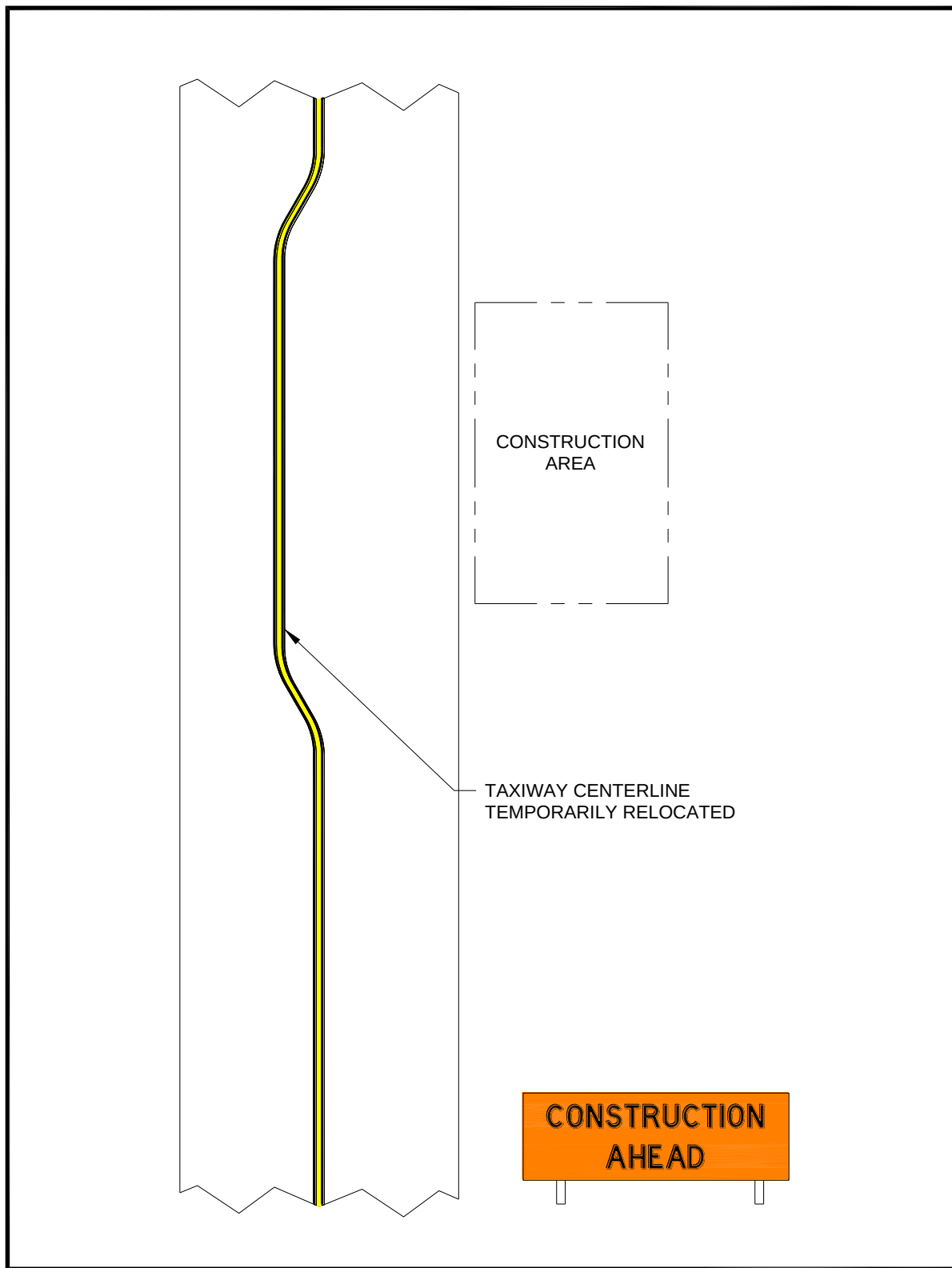
APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends



Figure F-2. Orange Construction Sign Example 1

Note: For proper placement of signs, refer to EB 93.

Figure F-3. Orange Construction Sign Example 2

Note: For proper placement of signs, refer to EB 93.

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Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G

Date: _____

Please check all appropriate line items:

- ☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.
- ☐ Recommend paragraph _____ on page _____ be changed as follows:
- _____
- _____
- _____
- ☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)
- _____
- _____
- _____
- ☐ Other comments:
- _____
- _____
- _____
- ☐ I would like to discuss the above. Please contact me at (phone number, email address).
- _____

Submitted by: _____

Date: _____

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Staff Summary

5/18/2020

Agenda Item # 12.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Keri Navratil, City Manager

SUBJECT: **Public Hearing For Application to IEDA for A Water/Sewer CDBG Program - Memorial Lift Station**

BACKGROUND: The grant application will request funding assistance for improvements to the City's sanitary sewer system, specifically improvements to Memorial Lift Station.

Memorial Lift station was originally built in 1983 and is an integral part of the wastewater system as 70% of wastewater flows through this lift station. The City intends to apply for a Community Development Block Grant (CDBG) to add redundancy to the system to ensure that that we do not bypass into the lake or to cause 70% of the community to not have access to the wastewater system.

FISCAL IMPACT: If awarded, the City of Storm Lake would be eligible to receive \$600,000 in Community Development Block Grant funds.

RECOMMENDATION: Open Hearing
Hear Comments
Close Hearing

ATTACHMENTS:

Description	Type
☐ Facility Plan	Backup Material
☐ Public Hearing Notice	Backup Material



Dec 31, 2019

City of Storm Lake
Keri Navratil, City Manager
620 Erie St, PO Box 1086
Storm Lake, IA 50588

RE: Memorial Lift Station Improvements
City of Storm Lake
DNR Project No. S2019-0384A
CWSRF No. CS1920XXXXX (pending)

Subject: Facility Plan Approval

Dear Keri:

The Iowa Department of Natural Resources has reviewed the Facility Plan and all subsequent correspondence for the above-referenced project and is in agreement with the project as currently proposed. The Facility Plan is officially approved. When ready, please submit Plans and Specifications to the Department for review. Plans and Specifications shall be prepared in accordance with the approved Facility Plan. The following is a brief summary of the approved Facility Plan.

A new isolation valve on the force main discharge line, replacing pump #1 and #2 with the same capacity as the existing pumps, replacing the sump pump in the existing wet well, temporary bypass pumping, valves replacement, sluice gate installation in the wet well, other miscellaneous maintenance work.

The existing pumping capacity of Memorial lift station will not be changed.

ELIGIBILITY

The City has opted to utilize State Revolving Loan Funds (SRF) for financing the proposed project. Therefore, an environmental review (ER) is necessary to assess the environmental impacts of the project in accordance with procedures in 40 CFR Part 6 and is required for all loan recipients. A decision will be made by the department to determine if the project qualifies for a categorical exclusion (CX) or if a finding of no significant impact (FNSI) is required. The facility plan is approved conditionally based strictly on the technical review of the proposed project. Any significant project change resulting from the environmental review may require an amendment to the facility plan or a revised facility plan to retain eligibility for SRF funding. Construction of the project prior to the environmental review completion could jeopardize your SRF funding. Please contact DNR Environmental Review Staff for questions about the ER status.

Our approval does not eliminate the need for the city to comply with all federal, state and local regulations. This department must be notified of any change in your proposal and approve the change prior to incorporation in plans and specifications. Our approval of the Facility Plan is not an endorsement for funding. Additional coordination and documentation may be necessary before a loan agreement can be offered.

Please feel free to contact me at 515-725-8421 or email emy.liu@dnr.iowa.gov if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Emy Wenxin Liu".

(Emy) Wenxin Liu, PhD, PE
Project Manager
Wastewater Engineering Section

Encl.

c: ISG (508 E. Locust, Des Moines, IA 50309) (w/FP)
DNR FO 3 (Spencer, Iowa)
DNR Sewage File 6-11-78-0-01
SRF File CS1920xxxxxx (pending) (w/FP)

FACILITY PLAN MEMORIAL LIFT STATION

CITY OF STORM LAKE, IOWA
JUNE 2019



REPORT FOR:
City of Storm Lake
620 Erie Street
Storm Lake, IA 50588
712.732.8000

FROM:
Jason Kenyon, P.E.
ISG
508 E. Locust Street
Des Moines, IA 50309
515.243.9143
Jason.kenyon@is-grp.com

ISG

Facility Plan

Memorial Lift Station, Storm Lake, Iowa

Ownership of Document

This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of ISG, and is not to be used, in whole or in part, for any other project without the written authorization of ISG.

Project No. 19-22797

	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa. <u>Jason C. Kenyon</u> <u>7-19-2019</u> Jason C. Kenyon Date License Number: 25053 My License Renewal Date is 12/31/2019 Sections covered by this seal: <u>Entire Bound Report</u>
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Executive Summary

The City of Storm Lake's Memorial Lift Station was constructed in 1983 to convey wastewater from the previous wastewater treatment plant site to the new wastewater treatment plant approximately 2.5 miles southeast. Memorial Lift station was originally designed to convey all wastewater from the City. New lift stations on the west side of Storm Lake have diverted some flow away from Memorial Lift Station, but Memorial Lift Station still handles the majority of the City's Wastewater. Minor improvements have been made to the lift station since its original construction, but many of the most critical components are original and have been in operation for 35 years. Improvements are necessary in order for this critical lift station to continue to operate reliably. Improvements identified in this facility plan include replacement of failing equipment, rehabilitation of the existing structure, modifications to comply with code requirements, and improvements for future operation and maintenance.

Minor improvements at the site, including removing vegetation, rerouting downspouts, and filling animal burrows are recommended to help maintain access and prevent future degradation to the structure. Filling the animal burrows under the transformer pad is critical due to the potential for animals to damage the electrical service conductors and interrupt power to the lift station. The total estimated cost for the recommended site improvements is \$1,800.

In order to make the recommended improvements inside memorial lift station, a new isolation valve will need to be installed on the force main discharge and the flow bypass pumped around the lift station. Work will need to occur during dry weather periods to reduce bypass pumping costs during construction. The estimated cost for installing the isolation valve and temporary bypass pumping is \$150,000.

Process improvements at Memorial Lift Station include replacement of valves that are in poor condition and failing, recoating the existing piping, and modifying the wet well configuration to reduce stagnant wastewater and solids deposition that contributes to hazardous and corrosive gases. The estimated cost for the process improvements is \$327,000.

The existing pumps at Memorial Lift Station include two 60 horsepower duty pumps and three 300 horsepower peak flow pumps. All five pumps are the original pumps that were installed when the lift station was built in 1983. One of the smaller pumps is inoperable and the other small pump runs continuously. The three peak flow pumps only run during heavy rain events when there is significant infiltration and inflow in the collection system. Replacement of the two 60 horsepower pumps is recommended as these pumps handle the majority of the flow at the lift station. Replacement of the larger pumps was also evaluated, but the existing pumps are still in good condition due to their low run time. The estimated cost of replacing the two 60 horsepower pumps is \$180,000.

Structurally, Memorial Lift Station is in serviceable condition. However, repairs are required to make the structure weather tight, replace protective coatings, and patch minor degradation of the concrete

structure. Filling and abandoning the unused grit chamber will help reduce stagnant wastewater as well. The estimated cost of the structural rehabilitation is \$260,000.

There are several HVAC components at Memorial Lift station that have failed or do not meet current code requirements. Replacing the failed ventilation components is critical for protecting operations staff from hazardous conditions. Additionally, the increased ventilation will protect electrical systems and metal components from corrosive gases. The estimated cost of the HVAC improvements is \$177,000.

The location of the existing water service lines at Memorial Lift Station create a significant risk to the electrical system. Rerouting water and drain lines away from electrical components is necessary to prevent catastrophic damage to the motor control center in the event of a pipe break. The water circulation pumps for the boiler heating system are also failing and should be replaced with newer variable speed pumps that will provide greater reliability and efficiency. The estimated cost of the plumbing repairs and improvements is \$74,000.

The existing motor control center at Memorial Lift Station are in poor shape due to age and exposure to water and corrosive gases. Some components of the electrical system do not meet current electrical codes. Replacement of these components is crucial for providing reliable power to the pumps. Additionally, replacing the existing florescent and high pressure sodium lights with LED lights can provide some energy savings and provide longer bulb life, reducing operator time required to maintain the lighting system. The estimated cost of the electrical improvements is \$318,500. The additional estimated cost for replacing and adding LED lighting is \$36,000.

The Controls system at Memorial Lift Station is in poor condition and replacement components for the existing system are no longer manufactured. Complete replacement of the controls system is required to ensure continued operation. Additionally, the new control system will provide better monitoring and remote operation of the lift station. New systems to monitor ventilation and hazardous gases are also necessary to protect operations staff. The estimated cost for the controls improvements is \$225,000.

The total estimated project cost, including contingency and non-construction costs, is \$2,275,000. The City of Storm Lake intends to apply for a Community Development Block Grant (CDBG) for \$600,000 and use a State Revolving Fund (SRF) loan for the remaining balance of \$1,675,000.

Due to the need for bypass pumping during construction, the proposed work must be done during a dry weather period. The preliminary project schedule includes bidding the project in spring 2020 to allow for equipment procurement lead time over summer 2020 and installation during bypass pumping in fall 2020.

Introduction

BACKGROUND

The City of Storm Lake's Memorial Lift Station was originally constructed in 1983 at the site of the City's previous wastewater treatment plant. The lift station was designed to convey all of the City's wastewater to the new wastewater treatment plant approximately 2.5 miles southeast. After construction of the lift station, force main, and new wastewater treatment facility, the old wastewater treatment facility was demolished. Minor improvements have been made to Memorial Lift Station since its original construction. An activated carbon odor control system and a diesel backup generator were installed in 2008. The mechanical bar screen and grit removal equipment were removed and a new grinder was installed in 2016. Most of the existing equipment is original to the lift station construction and has been in service for 35 years.

SCOPE OF WORK

Due to the age, condition, and criticality of Memorial Lift Station, the City of Storm Lake retained ISG to evaluate the condition of the lift station and prepare this facility plan. ISG evaluated the condition of the site, process equipment, structure, HVAC, plumbing, electrical, and controls systems to identify deficiencies that are currently or could in the future impact the operation of Memorial Lift Station. ISG then prepared an evaluation of proposed improvements to address those deficiencies and ensure Memorial Lift Station continues to operate reliably.

Existing Conditions and Deficiencies.

SITE

The City still owns the entire eight acre site of the previous wastewater treatment plant, which has since been demolished, and uses the open areas around the lift station for material and equipment storage. An eight foot fence with barbed wire follows the perimeter of the below-grade lift station structure and secures the above-grade entrances to the lift station. The parcels surrounding the lift station site are light industrial sites and the municipal cemetery. The Chicago Central and Pacific Railway line borders the site to the north. The nearest residential structure is approximately 1,300 feet east of the lift station.



Figure 1: Memorial Lift Station Site and Location

Around the exterior of the lift station, animals have burrowed holes at several locations below stoops and the transformer pad. These holes should be filled and measures taken to prevent future unwanted excavations. Vegetation has grown up around the building slab as well, hindering maintenance access. The roof gutter downspouts are not connected to a sufficient outlet and several of them discharge directly to the ground immediately next to the lift station. This likely contributes to water accumulation and seepage into the lift station. For proper drainage, the downspouts should be directed further away from the building exterior.



Figure 2: Animal Burrows, downspouts, and vegetation around lift station exterior

A summary of the site deficiencies identified is provided below:

- Animal burrows are present in several locations around the building exterior.
- Vegetation has grown up in several locations around the building exterior.
- The downspouts discharge directly adjacent to the lift station.

PROCESS

Flows

The original design flow rates for Memorial Lift Station are listed in Table 1 below. In 2014, additional lift stations were constructed around the western perimeter of Storm Lake which diverted a significant portion of the City's wastewater away from Memorial Lift Station.

Table 1: Memorial Lift Station Design Flow Rates

Flow Condition	Flow, MGD
Average Dry Weather	1.80
Average Wet Weather	3.34
Maximum Wet Weather	6.20
Peak Hourly Wet Weather	15.80

Influent flow at the lift station is measured by a parshall flume with a totalizing flow meter. The totalizer reading is periodically recorded in a log book at the lift station. Therefore, hourly flow data is not available for this lift station. The Flow rate data recorded between June 2015 and August 2016 is summarized in Figure 3 below. The peak average daily flow observed during this period was approximately 7.72 MGD, and the majority of the average daily flows were below 3 MGD. With the limited data available, it appears that flow rates are within the original design capacity for the Lift Station. Therefore, the existing design capacity is considered adequate and proposed improvements will maintain the existing capacity.

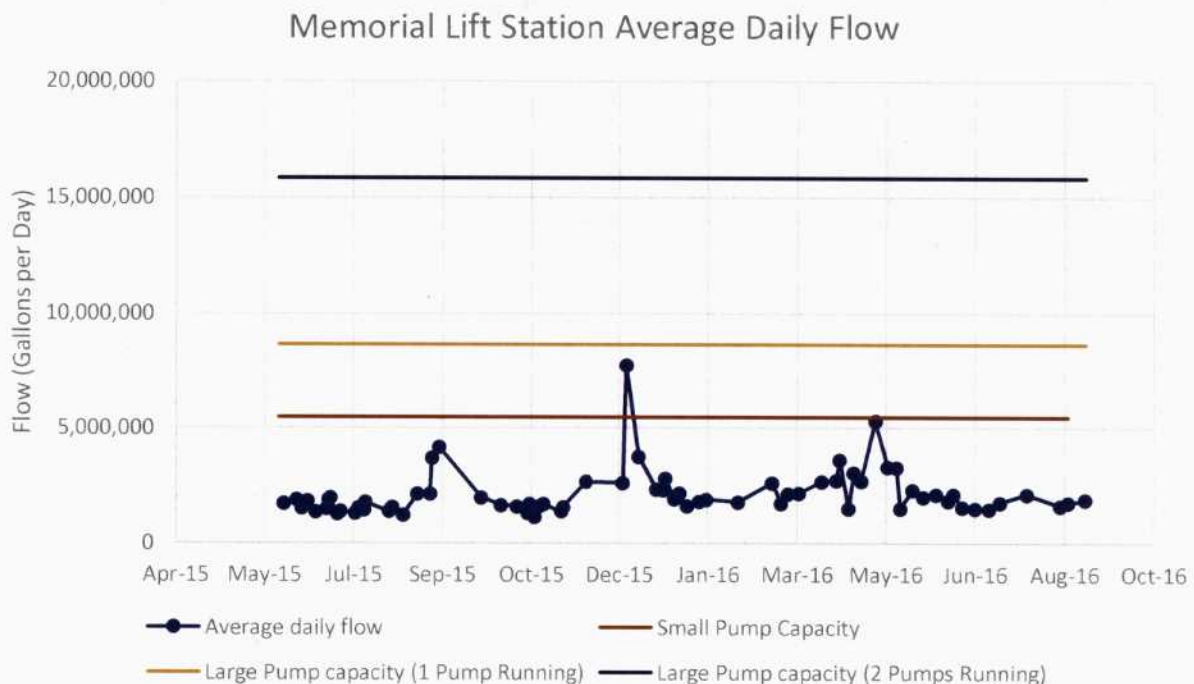


Figure 3: Recorded Flow May 2015-Aug 2016

Pumps

Memorial Lift station includes two 60 horsepower pumps (one duty, one standby) for average daily flows, and three 300 horsepower pumps (two duty, one standby) for peak flows during significant precipitation events. The Design Points of the pumps are listed in Table 2 below. A plug valve on the discharge piping of one of the smaller pumps (Pump #1) has failed in the closed position, rendering the pump inoperable. A variable frequency drive has been installed on the other small pump (Pump #2).

Table 2: Pump Design Points

Pump	Flow, GPM (MGD)	Head, ft.	Motor horsepower	Notes
Pump #1	3,750 (5.4)	42	60	Inoperable due to failed valve.
Pump #2	3,750 (5.4)	42	60	Operates on a VFD
Pump #3	5,500 (7.92)	140	300	Pumps 3, 4, and 5 operate as one or two pumps in service, with one pump on standby.
Pump #4	5,500 (7.92)	140	300	
Pump #5	5,500 (7.92)	140	300	

The seal on Pump #2 was recently replaced with a new mechanical seal as well. While not required, the manufacturer recommends that seal water be supplied to the new seal. The seals on the three larger pumps (Pumps #3, #4, and #5) have recently been replaced with new mechanical seals that do not require seal water. The seal water system is old and degraded. Additionally, the seal water pumps and suction tanks are located in the electrical room, creating a hazard to the electrical equipment.



Figure 4: Seal Water System

Solids Handling

When the Memorial Lift Station was originally constructed, it included a mechanical bar screen and aerated grit removal. The screening and grit removal equipment were removed in 2011 and replaced with an in-channel grinder to grind solids which would then be pumped to the new headworks facilities at the wastewater treatment plant and removed there. The grinder is in good condition.

The grit chamber is now isolated from the flow path by stop plates installed in the inlet channel; however, during high flow events water backs up over the grit chamber discharge weir and fills the chamber, resulting in stagnant wastewater which is a significant source of hydrogen sulfide and odors. The hydrogen sulfide gases produced by the stagnant wastewater contribute to corrosion and worker health and safety issues.

Odor Control

An activated carbon odor control system was installed at Memorial Lift station in 2007 to capture gases generated in the screening chamber. Shortly after installation, the carbon media was exhausted and replacement of the media was deemed cost prohibitive. In order to help reduce odors, Hydrogen peroxide is now fed into the sewer upstream of the lift station from a building located approximately 100 feet to the west of the current lift station facility.

Wet Well

A figure of the wet well layout is included in Appendix A. The wet well is separated into two zones, with the suction piping for the smaller pumps in one zone (The Average Flow Wet Well) and the suction piping for the larger pumps in the other zone (the Peak Flow Wet Well). The two zones are connected by a 4 ft wide by 2 ft tall overflow opening and a lower 36" circular opening with a sluice gate. Flow enters the average flow wet well through three 18" circular openings at the base of the wall between the influent channel and the wet well. As incoming flows increase above the capacity of the smaller pumps, the water elevation rises and overflows into the Peak flow wet well, where the large pumps are activated to handle peak flows. Once the large pumps stop, a sump pump should dewater the peak flow wet well. However, this sump pump does not appear to be functioning, leaving stagnant water in the peak flow wet well. Replacing the sump pump requires an operator to enter the wet well as there is no access to the sump pump from above the wet well.

While not shown on the original plans, a pipe has been installed from the influent channel to the peak flow wet well. Based on the elevation of this pipe, it is assumed that it serves to bypass flow directly to the peak flow wet well during high flow events when the 18" openings into the average flow wet well are unable to hydraulically pass the influent flows.

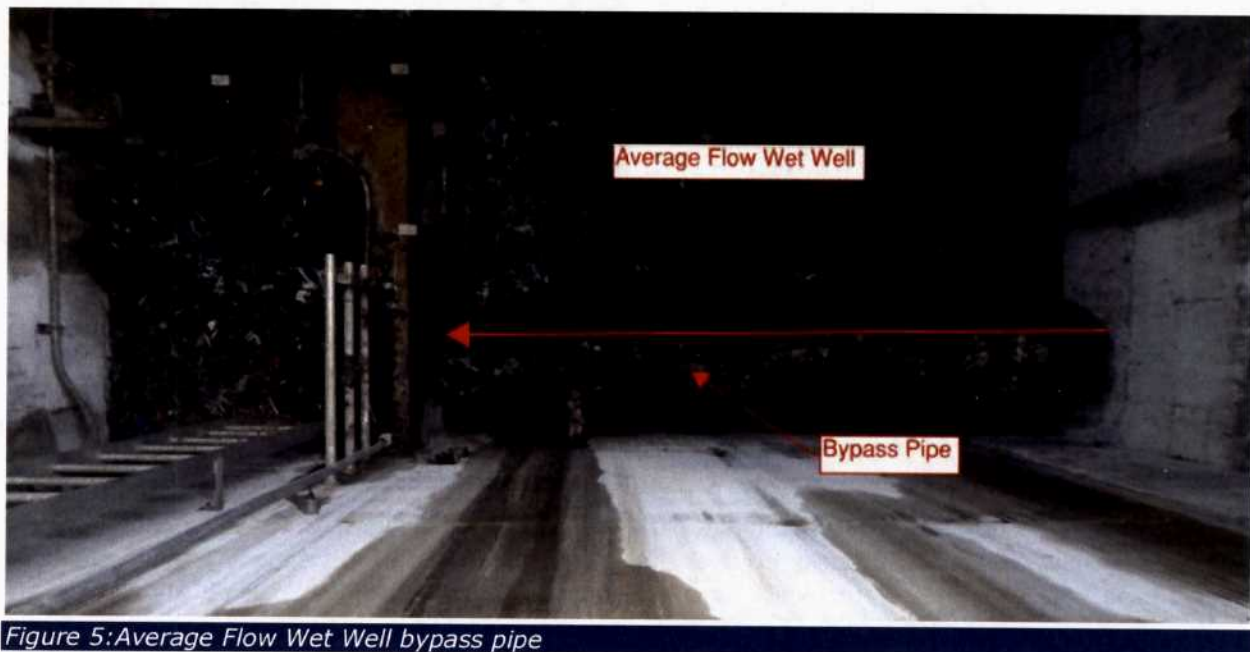


Figure 5: Average Flow Wet Well bypass pipe

Due to the large volume, solids are likely settling out in the wet well during low flow periods. This issue is exacerbated by limited accessibility for vacuum truck suction hoses to get into the wet well to remove solids and floating debris.

Suction/Discharge Piping

As shown in Figure 5 below, the existing piping in the drywell has some deterioration and corrosion. A non-destructive evaluation was performed on the piping in June 2019 to determine the condition of the pipe. The evaluation determined the pipe was still in good condition. A copy of the evaluation report dated June 4, 2019 is provided in Appendix B. The pipe supports are also rusting. The base plates of the pipe supports are frequently in contact with water on the floor of the pump room.

The plug valve on the discharge side of Pump #1 has failed in the closed position. A few of the check valves have broken lever arms as well. Replacing the pump isolation plug valves is currently not possible because there is no way to isolate the Lift Station piping from the rest of the downstream force main.



Figure 6: Pump Discharge Piping

A summary of the process deficiencies identified is provided below:

- Valve failure has made Pump #1 inoperable.
- The seal water supply system is old and degraded. Its location is a hazard to the electrical equipment.
- The grit chamber is unused and stagnant.
- The large wet well volume contributes to solids deposition.
- The sump pump in the wet well has failed and is difficult to access for maintenance.
- There is limited access for cleaning equipment into the wet well.
- The long residence time and solids deposition contribute to hydrogen sulfide gas production.
- The odor control media has been depleted and is no longer used.
- There is no way to isolate the average daily flow wet well for cleaning.
- The process piping and supports are corroded and need recoating.
- The suction and discharge valves are old and failing.
- There is no way to isolate the process piping for valve replacement.

STRUCTURE

The existing lift station consists of a below-grade cast in place concrete structure divided into several chambers. The top slab of the structure is at grade with several hatches for access and removal of equipment from the below-grade chambers. The above-grade structure consists of an older "corduroy brick" building with separate entrances to the stairwells into the electrical room and headworks room. A newer CMU building that houses the emergency generator and boiler is adjacent to the entrance building.

While the overall structure appears to be in serviceable condition, water infiltration has caused serious corrosion of metals and overall building degradation. Many surface coatings including paints, waterproofing, and insulation are visibly degraded and have exceeded their service lives. Due to such extensive water damage, it is recommended that all existing surface coatings should be removed and replacement coatings applied. The following sections discuss further recommendations for necessary repairs.

Exterior

The exterior fascia of the building is composed of corduroy brick that displays cracking and mortar deterioration. To prevent further damage, the cracks should be caulked. Additionally, tuck pointing is required at locations of mortar deterioration. An overhead door into the Generator room has significant corrosion and should be recoated or replaced.

A removable section of concrete slab is located in the roof of the headworks chamber for access to the grinder. Seepage around the slab has caused deterioration to the insulation on the interior ceiling of the lift station. Currently, a tarp has been placed over the slab in order to reduce seepage. Another access hatch is located on the East side of the lift station above the electrical room. A waterproofing membrane was previously installed on the slab surrounding the hatch. That membrane was damaged and currently sits in bundles on top of the slab, creating areas of water retention. Inside the electrical room, there are signs of water leakage through the existing access hatch.



Figure 7: Exterior Access Hatches

The main access into the wet well is through hinged fiberglass panels. The steel support beams for the fiberglass panels show signs of corrosion. Additionally, one of the access openings is located immediately outside the door to the generator room, a significant safety concern.



Figure 8: Wet Well Access Panels

Upper Level

Multiple areas of the building show signs of roof leakage, causing damage to insulation, harboring mold growth, and rusting the metal roof deck. The roof shingles have likely exceeded their service life and require replacement.

Minor cracks are visible in the interior CMU walls in the above-grade entrance to the headworks chamber. This cracking needs to be sealed.

Electrical Room

The ceiling insulation in the electrical room exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced. The hatch above the electrical room is not sealed, causing leakage. The hatch should be replaced to prevent further water damage.



Figure 9: Electrical Room Ceiling

Pump Room

An overhead crane is located in the pump room for removal and reinstallation of equipment. The posted rating of the crane is two (2) tons, or 4,000 pounds. Equipment weights were not verified but the crane capacity is assumed to be adequate. The support beams for the crane show signs of spalling paint.



Figure 10: Existing Overhead Crane

The existing pipe penetration seals between the drywell and wetwell are significantly corroded. These seals are critical for keeping wastewater and sewer gasses from entering the drywell.



Figure 11: Drywell Pipe Penetration Seals

The concrete slab that composes the ceiling of the pump room contains cracking. These cracks may exacerbate moisture conditions and should be repaired. The floor slab in the pump room shows significant deterioration due to standing water.



Figure 12: Pump Room Ceiling Cracking and Floor Slab

Headworks Chamber

There is an existing elevator that was used to remove the screening dumpster when the mechanical bar screen was in service. The elevator has stopped functioning and without the screening system it has limited usefulness. Adjacent to the elevator is a metal spiral staircase. The tight curvature of the spiral staircase makes it difficult for materials to be carried into the headworks chamber. City Operators have indicated a preference for both the elevator and spiral staircase to be replaced with a straight staircase with an intermediate landing, similar to the stairway into the pump room.



Figure 13: Elevator and Spiral Staircase

The ceiling insulation in the Headworks Chamber exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced.

The existing grating above the open channels does not cover the entire opening at several locations. This presents a safety hazard. All grating should be replaced with solid panels that cover the entirety of the openings. The solid panels will also help to direct gases to an HVAC/hood area.

The concrete channel walls are pitted and spalled, likely due to hydrogen sulfide gases. Continued erosion of the walls could affect the function of the channel. The walls need to be repaired.



Figure 14: Headworks Chamber Ceiling and Channel concrete spalling

A summary of the structural deficiencies Identified is provided below:

- There is minor exterior and interior cracking in the above-grade masonry buildings.
- The exterior hatches in the top slab leak.
- The access hatch into the wet well is located directly in front of generator room door.
- There are interior signs of roof leakage.
- There is significant moisture damage to the interior ceiling insulation.
- The pipe penetration seals between the wet well and dry well are significantly degraded.
- Interior paints and coating systems have degraded.
- The elevator is non-functional and the spiral stairway hinders maintenance access.
- Gaps in the headworks channel grating are a safety hazard.
- There is concrete spalling and deterioration in the headworks channel.

HVAC

The Drywell, headworks chamber, and generator room are all separately heated and ventilated. The drywell is ventilated by an exterior exhaust fan and heated by an electric furnace. The headworks chamber is ventilated by a large air handling unit that includes an activated carbon scrubber for odor control as previously discussed. The headworks chamber is heated by a gas-fired boiler supplemented with an electric unit heaters. The generator room is heated by an electric unit heater but has no active ventilation.

Exterior

The ductwork wrapping on all exterior ductwork is peeling off and in some locations barely attached to the duct. The dampers and actuators associated with the odor control system are rusted through and unusable. The make-up air unit is missing a handle on the shut off panel.

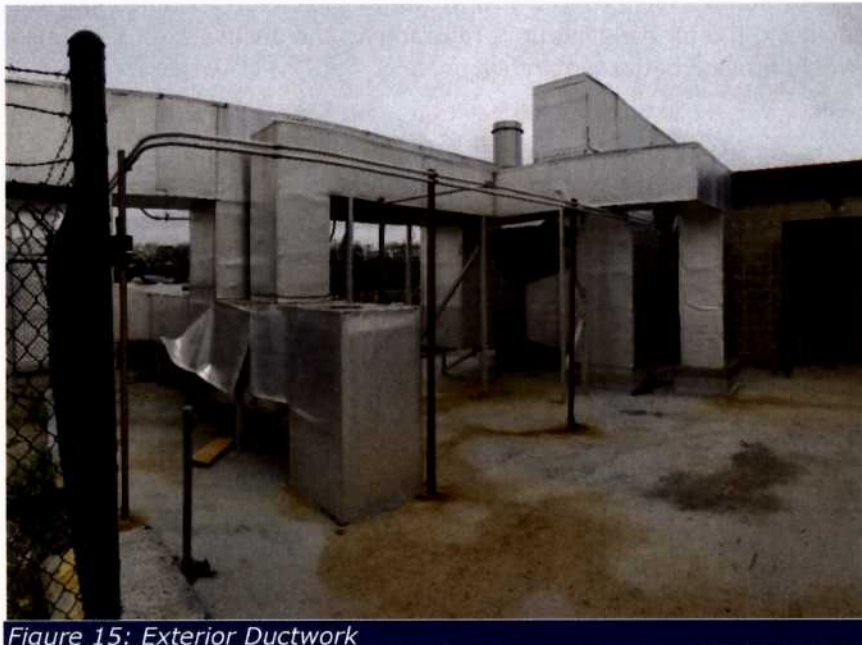


Figure 15: Exterior Ductwork

Emergency Generator Room

The electric heater hanging in the corner of the room is not working. City Staff have indicated that the electrical breaker for the heater trips very frequently. The condition of the heater itself seems to be OK. The seal around the generator exhaust pipe where it penetrates the building wall is visibly broken and should be resealed to prevent rainwater from leaking into the building. There is no active ventilation in the space, however the interior space does not appear to show any significant degradation. There is likely some passive air movement occurring through the large intake and exhaust louvers.

While the boiler appears to be in good working condition, the current location of the boiler in the generator room conflicts with NFPA 110, Standards for Emergency and Standby Power Systems. The code does not allow for other equipment that is not directly related to the generator function to be located in the generator room. To comply with code the boiler will need to be relocated or the space separated into 2 adjacent spaces. Functionally, the large amount of air required by the generator likely starves the gas-fired boiler of oxygen when the generator operates. This could lead to significant issues during a winter power outage.

There is an exhaust duct running through the room that is pulling air from the Electrical Room and Lower Pump Room. The duct will have to be separated from the generator room to comply with NFPA 820 requirements.

Electrical Room and Pump Room

There is currently no dehumidification in the space, and the walls are showing signs of damage from moisture. The exhaust fan that serves this space is currently non-functional. Additionally, there is no air intake louver, limiting the supply of fresh air to the space. Per NFPA 820, if the space is not ventilated with outside air, the space is classified as Class 1, Division 2, Group D, and the electrical equipment would require additional explosion protection. Providing a minimum of six (6) air changes per hour is required to declassify the space. Without the exhaust fan, the air-handling unit is only recirculating air, and the diffusers are mounted high and throwing air horizontally. In the lower pump room, the single exhaust grille is located high up, right below ceiling height. It may not be effectively exhausting the air from the bottom of the room. Replacing the air handling unit, rearranging the ductwork, and installing new downward facing diffusers would provide better air circulation.

Headworks Chamber

The headworks chamber is ventilated by the large air handling unit located outside the lift station. The exhaust duct and hood over are in poor condition. The supply duct appears to be in good condition but could be cleaned, both inside and outside. The explosion proof heaters appear to be out of order. There are no dehumidification measures in the space. Dehumidifiers could help reduce moisture damage to the interior surfaces and insulation.

Per NFPA 820, spaces like the headworks chamber with open wastewater channels are classified as Class 1, Division 1; unless ventilation is provided at 12 air changes per hour. If adequate ventilation is provided, the classification is reduced to Class 1, Division 2, and the requirements for explosion protection are reduced. Based on the documentation provided by the City on the existing air handling unit, adequate ventilation is being provided to reduce the classification in the headworks chamber.



Figure 16: Headworks Chamber Exhaust Hood and Duct

Wet Well

The wet well is actively ventilated by the exhaust fan of the air handling unit used for the headworks chamber. An intake hood is located in the top slab of the wet well and an exhaust duct passes through the wall into the headworks chamber. Based on the information provided by the City, the ventilation in this space does not appear to be adequate to reduce the classification. Therefore, the space is considered a Class 1, Division 1 space.

A summary of the HVAC deficiencies identified is provided below:

- The duct wrap on exterior ducts is degraded.
- The dampers and actuators on the exterior ductwork are rusted and non-functioning.
- The heater in the generator room is not functional due to an electrical issue.
- The seal on the generator exhaust pipe has cracked.
- The boiler located in the generator room violates NFPA 110.
- The exhaust vent passing through the generator room from the electrical room violates NFPA 820.
- There is no dehumidification to reduce moisture damage in several spaces.
- The exhaust fan for the electrical room and pump room has failed.
- There is no intake louver for the electrical room or pump room.
- The ductwork configuration in the pump room is inadequate for proper air circulation.
- The exhaust duct in the headworks chamber is in poor condition.

PLUMBING

Plumbing at Memorial Lift Station consists of a water service line that enters the electrical room from the north. The water line serves a toilet, sink, a small water heater, and the pump seal water system, all located in the electrical room. The water line also serves two hose bibs in the headworks chamber and the pump room, as well as the boiler for heating the headworks chamber.

Boiler Water System

The pumps that circulate water for the boiler show significant corrosion. They are operating at constant circulation volume without a VFD. The connected water pipes are leaking. The air separator does not appear to have a blowdown.

The boiler drain is crowded and needs to be relocated outside of the generator room. The drain pipe passes through the floor slab into the electrical room below and is routed above electrical equipment, creating a potential hazard.



Figure 17: Boiler Circulation Pumps and Drain

Restroom Facilities

There are cold water lines running above the MCC to the restroom facilities, creating a significant potential hazard to the electrical equipment. The toilet, sink, and water heater are in poor shape and could be replaced or removed. The sanitary pipes from the toilet and sink are routed along the ceiling of the pump room below and through the wall into the wet well. The sewer pipes and check valves are in poor condition. City staff have indicated that the restroom facilities are rarely used.

Floor Drains and Sump Pump

The sump pump and associated piping located in the pump room are in poor condition. There is significant standing water in the pump room and the floor drain piping is likely obstructed.

A summary of the plumbing deficiencies identified is provided below:

- The boiler pumps are in poor condition.
- The boiler system should not be located in the same room as the generator.
- The duct from the electrical room should not be routed through the generator room.
- The water piping to restroom is routed above electrical equipment.
- The floor drains and sump pump in the lower pump room are in poor condition.

ELECTRICAL

General

There are several electrical conduits and associated supports throughout the lift station that are severely corroded. Many of these conduits are unused and should be removed. There are several penetrations through the structure for unused conduits that should be sealed after the conduit is removed to prevent leakage. The conduits that are to remain in service should be replaced or recoated, and stainless steel supports provided.

Electrical Service

The building is served by a 3 phase, 480/277 volt 4-wire electrical service. The utility transformer is located outside the building on the north east corner. Unfused service conductors are installed underground from the utility transformer and extend overhead in the electrical room before entering the service disconnect located in the center of the electrical room. The service conductors should be fused to meet current electrical code. The main breaker installed is rated for 1,200 amps. Based on actual energy usage from MidAmerican Energy the service has experienced up to 83% utilization. The service is at or near maximum capacity. Peak demand records were obtained MidAmerican from May of 2014 through April of 2019. Average demand was 156 KW, and the highest recorded usage was 618 KW in June of 2017.

Backup Generator

The facility's electrical service is backed up by a stationary diesel generator. The generator is installed inside the building in the generator room. A 480-volt panelboard serving the equipment in the generator room is located in the adjacent stairway/entrance into the electrical room. The panelboard appears to be in good condition. The generator is rated for 750 KW, has a 1200 amp breaker, and is manufactured by Cummins. The generator's rated capacity appears to be adequate for the highest recorded energy use from the Utility Power. The generator appears to be in good condition, and according to staff is in working order.

Electrical Motor Control Center/Gear

The main service enters a 1200 amp Westinghouse breaker in a motor control center (MCC) in the electrical room. Capacitors are installed above the MCC for power factor correction. There is an MCC mounted transfer switch which appears to be out of service. An ASCO brand transfer switch has been installed outside the MCC and is now in service. There is an existing 1200 amp main breaker installed in the MCC for the generator. The generator breaker is likely not required, and may or may not be in

service. An Allen Bradley 2100 series MCC is installed for motor control and 120/208 volt power distribution.

Considerable corrosion was noted on the MCC and related electrical equipment. None of the MCC sections are installed on housekeeping pads, and corrosion is present at the base of several MCC sections. Foul odor was observed in the electrical room due to the lack of outside air ventilation. City staff indicated a variable speed drive had previously been installed in the MCC to serve pump #5, but had since failed. The VFD was subsequently replaced with a soft starter.

The electrical room has likely been exposed to corrosive gases such as hydrogen sulfide. Corrosive gas exposure is likely responsible for the premature VFD failure and corrosion of soft metals in the MCC. Copper and aluminum are soft metals commonly used as conductors and used within circuit boards. Exposure to corrosive gasses has likely shortened the life of electrical components in the electrical room. Additionally, water lines, water tanks, and water pumps are located in the electrical room, creating a significant potential risk to the electrical equipment.



Figure 18: Existing Motor Control Center

Lighting

The dry well area utilizes florescent lighting. Several of the lights are out of service.

The original lighting in the Headworks chamber utilized high pressure sodium lights, and appear to be explosion proof. Two of the lights are not functioning. Two other lights in the Headworks chamber have been upgraded, and appear to be LED.

Florescent lighting is used in the generator room. One of three florescent lighting fixtures is not functioning.

No emergency lighting fixtures were observed in any areas. Emergency lighting with battery backup is essential for lighting egress paths in the event of a power failure.

There is only one exterior light fixture observed on the south side of the building. The fixture appears to be in poor condition and it is unknown if the fixture operational. Overall, the site and building exterior is not well lit. Additional exterior lighting could benefit both security and maintenance at the lift station.



Figure 19: Headworks Chamber Original Lighting (left) and new LED lighting (right)

Electrical Equipment/Fixtures

An electric hoist is located in the pump room for equipment removal. The hoist is powered by a 480 volt open bus bar running across the ceiling. The open bus bar is very close to the stair handrail, and can be reached from the stairwell. This is a significant electric shock hazard and a barrier should be installed to prevent accidental contact with the bus bar. The bus bar disconnect is also in poor condition.

The sump pump disconnect, control panel, and floats in the lower pump room are in poor condition.



Figure 20: Electric Hoist Bus Bar near stair handrail

Explosion Protection

Headworks Chamber

The headworks chamber is a Class 1, Division 2 rated space. Two significant deficiencies were noted that do not meet electrical code requirements for explosion protection in the space. The conduit to the Parshall Flume level sensor is not explosion proof, and is not properly supported. Additionally, a main junction box is located on the East wall of the headworks chamber. The junction box is an explosion hazard and should be removed. The conduits and circuits currently utilizing the junction box should be removed and re-installed directly to sources.

Wet Well

The Wet Well is a Class 1, Division 1 rated space. A PVC conduit is installed through the top of the wet well and runs back to the pump station control panel. The conduit is required to be explosion proof since it penetrates the wet well which is a hazardous space. There are also various unused conduits and conductors visible inside the wet well, penetrating the wet well top slab, and penetrating the north wall of the wet well into the electrical and pump rooms. Unused conduits should be removed, penetrations properly sealed, and conduits that are to remain must be explosion proof.

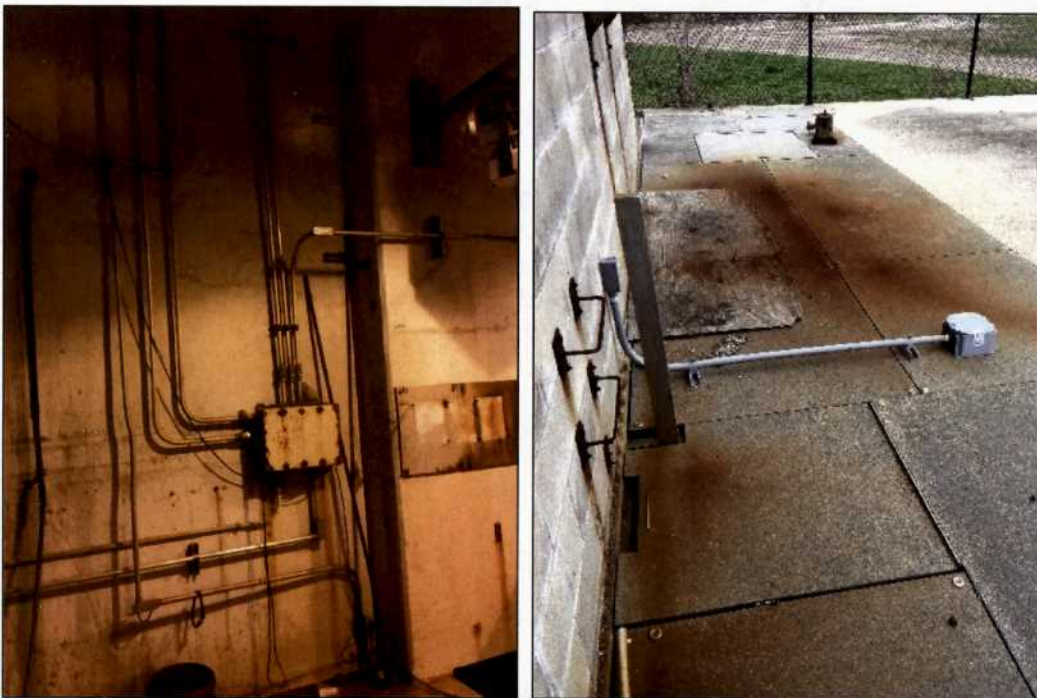


Figure 21: Main junction box in Headworks Chamber and Conduit Penetration into Wet Well

A summary of the electrical deficiencies identified is provided below:

- Several conduits and associated supports throughout the lift station are corroded and in need of replacement or recoating
- Many unused or failed electrical components remain and should be removed
- The service conductors are not protected by fuses
- The existing motor control center show signs of significant corrosion due to moisture and corrosive gas exposure.
- Several light fixtures are out of service
- There is limited exterior lighting.
- Electric shock hazard from the open bus bar powering the electric hoist.
- The sump pump disconnect is in poor condition.
- Several conduits in classified spaces are not explosion proof.

CONTROLS

Life Safety and Environmental Monitoring

Currently, there is very limited environmental monitoring at the Lift Station. It appears that a Fire Alarm System was installed in portions of the existing building, but is no longer in operation. There is currently no ventilation monitoring in the headworks chamber or drywell. Ventilation monitoring is critical in order to alert operators if a failure has occurred in the ventilation system that could create hazardous work conditions or allow the buildup of explosive gases. Additionally there are no permanent gas monitors installed in these spaces. Operators must currently enter the space and lower a gas monitor into the lower areas on a rope to test the air quality. Permanently installed gas monitoring can alert operators of hazardous conditions prior to them entering the space.

Supervisory Control And Data Acquisition

The existing pump control panel PLC is monitored by the water reclamation facilities Supervisory Control And Data Acquisition (SCADA) system over Ethernet. The city owns and maintains a fiber backbone that provides a connection between the lift station and the water reclamation facility. The fiber enters the electrical room and is converted to Category 5 Ethernet cable to make connection to the control system.

While the fiber connection has been installed to the lift station, there is limited data monitoring and control available from outside the lift station and few external alarms are generated to alert operators of critical conditions in the lift station. This is especially important since the facility is not staffed 24x7.

Pump Control System

The main control panel for controlling and monitoring the pump station is located in the electrical room. An Allen Bradley SLC500 Programmable Logic Controller (PLC) system is installed. SLC500 systems are nearing end of life status from the manufacturer. Some components within this family have been discontinued. Therefore, future maintenance of the control system will be difficult. Additionally, there does not appear to be any documentation of the control system at the lift station, making it very difficult to troubleshoot any problems.

A drain line is installed through the floor above the control panel, and water has infiltrated the control panel in the past causing damage. Overall the main control panel, components, and wiring are in poor condition and have reached end of life.



Figure 22: Pump Control System Panel

Grinder Controls

The grinder control panel is located in the electrical room. The system appears to be in good working order. There are signs that the operator interface was replaced with a smaller sized screen. There is currently no alarm to the SCADA system for grinder failure. A level sensor has been installed upstream of the grinder to alarm operators after debris buildup on the stopped grinder has caused the upstream water level to rise.

Instrumentation

Flow Measurement

Flow entering the lift station is measured by a parshall flume in the headworks chamber. The parshall flume level sensor is in poor condition. There is no data logging function in the flow totalizer, so flows can only be read by an operator at the lift station.

Level Measurement

A MultiTrobe level controller is utilized for monitoring the water level in the wet well, and is panel mounted in the control panel. This device has been discontinued by the manufacturer. The backup floats are not readily accessible in the wet well and should be replaced in a new location that is accessible without entering the wet well.

A summary of the controls deficiencies identified is provided below:

- There is no ventilation monitoring or hazardous gas monitoring in any of the spaces.
- There is only limited external monitoring and control through the SCADA system.
- The control panel is in poor condition and components have been discontinued by the manufacturer.
- There is no alarm for grinder failure.
- The flow measurement system has limited functionality
- The wet well level sensors have been discontinued and are difficult to access safely.

Improvement Options

Several improvement alternatives are proposed in order to address the deficiencies noted above. Improvements were categorized into three priority levels based on the following descriptions:

High Priority: Improvements are considered necessary for continued, reliable operation of Memorial Lift Station, code requirements, and addressing health & safety concerns.

Medium Priority: Improvements may not be necessary, but may improve performance, reliability, or efficiency of Memorial Lift Station

Low Priority: Improvements with limited benefit or low benefit to cost ratio.

SITE IMPROVEMENTS

Filling in the animal burrows around the lift station is considered a high priority due to the presence of animal burrows under the transformer pad. Animals may damage the service conductors and interrupt power to the lift station.

Removing the vegetation around the lift station and extending the downspouts are minor tasks that could be completed by City staff or incorporated into the overall improvements project and performed by a contractor.

A summary of the Proposed Site Improvements, including priority and estimated cost is provided in Table 3 below:

Table 3: Proposed Site Improvements

Description	Site Improvements		
	Priority	Recommended?	Estimated Cost
Fill in Animal Burrows	High	Yes	\$800
Remove vegetation around structure	Medium	Yes	\$500
Extend downspouts away from building	Medium	Yes	\$500
Total Recommended Improvements			\$1,800

PROCESS IMPROVEMENTS

Isolation Valve and Bypass Pumping Connection

Priority: High

Cost: \$150,000

In order to service the existing valves and wet well, an isolation valve on the common force main discharge and bypass pumping will be required. With the short lay length between the discharge tee of Pump #5 and the wall of the drywell, the valve and bypass connection will need to be located outside the lift station in a new valve vault. Two hot taps would be installed on the 24-inch force main. One tap will be used to insert an inflatable line stop and the other would be used as a discharge connection for bypass pumps. This would allow a new 24-inch plug valve to be cut into the force main for future isolation for bypass pumping. A new concrete valve vault structure would be built around the force main for future access. The estimated cost of installing the 24-inch isolation valve and bypass pumping for six weeks for construction of other improvements is approximately \$150,000.

For bypass pumping, it is anticipated that the work would be performed during a dry weather period (late fall or winter) and the flowrates would be at or below the capacity of the smaller pumps. Due to the very high peak flows that can occur at Memorial Lift Station during heavy precipitation events, attempting to perform this work in the spring or early summer is not recommended.

Pump Improvements

Several alternatives were evaluated for pump improvements. Because of the limited flow data available, the alternatives maintain the existing lift station capacity.

The use of new submersible pumps to replace the existing dry-pit pumps was also evaluated. However, submersible pumps were determined to be infeasible due to the configuration and layout of the existing wet well. The submersible pumps would need to be installed in the same location as the existing pump suction piping. This would place the access hatches for pump removal directly in front of the doors into the lift station. This location would also be very difficult to access with a lift to remove the pumps and place on a truck for service.

Submersible pumps installed in the existing grit chamber were also evaluated. However, this would leave the average flow wet well stagnant, resulting in the same issues with solids deposition and production of hazardous and corrosive gases. Therefore, maintaining the existing dry-pit pump configuration was deemed to be the simplest, most cost effective alternative for Memorial Lift Station.

Several alternatives were evaluated for the dry-pit configuration as described below. For the Smaller pumps, Alternative 1C, Replace both pumps #1 and #2 is the recommended alternative. Alternative 2, Replace Pumps #3, #4, and #5, is not recommended.

1A: Refurbish Pump #1

Priority: High

Cost: \$45,000

Pump #1 has not been operated in a significant time period and the condition is unknown. However, the pump could be refurbished with new bearings, seals, and impeller. The scope of refurbishment would be similar to the work that was recently done on Pump #2. The estimated cost for pump refurbishment is \$45,000. With this alternative, the seal water service would still be recommended. Additionally, the original pump motor would be used. A new VFD would be provided for the older motor with the MCC improvements. Because of the age, unknown condition, and criticality of Pump #1, this alternative is

not recommended. Even after refurbishment, the remaining life of pump #1 is likely limited. Additionally, the older pump is less efficient than a newer pump would be.

1B: Replace Pump #1

Priority: High

Cost: \$90,000

Given the age and cost of refurbishing Pump #1, full replacement of the pump may be more desirable. The replacement pump would be sized for the same design conditions as the existing pump to provide redundancy to pump #2. A new pump would run more efficiently, would not require seal water, and would include a VFD rated motor. Additionally, a dry-pit submersible pump would be less susceptible to degradation from moisture in the wet well. The estimated cost of replacing Pump #1 is \$90,000.

1C: Replace both Pumps #1 & #2

Priority: High

Cost: \$180,000

With pump #1 out of service, pump #2 has run almost continuously for several years. While Pump #2 was recently refurbished, it may be desirable to replace pump #2 as well. The remaining life of pumps #1 and #2 is likely limited due to their age and condition. Replacing both pumps #1 and #2 would provide the most robust upgrade for handling the average daily flow rates that the lift station experiences the vast majority of the time. Additionally, replacing both pumps would allow for the seal water system to be completely eliminated. The Estimated cost of replacing both pumps #1 and #2 is \$180,000. This option is the recommended alternative for the small pumps as it will provide the greatest reliability for the Lift Station.

2: Replace Pumps #3, #4, and #5

Priority: Low

Cost: \$630,000

Given the age of the existing large pumps, full replacement may be desirable. New pumps would be more efficient and could have slightly smaller motors than the existing pumps. (280 HP vs 300 HP) The estimated cost for replacing the three large pumps is \$630,000. Given the very low run time of the large pumps, the higher efficiency would not result in a significant energy savings. Additionally, the existing pumps were recently refurbished and noted to be in good condition for their age, likely due to the very low run time. Therefore, due to the high cost and limited benefit, replacement of pumps #3, #4, and #5 is not recommended.

Other Process-Related Improvements were evaluated as described below.

Replace peak flow wet well sump pump

Priority: Medium

Cost: \$10,000

The sump pump in the existing peak flow wet well is inoperable and is in need of replacement. The sump pump functions to dewater the peak flow wet well after high flow events and reduce the stagnant water in the wet well. Additionally, the sump pump cannot be accessed until the wet well can be isolated and dewatered, and all of the solids buildup and debris can be removed. Replacement of the sump pump can be accomplished once the cleaning is completed. New pump rails and chain could also be provided to allow the pump to be retrieved without entering the wet well. The estimated cost of replacing the sump pump, including new pump rails, is \$10,000.

Install Wet Well Isolation Gates*Priority: Medium**Cost: \$51,000*

Currently there is no way to isolate the AWW wet well for cleaning operations as solids deposition in the wet well contributes to odors and hydrogen sulfide gas formation. Flow enters the wet well from the influent channel through the three 18-inch diameter openings in the wet well west wall. The addition of three (3) sluice gates to these openings will provide the necessary isolation of the wet well from the incoming flows. These sluice gates will be equipped with a stem and riser operated by a gear driven hand wheel mounted on top of the wet well. The estimated cost for the Sluice Gates is approximately \$51,000.

Replace Pump Header Valves*Priority: High**Cost: \$231,000*

The failed 14-inch plug valve on Pump #1 must be replaced in order for Pump #1 to be used. It is also recommended that the other suction and discharge valves be replaced to prevent pump isolation due to valve failure in the future. In total, this includes replacement of four (4) 14-inch Plug valves, two (2) 14-inch check valves, six (6) 16-inch plug valves, three (3) 16-inch check valves, and one (1) 6-inch surge relief valve. The estimated cost for replacing these valves is \$231,000.

Recoat Discharge Header Piping*Priority: High**Cost: \$20,000*

While the evaluation of the discharge piping indicated that it was still in good condition, recoating is still necessary to prevent additional surface degradation of the piping. Sandblasting and recoating the piping with an epoxy coating system will ensure it remains in good condition for years to come. The estimated cost for recoating the piping is approximately \$20,000.

Install Hatches for Better Vector Truck Access into Wet Well*Priority: Medium**Cost: \$15,000*

Currently, access to both wet wells is through steel covers in each wet well lid. These doors are located in front of the main lift station building access doors. The distance from the gate at the perimeter of the lift station to the cover makes it difficult for vector truck equipment to reach the interior of the wet well for cleaning. Installing new access hatches near the fence would make it easier for cleaning equipment to reach into the wet well. The estimated cost for the new hatches is \$15,000.

Inspect 24-inch Forcemain to WWTP*Priority: Low**Cost: \$380,000*

While the piping in the drywell is in good condition, there is approximately 2.5 miles of ductile iron force main from the lift station to the WWTP. Pure Technologies can provide several evaluation tools to determine the condition of the existing force main. A description of these evaluation tools is provided in Appendix C. The internal inspection probes evaluate the pipe from the inside as it is pushed along with the flow, keeping the system in service during the inspection. The estimated cost of this evaluation is approximately \$380,000. Given the good condition of the piping that was inspected and the high cost of the additional inspection, this alternative is considered a low priority.

Relocate Hydrogen Peroxide Feed Equipment

Priority: Low

Cost: \$ 40,000

Relocating the existing hydrogen peroxide solution storage and feed system equipment to the existing lift station facility would provide easier access to the equipment from the lift station as well as added security for the equipment. The equipment would be located where the existing activated carbon filter is currently located and a new steel building would be required to house the equipment. One benefit of relocating the equipment to the lift station is that the chemical feed rate could be automatically adjusted based on the measured incoming flow rate.

However, other proposed improvements will significantly reduce the stagnant water at the lift station and could significantly reduce or eliminate the need for the hydrogen peroxide feed system. Feeding the hydrogen peroxide directly at the lift station would also eliminate the reaction time that is currently provided in the sewer between the existing feed point and the lift station. Therefore, this alternative is considered low priority. It is recommended that the chemical feed rate be evaluated after the improvements are completed to determine if chemical addition is still required or can be reduced.

A summary of the Process Improvements, including priority and estimated cost is provided in Table 4 below:

Table 4: Proposed Process improvements

Process Improvements			
Description	Priority	Recommended?	Estimated Cost
Force Main Isolation Valve and Bypass Pumping	High	Yes	\$150,000
1A: Refurbish Pump #1	High	No	\$45,000
1B: Replace Pump #1	High	No	\$90,000
1C: Replace Pumps #1 & 2	High	Yes	\$180,000
2: Replace Pumps #3-5	Low	No	\$630,000
Replace Peak Flow Wet Well Sump Pump	Medium	Yes	\$10,000
Relocate Peroxide Feed Equipment	Low	No	\$40,000
Replace Valves	High	Yes	\$231,000
Blast & Recoat Piping	High	Yes	\$20,000
Wet well Isolation Sluice Gates	Medium	Yes	\$51,000
New Hatches for Vactor Truck Access	Medium	Yes	\$15,000
Force Main Evaluation	Low	No	\$380,000
Total Recommended Improvements			\$657,000

STRUCTURAL IMPROVEMENTS

Replace Exterior Hatches

Priority: High

Cost: \$30,000

Replacing the hatches above the headworks chamber and electrical room will help prevent water from leaking into the building and causing further damage.

Rehabilitate Above Grade Structure

Priority: High

Cost: \$25,000

Rehabilitation of the above-grade structure include roof replacement, replacement of damaged ceiling insulation and metal decking, as well as mortar repair and crack sealing in the masonry walls. This will ensure the structure remains weather tight.

Replace Pipe Penetration Seals

Priority: High

Cost: \$10,000

The seals on the pipe penetrations into the wet well should be replaced while the lift station is being bypassed during construction. The piping may need to be temporarily supported while the seals are removed.

Repair Pump Room Ceiling Cracking

Priority: Medium

Cost \$5,000

While the cracking is not a structural concern, it should be patched and sealed to prevent potential degradation of the reinforcing steel.

Demolish Elevator and Spiral Staircase and Build New Stairway.

Priority: Medium

Cost: \$20,000

Removing the non-functional elevator and the spiral staircase will create space for a new stairway to be installed and improve access. The new stairway is anticipated to be aluminum or FRP to reduce future corrosion.

Fill in Grit Chambers

Priority: High

Cost: \$50,000

The Stagnant Grit Chamber will be filled in with sand and capped with a concrete slab. The stop plates that currently isolate the grit chamber will be replaced with new concrete walls. The Concrete wall for the effluent weir will be raised to completely eliminate the grit chamber. The smaller chambers for the grit equipment will also be filled in and capped to remove fall hazards.

Patch Spalled Concrete in Headworks Channel

Priority: High

Cost: 10,000

With the lift station taken out of service and bypassed during construction, the concrete channel should be repaired with cementitious or epoxy grout to prevent additional spalling and degradation.

Replace Grating with Solid Panels

Priority: Medium

Cost \$5,000

Replacing the open grating with solid panels that completely cover the headworks channel will eliminate trip hazards and help manage odors and humidity in the headworks chamber. FRP panels will provide corrosion resistance.

Replace ceiling Insulation

Priority: High

Cost: \$40,000

The molding insulation in the headworks chamber and electrical room should be completely removed and replaced with a new closed-cell insulation. While the insulation is removed, the underside of the concrete slab should be inspected for cracking or other degradation. Additional sealing may be necessary to prevent moisture from penetrating the slab and causing future water damage.

Recoat Interior Surfaces

Priority: High

Cost: \$60,000

The interior surface coatings should be removed and replaced to protect the structure and ensure it remains in good condition.

A summary of the Structural Improvements, including priority and estimated cost is provided in Table 5 below:

Table 5: Proposed Structural Improvements

Structural Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Exterior Hatches	High	Yes	\$30,000
Rehab above-grade masonry structure	Medium	Yes	\$25,000
Replace Pipe Penetration Seals between wet well and dry well	High	Yes	\$10,000
Repair Ceiling Cracking in Pump room	Medium	Yes	\$10,000
Demo elevator and spiral staircase and install new staircase	Medium	Yes	\$20,000
Fill in Grit Chamber	High	Yes	\$50,000
Patch spalled concrete in Headworks Channel	High	Yes	\$10,000
Replace Grating in Headworks Chamber	Medium	Yes	\$5,000
Remove and replace Ceiling Insulation	High	Yes	\$40,000
Recoat interior walls, floors, and ceilings	High	Yes	\$60,000
Total Recommended Improvements			\$260,000

HVAC IMPROVEMENTS

Replace Wrap on Exterior Ducts

Priority: High

Cost: \$14,000

The duct wrap is important both for protecting the ductwork from corrosion and also for maintaining heat for the heat exchanger. Replacing the wrap on the portions of ductwork to remain is highly recommended.

Demolish Odor Control Scrubber and Associated Ductwork.

Priority: High

Cost: \$10,000

The Odor control system is unused and it is recommended that it be removed. The associated ductwork and bypass dampers that are currently non-functional should also be removed. With the modifications to the ductwork, the air handling unit and heat exchanger should be rebalanced to ensure proper performance.

Repair/Replace Electric Unit Heater in Generator Room

Priority: High

Cost: \$1,000

As the only source of heat in the generator room, the electric unit heater should be repaired or replaced.

Separate Boiler from Generator Room

Priority: High

Cost: \$20,000

In order to comply with NFPA 110, the Boiler system cannot be located in the generator room. It may be feasible to separate the generator room into two spaces to comply with code requirements. Alternatively, a small enclosure could be constructed outside to house the boiler system.

Replace Drywell Exhaust Fan

Priority: High

Cost: \$11,000

A new exhaust fan is required to keep the electrical room declassified and meet NFPA requirements.

Reroute Drywell Ductwork

Priority: High

Cost: \$68,000

The ductwork in the drywell needs to be rerouted to provide adequate circulation in both the pump room and electrical room. Additionally, the ductwork need to be rerouted so as not to pass through the generator room. The new ductwork will exit through the north wall of the lift station and the existing wall penetrations closed with new CMU.

Add Dehumidifiers to Drywell

Priority: High

Cost: \$10,000

Adding commercial grade dehumidification units to both the pump room and electrical room are recommended to help reduce future moisture damage inside the lift station.

Add Intake Louver to Drywell

Priority: High

Cost: \$7,000

An Intake Louver should be provided in the drywell space to ensure adequate fresh air is being supplied.

Replace Exhaust hood and Duct in Headworks Chamber

Priority: High

Cost: \$ 27,000

Clean Supply Duct in Headworks Chamber

Priority: Medium

Cost: \$4,000

Add Dehumidifier to Headworks Chamber

Priority: Medium

Cost \$5,000

If solid covers are provided over the headworks channel, a commercial grade dehumidifier could be adequate for reducing moisture in the headworks chamber. If the channel is left uncovered with open grating, there will likely be too much moisture for the dehumidifier to provide a benefit.

A summary of the HVAC Improvements, including priority and estimated cost is provided in Table 6 below:

Table 6: Proposed HVAC Improvements

HVAC Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Wrap on Exterior Ducts	High	Yes	\$14,000
Demo Odor Control Scrubber and Associated Ductwork	High	Yes	\$10,000
Repair Electric Unit Heater in Generator Room	High	Yes	\$1,000
Separate boiler from Generator room	High	Yes	\$20,000
Replace Drywell Exhaust Fan	High	Yes	\$11,000
Reroute Drywell Ductwork	High	Yes	\$68,000
Add Dehumidifiers to Drywell	High	Yes	\$10,000
Add Intake louver to Drywell	High	Yes	\$7,000
Replace Exhaust hood and Ductwork in Headworks Chamber	High	Yes	\$27,000
Clean supply Duct in Headworks Chamber	Medium	Yes	\$4,000
Add Dehumidifier to Headworks Chamber	Medium	Yes	\$5,000
Total Recommended Improvements			\$177,000

PLUMBING IMPROVEMENTS

Replace boiler circulation pumps and appurtenances

Priority: High

Cost: \$37,000

Regardless of the final location of the boiler system, the circulation pumps should be replaced due to their condition. New pumps with variable frequency drives will allow the boiler system to operate more efficiently and ensure reliable heating is provided to the headworks chamber.

Relocate Water Piping outside of Electrical Room

Priority: High

Cost \$11,000

The water line entering the lift station in the electrical room should be rerouted away from the electrical equipment. The piping could be relocated over the stairwell and routed directly to the pump room. If water is still necessary for the bathroom facilities, the water piping could be routed along the ceiling of the pump room and up through the floor penetration where the piping currently passes down from the electrical room into the pump room.

Replace Bathroom Fixtures

Priority: Low

Cost: \$7,000

If the bathroom facilities are to remain, the fixtures could be replaced with newer fixtures. Additionally, a curb could be installed around the bathroom area to contain water and prevent it from reaching electrical components.

Demolish Bathroom Fixtures

Priority: High

Cost: \$1,000

It is recommended that the bathroom fixtures be demolished to eliminate the water source in the electrical room.

Replace Pump room Sump Pump

Priority: High

Cost: \$11,000

Due to the poor condition of the existing sump pump, complete replacement is recommended to reduce standing water in the pump room.

Rehabilitate Pump Room Floor Drains

Priority: High

Cost: \$14,000

The floor drains in the pump room should be jetted to remove blockages and ensure there is not standing water in the room. The drain covers should be replaced as well.

A summary of the Plumbing Improvements, including priority and estimated cost is provided in Table 7 below:

Table 7: Proposed Plumbing Improvements

Plumbing Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace boiler Circulation Pumps and Appurtenances	High	Yes	\$37,000
Relocate Water piping outside of electrical room	High	Yes	\$11,000
Replace Bathroom Fixtures	Low	No	\$7,000
Demolish Bathroom Fixtures	High	Yes	\$1,000
Replace Pump Room Sump Pump	High	Yes	\$11,000
Rehabilitate Pump Room floor Drains	High	Yes	\$14,000
Total Recommended Improvements			\$74,000

ELECTRICAL IMPROVEMENTS

Demolish unused conduits and electrical equipment

Priority: Medium

Cost: \$8,000

The unused conduits and electrical equipment should be removed for ease of construction and maintenance activities. Sealing the penetrations from unused conduits will help decrease water seepage and corrosive gases entering the electrical room from the headworks chamber and wet well.

Replace Electrical MCC/Gear

Priority: High

Cost: \$275,000

Due to the age and condition of the existing MCC, full replacement is recommended. This alternative includes VFD's for Pumps #1 and #2 and two-speed starters for Pumps #3, #4, and #5. A new housekeeping pad should be constructed prior to installation of the new MCC to protect them from any moisture present on the floors.

If the MCC is to be replaced, several ancillary improvements must also be made to bring the electrical service up to current code requirements. These improvements include replacing the electrical service entrance, replacing the main switchgear, and installing surge protection on the incoming power lines.

Lighting

Replace the explosion proof high pressure sodium light fixtures in the headworks chamber with LED type.

Priority: Medium

Cost: \$22,000

Replace existing interior and exterior light fixtures with LED type.

Priority: Medium

Cost: \$6,000

Install additional exterior LED light fixtures around the building for security and maintenance activities.

Priority: Medium

Cost: \$3,000

Install emergency lighting fixtures illuminating paths of egress inside and outside the building.

Priority: High

Cost: \$12,000

Install light pole on north side of building for additional security.

Priority: Medium

Cost: \$5,000

Guard Hoist Electrical Bus Bar

Priority: High

Cost: \$500

Adding an aluminum or non-metallic panel to shield the hoist electrical bus bar from accidental contact from the stairwell is an inexpensive but critical safety improvement.

Replace disconnects and conductors in Pump Room

Priority: High

Cost: \$15,000

Due to the age and condition of the disconnects located in the pump room, complete replacement is recommended. Existing disconnects to be replaced serve the hoist, sump pump. New disconnects should be installed for all five pumps as well. The copper wiring between the MCC and the electrical components is likely deteriorated as well and should be replaced when the disconnects are installed.

Replace Conduits in Headworks Chamber and in Wet Well with Explosion Proof Conduits

Priority: High

Cost: \$8,000

Demolish junction box and associated conduits that do not meet explosion proof installation. Install new conduits and conductors from headworks area to electrical room. Demolish and replace PVC conduit with rigid aluminum conduit, and install meeting Class I Division 1 requirements for hazardous locations.

A summary of the Electrical Improvements, including priority and estimated cost is provided in Table 8 below:

Table 8: Proposed Electrical Improvements

Electrical Improvements			
Description	Priority	Recommended?	Estimated Cost
Demo unused conduits and equipment	High	Yes	\$8,000
Replace MCC, Switchgear, and Service Conductors	High	Yes	\$275,000
Replace Explosion proof lighting in Headworks Chamber	Medium	Yes	\$22,000
Replace interior and exterior lights with LED lighting	Medium	Yes	\$6,000
Install additional exterior lighting on building	Medium	Yes	\$3,000
Install emergency egress lighting	High	Yes	\$12,000
Install new light pole near building	Medium	Yes	\$5,000
Guard hoist bus bar	High	Yes	\$500
Replace disconnects and conductors in pump room	High	Yes	\$15,000
Replace conduits in classified spaces with explosion proof conduits	High	Yes	\$8,000
Total Recommended Improvements			\$354,000

CONTROL IMPROVEMENTS

Replace Control and SCADA System

Priority: High

Cost: \$150,000

With the age and condition of the existing control panel, a completely new control system is recommended. The new control system would integrate the pump and grinder control, environmental monitoring, and flow measurement and allow for remote monitoring and control.

Install new ventilation monitoring and hazardous gas monitoring

Priority: High

Cost: \$25,000

Ventilation monitoring and hazardous gas detectors should be installed in both the headworks chamber and drywell. These systems are required by NFPA 820 and will alert operators of hazardous conditions prior to entering the lift station itself.

Replace Instrumentation

Priority: High

Cost: \$40,000

New level reading instrumentation in the lift station are necessary to accurately measure incoming flow and for controlling pump operation. If a new hatch is installed into the wet well, the backup floats could be relocated to be accessible from the hatch without entering the wet well. This instrumentation includes a new level sensor for the parshall flume, two new ultrasonic level sensors to monitor wet well levels, and new backup floats for the wet wells. These sensors would be connected to the new control panel for remote monitoring through SCADA.

Install additional environmental sensors

Priority: Medium

Cost: \$10,000

Installing Flood sensors in the headworks chamber and drywell can alert operators in the event of a pipe break, hydraulic backup or blockage, or other significant failure.

Temperature sensors in the headworks chamber and drywell can alert operators if there are extreme temperature conditions from a heating system failure prior to pipe freezing or electrical issues.

A summary of the Controls Improvements, including priority and estimated cost is provided in Table 4 below:

Table 9: Proposed Controls improvements

Control System Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Control and SCADA System	High	Yes	\$150,000
Ventilation and Hazardous Gas Monitoring	High	Yes	\$25,000
Replace Instrumentation	High	Yes	\$40,000
Install Flood and Temperature sensors	Medium	Yes	\$10,000
Total Recommended Improvements			\$225,000

Summary

SUMMARY

Memorial Lift Station requires several improvements to maintain reliable operation, meet current electrical and fire protection codes, and to protect worker health and safety. The recommended site improvements includes minor work around the perimeter of the lift station to address animals, vegetation, and drainage. Recommended process improvements include replacement of failed and failing equipment. Structural improvements include work to make the structure weather tight, reapply protective coatings, and patch minor concrete degradation. HVAC improvements include demolition of the unused odor control system, and improvements to ventilation in the drywell area to reduce hazardous gas buildup. Recommended plumbing improvements include replacement of the boiler circulation pumps and removal of the house water piping located above the electrical equipment. Recommended electrical improvements include complete replacement of the motor control center. Recommended Controls Improvements include complete replacement of the existing control system. A summary of the estimated costs is provided in Table 10 below.

Table 10: Summary of Estimated Costs for Recommended Improvements

Description	Estimated Cost
Site Improvements	\$1,800
Process Improvements	\$657,000
Structural Improvements	\$260,000
HVAC Improvements	\$177,000
Plumbing Improvements	\$74,000
Electrical Improvements	\$354,500
Controls Improvements	\$225,000
Subtotal	\$1,749,300
10% Contingency	\$175,000
Engineering, Legal, and Administrative Costs (Estimated 20%)	\$350,000
Total Estimated Project Cost	\$2,275,000

Financial Analysis

POTENTIAL FUNDING SOURCES

Community Development Block Grant

The Community Development Block Grant (CDBG) program is administered by the Iowa Economic Development Authority (IEDA) and allows municipalities to apply for grant funding on a competitive basis each year for water and wastewater improvements. The main criteria used in determining a community's grant eligibility revolves around the City's Low to Moderate Income (LMI) household percentage. To be eligible for funding, the community's LMI percentage needs to be greater than or equal to 51%. According to the IEDA's latest demographic information, the City of Storm Lake's LMI is 52%. Therefore, the City is eligible for a grant of up to \$600,000. The Grant requires a dollar-for-dollar local match, so in order to utilize the full \$600,000 the City would need to provide a minimum of \$600,000 in additional funding.

State Revolving Loan Fund, Clean Water Fund

The SRF is a revolving loan fund through the State of Iowa Finance Authority. Currently, the SRF interest rate is 1.75% for a 20-year loan. In some cases the loan term can be extended to 30 years if the project being funded has a lifespan greater than 30 years. Currently, 30-year rates are 2.75%. SRF loans have a 0.25% annual service fee, thus 2.00% and 3.00% should be expected for the 20-year and 30-year loan rates, respectively. This funding is subject to Federal Davis Bacon Prevailing Wages and has American Iron and Steel Requirements.

The SRF loan program also provides communities to apply for Disadvantaged Status. For clean water projects, the IDNR looks at the community's Median Household Income (MHI), number of rate payers, current and projected debt, along with additional criteria to determine eligibility. If determined eligible, the community can utilize the 30-year term at a discounted rate of 2.00%. The project is still subject to Federal Davis Bacon Prevailing Wages and American Iron and Steel Requirements.

The SRF loan program requires the City to enlist the services of a Municipal Advisor (MA) in order to be eligible for funding. The SRF will reimburse the City \$4,000 for the services of the MA. The MA's assistance is required through the program in an effort to ensure the City has the ability to repay the new debt service while maintaining a healthy wastewater fund balance. To meet the ability of the debt, an adjustment to sanitary sewer rates will be required to maintain a 1.10% debt coverage ratio. This means that the City needs to generate at least 10% more revenue than expenditures for the entire wastewater system on an annual basis.

State Revolving Loan Fund's Planning and Design Loan

SRF offers a Planning and Design (P&D) Loan that is a 0% interest loan for up to three years with no initiation or servicing fees. The P&D loan is intended to be utilized to pay for costs to produce reports such as this Facility Plan, legal/administration fees as necessary, and engineering design of the selected alternative. At the end of the three-year period (or before), the P&D loan can be rolled into a SRF Construction Loan.

SRF Sponsored Project Grant

SRF allows sewer utilities to finance water resource restoration sponsored projects in conjunction with a Clean Water Fund loan of \$1 million or more. On a Clean Water Fund loan with a sponsored project, the utility borrows money for both the wastewater improvements and the water resource improvements. However, SRF reduces the interest rate on the loan so that the debt service payment is the same as if only the wastewater improvements were funded. This effectively provides a grant for the water resources improvements. Total Sponsored Project funding is capped statewide and applications are selected on a competitive basis each fiscal year.

Sponsored Project funding is available up to the lowest of the following:

- 10% of the requested Clean Water Fund loan amount.
- 10% of the final amount of the Clean Water Fund Construction loan.
- The amount requested on the sponsored project application.

Therefore, the City of Storm Lake could be eligible for approximately \$172,000 for water resources restoration projects in conjunction with the anticipated SRF Clean Water Fund Loan for the Memorial Lift Station Improvements. In order to be eligible for a Sponsored Project Grant, the City would need to identify project(s) and apply by March 2020. The Sponsored Project application would need to be closely coordinated with the Clean Water Fund Loan in order to maintain eligibility.

FINANCING SCENARIOS

The City plans to apply for a Community Development Block Grant (CDBG) to fund a portion of the project. The City is eligible for up to \$600,000 from CDBG for this project. The remaining balance will be funded through a State Revolving Fund (SRF) Loan. It has not been determined if the City qualifies for disadvantaged community status at this time. Table 11 shows the estimated annual payments that the City would make based on each funding scenario. The financing evaluation does not incorporate the additional 10% revenue that the City must generate for its own wastewater fund as required by SRF.

Table 11: Financing Scenarios

Program	Rate Term	Grant	Loan	Estimated Annual Debt Service ¹	Total Principal + Interest Paid
SRF 20-Year	2.00% 20-Year	-	\$2,275,000	\$138,000	\$2,762,000
SRF 20-Year + CDBG	2.00% 20-Year	\$600,000	\$1,675,000	\$102,000	\$2,034,000
SRF 30-Year	3.00% 30-Year		\$2,275,000	\$115,000	\$3,453,000
SRF 30-Year + CDBG	3.00% 30-Year	\$600,000	\$1,675,000	\$85,000	\$2,542,000
SRF Disadvantaged ²	2.00% 30-Year		\$2,275,000	\$101,000	\$3,027,000
SRF Disadvantaged ² + CDBG	2.00% 30-Year	\$600,000	\$1,675,000	\$74,000	\$2,229,000

1 Does not include 110% debt coverage ratio required by SRF.

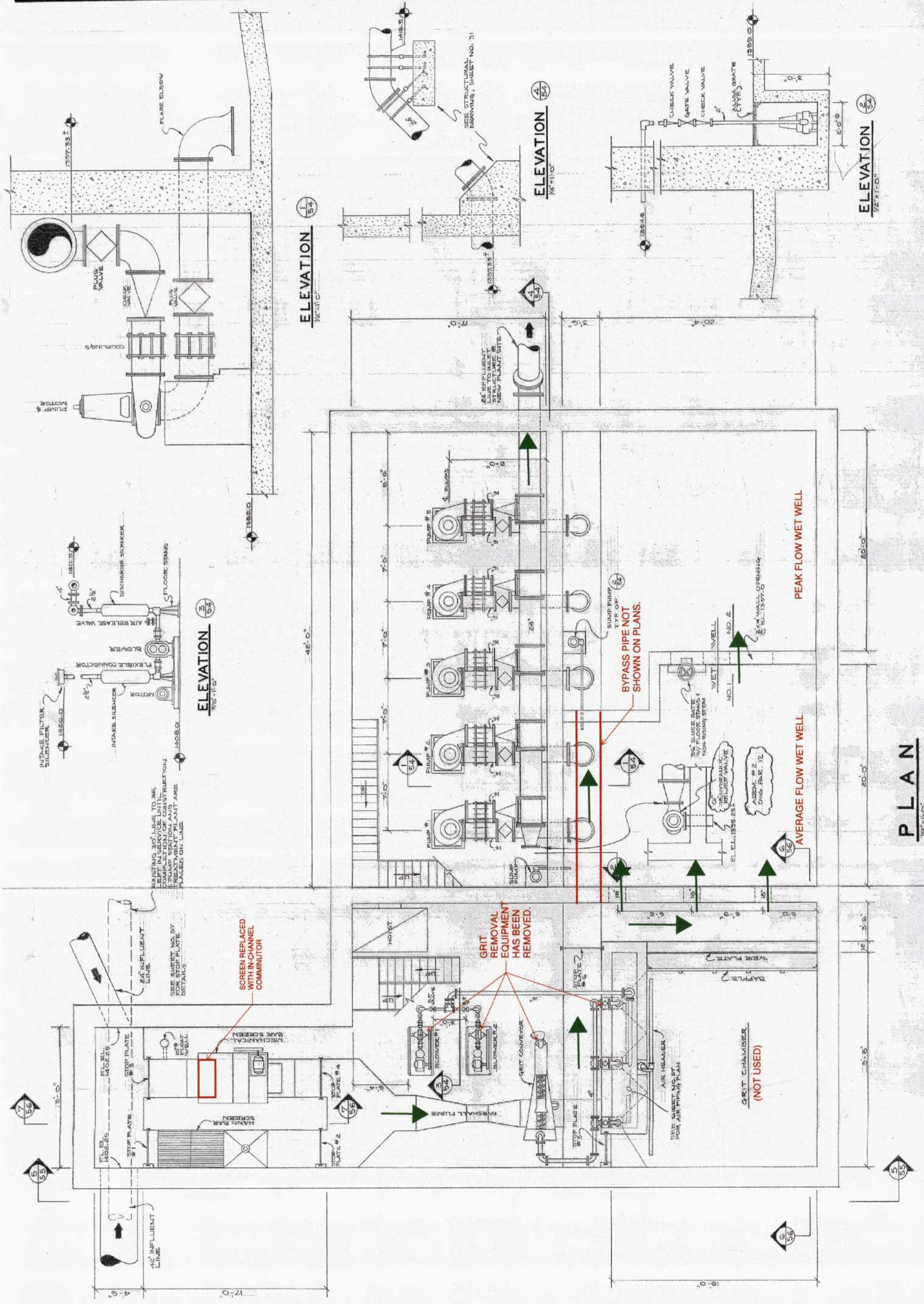
2 Disadvantaged community eligibility to be determined.

Final Considerations and Preliminary Schedule

Based on the evaluation described in this report, it is recommended that the City of Storm Lake proceed with the listed improvements to Memorial Lift Station. The Recommended Financing Scenario is a Community Development Block Grant for \$600,000 with an SRF loan for the remainder of the project cost. If desired, the City could evaluate if they qualify for disadvantaged community status and a longer loan term. The City can also apply for an SRF Sponsored Project grant to fund a water resources improvement project based on the wastewater loan. The preliminary project schedule is as follows:

July 2019	Submit Facility Plan to Iowa DNR
August 2019	Begin Final Design
September 3, 2019	SRF IUP Application Deadline
October 1, 2019	CDBG Application Deadline
December 17, 2019	SRF IUP Approval
December 2019	CDBG Grant Award
January 2020	Submit Final Plans & Specifications to Iowa DNR
March 2020	Issue Plans & Specifications for Bidding
April 2020	Award Contract
Summer 2020	Contractor Procures Equipment and Materials
October 2020	Begin Bypass Pumping and Lift Station Improvements
December 2020	Substantial Completion,
March 2021	Final Completion

APPENDIX A: Existing Lift Station Drawings



APPENDIX B: Pipe Non-Destructive Testing Report

June 4, 2019

Mr. Mark Streed
City of Storm Lake
P.O. Box 1086, 620 Erie Street
Storm Lake, IA

**Subject: 24-inch Ductile Iron Pipe Header, Memorial Lift Station
Ultra Thickness Testing Results Report Letter**

Dear Mr. Mark Streed:

This letter details the findings from the Ultra Thickness Testing (UTT) conducted by Jan X-Ray Services Inc. (JanX) under the direction of Pure Technologies U.S. Inc., a Xylem Brand (Pure Technologies) of the 24-Inch Ductile Iron Pipe (DIP) header at the Memorial Lift Station in Storm Lake, Iowa. The lift station is owned and operated by the City of Storm Lake, Iowa.

Background and Location

The lift station header piping was originally installed in 1983 and has been in continuous use since its construction. The exterior of the DIP piping has noticeable areas of corrosion and chipped paint (see **Figures 1 and 2**). Replacing this piping would require bypass pumping around the entire lift station, which would add significant cost. Therefore, the City of Storm Lake contracted Pure Technologies to collect thickness measurements of the header piping in order to verify the condition of the wall of the pipe, potentially allowing it to remain in place. UTT, an ultrasonic inspection technology, was chosen in order to externally verify the wall thickness of the header piping.

The ultrasonic inspection spanned approximately 36.5 feet of 24-inch DIP pipe and five (5) 24-inch DIP tees (see **Figure 3**). Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the updated design thickness with the measured thickness for a more accurate analysis.



Figures 1 and 2: Exterior of the Lift Station Header Piping

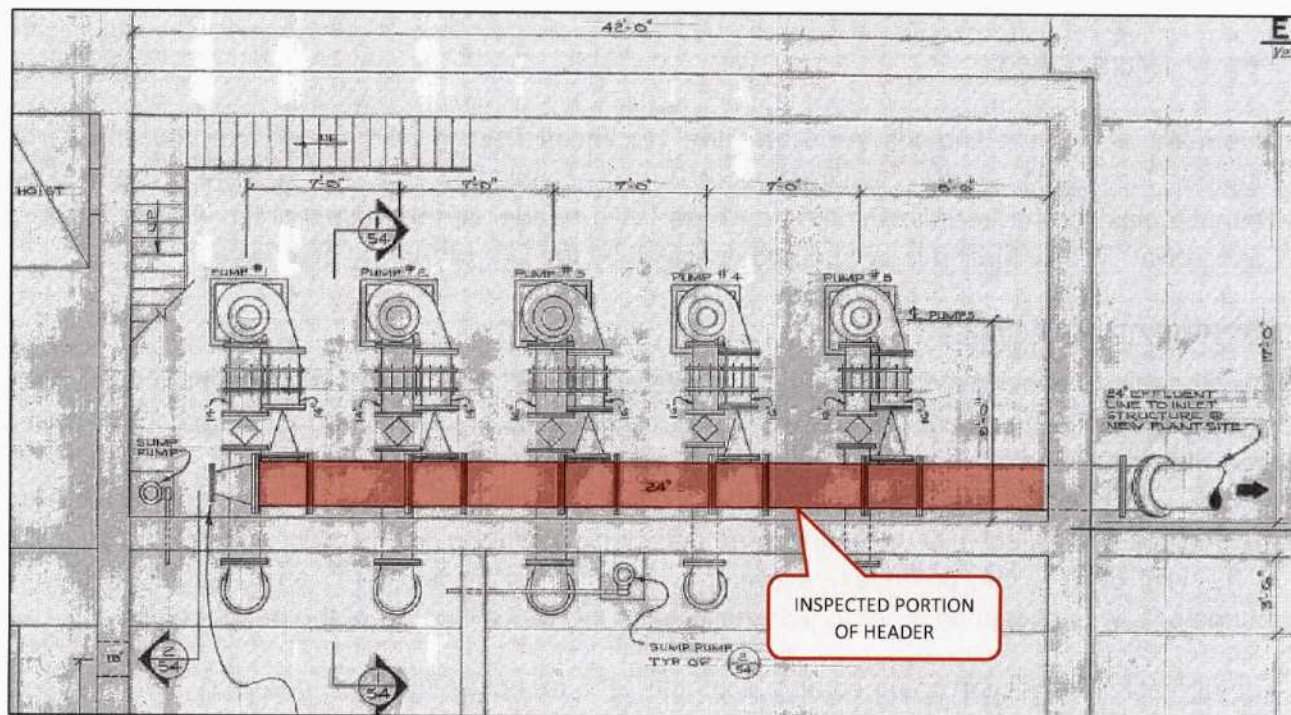


Figure 3: 24-inch DIP Lift Station Header

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

External Ultra Thickness Testing Results

The thickness measurements were taken using a model UM-1D ultrasonic thickness testing device. The transducer frequency was set to 5 MHz, with a single-element transducer sized at 0.250 inches. Thickness measurements were spaced evenly over the length of the pipes and tees, with nine (9) readings taken for each tee and twelve (12) readings taken for each pipe. A diagram of the measurement locations taken for tees and pipes is shown in **Figure 4**.

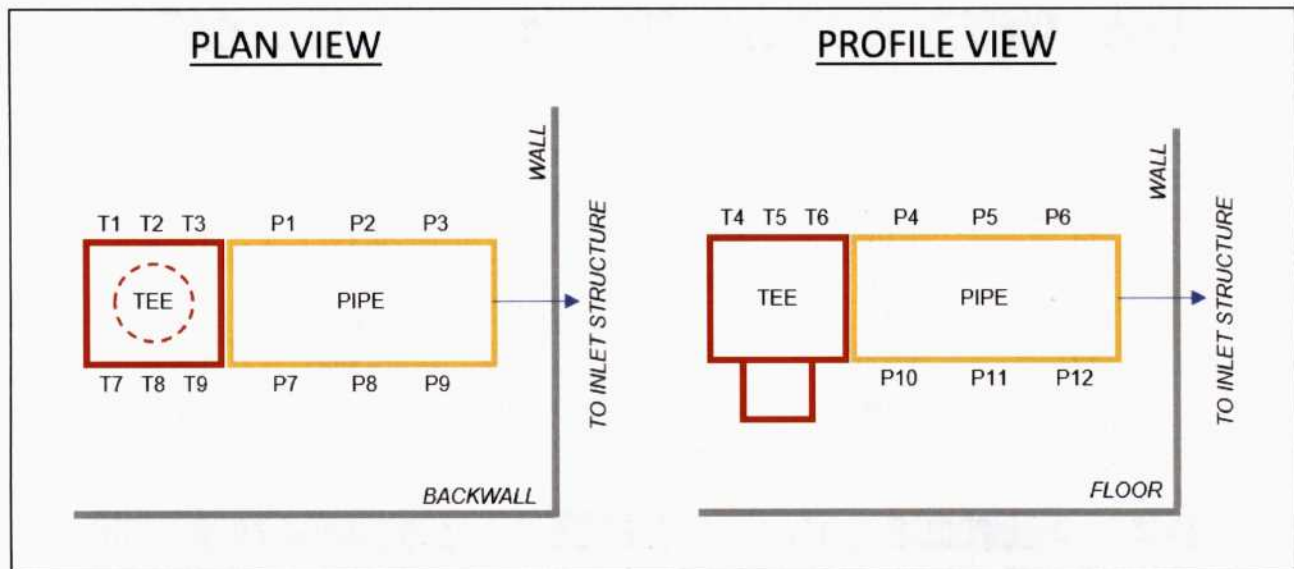


Figure 4: Diagram of Measurement Locations for Tees and Pipes

The tees and pipes were labeled one (1) through five (5), beginning at the sump pump and moving towards the inlet structure. A diagram of the labeled tees and pipes from the inspection is shown below in **Figure 5**. The results for the UTT thickness testing of the tees and the pipes are shown in **Tables 1 and 2**, respectively.

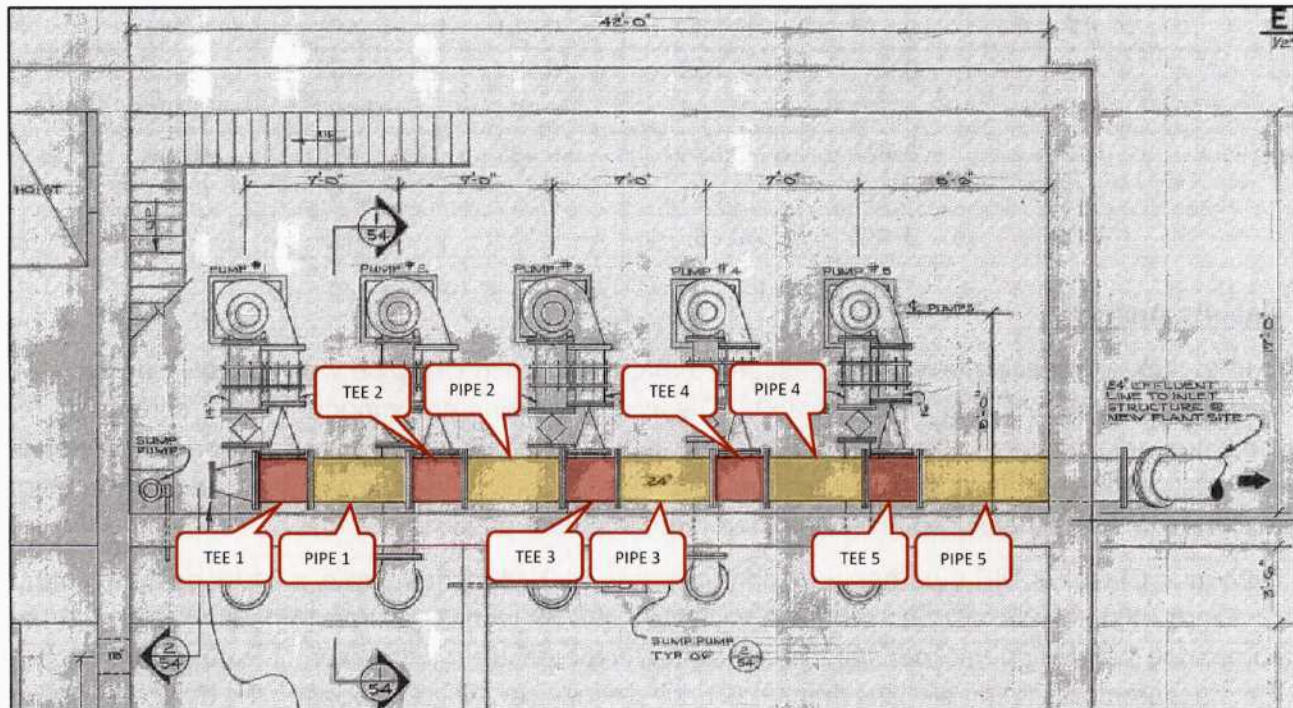


Figure 5: 24-inch DIP Lift Station Header (Labeled Tee & Pipe)

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

Table 1: Thickness Measurements for Tees (in inches)					
Measurement	Tee 1	Tee 2	Tee 3	Tee 4	Tee 5
T1	1.223	1.207	1.359	1.268	1.491
T2	1.241	1.268	1.294	1.306	1.469
T3	1.248	1.263	1.401	1.315	1.471
T4	1.301	1.321	1.338	1.331	1.454
T5	1.238	1.301	1.347	1.413	1.431
T6	1.287	1.331	1.353	1.442	1.299
T7	1.279	1.362	1.322	1.398	1.306
T8	1.296	1.371	1.359	1.365	1.322
T9	1.301	1.354	1.306	1.315	1.316

Table 2: Thickness Measurements for Pipes (in inches)					
Measurement	Pipe 1	Pipe 2	Pipe 3	Pipe 4	Pipe 5
P1	0.546	0.659	0.491	0.471	0.417
P2	0.554	0.651	0.479	0.454	0.421
P3	0.532	0.584	0.461	0.462	0.435
P4	0.559	0.631	0.468	0.471	0.421
P5	0.531	0.652	0.482	0.451	0.437
P6	0.601	0.591	0.499	0.449	0.435
P7	0.577	0.622	0.501	0.471	0.461
P8	0.587	0.668	0.477	0.465	0.458
P9	0.556	0.604	0.494	0.462	0.466
P10	0.577	0.684	0.481	0.458	0.417
P11	0.533	0.671	0.476	0.467	0.461
P12	0.482	0.665	0.473	0.471	0.509

Results Analysis

Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the correct design thickness with the measured thickness for a more accurate analysis.

A 24-inch Class 52 DIP pipe has a design thickness of 0.44 inches, while a 24-inch DI Tee with a pressure rating of 250 psi has a design thickness of 0.89 inches (source: American Pipe). When comparing the design thickness of the tee to the field measurements taken, it is clear that none of the measurements taken are less than 0.89 inches. However, when comparing the design thickness of the pipe to the field measurements taken, it can be seen that "Pipe 5" (closest to the inlet structure wall) has multiple thicknesses less than 0.44 inches.

Seven (7) of the twelve (12) thickness measurements taken for "Pipe 5" are less than 0.44 inches. Out of those seven (7), the maximum wall loss percentage was roughly 5% which was located at

measurements "P1" and "P10" at 0.417 inches. A diagram indicating the measurements taken for "Pipe 5" is shown in **Figure 6**.

Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition.

It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header.

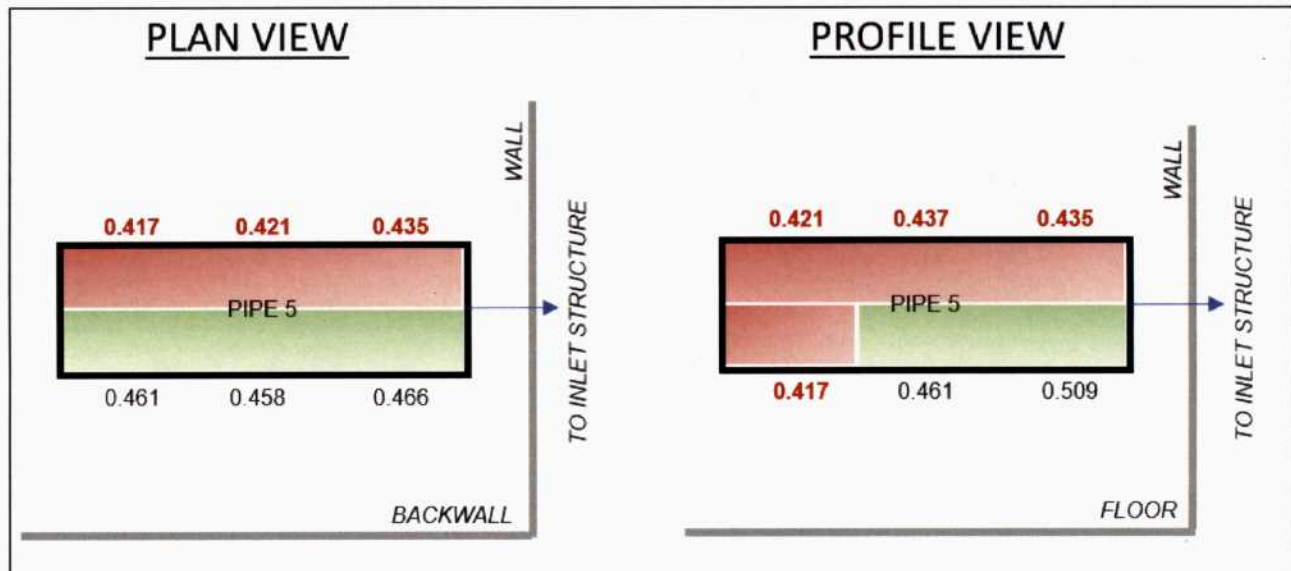


Figure 6: Thickness Measurements (in inches) of "Pipe 5"

Conclusion

Based on the findings from the JanX UTT external field testing, Pure Technologies concluded that only one (1) of the five (5) pipes tested were found to have wall thickness measurements less than the design thickness. The maximum wall loss percentage at this pipe was roughly 5% and was located at measurements "P1" and "P10" of "Pipe 5", at 0.417 inches. Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition. Additionally, it was determined that under normal operating

¹ U.S. Pipe and Foundry Company. "Ductile Iron Pipe Design for Fire Protection, Water & Wastewater". Page P10. Table 2; Pressure Class. 2013 Edition.

conditions, the header piping experiences a maximum operating pressure of 65 psi. Therefore, under those operating conditions, it can be assumed that the header piping is in serviceable condition. Pure Technologies also concluded that none of the five (5) tees tested were found to have wall thickness measurements less than the design thickness. The JanX Field Log used to collect and document the data is included as an appendix to this letter.

If you have any questions or require additional information, please contact us.

Sincerely,

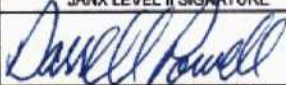
William Barloon

Bill Barloon, P.E.
Area General Manager, Xylem

cc: Steve Bruskiewicz, Business Development Manager, Xylem

Attachments

Appendix A: JanX Field Log

DATE: 5/20/2019		CLIENT: Pure Technologies US, Inc.		
REPORT No: 1 of 1		JOB LOCALE- CITY, STATE: Storm Lake, IA		
CLIENT PO No: #2019-052		JANX JOB No:		
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1		
CLIENT JOB No:		ACCEPTANCE CRITERIA: Information only		
ULTRASONIC THICKNESS TESTING TECHNIQUE				
Instrument Mfg: <u>Landmark</u> Model: <u>UM-1D</u> Serial No: <u>5102212</u> Cal. Date: <u>1/15/2019</u>				
Transducer Mfg: <u>Landmark</u> Transducer Frequency: <u>5</u> MHz Due Date: <u>1/15/2020</u>				
Transducer Size: <u>.250"</u> Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line				
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)				
Scan Description: <u>Thickness readings; looking for wall loss</u> Max. Scan Rate (in./sec.): <u>N/A</u> Scan Overlap %: <u>N/A</u>				
Couplant Brand or Type: <u>Sonagel</u> Remarks:				
PART DESCRIPTION			Calibration Block No: <u>3972</u> Material: <u>C/S</u>	
Material: <u>C/S</u> Thickness: <u>.500"</u>			Step 1 Step 2	
Inspection Area Description: <u>24" x .500wt pipe</u>			Cal Block Actual Thickness: <u>.250"</u> <u>1"</u> Time	
Surface Condition: <u>Clean</u>			Cal. Reading at Start: <u>.250"</u> <u>.500"</u> <u>10:30AM</u>	
Surface Preparation: <u>Coating removed and brushed</u>			Cal. Reading at End: <u>.250"</u> <u>.500"</u> <u>2PM</u>	
Temp. of Part and Cal. Block within ± 25°F of each other: ☒			Gate Height: <u> </u> % ☒ Not Applicable	
			Gain: <u> </u> dB ☒ Not Applicable	
THICKNESS READINGS			SKETCH / PICTURE / REMARKS - AS NEEDED	
1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100
Drive to Storm Lake, IA.....				
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045				
ADDRESS:				
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN
				Darrell Powell
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE
Steve Bruskiewicz (262)305-5238		550	10	Yes
				TOTAL ITEMS INSPECTED
				0
				Kenny Cox !
Print: UTT Report 14-06		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.		JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269

DATE: 5/21/2019		CLIENT: Pure Technologies US, Inc.		JANX					
REPORT No: 1 of 2		JOB LOCALE- CITY, STATE: Storm Lake, IA							
CLIENT PO No: #2019-052		JANX JOB No:							
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1							
CLIENT JOB No:		ACCEPTANCE CRITERIA: Information only							
ULTRASONIC THICKNESS TESTING TECHNIQUE									
Instrument Mfg: <u>Landmark</u>		Model: <u>UM-1D</u>		Serial No: <u>5102212</u>					
Transducer Mfg: <u>Landmark</u>		Transducer Frequency: <u>5</u> MHz		Cal. Date: <u>1/15/2019</u>					
Transducer Size: <u>.250"</u>		Transducer Type: ☐ Dual Element ☒ Single Element		Due Date: <u>1/15/2020</u>					
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam		☐ Delay Line							
☒ Spot Thickness Readings Only		☒ Area Scan (see below)							
Scan Description: <u>Thickness readings; looking for wall loss</u>		Max. Scan Rate (in./sec.): <u>N/A</u>		Scan Overlap %: <u>N/A</u>					
Couplant Brand or Type: <u>Sonagel</u>		Remarks:							
PART DESCRIPTION									
Material: <u>C/S</u>		Thickness: <u>.500"</u>							
Inspection Area Description: <u>Looking for wall loss; thickness readings</u>									
<u>24" x .500wt pipe</u>									
Surface Condition: <u>Clean</u>									
Surface Preparation: <u>Coating removed and brushed</u>									
Temp. of Part and Cal. Block within ± 25°F of each other: ☒									
Calibration Block No: <u>3972</u>		Material: <u>C/S</u>							
		Step 1		Step 2					
Cal Block Actual Thickness:		<u>.250"</u>		<u>1"</u>					
Cal. Reading at Start:		<u>.250"</u>		<u>.500"</u>					
Cal. Reading at End:		<u>.250"</u>		<u>.500"</u>					
Gate Height: <u> </u> %		☒ Not Applicable							
Gain: <u> </u> dB		☒ Not Applicable							
THICKNESS READINGS									
1	Tee 1	21	Tee 2	41	Tee 3	61	Tee 4	81	Tee 5
2	1.223	22	1.207	42	1.359	62	1.268	82	1.491
3	1.241	23	1.268	43	1.294	63	1.306	83	1.469
4	1.248	24	1.263	44	1.401	64	1.315	84	1.471
5	1.301	25	1.321	45	1.338	65	1.331	85	1.454
6	1.238	26	1.301	46	1.347	66	1.413	86	1.431
7	1.287	27	1.331	47	1.353	67	1.442	87	1.299
8	1.279	28	1.362	48	1.322	68	1.398	88	1.306
9	1.296	29	1.371	49	1.359	69	1.365	89	1.322
10	1.301	30	1.354	50	1.306	70	1.315	90	1.316
11		31		51		71		91	
12		32		52		72		92	
13		33		53		73		93	
14		34		54		74		94	
15		35		55		75		95	
16		36		56		76		96	
17		37		57		77		97	
18		38		58		78		98	
19		39		59		79		99	
20		40		60		80		100	
SKETCH / PICTURE / REMARKS - AS NEEDED									
Drive in and out of Storm Lake, IA.....									
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045									
ADDRESS:									
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN					
		<i>Darrell Powell</i>		Darrell Powell					
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE					
Steve Bruskiewicz (262)305-5238		300	14	Yes					
		TOTAL ITEMS INSPECTED		10					
		Kenny Cox !							
Form: UTT Report 14-06		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.		JANX (517) 531-8210 P.O. Box 190 Parma, MI 49269					

DATE: 5/21/2019		CLIENT: Pure Technologies US, Inc.							
REPORT No: 2 of 2		JOB LOCALE- CITY, STATE: Storm Lake, IA							
CLIENT PO No: #2019-052		JANX JOB No:							
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1							
CLIENT JOB No:		ACCEPTANCE CRITERIA: Information only							
ULTRASONIC THICKNESS TESTING TECHNIQUE									
Instrument Mfg: <u>Landmark</u>		Model: <u>UM-1D</u> Serial No: <u>5102212</u>		Cal. Date: <u>1/15/2019</u>					
Transducer Mfg: <u>Landmark</u>		Transducer Frequency: <u>5</u> MHz		Due Date: <u>1/15/2020</u>					
Transducer Size: <u>.250"</u>		Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line							
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)									
Scan Description: <u>Thickness readings; looking for wall loss</u>		Max. Scan Rate (in./sec.): <u>N/A</u>		Scan Overlap %: <u>N/A</u>					
Couplant Brand or Type: <u>Sonagel</u>		Remarks:							
PART DESCRIPTION									
Material: <u>C/S</u> Thickness: <u>.500"</u>									
Inspection Area Description: <u>Looking for wall loss; thickness readings</u>									
<u>24" x .500wt pipe</u>									
Surface Condition: <u>Clean</u>									
Surface Preparation: <u>Coating removed and brushed</u>									
Temp. of Part and Cal. Block within $\pm 25^{\circ}\text{F}$ of each other: ☒									
THICKNESS READINGS									
1	Pipe 1	21	Pipe 2	41	Pipe 3	61	Pipe 4	81	Pipe 5
2	0.546	22	0.659	42	0.491	62	0.471	82	0.417
3	0.554	23	0.651	43	0.479	63	0.454	83	0.421
4	0.532	24	0.584	44	0.461	64	0.462	84	0.435
5	0.559	25	0.631	45	0.468	65	0.471	85	0.421
6	0.531	26	0.652	46	0.482	66	0.451	86	0.437
7	0.601	27	0.591	47	0.499	67	0.449	87	0.435
8	0.577	28	0.622	48	0.501	68	0.471	88	0.461
9	0.587	29	0.668	49	0.477	69	0.465	89	0.458
10	0.556	30	0.604	50	0.494	70	0.462	90	0.466
11	0.577	31	0.684	51	0.481	71	0.458	91	0.417
12	0.533	32	0.671	52	0.476	72	0.467	92	0.461
13	0.482	33	0.665	53	0.473	73	0.471	93	0.509
14		34		54		74		94	
15		35		55		75		95	
16		36		56		76		96	
17		37		57		77		97	
18		38		58		78		98	
19		39		59		79		99	
20		40		60		80		100	
SKETCH / PICTURE / REMARKS - AS NEEDED									
Drive in and out of Storm Lake, IA..... (9) Readings per "TEE" (12) Readings per "PIPE"									
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045 ADDRESS:									
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN	OTHER EMPLOYEES & LEVEL				
				Darrell Powell	Kenny Cox I				
CLIENT REP NAME & PHONE NUMBER	TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE	TOTAL ITEMS INSPECTED					
Steve Bruskiwicz (262)305-5238	300	14	Yes	10					
Form: UTT Report 14-05			CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.						
			JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269						

DATE: 5/22/2019		CLIENT: Pure Technologies US, Inc.														
REPORT No: 1 of 1		JOB LOCALE- CITY, STATE: Storm Lake, IA														
CLIENT PO No: #2019-052		JANX JOB No:														
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1														
CLIENT JOB No:		ACCEPTANCE CRITERIA: information only														
ULTRASONIC THICKNESS TESTING TECHNIQUE																
Instrument Mfg: <u>Landmark</u>		Model: <u>UM-1D</u> Serial No: <u>5102212</u>		Cal. Date: <u>1/15/2019</u>												
Transducer Mfg: <u>Landmark</u>		Transducer Frequency: <u>5</u> MHz		Due Date: <u>1/15/2020</u>												
Transducer Size: <u>.250"</u>		Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line														
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)																
Scan Description: <u>Thickness readings; looking for wall loss</u> Max. Scan Rate (in./sec.): <u>N/A</u> Scan Overlap %: <u>N/A</u>																
Couplant Brand or Type: <u>Sonagel</u>		Remarks:														
PART DESCRIPTION																
Material: <u>C/S</u>		Thickness: <u>.500"</u>														
Inspection Area Description: <u>24" x .500wt pipe</u>																
Surface Condition: <u>Clean</u>																
Surface Preparation: <u>Coating removed and brushed</u>																
Temp. of Part and Cal. Block within ± 25°F of each other: ☒																
Calibration Block No: <u>3972</u>		Material: <u>C/S</u>														
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width: 30%;">Step 1</th> <th style="width: 30%;">Step 2</th> <th style="width: 40%;">Time</th> </tr> <tr> <td>Cal Block Actual Thickness: <u>.250"</u></td> <td><u>1"</u></td> <td></td> </tr> <tr> <td>Cal. Reading at Start: <u>.250"</u></td> <td><u>.500"</u></td> <td><u>10:30AM</u></td> </tr> <tr> <td>Cal. Reading at End: <u>.250"</u></td> <td><u>.500"</u></td> <td><u>2PM</u></td> </tr> </table>			Step 1	Step 2	Time	Cal Block Actual Thickness: <u>.250"</u>	<u>1"</u>		Cal. Reading at Start: <u>.250"</u>	<u>.500"</u>	<u>10:30AM</u>	Cal. Reading at End: <u>.250"</u>	<u>.500"</u>	<u>2PM</u>
Step 1	Step 2	Time														
Cal Block Actual Thickness: <u>.250"</u>	<u>1"</u>															
Cal. Reading at Start: <u>.250"</u>	<u>.500"</u>	<u>10:30AM</u>														
Cal. Reading at End: <u>.250"</u>	<u>.500"</u>	<u>2PM</u>														
Gate Height: _____ %		☒ Not Applicable														
Gain: _____ dB		☒ Not Applicable														
THICKNESS READINGS																
1	21	41	61	81												
2	22	42	62	82												
3	23	43	63	83												
4	24	44	64	84												
5	25	45	65	85												
6	26	46	66	86												
7	27	47	67	87												
8	28	48	68	88												
9	29	49	69	89												
10	30	50	70	90												
11	31	51	71	91												
12	32	52	72	92												
13	33	53	73	93												
14	34	54	74	94												
15	35	55	75	95												
16	36	56	76	96												
17	37	57	77	97												
18	38	58	78	98												
19	39	59	79	99												
20	40	60	80	100												
SKETCH / PICTURE / REMARKS - AS NEEDED																
Drive from Storm Lake, IA.....																
BILLING ADDRESS: Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbe MD 21045																
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN												
				Darrell Powell												
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE												
Steve Bruskiewicz (262)305-5238		550	10	0												
		OTHER EMPLOYEES & LEVEL														
		Kenny Cox 1														
Form UTT Report 14-06		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.														
		JANX (517) 531-8210 P.O. Box 190 Parma, MI 49269														

APPENDIX C: Forcemain Evaluation Methods

Transient Pressure Monitoring

The occurrence of pressure transients within a pressure pipeline can have adverse effects on the integrity of a pipe section as they can cause damage such as fatigue stress or even a pipe failure depending on the magnitude of the transient and current condition of the pipe. Accumulated damage of this nature can eventually decrease the structural integrity of the pipe. Therefore, it is important to understand the frequency and magnitude of pressure transients in the 300 mm watermain to ensure that operational protocols can be implemented to maintain the pressures below the specified design. An understanding of the actual pressure in a line will also permit knowledgeable decisions regarding future modifications to the line or facilities that affect the performance of the pipeline.

Traditional pressure monitors collect data in intervals of seconds while transients may occur in fractions of seconds. Pure's transient pressure monitoring system addresses the sampling frequency issue by continuously monitoring pressure and while under normal operating conditions, only recording data every few minutes (based on user defined intervals). However, when a transient occurs in the pipeline, the device detects the transient and begins sampling at a high rate of up to 20 samples per second (20 hertz). This provides periodic pressure readings as well as data on transient events.

Pure requires the subject watermain to be in-service during the monitoring period. The transient pressure monitors require an existing 1/4-inch tap or larger for installation. Pure will install one monitor at location to be determined during the project planning, for thirty (30) days of monitoring. At the end of the data collection period, Pure will analyze the data and include the results in the final condition assessment report to client.



SmartBall[®] Technology

A free-swimming tool for long distance water and wastewater inspections

How SmartBall works?

The SmartBall[®] platform is a free-flowing tool for the assessment of pressurized water and wastewater pipelines 8 inches and larger. It can complete long assessments in a single deployment without disruption to regular pipeline service.

The tool is inserted into a live pipeline and travels with the product flow for up to 21 hours while collecting pipeline condition information. It requires only two access points for insertion and extraction, and is tracked throughout the inspection at predetermined fixed locations on the pipeline.

Applications

Owners of water and wastewater pipelines deal with a variety of infrastructure challenges; the SmartBall platform can collect a variety of pipeline condition information in a single deployment that helps owners manage their assets more effectively.

Leak Detection

The tool is equipped with a highly sensitive acoustic sensor that can detect pinhole-sized leaks on pressurized pipelines. The SmartBall platform has been able to identify leaks as small as 0.028 gal/min (0.11 liters) and has a typical location accuracy of within 6 feet (1.8 meters).

Gas Pocket Detection

The acoustic sensor is also able to identify the sound of trapped gas within pressurized mains. The presence of trapped gas can adversely affect pipeline flow or lead to degradation of the pipe wall in sewer force mains.

Inspection Benefits

- Easy to deploy through existing pipeline features
- No disruption to regular pipeline service
- Can complete long inspections in a single deployment
- Highly sensitive acoustic sensor that can locate very small leaks
- Can identify features relevant to the operation and mapping of the pipeline
- Indicates the position of leaks, and gas pockets relative to known points





PipeDiver[®] Condition Assessment

An innovative, free-swimming condition assessment tool that operates while a pipeline remains in service

PipeDiver Technology

The PipeDiver platform is ideal for critical large-diameter pipelines that cannot be removed from service due to lack of redundancy or operational constraints. It can be effectively deployed for long inspections on several types of pipe to determine baseline condition; on concrete pressure pipe, the tool can identify and locate broken wire wraps, which are the main indication that this type of pipe will eventually fail; for metallic pipes that utilize a steel cylinder as the main structural component, the tool can locate and detect areas of corrosion and cylinder defects.

When inserted into a live pipeline through a hot tap connection, an existing access or a submerged tank, the tool travels with the product flow and is able to navigate most butterfly valves and bends in the pipeline.

Inspection Benefits

- No disruption to regular pipeline service
- Long inspection distances can be covered in a single deployment
- Accurate results that pinpoint areas of distress help optimize repair planning
- Effective on a variety of pipe materials
- More cost-effective than methods that require shutdown and dewatering



PUBLIC HEARING NOTICE

The City of Storm Lake, Iowa, is hereby serving as Public Notice that on May 18, 2020, at 5:00 p.m., the City Council will hold a public hearing during the regular City Council meeting which will be conducted by electronic means to consider the submission of an application for a Community Development Block Grant. The grant application will request funding assistance for improvements to the City's sanitary sewer system, specifically improvements to Memorial Lift Station.

This meeting will be held to give residents information concerning the proposed project. Citizens are encouraged to attend and express their preferences about the proposed activities. The Council meeting will be held via electronic means and residents are able to provide comments in writing in advance of the meeting by email to martinez@stormlake.org or by mail to PO Box 1086, Storm Lake, IA 50588. Additionally, citizens who wish to participate in the public hearing can do so by phone by calling 1-408-418-9388 and using the access number 24570177. Anyone having questions about this project or requiring special accommodations at the upcoming hearing may contact the City Clerk at 712-732-8000.

Mayra Martinez
City Clerk
City of Storm Lake, Iowa

Staff Summary

5/18/2020

Agenda Item # 13.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Keri Navratil, City Manager

SUBJECT: **Resolution No. 75-R-2019-2020 Committing Matching Funds for CDBG Application for Memorial Lift Station Rehabilitation Project.**

BACKGROUND: The City applied for and is listed on the State of Iowa Drinking Water State Revolving Loan Fund Intended Use Listing at a not to exceed amount of \$1,331,625.

Memorial Lift station was originally built in 1983 and is an integral part of the wastewater system as 70% of wastewater flows through this lift station. The City intends to apply for a Community Development Block Grant (CDBG) to add redundancy to the system to ensure that that we do not bypass into the lake or to cause 70% of the community to not have access to the wastewater system.

FISCAL IMPACT: If awarded, the City of Storm Lake would be eligible to receive \$600,000 in Community Development Block Grant funds.

The City intends to utilize the State Revolving Loan Fund as the source for financing our share of the project

RECOMMENDATION: Approve Resolution No. 75-R-2019-2020

ATTACHMENTS:

Description	Type
□ Facility Plan	Backup Material
□ Resolution No. 75-R-2019-2020	Resolution



Dec 31, 2019

City of Storm Lake
Keri Navratil, City Manager
620 Erie St, PO Box 1086
Storm Lake, IA 50588

RE: Memorial Lift Station Improvements
City of Storm Lake
DNR Project No. S2019-0384A
CWSRF No. CS1920XXXXX (pending)

Subject: Facility Plan Approval

Dear Keri:

The Iowa Department of Natural Resources has reviewed the Facility Plan and all subsequent correspondence for the above-referenced project and is in agreement with the project as currently proposed. The Facility Plan is officially approved. When ready, please submit Plans and Specifications to the Department for review. Plans and Specifications shall be prepared in accordance with the approved Facility Plan. The following is a brief summary of the approved Facility Plan.

A new isolation valve on the force main discharge line, replacing pump #1 and #2 with the same capacity as the existing pumps, replacing the sump pump in the existing wet well, temporary bypass pumping, valves replacement, sluice gate installation in the wet well, other miscellaneous maintenance work.

The existing pumping capacity of Memorial lift station will not be changed.

ELIGIBILITY

The City has opted to utilize State Revolving Loan Funds (SRF) for financing the proposed project. Therefore, an environmental review (ER) is necessary to assess the environmental impacts of the project in accordance with procedures in 40 CFR Part 6 and is required for all loan recipients. A decision will be made by the department to determine if the project qualifies for a categorical exclusion (CX) or if a finding of no significant impact (FNSI) is required. The facility plan is approved conditionally based strictly on the technical review of the proposed project. Any significant project change resulting from the environmental review may require an amendment to the facility plan or a revised facility plan to retain eligibility for SRF funding. Construction of the project prior to the environmental review completion could jeopardize your SRF funding. Please contact DNR Environmental Review Staff for questions about the ER status.

Our approval does not eliminate the need for the city to comply with all federal, state and local regulations. This department must be notified of any change in your proposal and approve the change prior to incorporation in plans and specifications. Our approval of the Facility Plan is not an endorsement for funding. Additional coordination and documentation may be necessary before a loan agreement can be offered.

Please feel free to contact me at 515-725-8421 or email emy.liu@dnr.iowa.gov if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Emy Wenxin Liu".

(Emy) Wenxin Liu, PhD, PE
Project Manager
Wastewater Engineering Section

Encl.

c: ISG (508 E. Locust, Des Moines, IA 50309) (w/FP)
DNR FO 3 (Spencer, Iowa)
DNR Sewage File 6-11-78-0-01
SRF File CS1920xxxxxx (pending) (w/FP)

FACILITY PLAN MEMORIAL LIFT STATION

CITY OF STORM LAKE, IOWA
JUNE 2019



REPORT FOR:
City of Storm Lake
620 Erie Street
Storm Lake, IA 50588
712.732.8000

FROM:
Jason Kenyon, P.E.
ISG
508 E. Locust Street
Des Moines, IA 50309
515.243.9143
Jason.kenyon@is-grp.com

ISG

Facility Plan

Memorial Lift Station, Storm Lake, Iowa

Ownership of Document

This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of ISG, and is not to be used, in whole or in part, for any other project without the written authorization of ISG.

Project No. 19-22797

	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa. <u>Jason C. Kenyon</u> <u>7-19-2019</u> Jason C. Kenyon Date License Number: 25053 My License Renewal Date is 12/31/2019 Sections covered by this seal: <u>Entire Bound Report</u>
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Executive Summary

The City of Storm Lake's Memorial Lift Station was constructed in 1983 to convey wastewater from the previous wastewater treatment plant site to the new wastewater treatment plant approximately 2.5 miles southeast. Memorial Lift station was originally designed to convey all wastewater from the City. New lift stations on the west side of Storm Lake have diverted some flow away from Memorial Lift Station, but Memorial Lift Station still handles the majority of the City's Wastewater. Minor improvements have been made to the lift station since its original construction, but many of the most critical components are original and have been in operation for 35 years. Improvements are necessary in order for this critical lift station to continue to operate reliably. Improvements identified in this facility plan include replacement of failing equipment, rehabilitation of the existing structure, modifications to comply with code requirements, and improvements for future operation and maintenance.

Minor improvements at the site, including removing vegetation, rerouting downspouts, and filling animal burrows are recommended to help maintain access and prevent future degradation to the structure. Filling the animal burrows under the transformer pad is critical due to the potential for animals to damage the electrical service conductors and interrupt power to the lift station. The total estimated cost for the recommended site improvements is \$1,800.

In order to make the recommended improvements inside memorial lift station, a new isolation valve will need to be installed on the force main discharge and the flow bypass pumped around the lift station. Work will need to occur during dry weather periods to reduce bypass pumping costs during construction. The estimated cost for installing the isolation valve and temporary bypass pumping is \$150,000.

Process improvements at Memorial Lift Station include replacement of valves that are in poor condition and failing, recoating the existing piping, and modifying the wet well configuration to reduce stagnant wastewater and solids deposition that contributes to hazardous and corrosive gases. The estimated cost for the process improvements is \$327,000.

The existing pumps at Memorial Lift Station include two 60 horsepower duty pumps and three 300 horsepower peak flow pumps. All five pumps are the original pumps that were installed when the lift station was built in 1983. One of the smaller pumps is inoperable and the other small pump runs continuously. The three peak flow pumps only run during heavy rain events when there is significant infiltration and inflow in the collection system. Replacement of the two 60 horsepower pumps is recommended as these pumps handle the majority of the flow at the lift station. Replacement of the larger pumps was also evaluated, but the existing pumps are still in good condition due to their low run time. The estimated cost of replacing the two 60 horsepower pumps is \$180,000.

Structurally, Memorial Lift Station is in serviceable condition. However, repairs are required to make the structure weather tight, replace protective coatings, and patch minor degradation of the concrete

structure. Filling and abandoning the unused grit chamber will help reduce stagnant wastewater as well. The estimated cost of the structural rehabilitation is \$260,000.

There are several HVAC components at Memorial Lift station that have failed or do not meet current code requirements. Replacing the failed ventilation components is critical for protecting operations staff from hazardous conditions. Additionally, the increased ventilation will protect electrical systems and metal components from corrosive gases. The estimated cost of the HVAC improvements is \$177,000.

The location of the existing water service lines at Memorial Lift Station create a significant risk to the electrical system. Rerouting water and drain lines away from electrical components is necessary to prevent catastrophic damage to the motor control center in the event of a pipe break. The water circulation pumps for the boiler heating system are also failing and should be replaced with newer variable speed pumps that will provide greater reliability and efficiency. The estimated cost of the plumbing repairs and improvements is \$74,000.

The existing motor control center at Memorial Lift Station are in poor shape due to age and exposure to water and corrosive gases. Some components of the electrical system do not meet current electrical codes. Replacement of these components is crucial for providing reliable power to the pumps. Additionally, replacing the existing florescent and high pressure sodium lights with LED lights can provide some energy savings and provide longer bulb life, reducing operator time required to maintain the lighting system. The estimated cost of the electrical improvements is \$318,500. The additional estimated cost for replacing and adding LED lighting is \$36,000.

The Controls system at Memorial Lift Station is in poor condition and replacement components for the existing system are no longer manufactured. Complete replacement of the controls system is required to ensure continued operation. Additionally, the new control system will provide better monitoring and remote operation of the lift station. New systems to monitor ventilation and hazardous gases are also necessary to protect operations staff. The estimated cost for the controls improvements is \$225,000.

The total estimated project cost, including contingency and non-construction costs, is \$2,275,000. The City of Storm Lake intends to apply for a Community Development Block Grant (CDBG) for \$600,000 and use a State Revolving Fund (SRF) loan for the remaining balance of \$1,675,000.

Due to the need for bypass pumping during construction, the proposed work must be done during a dry weather period. The preliminary project schedule includes bidding the project in spring 2020 to allow for equipment procurement lead time over summer 2020 and installation during bypass pumping in fall 2020.

Introduction

BACKGROUND

The City of Storm Lake's Memorial Lift Station was originally constructed in 1983 at the site of the City's previous wastewater treatment plant. The lift station was designed to convey all of the City's wastewater to the new wastewater treatment plant approximately 2.5 miles southeast. After construction of the lift station, force main, and new wastewater treatment facility, the old wastewater treatment facility was demolished. Minor improvements have been made to Memorial Lift Station since its original construction. An activated carbon odor control system and a diesel backup generator were installed in 2008. The mechanical bar screen and grit removal equipment were removed and a new grinder was installed in 2016. Most of the existing equipment is original to the lift station construction and has been in service for 35 years.

SCOPE OF WORK

Due to the age, condition, and criticality of Memorial Lift Station, the City of Storm Lake retained ISG to evaluate the condition of the lift station and prepare this facility plan. ISG evaluated the condition of the site, process equipment, structure, HVAC, plumbing, electrical, and controls systems to identify deficiencies that are currently or could in the future impact the operation of Memorial Lift Station. ISG then prepared an evaluation of proposed improvements to address those deficiencies and ensure Memorial Lift Station continues to operate reliably.

Existing Conditions and Deficiencies.

SITE

The City still owns the entire eight acre site of the previous wastewater treatment plant, which has since been demolished, and uses the open areas around the lift station for material and equipment storage. An eight foot fence with barbed wire follows the perimeter of the below-grade lift station structure and secures the above-grade entrances to the lift station. The parcels surrounding the lift station site are light industrial sites and the municipal cemetery. The Chicago Central and Pacific Railway line borders the site to the north. The nearest residential structure is approximately 1,300 feet east of the lift station.



Figure 1: Memorial Lift Station Site and Location

Around the exterior of the lift station, animals have burrowed holes at several locations below stoops and the transformer pad. These holes should be filled and measures taken to prevent future unwanted excavations. Vegetation has grown up around the building slab as well, hindering maintenance access. The roof gutter downspouts are not connected to a sufficient outlet and several of them discharge directly to the ground immediately next to the lift station. This likely contributes to water accumulation and seepage into the lift station. For proper drainage, the downspouts should be directed further away from the building exterior.



Figure 2: Animal Burrows, downspouts, and vegetation around lift station exterior

A summary of the site deficiencies identified is provided below:

- Animal burrows are present in several locations around the building exterior.
- Vegetation has grown up in several locations around the building exterior.
- The downspouts discharge directly adjacent to the lift station.

PROCESS

Flows

The original design flow rates for Memorial Lift Station are listed in Table 1 below. In 2014, additional lift stations were constructed around the western perimeter of Storm Lake which diverted a significant portion of the City's wastewater away from Memorial Lift Station.

Table 1: Memorial Lift Station Design Flow Rates

Flow Condition	Flow, MGD
Average Dry Weather	1.80
Average Wet Weather	3.34
Maximum Wet Weather	6.20
Peak Hourly Wet Weather	15.80

Influent flow at the lift station is measured by a parshall flume with a totalizing flow meter. The totalizer reading is periodically recorded in a log book at the lift station. Therefore, hourly flow data is not available for this lift station. The Flow rate data recorded between June 2015 and August 2016 is summarized in Figure 3 below. The peak average daily flow observed during this period was approximately 7.72 MGD, and the majority of the average daily flows were below 3 MGD. With the limited data available, it appears that flow rates are within the original design capacity for the Lift Station. Therefore, the existing design capacity is considered adequate and proposed improvements will maintain the existing capacity.

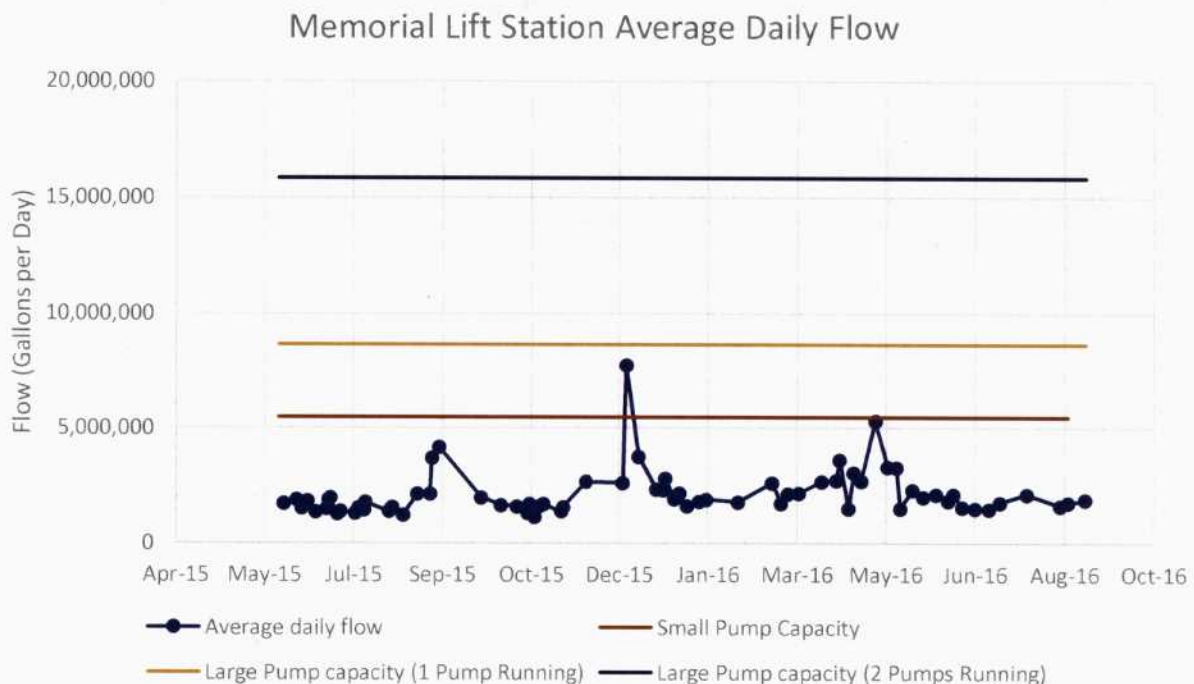


Figure 3: Recorded Flow May 2015-Aug 2016

Pumps

Memorial Lift station includes two 60 horsepower pumps (one duty, one standby) for average daily flows, and three 300 horsepower pumps (two duty, one standby) for peak flows during significant precipitation events. The Design Points of the pumps are listed in Table 2 below. A plug valve on the discharge piping of one of the smaller pumps (Pump #1) has failed in the closed position, rendering the pump inoperable. A variable frequency drive has been installed on the other small pump (Pump #2).

Table 2: Pump Design Points

Pump	Flow, GPM (MGD)	Head, ft.	Motor horsepower	Notes
Pump #1	3,750 (5.4)	42	60	Inoperable due to failed valve.
Pump #2	3,750 (5.4)	42	60	Operates on a VFD
Pump #3	5,500 (7.92)	140	300	Pumps 3, 4, and 5 operate as one or two pumps in service, with one pump on standby.
Pump #4	5,500 (7.92)	140	300	
Pump #5	5,500 (7.92)	140	300	

The seal on Pump #2 was recently replaced with a new mechanical seal as well. While not required, the manufacturer recommends that seal water be supplied to the new seal. The seals on the three larger pumps (Pumps #3, #4, and #5) have recently been replaced with new mechanical seals that do not require seal water. The seal water system is old and degraded. Additionally, the seal water pumps and suction tanks are located in the electrical room, creating a hazard to the electrical equipment.



Figure 4: Seal Water System

Solids Handling

When the Memorial Lift Station was originally constructed, it included a mechanical bar screen and aerated grit removal. The screening and grit removal equipment were removed in 2011 and replaced with an in-channel grinder to grind solids which would then be pumped to the new headworks facilities at the wastewater treatment plant and removed there. The grinder is in good condition.

The grit chamber is now isolated from the flow path by stop plates installed in the inlet channel; however, during high flow events water backs up over the grit chamber discharge weir and fills the chamber, resulting in stagnant wastewater which is a significant source of hydrogen sulfide and odors. The hydrogen sulfide gases produced by the stagnant wastewater contribute to corrosion and worker health and safety issues.

Odor Control

An activated carbon odor control system was installed at Memorial Lift station in 2007 to capture gases generated in the screening chamber. Shortly after installation, the carbon media was exhausted and replacement of the media was deemed cost prohibitive. In order to help reduce odors, Hydrogen peroxide is now fed into the sewer upstream of the lift station from a building located approximately 100 feet to the west of the current lift station facility.

Wet Well

A figure of the wet well layout is included in Appendix A. The wet well is separated into two zones, with the suction piping for the smaller pumps in one zone (The Average Flow Wet Well) and the suction piping for the larger pumps in the other zone (the Peak Flow Wet Well). The two zones are connected by a 4 ft wide by 2 ft tall overflow opening and a lower 36" circular opening with a sluice gate. Flow enters the average flow wet well through three 18" circular openings at the base of the wall between the influent channel and the wet well. As incoming flows increase above the capacity of the smaller pumps, the water elevation rises and overflows into the Peak flow wet well, where the large pumps are activated to handle peak flows. Once the large pumps stop, a sump pump should dewater the peak flow wet well. However, this sump pump does not appear to be functioning, leaving stagnant water in the peak flow wet well. Replacing the sump pump requires an operator to enter the wet well as there is no access to the sump pump from above the wet well.

While not shown on the original plans, a pipe has been installed from the influent channel to the peak flow wet well. Based on the elevation of this pipe, it is assumed that it serves to bypass flow directly to the peak flow wet well during high flow events when the 18" openings into the average flow wet well are unable to hydraulically pass the influent flows.

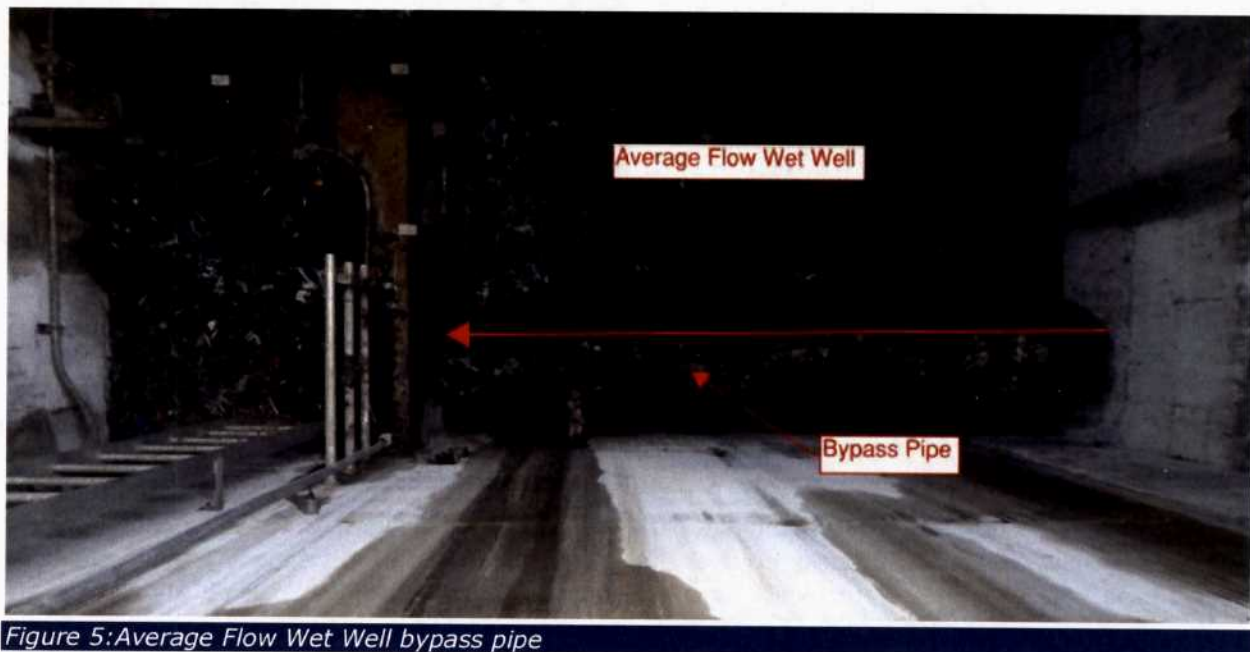


Figure 5: Average Flow Wet Well bypass pipe

Due to the large volume, solids are likely settling out in the wet well during low flow periods. This issue is exacerbated by limited accessibility for vacuum truck suction hoses to get into the wet well to remove solids and floating debris.

Suction/Discharge Piping

As shown in Figure 5 below, the existing piping in the drywell has some deterioration and corrosion. A non-destructive evaluation was performed on the piping in June 2019 to determine the condition of the pipe. The evaluation determined the pipe was still in good condition. A copy of the evaluation report dated June 4, 2019 is provided in Appendix B. The pipe supports are also rusting. The base plates of the pipe supports are frequently in contact with water on the floor of the pump room.

The plug valve on the discharge side of Pump #1 has failed in the closed position. A few of the check valves have broken lever arms as well. Replacing the pump isolation plug valves is currently not possible because there is no way to isolate the Lift Station piping from the rest of the downstream force main.



Figure 6: Pump Discharge Piping

A summary of the process deficiencies identified is provided below:

- Valve failure has made Pump #1 inoperable.
- The seal water supply system is old and degraded. Its location is a hazard to the electrical equipment.
- The grit chamber is unused and stagnant.
- The large wet well volume contributes to solids deposition.
- The sump pump in the wet well has failed and is difficult to access for maintenance.
- There is limited access for cleaning equipment into the wet well.
- The long residence time and solids deposition contribute to hydrogen sulfide gas production.
- The odor control media has been depleted and is no longer used.
- There is no way to isolate the average daily flow wet well for cleaning.
- The process piping and supports are corroded and need recoating.
- The suction and discharge valves are old and failing.
- There is no way to isolate the process piping for valve replacement.

STRUCTURE

The existing lift station consists of a below-grade cast in place concrete structure divided into several chambers. The top slab of the structure is at grade with several hatches for access and removal of equipment from the below-grade chambers. The above-grade structure consists of an older "corduroy brick" building with separate entrances to the stairwells into the electrical room and headworks room. A newer CMU building that houses the emergency generator and boiler is adjacent to the entrance building.

While the overall structure appears to be in serviceable condition, water infiltration has caused serious corrosion of metals and overall building degradation. Many surface coatings including paints, waterproofing, and insulation are visibly degraded and have exceeded their service lives. Due to such extensive water damage, it is recommended that all existing surface coatings should be removed and replacement coatings applied. The following sections discuss further recommendations for necessary repairs.

Exterior

The exterior fascia of the building is composed of corduroy brick that displays cracking and mortar deterioration. To prevent further damage, the cracks should be caulked. Additionally, tuck pointing is required at locations of mortar deterioration. An overhead door into the Generator room has significant corrosion and should be recoated or replaced.

A removable section of concrete slab is located in the roof of the headworks chamber for access to the grinder. Seepage around the slab has caused deterioration to the insulation on the interior ceiling of the lift station. Currently, a tarp has been placed over the slab in order to reduce seepage. Another access hatch is located on the East side of the lift station above the electrical room. A waterproofing membrane was previously installed on the slab surrounding the hatch. That membrane was damaged and currently sits in bundles on top of the slab, creating areas of water retention. Inside the electrical room, there are signs of water leakage through the existing access hatch.



The main access into the wet well is through hinged fiberglass panels. The steel support beams for the fiberglass panels show signs of corrosion. Additionally, one of the access openings is located immediately outside the door to the generator room, a significant safety concern.



Figure 8: Wet Well Access Panels

Upper Level

Multiple areas of the building show signs of roof leakage, causing damage to insulation, harboring mold growth, and rusting the metal roof deck. The roof shingles have likely exceeded their service life and require replacement.

Minor cracks are visible in the interior CMU walls in the above-grade entrance to the headworks chamber. This cracking needs to be sealed.

Electrical Room

The ceiling insulation in the electrical room exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced. The hatch above the electrical room is not sealed, causing leakage. The hatch should be replaced to prevent further water damage.



Figure 9: Electrical Room Ceiling

Pump Room

An overhead crane is located in the pump room for removal and reinstallation of equipment. The posted rating of the crane is two (2) tons, or 4,000 pounds. Equipment weights were not verified but the crane capacity is assumed to be adequate. The support beams for the crane show signs of spalling paint.



Figure 10: Existing Overhead Crane

The existing pipe penetration seals between the drywell and wetwell are significantly corroded. These seals are critical for keeping wastewater and sewer gasses from entering the drywell.



Figure 11: Drywell Pipe Penetration Seals

The concrete slab that composes the ceiling of the pump room contains cracking. These cracks may exacerbate moisture conditions and should be repaired. The floor slab in the pump room shows significant deterioration due to standing water.



Figure 12: Pump Room Ceiling Cracking and Floor Slab

Headworks Chamber

There is an existing elevator that was used to remove the screening dumpster when the mechanical bar screen was in service. The elevator has stopped functioning and without the screening system it has limited usefulness. Adjacent to the elevator is a metal spiral staircase. The tight curvature of the spiral staircase makes it difficult for materials to be carried into the headworks chamber. City Operators have indicated a preference for both the elevator and spiral staircase to be replaced with a straight staircase with an intermediate landing, similar to the stairway into the pump room.



Figure 13: Elevator and Spiral Staircase

The ceiling insulation in the Headworks Chamber exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced.

The existing grating above the open channels does not cover the entire opening at several locations. This presents a safety hazard. All grating should be replaced with solid panels that cover the entirety of the openings. The solid panels will also help to direct gases to an HVAC/hood area.

The concrete channel walls are pitted and spalled, likely due to hydrogen sulfide gases. Continued erosion of the walls could affect the function of the channel. The walls need to be repaired.



Figure 14: Headworks Chamber Ceiling and Channel concrete spalling

A summary of the structural deficiencies Identified is provided below:

- There is minor exterior and interior cracking in the above-grade masonry buildings.
- The exterior hatches in the top slab leak.
- The access hatch into the wet well is located directly in front of generator room door.
- There are interior signs of roof leakage.
- There is significant moisture damage to the interior ceiling insulation.
- The pipe penetration seals between the wet well and dry well are significantly degraded.
- Interior paints and coating systems have degraded.
- The elevator is non-functional and the spiral stairway hinders maintenance access.
- Gaps in the headworks channel grating are a safety hazard.
- There is concrete spalling and deterioration in the headworks channel.

HVAC

The Drywell, headworks chamber, and generator room are all separately heated and ventilated. The drywell is ventilated by an exterior exhaust fan and heated by an electric furnace. The headworks chamber is ventilated by a large air handling unit that includes an activated carbon scrubber for odor control as previously discussed. The headworks chamber is heated by a gas-fired boiler supplemented with an electric unit heaters. The generator room is heated by an electric unit heater but has no active ventilation.

Exterior

The ductwork wrapping on all exterior ductwork is peeling off and in some locations barely attached to the duct. The dampers and actuators associated with the odor control system are rusted through and unusable. The make-up air unit is missing a handle on the shut off panel.

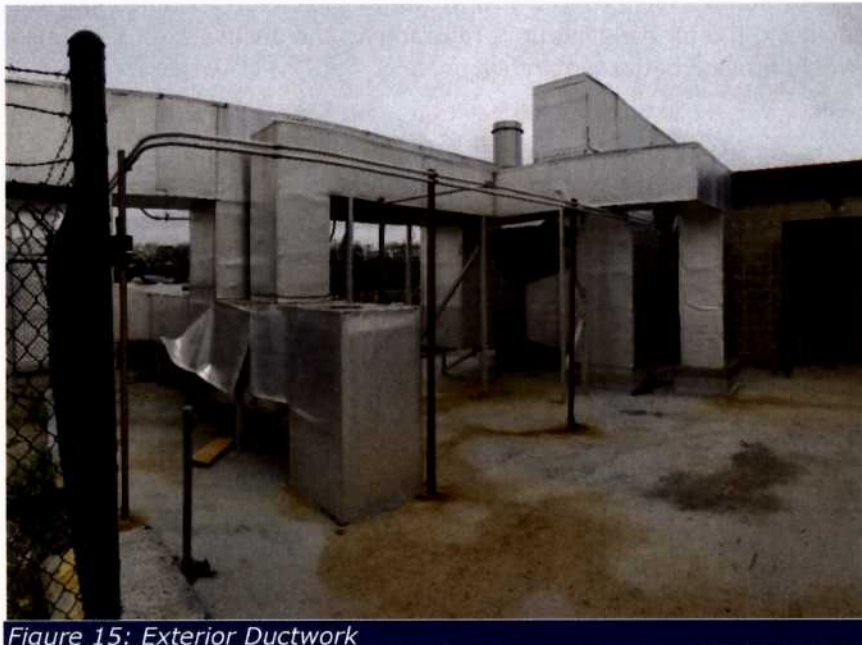


Figure 15: Exterior Ductwork

Emergency Generator Room

The electric heater hanging in the corner of the room is not working. City Staff have indicated that the electrical breaker for the heater trips very frequently. The condition of the heater itself seems to be OK. The seal around the generator exhaust pipe where it penetrates the building wall is visibly broken and should be resealed to prevent rainwater from leaking into the building. There is no active ventilation in the space, however the interior space does not appear to show any significant degradation. There is likely some passive air movement occurring through the large intake and exhaust louvers.

While the boiler appears to be in good working condition, the current location of the boiler in the generator room conflicts with NFPA 110, Standards for Emergency and Standby Power Systems. The code does not allow for other equipment that is not directly related to the generator function to be located in the generator room. To comply with code the boiler will need to be relocated or the space separated into 2 adjacent spaces. Functionally, the large amount of air required by the generator likely starves the gas-fired boiler of oxygen when the generator operates. This could lead to significant issues during a winter power outage.

There is an exhaust duct running through the room that is pulling air from the Electrical Room and Lower Pump Room. The duct will have to be separated from the generator room to comply with NFPA 820 requirements.

Electrical Room and Pump Room

There is currently no dehumidification in the space, and the walls are showing signs of damage from moisture. The exhaust fan that serves this space is currently non-functional. Additionally, there is no air intake louver, limiting the supply of fresh air to the space. Per NFPA 820, if the space is not ventilated with outside air, the space is classified as Class 1, Division 2, Group D, and the electrical equipment would require additional explosion protection. Providing a minimum of six (6) air changes per hour is required to declassify the space. Without the exhaust fan, the air-handling unit is only recirculating air, and the diffusers are mounted high and throwing air horizontally. In the lower pump room, the single exhaust grille is located high up, right below ceiling height. It may not be effectively exhausting the air from the bottom of the room. Replacing the air handling unit, rearranging the ductwork, and installing new downward facing diffusers would provide better air circulation.

Headworks Chamber

The headworks chamber is ventilated by the large air handling unit located outside the lift station. The exhaust duct and hood over are in poor condition. The supply duct appears to be in good condition but could be cleaned, both inside and outside. The explosion proof heaters appear to be out of order. There are no dehumidification measures in the space. Dehumidifiers could help reduce moisture damage to the interior surfaces and insulation.

Per NFPA 820, spaces like the headworks chamber with open wastewater channels are classified as Class 1, Division 1; unless ventilation is provided at 12 air changes per hour. If adequate ventilation is provided, the classification is reduced to Class 1, Division 2, and the requirements for explosion protection are reduced. Based on the documentation provided by the City on the existing air handling unit, adequate ventilation is being provided to reduce the classification in the headworks chamber.



Figure 16: Headworks Chamber Exhaust Hood and Duct

Wet Well

The wet well is actively ventilated by the exhaust fan of the air handling unit used for the headworks chamber. An intake hood is located in the top slab of the wet well and an exhaust duct passes through the wall into the headworks chamber. Based on the information provided by the City, the ventilation in this space does not appear to be adequate to reduce the classification. Therefore, the space is considered a Class 1, Division 1 space.

A summary of the HVAC deficiencies identified is provided below:

- The duct wrap on exterior ducts is degraded.
- The dampers and actuators on the exterior ductwork are rusted and non-functioning.
- The heater in the generator room is not functional due to an electrical issue.
- The seal on the generator exhaust pipe has cracked.
- The boiler located in the generator room violates NFPA 110.
- The exhaust vent passing through the generator room from the electrical room violates NFPA 820.
- There is no dehumidification to reduce moisture damage in several spaces.
- The exhaust fan for the electrical room and pump room has failed.
- There is no intake louver for the electrical room or pump room.
- The ductwork configuration in the pump room is inadequate for proper air circulation.
- The exhaust duct in the headworks chamber is in poor condition.

PLUMBING

Plumbing at Memorial Lift Station consists of a water service line that enters the electrical room from the north. The water line serves a toilet, sink, a small water heater, and the pump seal water system, all located in the electrical room. The water line also serves two hose bibs in the headworks chamber and the pump room, as well as the boiler for heating the headworks chamber.

Boiler Water System

The pumps that circulate water for the boiler show significant corrosion. They are operating at constant circulation volume without a VFD. The connected water pipes are leaking. The air separator does not appear to have a blowdown.

The boiler drain is crowded and needs to be relocated outside of the generator room. The drain pipe passes through the floor slab into the electrical room below and is routed above electrical equipment, creating a potential hazard.



Figure 17: Boiler Circulation Pumps and Drain

Restroom Facilities

There are cold water lines running above the MCC to the restroom facilities, creating a significant potential hazard to the electrical equipment. The toilet, sink, and water heater are in poor shape and could be replaced or removed. The sanitary pipes from the toilet and sink are routed along the ceiling of the pump room below and through the wall into the wet well. The sewer pipes and check valves are in poor condition. City staff have indicated that the restroom facilities are rarely used.

Floor Drains and Sump Pump

The sump pump and associated piping located in the pump room are in poor condition. There is significant standing water in the pump room and the floor drain piping is likely obstructed.

A summary of the plumbing deficiencies identified is provided below:

- The boiler pumps are in poor condition.
- The boiler system should not be located in the same room as the generator.
- The duct from the electrical room should not be routed through the generator room.
- The water piping to restroom is routed above electrical equipment.
- The floor drains and sump pump in the lower pump room are in poor condition.

ELECTRICAL

General

There are several electrical conduits and associated supports throughout the lift station that are severely corroded. Many of these conduits are unused and should be removed. There are several penetrations through the structure for unused conduits that should be sealed after the conduit is removed to prevent leakage. The conduits that are to remain in service should be replaced or recoated, and stainless steel supports provided.

Electrical Service

The building is served by a 3 phase, 480/277 volt 4-wire electrical service. The utility transformer is located outside the building on the north east corner. Unfused service conductors are installed underground from the utility transformer and extend overhead in the electrical room before entering the service disconnect located in the center of the electrical room. The service conductors should be fused to meet current electrical code. The main breaker installed is rated for 1,200 amps. Based on actual energy usage from MidAmerican Energy the service has experienced up to 83% utilization. The service is at or near maximum capacity. Peak demand records were obtained MidAmerican from May of 2014 through April of 2019. Average demand was 156 KW, and the highest recorded usage was 618 KW in June of 2017.

Backup Generator

The facility's electrical service is backed up by a stationary diesel generator. The generator is installed inside the building in the generator room. A 480-volt panelboard serving the equipment in the generator room is located in the adjacent stairway/entrance into the electrical room. The panelboard appears to be in good condition. The generator is rated for 750 KW, has a 1200 amp breaker, and is manufactured by Cummins. The generator's rated capacity appears to be adequate for the highest recorded energy use from the Utility Power. The generator appears to be in good condition, and according to staff is in working order.

Electrical Motor Control Center/Gear

The main service enters a 1200 amp Westinghouse breaker in a motor control center (MCC) in the electrical room. Capacitors are installed above the MCC for power factor correction. There is an MCC mounted transfer switch which appears to be out of service. An ASCO brand transfer switch has been installed outside the MCC and is now in service. There is an existing 1200 amp main breaker installed in the MCC for the generator. The generator breaker is likely not required, and may or may not be in

service. An Allen Bradley 2100 series MCC is installed for motor control and 120/208 volt power distribution.

Considerable corrosion was noted on the MCC and related electrical equipment. None of the MCC sections are installed on housekeeping pads, and corrosion is present at the base of several MCC sections. Foul odor was observed in the electrical room due to the lack of outside air ventilation. City staff indicated a variable speed drive had previously been installed in the MCC to serve pump #5, but had since failed. The VFD was subsequently replaced with a soft starter.

The electrical room has likely been exposed to corrosive gases such as hydrogen sulfide. Corrosive gas exposure is likely responsible for the premature VFD failure and corrosion of soft metals in the MCC. Copper and aluminum are soft metals commonly used as conductors and used within circuit boards. Exposure to corrosive gasses has likely shortened the life of electrical components in the electrical room. Additionally, water lines, water tanks, and water pumps are located in the electrical room, creating a significant potential risk to the electrical equipment.



Figure 18: Existing Motor Control Center

Lighting

The dry well area utilizes florescent lighting. Several of the lights are out of service.

The original lighting in the Headworks chamber utilized high pressure sodium lights, and appear to be explosion proof. Two of the lights are not functioning. Two other lights in the Headworks chamber have been upgraded, and appear to be LED.

Florescent lighting is used in the generator room. One of three florescent lighting fixtures is not functioning.

No emergency lighting fixtures were observed in any areas. Emergency lighting with battery backup is essential for lighting egress paths in the event of a power failure.

There is only one exterior light fixture observed on the south side of the building. The fixture appears to be in poor condition and it is unknown if the fixture operational. Overall, the site and building exterior is not well lit. Additional exterior lighting could benefit both security and maintenance at the lift station.



Figure 19: Headworks Chamber Original Lighting (left) and new LED lighting (right)

Electrical Equipment/Fixtures

An electric hoist is located in the pump room for equipment removal. The hoist is powered by a 480 volt open bus bar running across the ceiling. The open bus bar is very close to the stair handrail, and can be reached from the stairwell. This is a significant electric shock hazard and a barrier should be installed to prevent accidental contact with the bus bar. The bus bar disconnect is also in poor condition.

The sump pump disconnect, control panel, and floats in the lower pump room are in poor condition.



Figure 20: Electric Hoist Bus Bar near stair handrail

Explosion Protection

Headworks Chamber

The headworks chamber is a Class 1, Division 2 rated space. Two significant deficiencies were noted that do not meet electrical code requirements for explosion protection in the space. The conduit to the Parshall Flume level sensor is not explosion proof, and is not properly supported. Additionally, a main junction box is located on the East wall of the headworks chamber. The junction box is an explosion hazard and should be removed. The conduits and circuits currently utilizing the junction box should be removed and re-installed directly to sources.

Wet Well

The Wet Well is a Class 1, Division 1 rated space. A PVC conduit is installed through the top of the wet well and runs back to the pump station control panel. The conduit is required to be explosion proof since it penetrates the wet well which is a hazardous space. There are also various unused conduits and conductors visible inside the wet well, penetrating the wet well top slab, and penetrating the north wall of the wet well into the electrical and pump rooms. Unused conduits should be removed, penetrations properly sealed, and conduits that are to remain must be explosion proof.

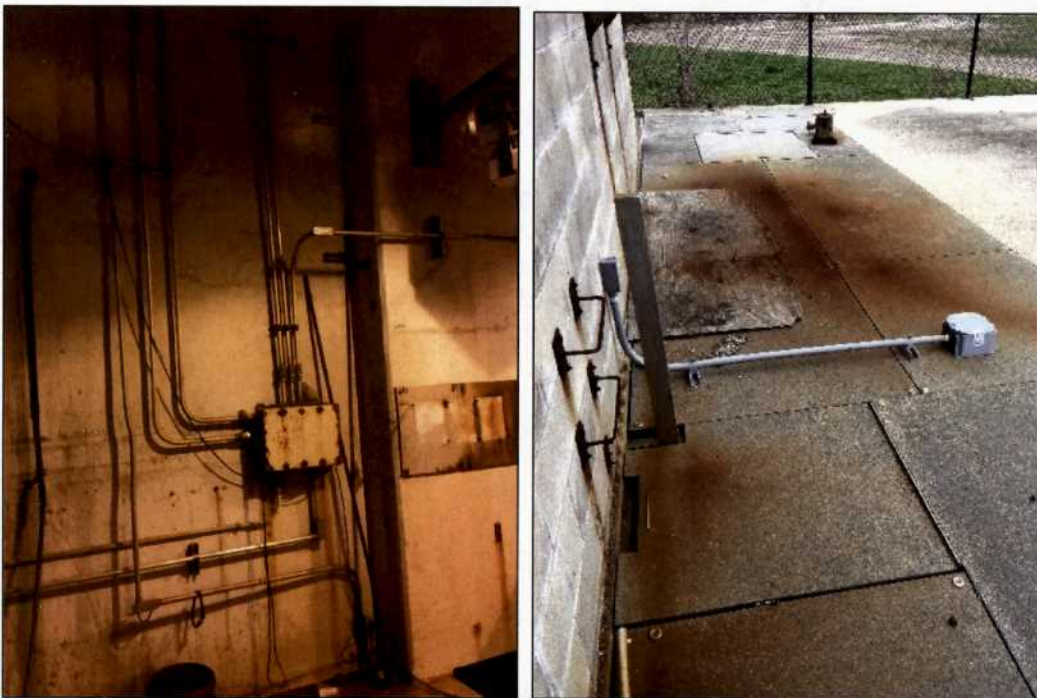


Figure 21: Main junction box in Headworks Chamber and Conduit Penetration into Wet Well

A summary of the electrical deficiencies identified is provided below:

- Several conduits and associated supports throughout the lift station are corroded and in need of replacement or recoating
- Many unused or failed electrical components remain and should be removed
- The service conductors are not protected by fuses
- The existing motor control center show signs of significant corrosion due to moisture and corrosive gas exposure.
- Several light fixtures are out of service
- There is limited exterior lighting.
- Electric shock hazard from the open bus bar powering the electric hoist.
- The sump pump disconnect is in poor condition.
- Several conduits in classified spaces are not explosion proof.

CONTROLS

Life Safety and Environmental Monitoring

Currently, there is very limited environmental monitoring at the Lift Station. It appears that a Fire Alarm System was installed in portions of the existing building, but is no longer in operation. There is currently no ventilation monitoring in the headworks chamber or drywell. Ventilation monitoring is critical in order to alert operators if a failure has occurred in the ventilation system that could create hazardous work conditions or allow the buildup of explosive gases. Additionally there are no permanent gas monitors installed in these spaces. Operators must currently enter the space and lower a gas monitor into the lower areas on a rope to test the air quality. Permanently installed gas monitoring can alert operators of hazardous conditions prior to them entering the space.

Supervisory Control And Data Acquisition

The existing pump control panel PLC is monitored by the water reclamation facilities Supervisory Control And Data Acquisition (SCADA) system over Ethernet. The city owns and maintains a fiber backbone that provides a connection between the lift station and the water reclamation facility. The fiber enters the electrical room and is converted to Category 5 Ethernet cable to make connection to the control system.

While the fiber connection has been installed to the lift station, there is limited data monitoring and control available from outside the lift station and few external alarms are generated to alert operators of critical conditions in the lift station. This is especially important since the facility is not staffed 24x7.

Pump Control System

The main control panel for controlling and monitoring the pump station is located in the electrical room. An Allen Bradley SLC500 Programmable Logic Controller (PLC) system is installed. SLC500 systems are nearing end of life status from the manufacturer. Some components within this family have been discontinued. Therefore, future maintenance of the control system will be difficult. Additionally, there does not appear to be any documentation of the control system at the lift station, making it very difficult to troubleshoot any problems.

A drain line is installed through the floor above the control panel, and water has infiltrated the control panel in the past causing damage. Overall the main control panel, components, and wiring are in poor condition and have reached end of life.



Figure 22: Pump Control System Panel

Grinder Controls

The grinder control panel is located in the electrical room. The system appears to be in good working order. There are signs that the operator interface was replaced with a smaller sized screen. There is currently no alarm to the SCADA system for grinder failure. A level sensor has been installed upstream of the grinder to alarm operators after debris buildup on the stopped grinder has caused the upstream water level to rise.

Instrumentation

Flow Measurement

Flow entering the lift station is measured by a parshall flume in the headworks chamber. The parshall flume level sensor is in poor condition. There is no data logging function in the flow totalizer, so flows can only be read by an operator at the lift station.

Level Measurement

A MultiTrobe level controller is utilized for monitoring the water level in the wet well, and is panel mounted in the control panel. This device has been discontinued by the manufacturer. The backup floats are not readily accessible in the wet well and should be replaced in a new location that is accessible without entering the wet well.

A summary of the controls deficiencies identified is provided below:

- There is no ventilation monitoring or hazardous gas monitoring in any of the spaces.
- There is only limited external monitoring and control through the SCADA system.
- The control panel is in poor condition and components have been discontinued by the manufacturer.
- There is no alarm for grinder failure.
- The flow measurement system has limited functionality
- The wet well level sensors have been discontinued and are difficult to access safely.

Improvement Options

Several improvement alternatives are proposed in order to address the deficiencies noted above. Improvements were categorized into three priority levels based on the following descriptions:

High Priority: Improvements are considered necessary for continued, reliable operation of Memorial Lift Station, code requirements, and addressing health & safety concerns.

Medium Priority: Improvements may not be necessary, but may improve performance, reliability, or efficiency of Memorial Lift Station

Low Priority: Improvements with limited benefit or low benefit to cost ratio.

SITE IMPROVEMENTS

Filling in the animal burrows around the lift station is considered a high priority due to the presence of animal burrows under the transformer pad. Animals may damage the service conductors and interrupt power to the lift station.

Removing the vegetation around the lift station and extending the downspouts are minor tasks that could be completed by City staff or incorporated into the overall improvements project and performed by a contractor.

A summary of the Proposed Site Improvements, including priority and estimated cost is provided in Table 3 below:

Table 3: Proposed Site Improvements

Description	Site Improvements		
	Priority	Recommended?	Estimated Cost
Fill in Animal Burrows	High	Yes	\$800
Remove vegetation around structure	Medium	Yes	\$500
Extend downspouts away from building	Medium	Yes	\$500
Total Recommended Improvements			\$1,800

PROCESS IMPROVEMENTS

Isolation Valve and Bypass Pumping Connection

Priority: High

Cost: \$150,000

In order to service the existing valves and wet well, an isolation valve on the common force main discharge and bypass pumping will be required. With the short lay length between the discharge tee of Pump #5 and the wall of the drywell, the valve and bypass connection will need to be located outside the lift station in a new valve vault. Two hot taps would be installed on the 24-inch force main. One tap will be used to insert an inflatable line stop and the other would be used as a discharge connection for bypass pumps. This would allow a new 24-inch plug valve to be cut into the force main for future isolation for bypass pumping. A new concrete valve vault structure would be built around the force main for future access. The estimated cost of installing the 24-inch isolation valve and bypass pumping for six weeks for construction of other improvements is approximately \$150,000.

For bypass pumping, it is anticipated that the work would be performed during a dry weather period (late fall or winter) and the flowrates would be at or below the capacity of the smaller pumps. Due to the very high peak flows that can occur at Memorial Lift Station during heavy precipitation events, attempting to perform this work in the spring or early summer is not recommended.

Pump Improvements

Several alternatives were evaluated for pump improvements. Because of the limited flow data available, the alternatives maintain the existing lift station capacity.

The use of new submersible pumps to replace the existing dry-pit pumps was also evaluated. However, submersible pumps were determined to be infeasible due to the configuration and layout of the existing wet well. The submersible pumps would need to be installed in the same location as the existing pump suction piping. This would place the access hatches for pump removal directly in front of the doors into the lift station. This location would also be very difficult to access with a lift to remove the pumps and place on a truck for service.

Submersible pumps installed in the existing grit chamber were also evaluated. However, this would leave the average flow wet well stagnant, resulting in the same issues with solids deposition and production of hazardous and corrosive gases. Therefore, maintaining the existing dry-pit pump configuration was deemed to be the simplest, most cost effective alternative for Memorial Lift Station.

Several alternatives were evaluated for the dry-pit configuration as described below. For the Smaller pumps, Alternative 1C, Replace both pumps #1 and #2 is the recommended alternative. Alternative 2, Replace Pumps #3, #4, and #5, is not recommended.

1A: Refurbish Pump #1

Priority: High

Cost: \$45,000

Pump #1 has not been operated in a significant time period and the condition is unknown. However, the pump could be refurbished with new bearings, seals, and impeller. The scope of refurbishment would be similar to the work that was recently done on Pump #2. The estimated cost for pump refurbishment is \$45,000. With this alternative, the seal water service would still be recommended. Additionally, the original pump motor would be used. A new VFD would be provided for the older motor with the MCC improvements. Because of the age, unknown condition, and criticality of Pump #1, this alternative is

not recommended. Even after refurbishment, the remaining life of pump #1 is likely limited. Additionally, the older pump is less efficient than a newer pump would be.

1B: Replace Pump #1

Priority: High

Cost: \$90,000

Given the age and cost of refurbishing Pump #1, full replacement of the pump may be more desirable. The replacement pump would be sized for the same design conditions as the existing pump to provide redundancy to pump #2. A new pump would run more efficiently, would not require seal water, and would include a VFD rated motor. Additionally, a dry-pit submersible pump would be less susceptible to degradation from moisture in the wet well. The estimated cost of replacing Pump #1 is \$90,000.

1C: Replace both Pumps #1 & #2

Priority: High

Cost: \$180,000

With pump #1 out of service, pump #2 has run almost continuously for several years. While Pump #2 was recently refurbished, it may be desirable to replace pump #2 as well. The remaining life of pumps #1 and #2 is likely limited due to their age and condition. Replacing both pumps #1 and #2 would provide the most robust upgrade for handling the average daily flow rates that the lift station experiences the vast majority of the time. Additionally, replacing both pumps would allow for the seal water system to be completely eliminated. The Estimated cost of replacing both pumps #1 and #2 is \$180,000. This option is the recommended alternative for the small pumps as it will provide the greatest reliability for the Lift Station.

2: Replace Pumps #3, #4, and #5

Priority: Low

Cost: \$630,000

Given the age of the existing large pumps, full replacement may be desirable. New pumps would be more efficient and could have slightly smaller motors than the existing pumps. (280 HP vs 300 HP) The estimated cost for replacing the three large pumps is \$630,000. Given the very low run time of the large pumps, the higher efficiency would not result in a significant energy savings. Additionally, the existing pumps were recently refurbished and noted to be in good condition for their age, likely due to the very low run time. Therefore, due to the high cost and limited benefit, replacement of pumps #3, #4, and #5 is not recommended.

Other Process-Related Improvements were evaluated as described below.

Replace peak flow wet well sump pump

Priority: Medium

Cost: \$10,000

The sump pump in the existing peak flow wet well is inoperable and is in need of replacement. The sump pump functions to dewater the peak flow wet well after high flow events and reduce the stagnant water in the wet well. Additionally, the sump pump cannot be accessed until the wet well can be isolated and dewatered, and all of the solids buildup and debris can be removed. Replacement of the sump pump can be accomplished once the cleaning is completed. New pump rails and chain could also be provided to allow the pump to be retrieved without entering the wet well. The estimated cost of replacing the sump pump, including new pump rails, is \$10,000.

Install Wet Well Isolation Gates*Priority: Medium**Cost: \$51,000*

Currently there is no way to isolate the AWW wet well for cleaning operations as solids deposition in the wet well contributes to odors and hydrogen sulfide gas formation. Flow enters the wet well from the influent channel through the three 18-inch diameter openings in the wet well west wall. The addition of three (3) sluice gates to these openings will provide the necessary isolation of the wet well from the incoming flows. These sluice gates will be equipped with a stem and riser operated by a gear driven hand wheel mounted on top of the wet well. The estimated cost for the Sluice Gates is approximately \$51,000.

Replace Pump Header Valves*Priority: High**Cost: \$231,000*

The failed 14-inch plug valve on Pump #1 must be replaced in order for Pump #1 to be used. It is also recommended that the other suction and discharge valves be replaced to prevent pump isolation due to valve failure in the future. In total, this includes replacement of four (4) 14-inch Plug valves, two (2) 14-inch check valves, six (6) 16-inch plug valves, three (3) 16-inch check valves, and one (1) 6-inch surge relief valve. The estimated cost for replacing these valves is \$231,000.

Recoat Discharge Header Piping*Priority: High**Cost: \$20,000*

While the evaluation of the discharge piping indicated that it was still in good condition, recoating is still necessary to prevent additional surface degradation of the piping. Sandblasting and recoating the piping with an epoxy coating system will ensure it remains in good condition for years to come. The estimated cost for recoating the piping is approximately \$20,000.

Install Hatches for Better Vector Truck Access into Wet Well*Priority: Medium**Cost: \$15,000*

Currently, access to both wet wells is through steel covers in each wet well lid. These doors are located in front of the main lift station building access doors. The distance from the gate at the perimeter of the lift station to the cover makes it difficult for vector truck equipment to reach the interior of the wet well for cleaning. Installing new access hatches near the fence would make it easier for cleaning equipment to reach into the wet well. The estimated cost for the new hatches is \$15,000.

Inspect 24-inch Forcemain to WWTP*Priority: Low**Cost: \$380,000*

While the piping in the drywell is in good condition, there is approximately 2.5 miles of ductile iron force main from the lift station to the WWTP. Pure Technologies can provide several evaluation tools to determine the condition of the existing force main. A description of these evaluation tools is provided in Appendix C. The internal inspection probes evaluate the pipe from the inside as it is pushed along with the flow, keeping the system in service during the inspection. The estimated cost of this evaluation is approximately \$380,000. Given the good condition of the piping that was inspected and the high cost of the additional inspection, this alternative is considered a low priority.

Relocate Hydrogen Peroxide Feed Equipment

Priority: Low

Cost: \$ 40,000

Relocating the existing hydrogen peroxide solution storage and feed system equipment to the existing lift station facility would provide easier access to the equipment from the lift station as well as added security for the equipment. The equipment would be located where the existing activated carbon filter is currently located and a new steel building would be required to house the equipment. One benefit of relocating the equipment to the lift station is that the chemical feed rate could be automatically adjusted based on the measured incoming flow rate.

However, other proposed improvements will significantly reduce the stagnant water at the lift station and could significantly reduce or eliminate the need for the hydrogen peroxide feed system. Feeding the hydrogen peroxide directly at the lift station would also eliminate the reaction time that is currently provided in the sewer between the existing feed point and the lift station. Therefore, this alternative is considered low priority. It is recommended that the chemical feed rate be evaluated after the improvements are completed to determine if chemical addition is still required or can be reduced.

A summary of the Process Improvements, including priority and estimated cost is provided in Table 4 below:

Table 4: Proposed Process improvements

Process Improvements			
Description	Priority	Recommended?	Estimated Cost
Force Main Isolation Valve and Bypass Pumping	High	Yes	\$150,000
1A: Refurbish Pump #1	High	No	\$45,000
1B: Replace Pump #1	High	No	\$90,000
1C: Replace Pumps #1 & 2	High	Yes	\$180,000
2: Replace Pumps #3-5	Low	No	\$630,000
Replace Peak Flow Wet Well Sump Pump	Medium	Yes	\$10,000
Relocate Peroxide Feed Equipment	Low	No	\$40,000
Replace Valves	High	Yes	\$231,000
Blast & Recoat Piping	High	Yes	\$20,000
Wet well Isolation Sluice Gates	Medium	Yes	\$51,000
New Hatches for Vactor Truck Access	Medium	Yes	\$15,000
Force Main Evaluation	Low	No	\$380,000
Total Recommended Improvements			\$657,000

STRUCTURAL IMPROVEMENTS

Replace Exterior Hatches

Priority: High

Cost: \$30,000

Replacing the hatches above the headworks chamber and electrical room will help prevent water from leaking into the building and causing further damage.

Rehabilitate Above Grade Structure

Priority: High

Cost: \$25,000

Rehabilitation of the above-grade structure include roof replacement, replacement of damaged ceiling insulation and metal decking, as well as mortar repair and crack sealing in the masonry walls. This will ensure the structure remains weather tight.

Replace Pipe Penetration Seals

Priority: High

Cost: \$10,000

The seals on the pipe penetrations into the wet well should be replaced while the lift station is being bypassed during construction. The piping may need to be temporarily supported while the seals are removed.

Repair Pump Room Ceiling Cracking

Priority: Medium

Cost \$5,000

While the cracking is not a structural concern, it should be patched and sealed to prevent potential degradation of the reinforcing steel.

Demolish Elevator and Spiral Staircase and Build New Stairway.

Priority: Medium

Cost: \$20,000

Removing the non-functional elevator and the spiral staircase will create space for a new stairway to be installed and improve access. The new stairway is anticipated to be aluminum or FRP to reduce future corrosion.

Fill in Grit Chambers

Priority: High

Cost: \$50,000

The Stagnant Grit Chamber will be filled in with sand and capped with a concrete slab. The stop plates that currently isolate the grit chamber will be replaced with new concrete walls. The Concrete wall for the effluent weir will be raised to completely eliminate the grit chamber. The smaller chambers for the grit equipment will also be filled in and capped to remove fall hazards.

Patch Spalled Concrete in Headworks Channel

Priority: High

Cost: 10,000

With the lift station taken out of service and bypassed during construction, the concrete channel should be repaired with cementitious or epoxy grout to prevent additional spalling and degradation.

Replace Grating with Solid Panels

Priority: Medium

Cost \$5,000

Replacing the open grating with solid panels that completely cover the headworks channel will eliminate trip hazards and help manage odors and humidity in the headworks chamber. FRP panels will provide corrosion resistance.

Replace ceiling Insulation

Priority: High

Cost: \$40,000

The molding insulation in the headworks chamber and electrical room should be completely removed and replaced with a new closed-cell insulation. While the insulation is removed, the underside of the concrete slab should be inspected for cracking or other degradation. Additional sealing may be necessary to prevent moisture from penetrating the slab and causing future water damage.

Recoat Interior Surfaces

Priority: High

Cost: \$60,000

The interior surface coatings should be removed and replaced to protect the structure and ensure it remains in good condition.

A summary of the Structural Improvements, including priority and estimated cost is provided in Table 5 below:

Table 5: Proposed Structural Improvements

Structural Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Exterior Hatches	High	Yes	\$30,000
Rehab above-grade masonry structure	Medium	Yes	\$25,000
Replace Pipe Penetration Seals between wet well and dry well	High	Yes	\$10,000
Repair Ceiling Cracking in Pump room	Medium	Yes	\$10,000
Demo elevator and spiral staircase and install new staircase	Medium	Yes	\$20,000
Fill in Grit Chamber	High	Yes	\$50,000
Patch spalled concrete in Headworks Channel	High	Yes	\$10,000
Replace Grating in Headworks Chamber	Medium	Yes	\$5,000
Remove and replace Ceiling Insulation	High	Yes	\$40,000
Recoat interior walls, floors, and ceilings	High	Yes	\$60,000
Total Recommended Improvements			\$260,000

HVAC IMPROVEMENTS

Replace Wrap on Exterior Ducts

Priority: High

Cost: \$14,000

The duct wrap is important both for protecting the ductwork from corrosion and also for maintaining heat for the heat exchanger. Replacing the wrap on the portions of ductwork to remain is highly recommended.

Demolish Odor Control Scrubber and Associated Ductwork.

Priority: High

Cost: \$10,000

The Odor control system is unused and it is recommended that it be removed. The associated ductwork and bypass dampers that are currently non-functional should also be removed. With the modifications to the ductwork, the air handling unit and heat exchanger should be rebalanced to ensure proper performance.

Repair/Replace Electric Unit Heater in Generator Room

Priority: High

Cost: \$1,000

As the only source of heat in the generator room, the electric unit heater should be repaired or replaced.

Separate Boiler from Generator Room

Priority: High

Cost: \$20,000

In order to comply with NFPA 110, the Boiler system cannot be located in the generator room. It may be feasible to separate the generator room into two spaces to comply with code requirements. Alternatively, a small enclosure could be constructed outside to house the boiler system.

Replace Drywell Exhaust Fan

Priority: High

Cost: \$11,000

A new exhaust fan is required to keep the electrical room declassified and meet NFPA requirements.

Reroute Drywell Ductwork

Priority: High

Cost: \$68,000

The ductwork in the drywell needs to be rerouted to provide adequate circulation in both the pump room and electrical room. Additionally, the ductwork need to be rerouted so as not to pass through the generator room. The new ductwork will exit through the north wall of the lift station and the existing wall penetrations closed with new CMU.

Add Dehumidifiers to Drywell

Priority: High

Cost: \$10,000

Adding commercial grade dehumidification units to both the pump room and electrical room are recommended to help reduce future moisture damage inside the lift station.

Add Intake Louver to Drywell

Priority: High

Cost: \$7,000

An Intake Louver should be provided in the drywell space to ensure adequate fresh air is being supplied.

Replace Exhaust hood and Duct in Headworks Chamber

Priority: High

Cost: \$ 27,000

Clean Supply Duct in Headworks Chamber

Priority: Medium

Cost: \$4,000

Add Dehumidifier to Headworks Chamber

Priority: Medium

Cost \$5,000

If solid covers are provided over the headworks channel, a commercial grade dehumidifier could be adequate for reducing moisture in the headworks chamber. If the channel is left uncovered with open grating, there will likely be too much moisture for the dehumidifier to provide a benefit.

A summary of the HVAC Improvements, including priority and estimated cost is provided in Table 6 below:

Table 6: Proposed HVAC Improvements

HVAC Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Wrap on Exterior Ducts	High	Yes	\$14,000
Demo Odor Control Scrubber and Associated Ductwork	High	Yes	\$10,000
Repair Electric Unit Heater in Generator Room	High	Yes	\$1,000
Separate boiler from Generator room	High	Yes	\$20,000
Replace Drywell Exhaust Fan	High	Yes	\$11,000
Reroute Drywell Ductwork	High	Yes	\$68,000
Add Dehumidifiers to Drywell	High	Yes	\$10,000
Add Intake louver to Drywell	High	Yes	\$7,000
Replace Exhaust hood and Ductwork in Headworks Chamber	High	Yes	\$27,000
Clean supply Duct in Headworks Chamber	Medium	Yes	\$4,000
Add Dehumidifier to Headworks Chamber	Medium	Yes	\$5,000
Total Recommended Improvements			\$177,000

PLUMBING IMPROVEMENTS

Replace boiler circulation pumps and appurtenances

Priority: High

Cost: \$37,000

Regardless of the final location of the boiler system, the circulation pumps should be replaced due to their condition. New pumps with variable frequency drives will allow the boiler system to operate more efficiently and ensure reliable heating is provided to the headworks chamber.

Relocate Water Piping outside of Electrical Room

Priority: High

Cost \$11,000

The water line entering the lift station in the electrical room should be rerouted away from the electrical equipment. The piping could be relocated over the stairwell and routed directly to the pump room. If water is still necessary for the bathroom facilities, the water piping could be routed along the ceiling of the pump room and up through the floor penetration where the piping currently passes down from the electrical room into the pump room.

Replace Bathroom Fixtures

Priority: Low

Cost: \$7,000

If the bathroom facilities are to remain, the fixtures could be replaced with newer fixtures. Additionally, a curb could be installed around the bathroom area to contain water and prevent it from reaching electrical components.

Demolish Bathroom Fixtures

Priority: High

Cost: \$1,000

It is recommended that the bathroom fixtures be demolished to eliminate the water source in the electrical room.

Replace Pump room Sump Pump

Priority: High

Cost: \$11,000

Due to the poor condition of the existing sump pump, complete replacement is recommended to reduce standing water in the pump room.

Rehabilitate Pump Room Floor Drains

Priority: High

Cost: \$14,000

The floor drains in the pump room should be jetted to remove blockages and ensure there is not standing water in the room. The drain covers should be replaced as well.

A summary of the Plumbing Improvements, including priority and estimated cost is provided in Table 7 below:

Table 7: Proposed Plumbing Improvements

Plumbing Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace boiler Circulation Pumps and Appurtenances	High	Yes	\$37,000
Relocate Water piping outside of electrical room	High	Yes	\$11,000
Replace Bathroom Fixtures	Low	No	\$7,000
Demolish Bathroom Fixtures	High	Yes	\$1,000
Replace Pump Room Sump Pump	High	Yes	\$11,000
Rehabilitate Pump Room floor Drains	High	Yes	\$14,000
Total Recommended Improvements			\$74,000

ELECTRICAL IMPROVEMENTS

Demolish unused conduits and electrical equipment

Priority: Medium

Cost: \$8,000

The unused conduits and electrical equipment should be removed for ease of construction and maintenance activities. Sealing the penetrations from unused conduits will help decrease water seepage and corrosive gases entering the electrical room from the headworks chamber and wet well.

Replace Electrical MCC/Gear

Priority: High

Cost: \$275,000

Due to the age and condition of the existing MCC, full replacement is recommended. This alternative includes VFD's for Pumps #1 and #2 and two-speed starters for Pumps #3, #4, and #5. A new housekeeping pad should be constructed prior to installation of the new MCC to protect them from any moisture present on the floors.

If the MCC is to be replaced, several ancillary improvements must also be made to bring the electrical service up to current code requirements. These improvements include replacing the electrical service entrance, replacing the main switchgear, and installing surge protection on the incoming power lines.

Lighting

Replace the explosion proof high pressure sodium light fixtures in the headworks chamber with LED type.

Priority: Medium

Cost: \$22,000

Replace existing interior and exterior light fixtures with LED type.

Priority: Medium

Cost: \$6,000

Install additional exterior LED light fixtures around the building for security and maintenance activities.

Priority: Medium

Cost: \$3,000

Install emergency lighting fixtures illuminating paths of egress inside and outside the building.

Priority: High

Cost: \$12,000

Install light pole on north side of building for additional security.

Priority: Medium

Cost: \$5,000

Guard Hoist Electrical Bus Bar

Priority: High

Cost: \$500

Adding an aluminum or non-metallic panel to shield the hoist electrical bus bar from accidental contact from the stairwell is an inexpensive but critical safety improvement.

Replace disconnects and conductors in Pump Room

Priority: High

Cost: \$15,000

Due to the age and condition of the disconnects located in the pump room, complete replacement is recommended. Existing disconnects to be replaced serve the hoist, sump pump. New disconnects should be installed for all five pumps as well. The copper wiring between the MCC and the electrical components is likely deteriorated as well and should be replaced when the disconnects are installed.

Replace Conduits in Headworks Chamber and in Wet Well with Explosion Proof Conduits

Priority: High

Cost: \$8,000

Demolish junction box and associated conduits that do not meet explosion proof installation. Install new conduits and conductors from headworks area to electrical room. Demolish and replace PVC conduit with rigid aluminum conduit, and install meeting Class I Division 1 requirements for hazardous locations.

A summary of the Electrical Improvements, including priority and estimated cost is provided in Table 8 below:

Table 8: Proposed Electrical Improvements

Electrical Improvements			
Description	Priority	Recommended?	Estimated Cost
Demo unused conduits and equipment	High	Yes	\$8,000
Replace MCC, Switchgear, and Service Conductors	High	Yes	\$275,000
Replace Explosion proof lighting in Headworks Chamber	Medium	Yes	\$22,000
Replace interior and exterior lights with LED lighting	Medium	Yes	\$6,000
Install additional exterior lighting on building	Medium	Yes	\$3,000
Install emergency egress lighting	High	Yes	\$12,000
Install new light pole near building	Medium	Yes	\$5,000
Guard hoist bus bar	High	Yes	\$500
Replace disconnects and conductors in pump room	High	Yes	\$15,000
Replace conduits in classified spaces with explosion proof conduits	High	Yes	\$8,000
Total Recommended Improvements			\$354,000

CONTROL IMPROVEMENTS

Replace Control and SCADA System

Priority: High

Cost: \$150,000

With the age and condition of the existing control panel, a completely new control system is recommended. The new control system would integrate the pump and grinder control, environmental monitoring, and flow measurement and allow for remote monitoring and control.

Install new ventilation monitoring and hazardous gas monitoring

Priority: High

Cost: \$25,000

Ventilation monitoring and hazardous gas detectors should be installed in both the headworks chamber and drywell. These systems are required by NFPA 820 and will alert operators of hazardous conditions prior to entering the lift station itself.

Replace Instrumentation

Priority: High

Cost: \$40,000

New level reading instrumentation in the lift station are necessary to accurately measure incoming flow and for controlling pump operation. If a new hatch is installed into the wet well, the backup floats could be relocated to be accessible from the hatch without entering the wet well. This instrumentation includes a new level sensor for the parshall flume, two new ultrasonic level sensors to monitor wet well levels, and new backup floats for the wet wells. These sensors would be connected to the new control panel for remote monitoring through SCADA.

Install additional environmental sensors

Priority: Medium

Cost: \$10,000

Installing Flood sensors in the headworks chamber and drywell can alert operators in the event of a pipe break, hydraulic backup or blockage, or other significant failure.

Temperature sensors in the headworks chamber and drywell can alert operators if there are extreme temperature conditions from a heating system failure prior to pipe freezing or electrical issues.

A summary of the Controls Improvements, including priority and estimated cost is provided in Table 4 below:

Table 9: Proposed Controls improvements

Control System Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Control and SCADA System	High	Yes	\$150,000
Ventilation and Hazardous Gas Monitoring	High	Yes	\$25,000
Replace Instrumentation	High	Yes	\$40,000
Install Flood and Temperature sensors	Medium	Yes	\$10,000
Total Recommended Improvements			\$225,000

Summary

SUMMARY

Memorial Lift Station requires several improvements to maintain reliable operation, meet current electrical and fire protection codes, and to protect worker health and safety. The recommended site improvements includes minor work around the perimeter of the lift station to address animals, vegetation, and drainage. Recommended process improvements include replacement of failed and failing equipment. Structural improvements include work to make the structure weather tight, reapply protective coatings, and patch minor concrete degradation. HVAC improvements include demolition of the unused odor control system, and improvements to ventilation in the drywell area to reduce hazardous gas buildup. Recommended plumbing improvements include replacement of the boiler circulation pumps and removal of the house water piping located above the electrical equipment. Recommended electrical improvements include complete replacement of the motor control center. Recommended Controls Improvements include complete replacement of the existing control system. A summary of the estimated costs is provided in Table 10 below.

Table 10: Summary of Estimated Costs for Recommended Improvements

Description	Estimated Cost
Site Improvements	\$1,800
Process Improvements	\$657,000
Structural Improvements	\$260,000
HVAC Improvements	\$177,000
Plumbing Improvements	\$74,000
Electrical Improvements	\$354,500
Controls Improvements	\$225,000
Subtotal	\$1,749,300
10% Contingency	\$175,000
Engineering, Legal, and Administrative Costs (Estimated 20%)	\$350,000
Total Estimated Project Cost	\$2,275,000

Financial Analysis

POTENTIAL FUNDING SOURCES

Community Development Block Grant

The Community Development Block Grant (CDBG) program is administered by the Iowa Economic Development Authority (IEDA) and allows municipalities to apply for grant funding on a competitive basis each year for water and wastewater improvements. The main criteria used in determining a community's grant eligibility revolves around the City's Low to Moderate Income (LMI) household percentage. To be eligible for funding, the community's LMI percentage needs to be greater than or equal to 51%. According to the IEDA's latest demographic information, the City of Storm Lake's LMI is 52%. Therefore, the City is eligible for a grant of up to \$600,000. The Grant requires a dollar-for-dollar local match, so in order to utilize the full \$600,000 the City would need to provide a minimum of \$600,000 in additional funding.

State Revolving Loan Fund, Clean Water Fund

The SRF is a revolving loan fund through the State of Iowa Finance Authority. Currently, the SRF interest rate is 1.75% for a 20-year loan. In some cases the loan term can be extended to 30 years if the project being funded has a lifespan greater than 30 years. Currently, 30-year rates are 2.75%. SRF loans have a 0.25% annual service fee, thus 2.00% and 3.00% should be expected for the 20-year and 30-year loan rates, respectively. This funding is subject to Federal Davis Bacon Prevailing Wages and has American Iron and Steel Requirements.

The SRF loan program also provides communities to apply for Disadvantaged Status. For clean water projects, the IDNR looks at the community's Median Household Income (MHI), number of rate payers, current and projected debt, along with additional criteria to determine eligibility. If determined eligible, the community can utilize the 30-year term at a discounted rate of 2.00%. The project is still subject to Federal Davis Bacon Prevailing Wages and American Iron and Steel Requirements.

The SRF loan program requires the City to enlist the services of a Municipal Advisor (MA) in order to be eligible for funding. The SRF will reimburse the City \$4,000 for the services of the MA. The MA's assistance is required through the program in an effort to ensure the City has the ability to repay the new debt service while maintaining a healthy wastewater fund balance. To meet the ability of the debt, an adjustment to sanitary sewer rates will be required to maintain a 1.10% debt coverage ratio. This means that the City needs to generate at least 10% more revenue than expenditures for the entire wastewater system on an annual basis.

State Revolving Loan Fund's Planning and Design Loan

SRF offers a Planning and Design (P&D) Loan that is a 0% interest loan for up to three years with no initiation or servicing fees. The P&D loan is intended to be utilized to pay for costs to produce reports such as this Facility Plan, legal/administration fees as necessary, and engineering design of the selected alternative. At the end of the three-year period (or before), the P&D loan can be rolled into a SRF Construction Loan.

SRF Sponsored Project Grant

SRF allows sewer utilities to finance water resource restoration sponsored projects in conjunction with a Clean Water Fund loan of \$1 million or more. On a Clean Water Fund loan with a sponsored project, the utility borrows money for both the wastewater improvements and the water resource improvements. However, SRF reduces the interest rate on the loan so that the debt service payment is the same as if only the wastewater improvements were funded. This effectively provides a grant for the water resources improvements. Total Sponsored Project funding is capped statewide and applications are selected on a competitive basis each fiscal year.

Sponsored Project funding is available up to the lowest of the following:

- 10% of the requested Clean Water Fund loan amount.
- 10% of the final amount of the Clean Water Fund Construction loan.
- The amount requested on the sponsored project application.

Therefore, the City of Storm Lake could be eligible for approximately \$172,000 for water resources restoration projects in conjunction with the anticipated SRF Clean Water Fund Loan for the Memorial Lift Station Improvements. In order to be eligible for a Sponsored Project Grant, the City would need to identify project(s) and apply by March 2020. The Sponsored Project application would need to be closely coordinated with the Clean Water Fund Loan in order to maintain eligibility.

FINANCING SCENARIOS

The City plans to apply for a Community Development Block Grant (CDBG) to fund a portion of the project. The City is eligible for up to \$600,000 from CDBG for this project. The remaining balance will be funded through a State Revolving Fund (SRF) Loan. It has not been determined if the City qualifies for disadvantaged community status at this time. Table 11 shows the estimated annual payments that the City would make based on each funding scenario. The financing evaluation does not incorporate the additional 10% revenue that the City must generate for its own wastewater fund as required by SRF.

Table 11: Financing Scenarios

Program	Rate Term	Grant	Loan	Estimated Annual Debt Service ¹	Total Principal + Interest Paid
SRF 20-Year	2.00% 20-Year	-	\$2,275,000	\$138,000	\$2,762,000
SRF 20-Year + CDBG	2.00% 20-Year	\$600,000	\$1,675,000	\$102,000	\$2,034,000
SRF 30-Year	3.00% 30-Year		\$2,275,000	\$115,000	\$3,453,000
SRF 30-Year + CDBG	3.00% 30-Year	\$600,000	\$1,675,000	\$85,000	\$2,542,000
SRF Disadvantaged ²	2.00% 30-Year		\$2,275,000	\$101,000	\$3,027,000
SRF Disadvantaged ² + CDBG	2.00% 30-Year	\$600,000	\$1,675,000	\$74,000	\$2,229,000

1 Does not include 110% debt coverage ratio required by SRF.

2 Disadvantaged community eligibility to be determined.

Final Considerations and Preliminary Schedule

Based on the evaluation described in this report, it is recommended that the City of Storm Lake proceed with the listed improvements to Memorial Lift Station. The Recommended Financing Scenario is a Community Development Block Grant for \$600,000 with an SRF loan for the remainder of the project cost. If desired, the City could evaluate if they qualify for disadvantaged community status and a longer loan term. The City can also apply for an SRF Sponsored Project grant to fund a water resources improvement project based on the wastewater loan. The preliminary project schedule is as follows:

July 2019	Submit Facility Plan to Iowa DNR
August 2019	Begin Final Design
September 3, 2019	SRF IUP Application Deadline
October 1, 2019	CDBG Application Deadline
December 17, 2019	SRF IUP Approval
December 2019	CDBG Grant Award
January 2020	Submit Final Plans & Specifications to Iowa DNR
March 2020	Issue Plans & Specifications for Bidding
April 2020	Award Contract
Summer 2020	Contractor Procures Equipment and Materials
October 2020	Begin Bypass Pumping and Lift Station Improvements
December 2020	Substantial Completion,
March 2021	Final Completion

APPENDIX A: Existing Lift Station Drawings



APPENDIX B: Pipe Non-Destructive Testing Report

June 4, 2019

Mr. Mark Streed
City of Storm Lake
P.O. Box 1086, 620 Erie Street
Storm Lake, IA

**Subject: 24-inch Ductile Iron Pipe Header, Memorial Lift Station
Ultra Thickness Testing Results Report Letter**

Dear Mr. Mark Streed:

This letter details the findings from the Ultra Thickness Testing (UTT) conducted by Jan X-Ray Services Inc. (JanX) under the direction of Pure Technologies U.S. Inc., a Xylem Brand (Pure Technologies) of the 24-Inch Ductile Iron Pipe (DIP) header at the Memorial Lift Station in Storm Lake, Iowa. The lift station is owned and operated by the City of Storm Lake, Iowa.

Background and Location

The lift station header piping was originally installed in 1983 and has been in continuous use since its construction. The exterior of the DIP piping has noticeable areas of corrosion and chipped paint (see **Figures 1 and 2**). Replacing this piping would require bypass pumping around the entire lift station, which would add significant cost. Therefore, the City of Storm Lake contracted Pure Technologies to collect thickness measurements of the header piping in order to verify the condition of the wall of the pipe, potentially allowing it to remain in place. UTT, an ultrasonic inspection technology, was chosen in order to externally verify the wall thickness of the header piping.

The ultrasonic inspection spanned approximately 36.5 feet of 24-inch DIP pipe and five (5) 24-inch DIP tees (see **Figure 3**). Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the updated design thickness with the measured thickness for a more accurate analysis.



Figures 1 and 2: Exterior of the Lift Station Header Piping

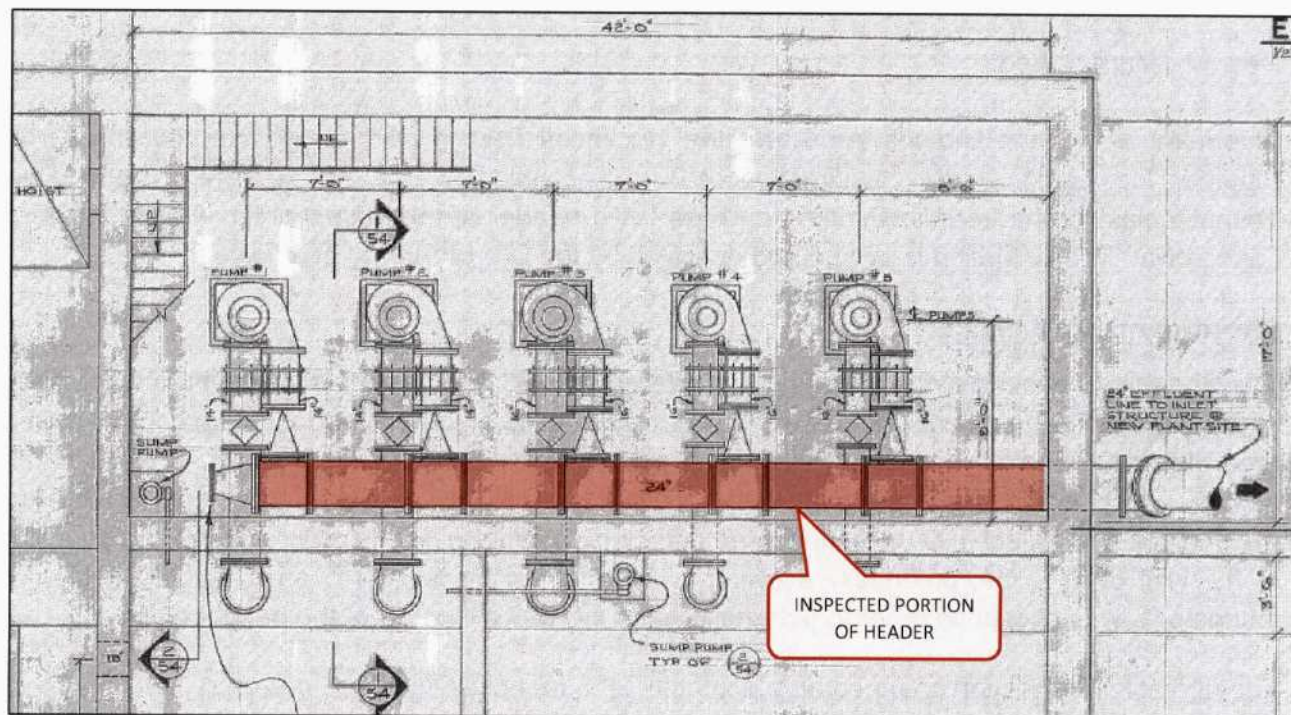


Figure 3: 24-inch DIP Lift Station Header

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

External Ultra Thickness Testing Results

The thickness measurements were taken using a model UM-1D ultrasonic thickness testing device. The transducer frequency was set to 5 MHz, with a single-element transducer sized at 0.250 inches. Thickness measurements were spaced evenly over the length of the pipes and tees, with nine (9) readings taken for each tee and twelve (12) readings taken for each pipe. A diagram of the measurement locations taken for tees and pipes is shown in **Figure 4**.

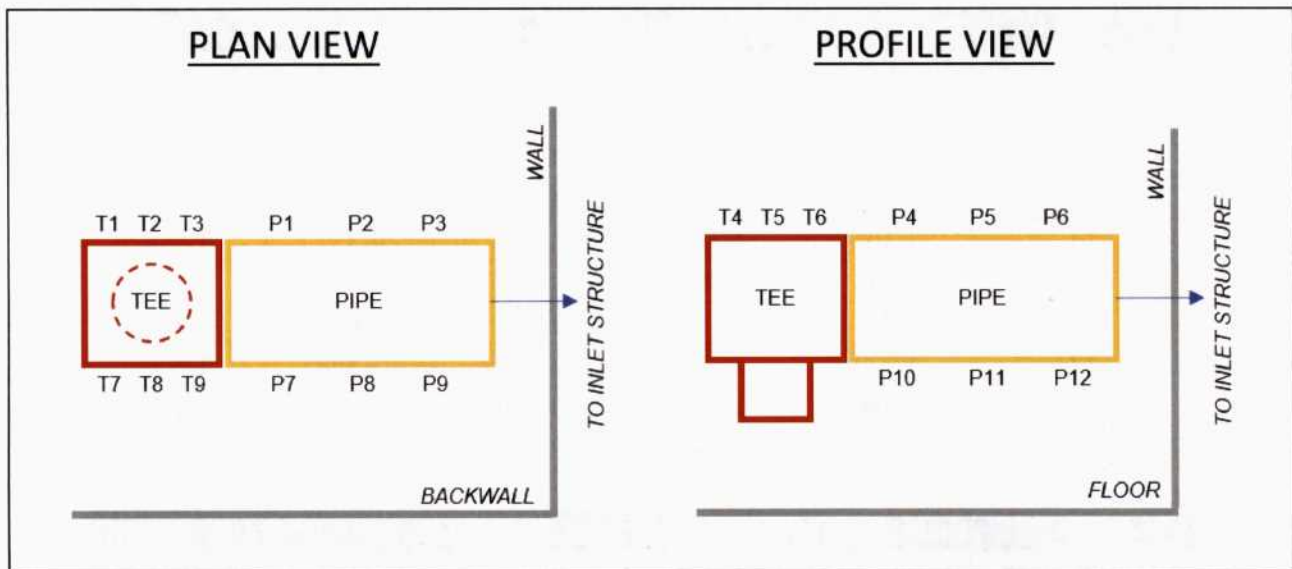


Figure 4: Diagram of Measurement Locations for Tees and Pipes

The tees and pipes were labeled one (1) through five (5), beginning at the sump pump and moving towards the inlet structure. A diagram of the labeled tees and pipes from the inspection is shown below in **Figure 5**. The results for the UTT thickness testing of the tees and the pipes are shown in **Tables 1 and 2**, respectively.

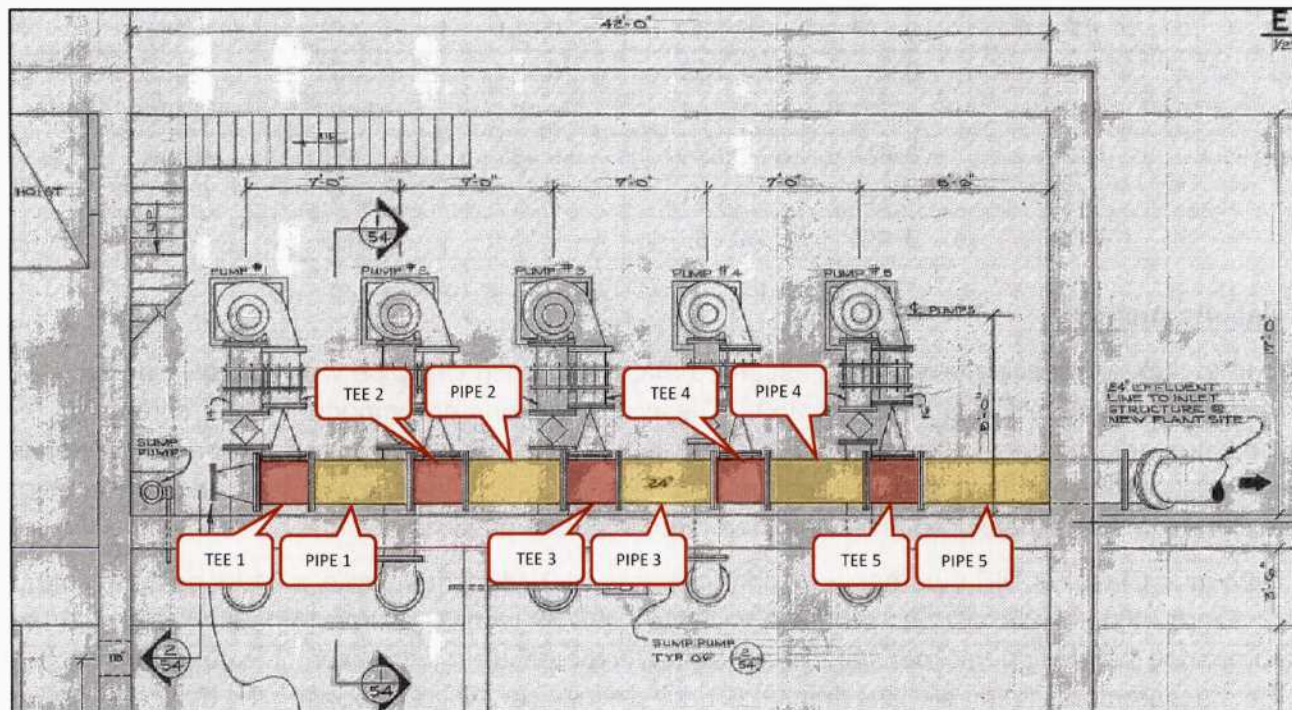


Figure 5: 24-inch DIP Lift Station Header (Labeled Tee & Pipe)

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

Table 1: Thickness Measurements for Tees (in inches)					
Measurement	Tee 1	Tee 2	Tee 3	Tee 4	Tee 5
T1	1.223	1.207	1.359	1.268	1.491
T2	1.241	1.268	1.294	1.306	1.469
T3	1.248	1.263	1.401	1.315	1.471
T4	1.301	1.321	1.338	1.331	1.454
T5	1.238	1.301	1.347	1.413	1.431
T6	1.287	1.331	1.353	1.442	1.299
T7	1.279	1.362	1.322	1.398	1.306
T8	1.296	1.371	1.359	1.365	1.322
T9	1.301	1.354	1.306	1.315	1.316

Table 2: Thickness Measurements for Pipes (in inches)					
Measurement	Pipe 1	Pipe 2	Pipe 3	Pipe 4	Pipe 5
P1	0.546	0.659	0.491	0.471	0.417
P2	0.554	0.651	0.479	0.454	0.421
P3	0.532	0.584	0.461	0.462	0.435
P4	0.559	0.631	0.468	0.471	0.421
P5	0.531	0.652	0.482	0.451	0.437
P6	0.601	0.591	0.499	0.449	0.435
P7	0.577	0.622	0.501	0.471	0.461
P8	0.587	0.668	0.477	0.465	0.458
P9	0.556	0.604	0.494	0.462	0.466
P10	0.577	0.684	0.481	0.458	0.417
P11	0.533	0.671	0.476	0.467	0.461
P12	0.482	0.665	0.473	0.471	0.509

Results Analysis

Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the correct design thickness with the measured thickness for a more accurate analysis.

A 24-inch Class 52 DIP pipe has a design thickness of 0.44 inches, while a 24-inch DI Tee with a pressure rating of 250 psi has a design thickness of 0.89 inches (source: American Pipe). When comparing the design thickness of the tee to the field measurements taken, it is clear that none of the measurements taken are less than 0.89 inches. However, when comparing the design thickness of the pipe to the field measurements taken, it can be seen that "Pipe 5" (closest to the inlet structure wall) has multiple thicknesses less than 0.44 inches.

Seven (7) of the twelve (12) thickness measurements taken for "Pipe 5" are less than 0.44 inches. Out of those seven (7), the maximum wall loss percentage was roughly 5% which was located at

measurements "P1" and "P10" at 0.417 inches. A diagram indicating the measurements taken for "Pipe 5" is shown in **Figure 6**.

Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition.

It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header.

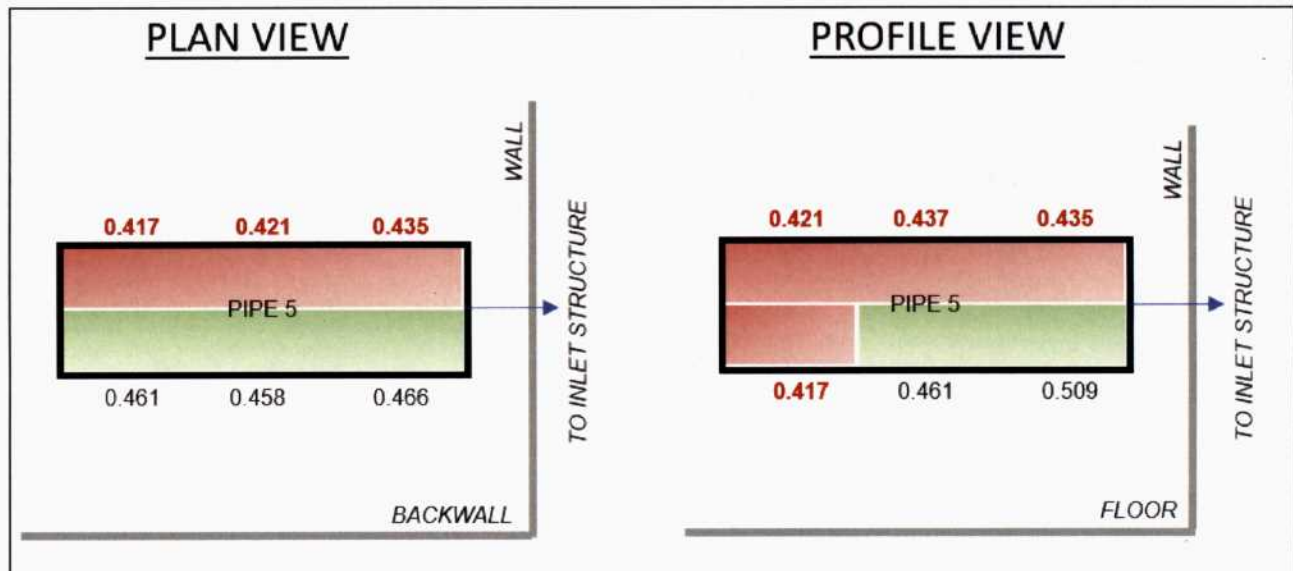


Figure 6: Thickness Measurements (in inches) of "Pipe 5"

Conclusion

Based on the findings from the JanX UTT external field testing, Pure Technologies concluded that only one (1) of the five (5) pipes tested were found to have wall thickness measurements less than the design thickness. The maximum wall loss percentage at this pipe was roughly 5% and was located at measurements "P1" and "P10" of "Pipe 5", at 0.417 inches. Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition. Additionally, it was determined that under normal operating

¹ U.S. Pipe and Foundry Company. "Ductile Iron Pipe Design for Fire Protection, Water & Wastewater". Page P10. Table 2; Pressure Class. 2013 Edition.

conditions, the header piping experiences a maximum operating pressure of 65 psi. Therefore, under those operating conditions, it can be assumed that the header piping is in serviceable condition. Pure Technologies also concluded that none of the five (5) tees tested were found to have wall thickness measurements less than the design thickness. The JanX Field Log used to collect and document the data is included as an appendix to this letter.

If you have any questions or require additional information, please contact us.

Sincerely,

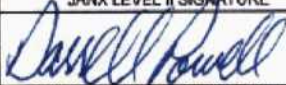
William Barloon

Bill Barloon, P.E.
Area General Manager, Xylem

cc: Steve Bruskiewicz, Business Development Manager, Xylem

Attachments

Appendix A: JanX Field Log

DATE: 5/20/2019		CLIENT: Pure Technologies US, Inc.		
REPORT No: 1 of 1		JOB LOCALE- CITY, STATE: Storm Lake, IA		
CLIENT PO No: #2019-052		JANX JOB No:		
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1		
CLIENT JOB No:		ACCEPTANCE CRITERIA: Information only		
ULTRASONIC THICKNESS TESTING TECHNIQUE				
Instrument Mfg: <u>Landmark</u> Model: <u>UM-1D</u> Serial No: <u>5102212</u> Cal. Date: <u>1/15/2019</u>				
Transducer Mfg: <u>Landmark</u> Transducer Frequency: <u>5</u> MHz Due Date: <u>1/15/2020</u>				
Transducer Size: <u>.250"</u> Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line				
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)				
Scan Description: <u>Thickness readings; looking for wall loss</u> Max. Scan Rate (in./sec.): <u>N/A</u> Scan Overlap %: <u>N/A</u>				
Couplant Brand or Type: <u>Sonagel</u> Remarks:				
PART DESCRIPTION			Calibration Block No: <u>3972</u> Material: <u>C/S</u>	
Material: <u>C/S</u> Thickness: <u>.500"</u>			Step 1 Step 2	
Inspection Area Description: <u>24" x .500wt pipe</u>			Cal Block Actual Thickness: <u>.250"</u> <u>1"</u> Time	
Surface Condition: <u>Clean</u>			Cal. Reading at Start: <u>.250"</u> <u>.500"</u> <u>10:30AM</u>	
Surface Preparation: <u>Coating removed and brushed</u>			Cal. Reading at End: <u>.250"</u> <u>.500"</u> <u>2PM</u>	
Temp. of Part and Cal. Block within ± 25°F of each other: ☒			Gate Height: <u> </u> % ☒ Not Applicable	
			Gain: <u> </u> dB ☒ Not Applicable	
THICKNESS READINGS			SKETCH / PICTURE / REMARKS - AS NEEDED	
1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100
Drive to Storm Lake, IA.....				
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045				
ADDRESS:				
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN
				Darrell Powell
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE
Steve Bruskiewicz (262)305-5238		550	10	Yes
				TOTAL ITEMS INSPECTED
				0
Kenny Cox !				
Print: UTT Report 14-06		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.		JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269

DATE: 5/21/2019		CLIENT: Pure Technologies US, Inc.		JANX																				
REPORT No: 1 of 2		JOB LOCALE- CITY, STATE: Storm Lake, IA																						
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THICKNESS READINGS																								
1	Tee 1	21	Tee 2	41	Tee 3	61	Tee 4	81	Tee 5															
2	1.223	22	1.207	42	1.359	62	1.268	82	1.491															
3	1.241	23	1.268	43	1.294	63	1.306	83	1.469															
4	1.248	24	1.263	44	1.401	64	1.315	84	1.471															
5	1.301	25	1.321	45	1.338	65	1.331	85	1.454															
6	1.238	26	1.301	46	1.347	66	1.413	86	1.431															
7	1.287	27	1.331	47	1.353	67	1.442	87	1.299															
8	1.279	28	1.362	48	1.322	68	1.398	88	1.306															
9	1.296	29	1.371	49	1.359	69	1.365	89	1.322															
10	1.301	30	1.354	50	1.306	70	1.315	90	1.316															
11		31		51		71		91																
12		32		52		72		92																
13		33		53		73		93																
14		34		54		74		94																
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DATE: 5/21/2019		CLIENT: Pure Technologies US, Inc.							
REPORT No: 2 of 2		JOB LOCALE- CITY, STATE: Storm Lake, IA							
CLIENT PO No: #2019-052		JANX JOB No:							
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Inspection Area Description: <u>Looking for wall loss; thickness readings</u>									
<u>24" x .500wt pipe</u>									
Surface Condition: <u>Clean</u>									
Surface Preparation: <u>Coating removed and brushed</u>									
Temp. of Part and Cal. Block within $\pm 25^{\circ}\text{F}$ of each other: ☒									
THICKNESS READINGS									
1	Pipe 1	21	Pipe 2	41	Pipe 3	61	Pipe 4	81	Pipe 5
2	0.546	22	0.659	42	0.491	62	0.471	82	0.417
3	0.554	23	0.651	43	0.479	63	0.454	83	0.421
4	0.532	24	0.584	44	0.461	64	0.462	84	0.435
5	0.559	25	0.631	45	0.468	65	0.471	85	0.421
6	0.531	26	0.652	46	0.482	66	0.451	86	0.437
7	0.601	27	0.591	47	0.499	67	0.449	87	0.435
8	0.577	28	0.622	48	0.501	68	0.471	88	0.461
9	0.587	29	0.668	49	0.477	69	0.465	89	0.458
10	0.556	30	0.604	50	0.494	70	0.462	90	0.466
11	0.577	31	0.684	51	0.481	71	0.458	91	0.417
12	0.533	32	0.671	52	0.476	72	0.467	92	0.461
13	0.482	33	0.665	53	0.473	73	0.471	93	0.509
14		34		54		74		94	
15		35		55		75		95	
16		36		56		76		96	
17		37		57		77		97	
18		38		58		78		98	
19		39		59		79		99	
20		40		60		80		100	
SKETCH / PICTURE / REMARKS - AS NEEDED									
Drive in and out of Storm Lake, IA..... (9) Readings per "TEE" (12) Readings per "PIPE"									
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045 ADDRESS:									
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN					
				Darrell Powell					
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE					
Steve Bruskiwicz (262)305-5238		300	14	Yes					
				TOTAL ITEMS INSPECTED					
				10					
OTHER EMPLOYEES & LEVEL									
Kenny Cox I									
Form: UTT Report 14-05 CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.									
JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269									

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1	21	41	61	81	Drive from Storm Lake, IA.....																
2	22	42	62	82																	
3	23	43	63	83																	
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5	25	45	65	85																	
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APPENDIX C: Forcemain Evaluation Methods

Transient Pressure Monitoring

The occurrence of pressure transients within a pressure pipeline can have adverse effects on the integrity of a pipe section as they can cause damage such as fatigue stress or even a pipe failure depending on the magnitude of the transient and current condition of the pipe. Accumulated damage of this nature can eventually decrease the structural integrity of the pipe. Therefore, it is important to understand the frequency and magnitude of pressure transients in the 300 mm watermain to ensure that operational protocols can be implemented to maintain the pressures below the specified design. An understanding of the actual pressure in a line will also permit knowledgeable decisions regarding future modifications to the line or facilities that affect the performance of the pipeline.

Traditional pressure monitors collect data in intervals of seconds while transients may occur in fractions of seconds. Pure's transient pressure monitoring system addresses the sampling frequency issue by continuously monitoring pressure and while under normal operating conditions, only recording data every few minutes (based on user defined intervals). However, when a transient occurs in the pipeline, the device detects the transient and begins sampling at a high rate of up to 20 samples per second (20 hertz). This provides periodic pressure readings as well as data on transient events.

Pure requires the subject watermain to be in-service during the monitoring period. The transient pressure monitors require an existing 1/4-inch tap or larger for installation. Pure will install one monitor at location to be determined during the project planning, for thirty (30) days of monitoring. At the end of the data collection period, Pure will analyze the data and include the results in the final condition assessment report to client.



SmartBall[®] Technology

A free-swimming tool for long distance water and wastewater inspections

How SmartBall works?

The SmartBall[®] platform is a free-flowing tool for the assessment of pressurized water and wastewater pipelines 8 inches and larger. It can complete long assessments in a single deployment without disruption to regular pipeline service.

The tool is inserted into a live pipeline and travels with the product flow for up to 21 hours while collecting pipeline condition information. It requires only two access points for insertion and extraction, and is tracked throughout the inspection at predetermined fixed locations on the pipeline.

Applications

Owners of water and wastewater pipelines deal with a variety of infrastructure challenges; the SmartBall platform can collect a variety of pipeline condition information in a single deployment that helps owners manage their assets more effectively.

Leak Detection

The tool is equipped with a highly sensitive acoustic sensor that can detect pinhole-sized leaks on pressurized pipelines. The SmartBall platform has been able to identify leaks as small as 0.028 gal/min (0.11 liters) and has a typical location accuracy of within 6 feet (1.8 meters).

Gas Pocket Detection

The acoustic sensor is also able to identify the sound of trapped gas within pressurized mains. The presence of trapped gas can adversely affect pipeline flow or lead to degradation of the pipe wall in sewer force mains.

Inspection Benefits

- Easy to deploy through existing pipeline features
- No disruption to regular pipeline service
- Can complete long inspections in a single deployment
- Highly sensitive acoustic sensor that can locate very small leaks
- Can identify features relevant to the operation and mapping of the pipeline
- Indicates the position of leaks, and gas pockets relative to known points





PipeDiver[®] Condition Assessment

An innovative, free-swimming condition assessment tool that operates while a pipeline remains in service

PipeDiver Technology

The PipeDiver platform is ideal for critical large-diameter pipelines that cannot be removed from service due to lack of redundancy or operational constraints. It can be effectively deployed for long inspections on several types of pipe to determine baseline condition; on concrete pressure pipe, the tool can identify and locate broken wire wraps, which are the main indication that this type of pipe will eventually fail; for metallic pipes that utilize a steel cylinder as the main structural component, the tool can locate and detect areas of corrosion and cylinder defects.

When inserted into a live pipeline through a hot tap connection, an existing access or a submerged tank, the tool travels with the product flow and is able to navigate most butterfly valves and bends in the pipeline.

Inspection Benefits

- No disruption to regular pipeline service
- Long inspection distances can be covered in a single deployment
- Accurate results that pinpoint areas of distress help optimize repair planning
- Effective on a variety of pipe materials
- More cost-effective than methods that require shutdown and dewatering



RESOLUTION NO. 75-R-2019-2020

**A RESOLUTION COMMITTING MATCHING FUNDS
FOR A COMMUNITY DEVELOPMENT BLOCK GRANT APPLICATION**

WHEREAS, the City of Storm Lake is applying for an Iowa Community Development Block Grant under the Water/Sewer portion of the program for the Storm Lake Memorial Lift Station Project, and,

WHEREAS, the City has applied for and is listed on the State of Iowa Drinking Water State Revolving Loan Fund Intended Use Listing at a not to exceed amount of \$1,331,625.00; and,

WHEREAS, the City intends to utilize the State Revolving Loan Fund as the source for financing their share of the project;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE:

SECTION 1. The City commits to the issuance of bonds, through the State Revolving Loan Program in an amount not to exceed \$1,331,625.00, for the purpose of funding the City's share of the Storm Lake Memorial Lift Station Project.

SECTION 2. The City commits to the issuance of bonds in a timely manner so as not to unduly delay the construction of the project.

PASSED AND APPROVED this 18th day of May 2020.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

Staff Summary

5/18/2020

Agenda Item # 14.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Keri Navratil, City Manager

SUBJECT: **Resolution No. 76-R-2019-2020 Authorizing Submittal of CDBG Application for Memorial Lift Station Rehabilitation Project.**

BACKGROUND: The grant application will request funding assistance for improvements to the City's sanitary sewer system, specifically improvements to Memorial Lift Station.

Memorial Lift station was originally built in 1983 and is an integral part of the wastewater system as 70% of wastewater flows through this lift station. The City intends to apply for a Community Development Block Grant (CDBG) to add redundancy to the system to ensure that that we do not bypass into the lake or to cause 70% of the community to not have access to the wastewater system.

FISCAL IMPACT: If awarded, the City of Storm Lake would be eligible to receive \$600,000 in Community Development Block Grant funds.

RECOMMENDATION: Approve Resolution No. 76-R-2019-2020

ATTACHMENTS:

Description	Type
□ Facility Plan	Backup Material
□ Resolution No. 76-R-2019-2020	Resolution



Dec 31, 2019

City of Storm Lake
Keri Navratil, City Manager
620 Erie St, PO Box 1086
Storm Lake, IA 50588

RE: Memorial Lift Station Improvements
City of Storm Lake
DNR Project No. S2019-0384A
CWSRF No. CS1920XXXXX (pending)

Subject: Facility Plan Approval

Dear Keri:

The Iowa Department of Natural Resources has reviewed the Facility Plan and all subsequent correspondence for the above-referenced project and is in agreement with the project as currently proposed. The Facility Plan is officially approved. When ready, please submit Plans and Specifications to the Department for review. Plans and Specifications shall be prepared in accordance with the approved Facility Plan. The following is a brief summary of the approved Facility Plan.

A new isolation valve on the force main discharge line, replacing pump #1 and #2 with the same capacity as the existing pumps, replacing the sump pump in the existing wet well, temporary bypass pumping, valves replacement, sluice gate installation in the wet well, other miscellaneous maintenance work.

The existing pumping capacity of Memorial lift station will not be changed.

ELIGIBILITY

The City has opted to utilize State Revolving Loan Funds (SRF) for financing the proposed project. Therefore, an environmental review (ER) is necessary to assess the environmental impacts of the project in accordance with procedures in 40 CFR Part 6 and is required for all loan recipients. A decision will be made by the department to determine if the project qualifies for a categorical exclusion (CX) or if a finding of no significant impact (FNSI) is required. The facility plan is approved conditionally based strictly on the technical review of the proposed project. Any significant project change resulting from the environmental review may require an amendment to the facility plan or a revised facility plan to retain eligibility for SRF funding. Construction of the project prior to the environmental review completion could jeopardize your SRF funding. Please contact DNR Environmental Review Staff for questions about the ER status.

Our approval does not eliminate the need for the city to comply with all federal, state and local regulations. This department must be notified of any change in your proposal and approve the change prior to incorporation in plans and specifications. Our approval of the Facility Plan is not an endorsement for funding. Additional coordination and documentation may be necessary before a loan agreement can be offered.

Please feel free to contact me at 515-725-8421 or email emy.liu@dnr.iowa.gov if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Emy Wenxin Liu".

(Emy) Wenxin Liu, PhD, PE
Project Manager
Wastewater Engineering Section

Encl.

c: ISG (508 E. Locust, Des Moines, IA 50309) (w/FP)
DNR FO 3 (Spencer, Iowa)
DNR Sewage File 6-11-78-0-01
SRF File CS1920xxxxxx (pending) (w/FP)

FACILITY PLAN MEMORIAL LIFT STATION

CITY OF STORM LAKE, IOWA
JUNE 2019



REPORT FOR:
City of Storm Lake
620 Erie Street
Storm Lake, IA 50588
712.732.8000

FROM:
Jason Kenyon, P.E.
ISG
508 E. Locust Street
Des Moines, IA 50309
515.243.9143
Jason.kenyon@is-grp.com

ISG

Facility Plan

Memorial Lift Station, Storm Lake, Iowa

Ownership of Document

This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of ISG, and is not to be used, in whole or in part, for any other project without the written authorization of ISG.

Project No. 19-22797

	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa. <u>Jason C. Kenyon</u> <u>7-19-2019</u> Jason C. Kenyon Date License Number: 25053 My License Renewal Date is 12/31/2019 Sections covered by this seal: <u>Entire Bound Report</u>
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Executive Summary

The City of Storm Lake's Memorial Lift Station was constructed in 1983 to convey wastewater from the previous wastewater treatment plant site to the new wastewater treatment plant approximately 2.5 miles southeast. Memorial Lift station was originally designed to convey all wastewater from the City. New lift stations on the west side of Storm Lake have diverted some flow away from Memorial Lift Station, but Memorial Lift Station still handles the majority of the City's Wastewater. Minor improvements have been made to the lift station since its original construction, but many of the most critical components are original and have been in operation for 35 years. Improvements are necessary in order for this critical lift station to continue to operate reliably. Improvements identified in this facility plan include replacement of failing equipment, rehabilitation of the existing structure, modifications to comply with code requirements, and improvements for future operation and maintenance.

Minor improvements at the site, including removing vegetation, rerouting downspouts, and filling animal burrows are recommended to help maintain access and prevent future degradation to the structure. Filling the animal burrows under the transformer pad is critical due to the potential for animals to damage the electrical service conductors and interrupt power to the lift station. The total estimated cost for the recommended site improvements is \$1,800.

In order to make the recommended improvements inside memorial lift station, a new isolation valve will need to be installed on the force main discharge and the flow bypass pumped around the lift station. Work will need to occur during dry weather periods to reduce bypass pumping costs during construction. The estimated cost for installing the isolation valve and temporary bypass pumping is \$150,000.

Process improvements at Memorial Lift Station include replacement of valves that are in poor condition and failing, recoating the existing piping, and modifying the wet well configuration to reduce stagnant wastewater and solids deposition that contributes to hazardous and corrosive gases. The estimated cost for the process improvements is \$327,000.

The existing pumps at Memorial Lift Station include two 60 horsepower duty pumps and three 300 horsepower peak flow pumps. All five pumps are the original pumps that were installed when the lift station was built in 1983. One of the smaller pumps is inoperable and the other small pump runs continuously. The three peak flow pumps only run during heavy rain events when there is significant infiltration and inflow in the collection system. Replacement of the two 60 horsepower pumps is recommended as these pumps handle the majority of the flow at the lift station. Replacement of the larger pumps was also evaluated, but the existing pumps are still in good condition due to their low run time. The estimated cost of replacing the two 60 horsepower pumps is \$180,000.

Structurally, Memorial Lift Station is in serviceable condition. However, repairs are required to make the structure weather tight, replace protective coatings, and patch minor degradation of the concrete

structure. Filling and abandoning the unused grit chamber will help reduce stagnant wastewater as well. The estimated cost of the structural rehabilitation is \$260,000.

There are several HVAC components at Memorial Lift station that have failed or do not meet current code requirements. Replacing the failed ventilation components is critical for protecting operations staff from hazardous conditions. Additionally, the increased ventilation will protect electrical systems and metal components from corrosive gases. The estimated cost of the HVAC improvements is \$177,000.

The location of the existing water service lines at Memorial Lift Station create a significant risk to the electrical system. Rerouting water and drain lines away from electrical components is necessary to prevent catastrophic damage to the motor control center in the event of a pipe break. The water circulation pumps for the boiler heating system are also failing and should be replaced with newer variable speed pumps that will provide greater reliability and efficiency. The estimated cost of the plumbing repairs and improvements is \$74,000.

The existing motor control center at Memorial Lift Station are in poor shape due to age and exposure to water and corrosive gases. Some components of the electrical system do not meet current electrical codes. Replacement of these components is crucial for providing reliable power to the pumps. Additionally, replacing the existing florescent and high pressure sodium lights with LED lights can provide some energy savings and provide longer bulb life, reducing operator time required to maintain the lighting system. The estimated cost of the electrical improvements is \$318,500. The additional estimated cost for replacing and adding LED lighting is \$36,000.

The Controls system at Memorial Lift Station is in poor condition and replacement components for the existing system are no longer manufactured. Complete replacement of the controls system is required to ensure continued operation. Additionally, the new control system will provide better monitoring and remote operation of the lift station. New systems to monitor ventilation and hazardous gases are also necessary to protect operations staff. The estimated cost for the controls improvements is \$225,000.

The total estimated project cost, including contingency and non-construction costs, is \$2,275,000. The City of Storm Lake intends to apply for a Community Development Block Grant (CDBG) for \$600,000 and use a State Revolving Fund (SRF) loan for the remaining balance of \$1,675,000.

Due to the need for bypass pumping during construction, the proposed work must be done during a dry weather period. The preliminary project schedule includes bidding the project in spring 2020 to allow for equipment procurement lead time over summer 2020 and installation during bypass pumping in fall 2020.

Introduction

BACKGROUND

The City of Storm Lake's Memorial Lift Station was originally constructed in 1983 at the site of the City's previous wastewater treatment plant. The lift station was designed to convey all of the City's wastewater to the new wastewater treatment plant approximately 2.5 miles southeast. After construction of the lift station, force main, and new wastewater treatment facility, the old wastewater treatment facility was demolished. Minor improvements have been made to Memorial Lift Station since its original construction. An activated carbon odor control system and a diesel backup generator were installed in 2008. The mechanical bar screen and grit removal equipment were removed and a new grinder was installed in 2016. Most of the existing equipment is original to the lift station construction and has been in service for 35 years.

SCOPE OF WORK

Due to the age, condition, and criticality of Memorial Lift Station, the City of Storm Lake retained ISG to evaluate the condition of the lift station and prepare this facility plan. ISG evaluated the condition of the site, process equipment, structure, HVAC, plumbing, electrical, and controls systems to identify deficiencies that are currently or could in the future impact the operation of Memorial Lift Station. ISG then prepared an evaluation of proposed improvements to address those deficiencies and ensure Memorial Lift Station continues to operate reliably.

Existing Conditions and Deficiencies.

SITE

The City still owns the entire eight acre site of the previous wastewater treatment plant, which has since been demolished, and uses the open areas around the lift station for material and equipment storage. An eight foot fence with barbed wire follows the perimeter of the below-grade lift station structure and secures the above-grade entrances to the lift station. The parcels surrounding the lift station site are light industrial sites and the municipal cemetery. The Chicago Central and Pacific Railway line borders the site to the north. The nearest residential structure is approximately 1,300 feet east of the lift station.



Figure 1: Memorial Lift Station Site and Location

Around the exterior of the lift station, animals have burrowed holes at several locations below stoops and the transformer pad. These holes should be filled and measures taken to prevent future unwanted excavations. Vegetation has grown up around the building slab as well, hindering maintenance access. The roof gutter downspouts are not connected to a sufficient outlet and several of them discharge directly to the ground immediately next to the lift station. This likely contributes to water accumulation and seepage into the lift station. For proper drainage, the downspouts should be directed further away from the building exterior.



Figure 2: Animal Burrows, downspouts, and vegetation around lift station exterior

A summary of the site deficiencies identified is provided below:

- Animal burrows are present in several locations around the building exterior.
- Vegetation has grown up in several locations around the building exterior.
- The downspouts discharge directly adjacent to the lift station.

PROCESS

Flows

The original design flow rates for Memorial Lift Station are listed in Table 1 below. In 2014, additional lift stations were constructed around the western perimeter of Storm Lake which diverted a significant portion of the City's wastewater away from Memorial Lift Station.

Table 1: Memorial Lift Station Design Flow Rates

Flow Condition	Flow, MGD
Average Dry Weather	1.80
Average Wet Weather	3.34
Maximum Wet Weather	6.20
Peak Hourly Wet Weather	15.80

Influent flow at the lift station is measured by a parshall flume with a totalizing flow meter. The totalizer reading is periodically recorded in a log book at the lift station. Therefore, hourly flow data is not available for this lift station. The Flow rate data recorded between June 2015 and August 2016 is summarized in Figure 3 below. The peak average daily flow observed during this period was approximately 7.72 MGD, and the majority of the average daily flows were below 3 MGD. With the limited data available, it appears that flow rates are within the original design capacity for the Lift Station. Therefore, the existing design capacity is considered adequate and proposed improvements will maintain the existing capacity.

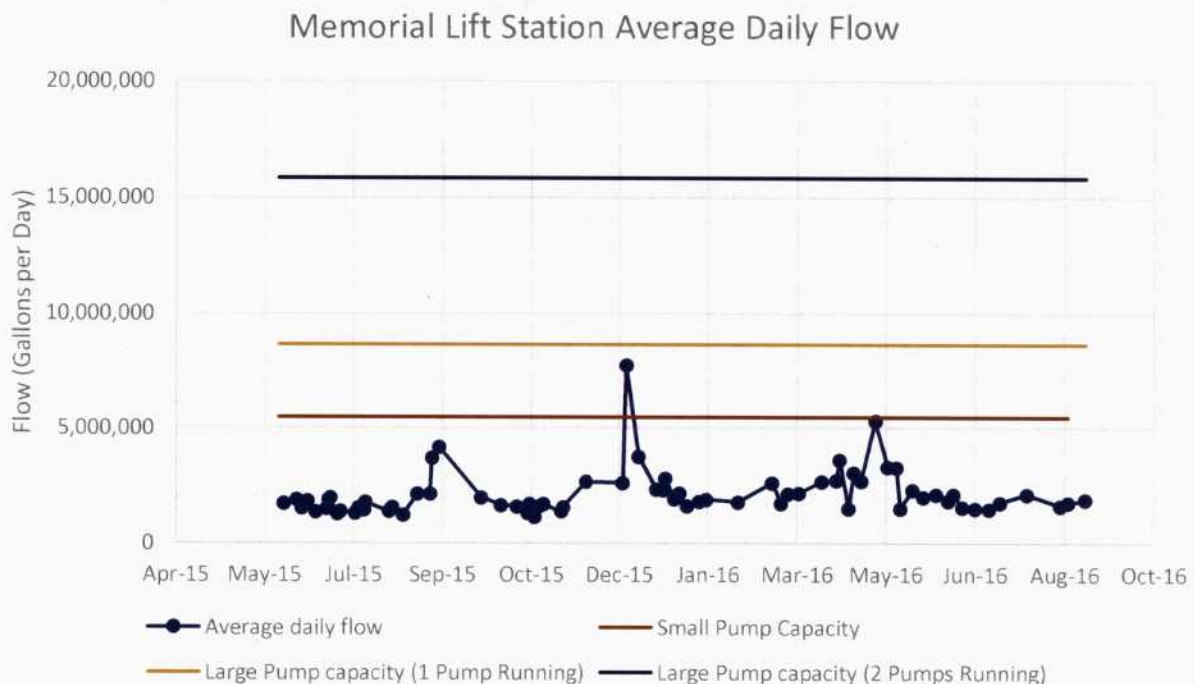


Figure 3: Recorded Flow May 2015-Aug 2016

Pumps

Memorial Lift station includes two 60 horsepower pumps (one duty, one standby) for average daily flows, and three 300 horsepower pumps (two duty, one standby) for peak flows during significant precipitation events. The Design Points of the pumps are listed in Table 2 below. A plug valve on the discharge piping of one of the smaller pumps (Pump #1) has failed in the closed position, rendering the pump inoperable. A variable frequency drive has been installed on the other small pump (Pump #2).

Table 2: Pump Design Points

Pump	Flow, GPM (MGD)	Head, ft.	Motor horsepower	Notes
Pump #1	3,750 (5.4)	42	60	Inoperable due to failed valve.
Pump #2	3,750 (5.4)	42	60	Operates on a VFD
Pump #3	5,500 (7.92)	140	300	Pumps 3, 4, and 5 operate as one or two pumps in service, with one pump on standby.
Pump #4	5,500 (7.92)	140	300	
Pump #5	5,500 (7.92)	140	300	

The seal on Pump #2 was recently replaced with a new mechanical seal as well. While not required, the manufacturer recommends that seal water be supplied to the new seal. The seals on the three larger pumps (Pumps #3, #4, and #5) have recently been replaced with new mechanical seals that do not require seal water. The seal water system is old and degraded. Additionally, the seal water pumps and suction tanks are located in the electrical room, creating a hazard to the electrical equipment.



Figure 4: Seal Water System

Solids Handling

When the Memorial Lift Station was originally constructed, it included a mechanical bar screen and aerated grit removal. The screening and grit removal equipment were removed in 2011 and replaced with an in-channel grinder to grind solids which would then be pumped to the new headworks facilities at the wastewater treatment plant and removed there. The grinder is in good condition.

The grit chamber is now isolated from the flow path by stop plates installed in the inlet channel; however, during high flow events water backs up over the grit chamber discharge weir and fills the chamber, resulting in stagnant wastewater which is a significant source of hydrogen sulfide and odors. The hydrogen sulfide gases produced by the stagnant wastewater contribute to corrosion and worker health and safety issues.

Odor Control

An activated carbon odor control system was installed at Memorial Lift station in 2007 to capture gases generated in the screening chamber. Shortly after installation, the carbon media was exhausted and replacement of the media was deemed cost prohibitive. In order to help reduce odors, Hydrogen peroxide is now fed into the sewer upstream of the lift station from a building located approximately 100 feet to the west of the current lift station facility.

Wet Well

A figure of the wet well layout is included in Appendix A. The wet well is separated into two zones, with the suction piping for the smaller pumps in one zone (The Average Flow Wet Well) and the suction piping for the larger pumps in the other zone (the Peak Flow Wet Well). The two zones are connected by a 4 ft wide by 2 ft tall overflow opening and a lower 36" circular opening with a sluice gate. Flow enters the average flow wet well through three 18" circular openings at the base of the wall between the influent channel and the wet well. As incoming flows increase above the capacity of the smaller pumps, the water elevation rises and overflows into the Peak flow wet well, where the large pumps are activated to handle peak flows. Once the large pumps stop, a sump pump should dewater the peak flow wet well. However, this sump pump does not appear to be functioning, leaving stagnant water in the peak flow wet well. Replacing the sump pump requires an operator to enter the wet well as there is no access to the sump pump from above the wet well.

While not shown on the original plans, a pipe has been installed from the influent channel to the peak flow wet well. Based on the elevation of this pipe, it is assumed that it serves to bypass flow directly to the peak flow wet well during high flow events when the 18" openings into the average flow wet well are unable to hydraulically pass the influent flows.

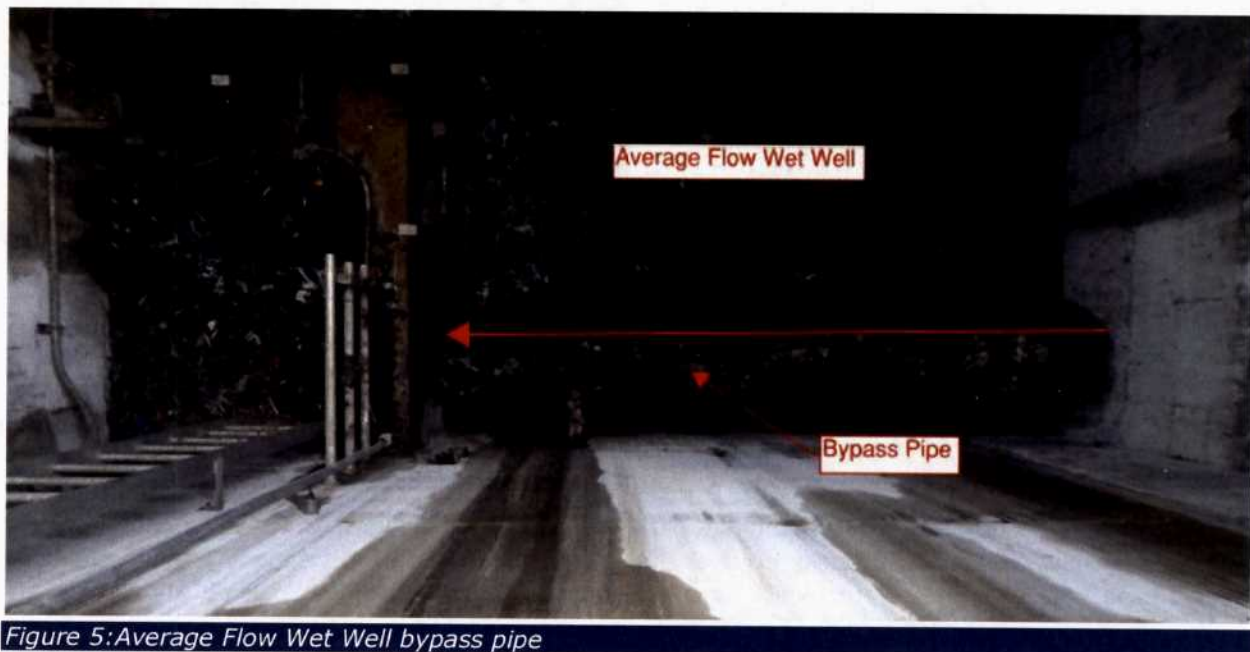


Figure 5: Average Flow Wet Well bypass pipe

Due to the large volume, solids are likely settling out in the wet well during low flow periods. This issue is exacerbated by limited accessibility for vacuum truck suction hoses to get into the wet well to remove solids and floating debris.

Suction/Discharge Piping

As shown in Figure 5 below, the existing piping in the drywell has some deterioration and corrosion. A non-destructive evaluation was performed on the piping in June 2019 to determine the condition of the pipe. The evaluation determined the pipe was still in good condition. A copy of the evaluation report dated June 4, 2019 is provided in Appendix B. The pipe supports are also rusting. The base plates of the pipe supports are frequently in contact with water on the floor of the pump room.

The plug valve on the discharge side of Pump #1 has failed in the closed position. A few of the check valves have broken lever arms as well. Replacing the pump isolation plug valves is currently not possible because there is no way to isolate the Lift Station piping from the rest of the downstream force main.



Figure 6: Pump Discharge Piping

A summary of the process deficiencies identified is provided below:

- Valve failure has made Pump #1 inoperable.
- The seal water supply system is old and degraded. Its location is a hazard to the electrical equipment.
- The grit chamber is unused and stagnant.
- The large wet well volume contributes to solids deposition.
- The sump pump in the wet well has failed and is difficult to access for maintenance.
- There is limited access for cleaning equipment into the wet well.
- The long residence time and solids deposition contribute to hydrogen sulfide gas production.
- The odor control media has been depleted and is no longer used.
- There is no way to isolate the average daily flow wet well for cleaning.
- The process piping and supports are corroded and need recoating.
- The suction and discharge valves are old and failing.
- There is no way to isolate the process piping for valve replacement.

STRUCTURE

The existing lift station consists of a below-grade cast in place concrete structure divided into several chambers. The top slab of the structure is at grade with several hatches for access and removal of equipment from the below-grade chambers. The above-grade structure consists of an older "corduroy brick" building with separate entrances to the stairwells into the electrical room and headworks room. A newer CMU building that houses the emergency generator and boiler is adjacent to the entrance building.

While the overall structure appears to be in serviceable condition, water infiltration has caused serious corrosion of metals and overall building degradation. Many surface coatings including paints, waterproofing, and insulation are visibly degraded and have exceeded their service lives. Due to such extensive water damage, it is recommended that all existing surface coatings should be removed and replacement coatings applied. The following sections discuss further recommendations for necessary repairs.

Exterior

The exterior fascia of the building is composed of corduroy brick that displays cracking and mortar deterioration. To prevent further damage, the cracks should be caulked. Additionally, tuck pointing is required at locations of mortar deterioration. An overhead door into the Generator room has significant corrosion and should be recoated or replaced.

A removable section of concrete slab is located in the roof of the headworks chamber for access to the grinder. Seepage around the slab has caused deterioration to the insulation on the interior ceiling of the lift station. Currently, a tarp has been placed over the slab in order to reduce seepage. Another access hatch is located on the East side of the lift station above the electrical room. A waterproofing membrane was previously installed on the slab surrounding the hatch. That membrane was damaged and currently sits in bundles on top of the slab, creating areas of water retention. Inside the electrical room, there are signs of water leakage through the existing access hatch.



Figure 7: Exterior Access Hatches

The main access into the wet well is through hinged fiberglass panels. The steel support beams for the fiberglass panels show signs of corrosion. Additionally, one of the access openings is located immediately outside the door to the generator room, a significant safety concern.



Figure 8: Wet Well Access Panels

Upper Level

Multiple areas of the building show signs of roof leakage, causing damage to insulation, harboring mold growth, and rusting the metal roof deck. The roof shingles have likely exceeded their service life and require replacement.

Minor cracks are visible in the interior CMU walls in the above-grade entrance to the headworks chamber. This cracking needs to be sealed.

Electrical Room

The ceiling insulation in the electrical room exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced. The hatch above the electrical room is not sealed, causing leakage. The hatch should be replaced to prevent further water damage.



Figure 9: Electrical Room Ceiling

Pump Room

An overhead crane is located in the pump room for removal and reinstallation of equipment. The posted rating of the crane is two (2) tons, or 4,000 pounds. Equipment weights were not verified but the crane capacity is assumed to be adequate. The support beams for the crane show signs of spalling paint.



Figure 10: Existing Overhead Crane

The existing pipe penetration seals between the drywell and wetwell are significantly corroded. These seals are critical for keeping wastewater and sewer gasses from entering the drywell.



Figure 11: Drywell Pipe Penetration Seals

The concrete slab that composes the ceiling of the pump room contains cracking. These cracks may exacerbate moisture conditions and should be repaired. The floor slab in the pump room shows significant deterioration due to standing water.



Figure 12: Pump Room Ceiling Cracking and Floor Slab

Headworks Chamber

There is an existing elevator that was used to remove the screening dumpster when the mechanical bar screen was in service. The elevator has stopped functioning and without the screening system it has limited usefulness. Adjacent to the elevator is a metal spiral staircase. The tight curvature of the spiral staircase makes it difficult for materials to be carried into the headworks chamber. City Operators have indicated a preference for both the elevator and spiral staircase to be replaced with a straight staircase with an intermediate landing, similar to the stairway into the pump room.



Figure 13: Elevator and Spiral Staircase

The ceiling insulation in the Headworks Chamber exhibits signs of moisture retention and molding. The existing insulation should be removed and replaced.

The existing grating above the open channels does not cover the entire opening at several locations. This presents a safety hazard. All grating should be replaced with solid panels that cover the entirety of the openings. The solid panels will also help to direct gases to an HVAC/hood area.

The concrete channel walls are pitted and spalled, likely due to hydrogen sulfide gases. Continued erosion of the walls could affect the function of the channel. The walls need to be repaired.



Figure 14: Headworks Chamber Ceiling and Channel concrete spalling

A summary of the structural deficiencies Identified is provided below:

- There is minor exterior and interior cracking in the above-grade masonry buildings.
- The exterior hatches in the top slab leak.
- The access hatch into the wet well is located directly in front of generator room door.
- There are interior signs of roof leakage.
- There is significant moisture damage to the interior ceiling insulation.
- The pipe penetration seals between the wet well and dry well are significantly degraded.
- Interior paints and coating systems have degraded.
- The elevator is non-functional and the spiral stairway hinders maintenance access.
- Gaps in the headworks channel grating are a safety hazard.
- There is concrete spalling and deterioration in the headworks channel.

HVAC

The Drywell, headworks chamber, and generator room are all separately heated and ventilated. The drywell is ventilated by an exterior exhaust fan and heated by an electric furnace. The headworks chamber is ventilated by a large air handling unit that includes an activated carbon scrubber for odor control as previously discussed. The headworks chamber is heated by a gas-fired boiler supplemented with an electric unit heaters. The generator room is heated by an electric unit heater but has no active ventilation.

Exterior

The ductwork wrapping on all exterior ductwork is peeling off and in some locations barely attached to the duct. The dampers and actuators associated with the odor control system are rusted through and unusable. The make-up air unit is missing a handle on the shut off panel.



Figure 15: Exterior Ductwork

Emergency Generator Room

The electric heater hanging in the corner of the room is not working. City Staff have indicated that the electrical breaker for the heater trips very frequently. The condition of the heater itself seems to be OK. The seal around the generator exhaust pipe where it penetrates the building wall is visibly broken and should be resealed to prevent rainwater from leaking into the building. There is no active ventilation in the space, however the interior space does not appear to show any significant degradation. There is likely some passive air movement occurring through the large intake and exhaust louvers.

While the boiler appears to be in good working condition, the current location of the boiler in the generator room conflicts with NFPA 110, Standards for Emergency and Standby Power Systems. The code does not allow for other equipment that is not directly related to the generator function to be located in the generator room. To comply with code the boiler will need to be relocated or the space separated into 2 adjacent spaces. Functionally, the large amount of air required by the generator likely starves the gas-fired boiler of oxygen when the generator operates. This could lead to significant issues during a winter power outage.

There is an exhaust duct running through the room that is pulling air from the Electrical Room and Lower Pump Room. The duct will have to be separated from the generator room to comply with NFPA 820 requirements.

Electrical Room and Pump Room

There is currently no dehumidification in the space, and the walls are showing signs of damage from moisture. The exhaust fan that serves this space is currently non-functional. Additionally, there is no air intake louver, limiting the supply of fresh air to the space. Per NFPA 820, if the space is not ventilated with outside air, the space is classified as Class 1, Division 2, Group D, and the electrical equipment would require additional explosion protection. Providing a minimum of six (6) air changes per hour is required to declassify the space. Without the exhaust fan, the air-handling unit is only recirculating air, and the diffusers are mounted high and throwing air horizontally. In the lower pump room, the single exhaust grille is located high up, right below ceiling height. It may not be effectively exhausting the air from the bottom of the room. Replacing the air handling unit, rearranging the ductwork, and installing new downward facing diffusers would provide better air circulation.

Headworks Chamber

The headworks chamber is ventilated by the large air handling unit located outside the lift station. The exhaust duct and hood over are in poor condition. The supply duct appears to be in good condition but could be cleaned, both inside and outside. The explosion proof heaters appear to be out of order. There are no dehumidification measures in the space. Dehumidifiers could help reduce moisture damage to the interior surfaces and insulation.

Per NFPA 820, spaces like the headworks chamber with open wastewater channels are classified as Class 1, Division 1; unless ventilation is provided at 12 air changes per hour. If adequate ventilation is provided, the classification is reduced to Class 1, Division 2, and the requirements for explosion protection are reduced. Based on the documentation provided by the City on the existing air handling unit, adequate ventilation is being provided to reduce the classification in the headworks chamber.



Figure 16: Headworks Chamber Exhaust Hood and Duct

Wet Well

The wet well is actively ventilated by the exhaust fan of the air handling unit used for the headworks chamber. An intake hood is located in the top slab of the wet well and an exhaust duct passes through the wall into the headworks chamber. Based on the information provided by the City, the ventilation in this space does not appear to be adequate to reduce the classification. Therefore, the space is considered a Class 1, Division 1 space.

A summary of the HVAC deficiencies identified is provided below:

- The duct wrap on exterior ducts is degraded.
- The dampers and actuators on the exterior ductwork are rusted and non-functioning.
- The heater in the generator room is not functional due to an electrical issue.
- The seal on the generator exhaust pipe has cracked.
- The boiler located in the generator room violates NFPA 110.
- The exhaust vent passing through the generator room from the electrical room violates NFPA 820.
- There is no dehumidification to reduce moisture damage in several spaces.
- The exhaust fan for the electrical room and pump room has failed.
- There is no intake louver for the electrical room or pump room.
- The ductwork configuration in the pump room is inadequate for proper air circulation.
- The exhaust duct in the headworks chamber is in poor condition.

PLUMBING

Plumbing at Memorial Lift Station consists of a water service line that enters the electrical room from the north. The water line serves a toilet, sink, a small water heater, and the pump seal water system, all located in the electrical room. The water line also serves two hose bibs in the headworks chamber and the pump room, as well as the boiler for heating the headworks chamber.

Boiler Water System

The pumps that circulate water for the boiler show significant corrosion. They are operating at constant circulation volume without a VFD. The connected water pipes are leaking. The air separator does not appear to have a blowdown.

The boiler drain is crowded and needs to be relocated outside of the generator room. The drain pipe passes through the floor slab into the electrical room below and is routed above electrical equipment, creating a potential hazard.



Figure 17: Boiler Circulation Pumps and Drain

Restroom Facilities

There are cold water lines running above the MCC to the restroom facilities, creating a significant potential hazard to the electrical equipment. The toilet, sink, and water heater are in poor shape and could be replaced or removed. The sanitary pipes from the toilet and sink are routed along the ceiling of the pump room below and through the wall into the wet well. The sewer pipes and check valves are in poor condition. City staff have indicated that the restroom facilities are rarely used.

Floor Drains and Sump Pump

The sump pump and associated piping located in the pump room are in poor condition. There is significant standing water in the pump room and the floor drain piping is likely obstructed.

A summary of the plumbing deficiencies identified is provided below:

- The boiler pumps are in poor condition.
- The boiler system should not be located in the same room as the generator.
- The duct from the electrical room should not be routed through the generator room.
- The water piping to restroom is routed above electrical equipment.
- The floor drains and sump pump in the lower pump room are in poor condition.

ELECTRICAL

General

There are several electrical conduits and associated supports throughout the lift station that are severely corroded. Many of these conduits are unused and should be removed. There are several penetrations through the structure for unused conduits that should be sealed after the conduit is removed to prevent leakage. The conduits that are to remain in service should be replaced or recoated, and stainless steel supports provided.

Electrical Service

The building is served by a 3 phase, 480/277 volt 4-wire electrical service. The utility transformer is located outside the building on the north east corner. Unfused service conductors are installed underground from the utility transformer and extend overhead in the electrical room before entering the service disconnect located in the center of the electrical room. The service conductors should be fused to meet current electrical code. The main breaker installed is rated for 1,200 amps. Based on actual energy usage from MidAmerican Energy the service has experienced up to 83% utilization. The service is at or near maximum capacity. Peak demand records were obtained MidAmerican from May of 2014 through April of 2019. Average demand was 156 KW, and the highest recorded usage was 618 KW in June of 2017.

Backup Generator

The facility's electrical service is backed up by a stationary diesel generator. The generator is installed inside the building in the generator room. A 480-volt panelboard serving the equipment in the generator room is located in the adjacent stairway/entrance into the electrical room. The panelboard appears to be in good condition. The generator is rated for 750 KW, has a 1200 amp breaker, and is manufactured by Cummins. The generator's rated capacity appears to be adequate for the highest recorded energy use from the Utility Power. The generator appears to be in good condition, and according to staff is in working order.

Electrical Motor Control Center/Gear

The main service enters a 1200 amp Westinghouse breaker in a motor control center (MCC) in the electrical room. Capacitors are installed above the MCC for power factor correction. There is an MCC mounted transfer switch which appears to be out of service. An ASCO brand transfer switch has been installed outside the MCC and is now in service. There is an existing 1200 amp main breaker installed in the MCC for the generator. The generator breaker is likely not required, and may or may not be in

service. An Allen Bradley 2100 series MCC is installed for motor control and 120/208 volt power distribution.

Considerable corrosion was noted on the MCC and related electrical equipment. None of the MCC sections are installed on housekeeping pads, and corrosion is present at the base of several MCC sections. Foul odor was observed in the electrical room due to the lack of outside air ventilation. City staff indicated a variable speed drive had previously been installed in the MCC to serve pump #5, but had since failed. The VFD was subsequently replaced with a soft starter.

The electrical room has likely been exposed to corrosive gases such as hydrogen sulfide. Corrosive gas exposure is likely responsible for the premature VFD failure and corrosion of soft metals in the MCC. Copper and aluminum are soft metals commonly used as conductors and used within circuit boards. Exposure to corrosive gasses has likely shortened the life of electrical components in the electrical room. Additionally, water lines, water tanks, and water pumps are located in the electrical room, creating a significant potential risk to the electrical equipment.



Figure 18: Existing Motor Control Center

Lighting

The dry well area utilizes florescent lighting. Several of the lights are out of service.

The original lighting in the Headworks chamber utilized high pressure sodium lights, and appear to be explosion proof. Two of the lights are not functioning. Two other lights in the Headworks chamber have been upgraded, and appear to be LED.

Florescent lighting is used in the generator room. One of three florescent lighting fixtures is not functioning.

No emergency lighting fixtures were observed in any areas. Emergency lighting with battery backup is essential for lighting egress paths in the event of a power failure.

There is only one exterior light fixture observed on the south side of the building. The fixture appears to be in poor condition and it is unknown if the fixture operational. Overall, the site and building exterior is not well lit. Additional exterior lighting could benefit both security and maintenance at the lift station.



Figure 19: Headworks Chamber Original Lighting (left) and new LED lighting (right)

Electrical Equipment/Fixtures

An electric hoist is located in the pump room for equipment removal. The hoist is powered by a 480 volt open bus bar running across the ceiling. The open bus bar is very close to the stair handrail, and can be reached from the stairwell. This is a significant electric shock hazard and a barrier should be installed to prevent accidental contact with the bus bar. The bus bar disconnect is also in poor condition.

The sump pump disconnect, control panel, and floats in the lower pump room are in poor condition.



Figure 20: Electric Hoist Bus Bar near stair handrail

Explosion Protection

Headworks Chamber

The headworks chamber is a Class 1, Division 2 rated space. Two significant deficiencies were noted that do not meet electrical code requirements for explosion protection in the space. The conduit to the Parshall Flume level sensor is not explosion proof, and is not properly supported. Additionally, a main junction box is located on the East wall of the headworks chamber. The junction box is an explosion hazard and should be removed. The conduits and circuits currently utilizing the junction box should be removed and re-installed directly to sources.

Wet Well

The Wet Well is a Class 1, Division 1 rated space. A PVC conduit is installed through the top of the wet well and runs back to the pump station control panel. The conduit is required to be explosion proof since it penetrates the wet well which is a hazardous space. There are also various unused conduits and conductors visible inside the wet well, penetrating the wet well top slab, and penetrating the north wall of the wet well into the electrical and pump rooms. Unused conduits should be removed, penetrations properly sealed, and conduits that are to remain must be explosion proof.

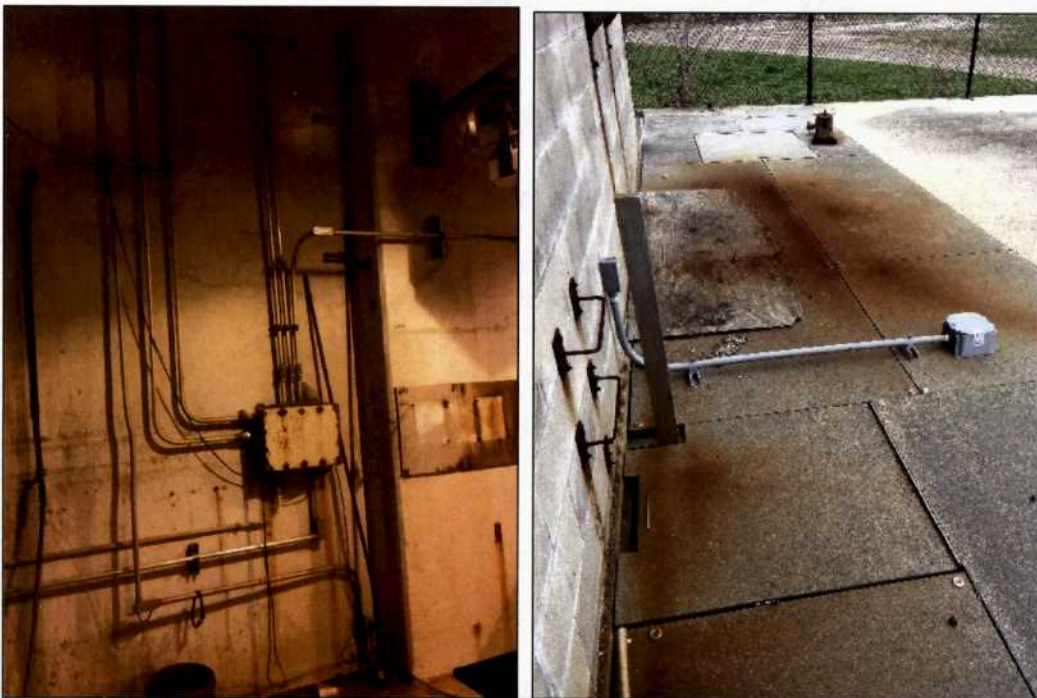


Figure 21: Main junction box in Headworks Chamber and Conduit Penetration into Wet Well

A summary of the electrical deficiencies identified is provided below:

- Several conduits and associated supports throughout the lift station are corroded and in need of replacement or recoating
- Many unused or failed electrical components remain and should be removed
- The service conductors are not protected by fuses
- The existing motor control center show signs of significant corrosion due to moisture and corrosive gas exposure.
- Several light fixtures are out of service
- There is limited exterior lighting.
- Electric shock hazard from the open bus bar powering the electric hoist.
- The sump pump disconnect is in poor condition.
- Several conduits in classified spaces are not explosion proof.

CONTROLS

Life Safety and Environmental Monitoring

Currently, there is very limited environmental monitoring at the Lift Station. It appears that a Fire Alarm System was installed in portions of the existing building, but is no longer in operation. There is currently no ventilation monitoring in the headworks chamber or drywell. Ventilation monitoring is critical in order to alert operators if a failure has occurred in the ventilation system that could create hazardous work conditions or allow the buildup of explosive gases. Additionally there are no permanent gas monitors installed in these spaces. Operators must currently enter the space and lower a gas monitor into the lower areas on a rope to test the air quality. Permanently installed gas monitoring can alert operators of hazardous conditions prior to them entering the space.

Supervisory Control And Data Acquisition

The existing pump control panel PLC is monitored by the water reclamation facilities Supervisory Control And Data Acquisition (SCADA) system over Ethernet. The city owns and maintains a fiber backbone that provides a connection between the lift station and the water reclamation facility. The fiber enters the electrical room and is converted to Category 5 Ethernet cable to make connection to the control system.

While the fiber connection has been installed to the lift station, there is limited data monitoring and control available from outside the lift station and few external alarms are generated to alert operators of critical conditions in the lift station. This is especially important since the facility is not staffed 24x7.

Pump Control System

The main control panel for controlling and monitoring the pump station is located in the electrical room. An Allen Bradley SLC500 Programmable Logic Controller (PLC) system is installed. SLC500 systems are nearing end of life status from the manufacturer. Some components within this family have been discontinued. Therefore, future maintenance of the control system will be difficult. Additionally, there does not appear to be any documentation of the control system at the lift station, making it very difficult to troubleshoot any problems.

A drain line is installed through the floor above the control panel, and water has infiltrated the control panel in the past causing damage. Overall the main control panel, components, and wiring are in poor condition and have reached end of life.



Figure 22: Pump Control System Panel

Grinder Controls

The grinder control panel is located in the electrical room. The system appears to be in good working order. There are signs that the operator interface was replaced with a smaller sized screen. There is currently no alarm to the SCADA system for grinder failure. A level sensor has been installed upstream of the grinder to alarm operators after debris buildup on the stopped grinder has caused the upstream water level to rise.

Instrumentation

Flow Measurement

Flow entering the lift station is measured by a parshall flume in the headworks chamber. The parshall flume level sensor is in poor condition. There is no data logging function in the flow totalizer, so flows can only be read by an operator at the lift station.

Level Measurement

A MultiTrobe level controller is utilized for monitoring the water level in the wet well, and is panel mounted in the control panel. This device has been discontinued by the manufacturer. The backup floats are not readily accessible in the wet well and should be replaced in a new location that is accessible without entering the wet well.

A summary of the controls deficiencies identified is provided below:

- There is no ventilation monitoring or hazardous gas monitoring in any of the spaces.
- There is only limited external monitoring and control through the SCADA system.
- The control panel is in poor condition and components have been discontinued by the manufacturer.
- There is no alarm for grinder failure.
- The flow measurement system has limited functionality
- The wet well level sensors have been discontinued and are difficult to access safely.

Improvement Options

Several improvement alternatives are proposed in order to address the deficiencies noted above. Improvements were categorized into three priority levels based on the following descriptions:

High Priority: Improvements are considered necessary for continued, reliable operation of Memorial Lift Station, code requirements, and addressing health & safety concerns.

Medium Priority: Improvements may not be necessary, but may improve performance, reliability, or efficiency of Memorial Lift Station

Low Priority: Improvements with limited benefit or low benefit to cost ratio.

SITE IMPROVEMENTS

Filling in the animal burrows around the lift station is considered a high priority due to the presence of animal burrows under the transformer pad. Animals may damage the service conductors and interrupt power to the lift station.

Removing the vegetation around the lift station and extending the downspouts are minor tasks that could be completed by City staff or incorporated into the overall improvements project and performed by a contractor.

A summary of the Proposed Site Improvements, including priority and estimated cost is provided in Table 3 below:

Table 3: Proposed Site Improvements

Description	Site Improvements		
	Priority	Recommended?	Estimated Cost
Fill in Animal Burrows	High	Yes	\$800
Remove vegetation around structure	Medium	Yes	\$500
Extend downspouts away from building	Medium	Yes	\$500
Total Recommended Improvements			\$1,800

PROCESS IMPROVEMENTS

Isolation Valve and Bypass Pumping Connection

Priority: High

Cost: \$150,000

In order to service the existing valves and wet well, an isolation valve on the common force main discharge and bypass pumping will be required. With the short lay length between the discharge tee of Pump #5 and the wall of the drywell, the valve and bypass connection will need to be located outside the lift station in a new valve vault. Two hot taps would be installed on the 24-inch force main. One tap will be used to insert an inflatable line stop and the other would be used as a discharge connection for bypass pumps. This would allow a new 24-inch plug valve to be cut into the force main for future isolation for bypass pumping. A new concrete valve vault structure would be built around the force main for future access. The estimated cost of installing the 24-inch isolation valve and bypass pumping for six weeks for construction of other improvements is approximately \$150,000.

For bypass pumping, it is anticipated that the work would be performed during a dry weather period (late fall or winter) and the flowrates would be at or below the capacity of the smaller pumps. Due to the very high peak flows that can occur at Memorial Lift Station during heavy precipitation events, attempting to perform this work in the spring or early summer is not recommended.

Pump Improvements

Several alternatives were evaluated for pump improvements. Because of the limited flow data available, the alternatives maintain the existing lift station capacity.

The use of new submersible pumps to replace the existing dry-pit pumps was also evaluated. However, submersible pumps were determined to be infeasible due to the configuration and layout of the existing wet well. The submersible pumps would need to be installed in the same location as the existing pump suction piping. This would place the access hatches for pump removal directly in front of the doors into the lift station. This location would also be very difficult to access with a lift to remove the pumps and place on a truck for service.

Submersible pumps installed in the existing grit chamber were also evaluated. However, this would leave the average flow wet well stagnant, resulting in the same issues with solids deposition and production of hazardous and corrosive gases. Therefore, maintaining the existing dry-pit pump configuration was deemed to be the simplest, most cost effective alternative for Memorial Lift Station.

Several alternatives were evaluated for the dry-pit configuration as described below. For the Smaller pumps, Alternative 1C, Replace both pumps #1 and #2 is the recommended alternative. Alternative 2, Replace Pumps #3, #4, and #5, is not recommended.

1A: Refurbish Pump #1

Priority: High

Cost: \$45,000

Pump #1 has not been operated in a significant time period and the condition is unknown. However, the pump could be refurbished with new bearings, seals, and impeller. The scope of refurbishment would be similar to the work that was recently done on Pump #2. The estimated cost for pump refurbishment is \$45,000. With this alternative, the seal water service would still be recommended. Additionally, the original pump motor would be used. A new VFD would be provided for the older motor with the MCC improvements. Because of the age, unknown condition, and criticality of Pump #1, this alternative is

not recommended. Even after refurbishment, the remaining life of pump #1 is likely limited. Additionally, the older pump is less efficient than a newer pump would be.

1B: Replace Pump #1

Priority: High

Cost: \$90,000

Given the age and cost of refurbishing Pump #1, full replacement of the pump may be more desirable. The replacement pump would be sized for the same design conditions as the existing pump to provide redundancy to pump #2. A new pump would run more efficiently, would not require seal water, and would include a VFD rated motor. Additionally, a dry-pit submersible pump would be less susceptible to degradation from moisture in the wet well. The estimated cost of replacing Pump #1 is \$90,000.

1C: Replace both Pumps #1 & #2

Priority: High

Cost: \$180,000

With pump #1 out of service, pump #2 has run almost continuously for several years. While Pump #2 was recently refurbished, it may be desirable to replace pump #2 as well. The remaining life of pumps #1 and #2 is likely limited due to their age and condition. Replacing both pumps #1 and #2 would provide the most robust upgrade for handling the average daily flow rates that the lift station experiences the vast majority of the time. Additionally, replacing both pumps would allow for the seal water system to be completely eliminated. The Estimated cost of replacing both pumps #1 and #2 is \$180,000. This option is the recommended alternative for the small pumps as it will provide the greatest reliability for the Lift Station.

2: Replace Pumps #3, #4, and #5

Priority: Low

Cost: \$630,000

Given the age of the existing large pumps, full replacement may be desirable. New pumps would be more efficient and could have slightly smaller motors than the existing pumps. (280 HP vs 300 HP) The estimated cost for replacing the three large pumps is \$630,000. Given the very low run time of the large pumps, the higher efficiency would not result in a significant energy savings. Additionally, the existing pumps were recently refurbished and noted to be in good condition for their age, likely due to the very low run time. Therefore, due to the high cost and limited benefit, replacement of pumps #3, #4, and #5 is not recommended.

Other Process-Related Improvements were evaluated as described below.

Replace peak flow wet well sump pump

Priority: Medium

Cost: \$10,000

The sump pump in the existing peak flow wet well is inoperable and is in need of replacement. The sump pump functions to dewater the peak flow wet well after high flow events and reduce the stagnant water in the wet well. Additionally, the sump pump cannot be accessed until the wet well can be isolated and dewatered, and all of the solids buildup and debris can be removed. Replacement of the sump pump can be accomplished once the cleaning is completed. New pump rails and chain could also be provided to allow the pump to be retrieved without entering the wet well. The estimated cost of replacing the sump pump, including new pump rails, is \$10,000.

Install Wet Well Isolation Gates*Priority: Medium**Cost: \$51,000*

Currently there is no way to isolate the AWW wet well for cleaning operations as solids deposition in the wet well contributes to odors and hydrogen sulfide gas formation. Flow enters the wet well from the influent channel through the three 18-inch diameter openings in the wet well west wall. The addition of three (3) sluice gates to these openings will provide the necessary isolation of the wet well from the incoming flows. These sluice gates will be equipped with a stem and riser operated by a gear driven hand wheel mounted on top of the wet well. The estimated cost for the Sluice Gates is approximately \$51,000.

Replace Pump Header Valves*Priority: High**Cost: \$231,000*

The failed 14-inch plug valve on Pump #1 must be replaced in order for Pump #1 to be used. It is also recommended that the other suction and discharge valves be replaced to prevent pump isolation due to valve failure in the future. In total, this includes replacement of four (4) 14-inch Plug valves, two (2) 14-inch check valves, six (6) 16-inch plug valves, three (3) 16-inch check valves, and one (1) 6-inch surge relief valve. The estimated cost for replacing these valves is \$231,000.

Recoat Discharge Header Piping*Priority: High**Cost: \$20,000*

While the evaluation of the discharge piping indicated that it was still in good condition, recoating is still necessary to prevent additional surface degradation of the piping. Sandblasting and recoating the piping with an epoxy coating system will ensure it remains in good condition for years to come. The estimated cost for recoating the piping is approximately \$20,000.

Install Hatches for Better Vector Truck Access into Wet Well*Priority: Medium**Cost: \$15,000*

Currently, access to both wet wells is through steel covers in each wet well lid. These doors are located in front of the main lift station building access doors. The distance from the gate at the perimeter of the lift station to the cover makes it difficult for vector truck equipment to reach the interior of the wet well for cleaning. Installing new access hatches near the fence would make it easier for cleaning equipment to reach into the wet well. The estimated cost for the new hatches is \$15,000.

Inspect 24-inch Forcemain to WWTP*Priority: Low**Cost: \$380,000*

While the piping in the drywell is in good condition, there is approximately 2.5 miles of ductile iron force main from the lift station to the WWTP. Pure Technologies can provide several evaluation tools to determine the condition of the existing force main. A description of these evaluation tools is provided in Appendix C. The internal inspection probes evaluate the pipe from the inside as it is pushed along with the flow, keeping the system in service during the inspection. The estimated cost of this evaluation is approximately \$380,000. Given the good condition of the piping that was inspected and the high cost of the additional inspection, this alternative is considered a low priority.

Relocate Hydrogen Peroxide Feed Equipment

Priority: Low

Cost: \$ 40,000

Relocating the existing hydrogen peroxide solution storage and feed system equipment to the existing lift station facility would provide easier access to the equipment from the lift station as well as added security for the equipment. The equipment would be located where the existing activated carbon filter is currently located and a new steel building would be required to house the equipment. One benefit of relocating the equipment to the lift station is that the chemical feed rate could be automatically adjusted based on the measured incoming flow rate.

However, other proposed improvements will significantly reduce the stagnant water at the lift station and could significantly reduce or eliminate the need for the hydrogen peroxide feed system. Feeding the hydrogen peroxide directly at the lift station would also eliminate the reaction time that is currently provided in the sewer between the existing feed point and the lift station. Therefore, this alternative is considered low priority. It is recommended that the chemical feed rate be evaluated after the improvements are completed to determine if chemical addition is still required or can be reduced.

A summary of the Process Improvements, including priority and estimated cost is provided in Table 4 below:

Table 4: Proposed Process improvements

Process Improvements			
Description	Priority	Recommended?	Estimated Cost
Force Main Isolation Valve and Bypass Pumping	High	Yes	\$150,000
1A: Refurbish Pump #1	High	No	\$45,000
1B: Replace Pump #1	High	No	\$90,000
1C: Replace Pumps #1 & 2	High	Yes	\$180,000
2: Replace Pumps #3-5	Low	No	\$630,000
Replace Peak Flow Wet Well Sump Pump	Medium	Yes	\$10,000
Relocate Peroxide Feed Equipment	Low	No	\$40,000
Replace Valves	High	Yes	\$231,000
Blast & Recoat Piping	High	Yes	\$20,000
Wet well Isolation Sluice Gates	Medium	Yes	\$51,000
New Hatches for Vactor Truck Access	Medium	Yes	\$15,000
Force Main Evaluation	Low	No	\$380,000
Total Recommended Improvements			\$657,000

STRUCTURAL IMPROVEMENTS

Replace Exterior Hatches

Priority: High

Cost: \$30,000

Replacing the hatches above the headworks chamber and electrical room will help prevent water from leaking into the building and causing further damage.

Rehabilitate Above Grade Structure

Priority: High

Cost: \$25,000

Rehabilitation of the above-grade structure include roof replacement, replacement of damaged ceiling insulation and metal decking, as well as mortar repair and crack sealing in the masonry walls. This will ensure the structure remains weather tight.

Replace Pipe Penetration Seals

Priority: High

Cost: \$10,000

The seals on the pipe penetrations into the wet well should be replaced while the lift station is being bypassed during construction. The piping may need to be temporarily supported while the seals are removed.

Repair Pump Room Ceiling Cracking

Priority: Medium

Cost \$5,000

While the cracking is not a structural concern, it should be patched and sealed to prevent potential degradation of the reinforcing steel.

Demolish Elevator and Spiral Staircase and Build New Stairway.

Priority: Medium

Cost: \$20,000

Removing the non-functional elevator and the spiral staircase will create space for a new stairway to be installed and improve access. The new stairway is anticipated to be aluminum or FRP to reduce future corrosion.

Fill in Grit Chambers

Priority: High

Cost: \$50,000

The Stagnant Grit Chamber will be filled in with sand and capped with a concrete slab. The stop plates that currently isolate the grit chamber will be replaced with new concrete walls. The Concrete wall for the effluent weir will be raised to completely eliminate the grit chamber. The smaller chambers for the grit equipment will also be filled in and capped to remove fall hazards.

Patch Spalled Concrete in Headworks Channel

Priority: High

Cost: 10,000

With the lift station taken out of service and bypassed during construction, the concrete channel should be repaired with cementitious or epoxy grout to prevent additional spalling and degradation.

Replace Grating with Solid Panels

Priority: Medium

Cost \$5,000

Replacing the open grating with solid panels that completely cover the headworks channel will eliminate trip hazards and help manage odors and humidity in the headworks chamber. FRP panels will provide corrosion resistance.

Replace ceiling Insulation

Priority: High

Cost: \$40,000

The molding insulation in the headworks chamber and electrical room should be completely removed and replaced with a new closed-cell insulation. While the insulation is removed, the underside of the concrete slab should be inspected for cracking or other degradation. Additional sealing may be necessary to prevent moisture from penetrating the slab and causing future water damage.

Recoat Interior Surfaces

Priority: High

Cost: \$60,000

The interior surface coatings should be removed and replaced to protect the structure and ensure it remains in good condition.

A summary of the Structural Improvements, including priority and estimated cost is provided in Table 5 below:

Table 5: Proposed Structural Improvements

Structural Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Exterior Hatches	High	Yes	\$30,000
Rehab above-grade masonry structure	Medium	Yes	\$25,000
Replace Pipe Penetration Seals between wet well and dry well	High	Yes	\$10,000
Repair Ceiling Cracking in Pump room	Medium	Yes	\$10,000
Demo elevator and spiral staircase and install new staircase	Medium	Yes	\$20,000
Fill in Grit Chamber	High	Yes	\$50,000
Patch spalled concrete in Headworks Channel	High	Yes	\$10,000
Replace Grating in Headworks Chamber	Medium	Yes	\$5,000
Remove and replace Ceiling Insulation	High	Yes	\$40,000
Recoat interior walls, floors, and ceilings	High	Yes	\$60,000
Total Recommended Improvements			\$260,000

HVAC IMPROVEMENTS

Replace Wrap on Exterior Ducts

Priority: High

Cost: \$14,000

The duct wrap is important both for protecting the ductwork from corrosion and also for maintaining heat for the heat exchanger. Replacing the wrap on the portions of ductwork to remain is highly recommended.

Demolish Odor Control Scrubber and Associated Ductwork.

Priority: High

Cost: \$10,000

The Odor control system is unused and it is recommended that it be removed. The associated ductwork and bypass dampers that are currently non-functional should also be removed. With the modifications to the ductwork, the air handling unit and heat exchanger should be rebalanced to ensure proper performance.

Repair/Replace Electric Unit Heater in Generator Room

Priority: High

Cost: \$1,000

As the only source of heat in the generator room, the electric unit heater should be repaired or replaced.

Separate Boiler from Generator Room

Priority: High

Cost: \$20,000

In order to comply with NFPA 110, the Boiler system cannot be located in the generator room. It may be feasible to separate the generator room into two spaces to comply with code requirements. Alternatively, a small enclosure could be constructed outside to house the boiler system.

Replace Drywell Exhaust Fan

Priority: High

Cost: \$11,000

A new exhaust fan is required to keep the electrical room declassified and meet NFPA requirements.

Reroute Drywell Ductwork

Priority: High

Cost: \$68,000

The ductwork in the drywell needs to be rerouted to provide adequate circulation in both the pump room and electrical room. Additionally, the ductwork need to be rerouted so as not to pass through the generator room. The new ductwork will exit through the north wall of the lift station and the existing wall penetrations closed with new CMU.

Add Dehumidifiers to Drywell

Priority: High

Cost: \$10,000

Adding commercial grade dehumidification units to both the pump room and electrical room are recommended to help reduce future moisture damage inside the lift station.

Add Intake Louver to Drywell

Priority: High

Cost: \$7,000

An Intake Louver should be provided in the drywell space to ensure adequate fresh air is being supplied.

Replace Exhaust hood and Duct in Headworks Chamber

Priority: High

Cost: \$ 27,000

Clean Supply Duct in Headworks Chamber

Priority: Medium

Cost: \$4,000

Add Dehumidifier to Headworks Chamber

Priority: Medium

Cost \$5,000

If solid covers are provided over the headworks channel, a commercial grade dehumidifier could be adequate for reducing moisture in the headworks chamber. If the channel is left uncovered with open grating, there will likely be too much moisture for the dehumidifier to provide a benefit.

A summary of the HVAC Improvements, including priority and estimated cost is provided in Table 6 below:

Table 6: Proposed HVAC Improvements

HVAC Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Wrap on Exterior Ducts	High	Yes	\$14,000
Demo Odor Control Scrubber and Associated Ductwork	High	Yes	\$10,000
Repair Electric Unit Heater in Generator Room	High	Yes	\$1,000
Separate boiler from Generator room	High	Yes	\$20,000
Replace Drywell Exhaust Fan	High	Yes	\$11,000
Reroute Drywell Ductwork	High	Yes	\$68,000
Add Dehumidifiers to Drywell	High	Yes	\$10,000
Add Intake louver to Drywell	High	Yes	\$7,000
Replace Exhaust hood and Ductwork in Headworks Chamber	High	Yes	\$27,000
Clean supply Duct in Headworks Chamber	Medium	Yes	\$4,000
Add Dehumidifier to Headworks Chamber	Medium	Yes	\$5,000
Total Recommended Improvements			\$177,000

PLUMBING IMPROVEMENTS

Replace boiler circulation pumps and appurtenances

Priority: High

Cost: \$37,000

Regardless of the final location of the boiler system, the circulation pumps should be replaced due to their condition. New pumps with variable frequency drives will allow the boiler system to operate more efficiently and ensure reliable heating is provided to the headworks chamber.

Relocate Water Piping outside of Electrical Room

Priority: High

Cost \$11,000

The water line entering the lift station in the electrical room should be rerouted away from the electrical equipment. The piping could be relocated over the stairwell and routed directly to the pump room. If water is still necessary for the bathroom facilities, the water piping could be routed along the ceiling of the pump room and up through the floor penetration where the piping currently passes down from the electrical room into the pump room.

Replace Bathroom Fixtures

Priority: Low

Cost: \$7,000

If the bathroom facilities are to remain, the fixtures could be replaced with newer fixtures. Additionally, a curb could be installed around the bathroom area to contain water and prevent it from reaching electrical components.

Demolish Bathroom Fixtures

Priority: High

Cost: \$1,000

It is recommended that the bathroom fixtures be demolished to eliminate the water source in the electrical room.

Replace Pump room Sump Pump

Priority: High

Cost: \$11,000

Due to the poor condition of the existing sump pump, complete replacement is recommended to reduce standing water in the pump room.

Rehabilitate Pump Room Floor Drains

Priority: High

Cost: \$14,000

The floor drains in the pump room should be jetted to remove blockages and ensure there is not standing water in the room. The drain covers should be replaced as well.

A summary of the Plumbing Improvements, including priority and estimated cost is provided in Table 7 below:

Table 7: Proposed Plumbing Improvements

Plumbing Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace boiler Circulation Pumps and Appurtenances	High	Yes	\$37,000
Relocate Water piping outside of electrical room	High	Yes	\$11,000
Replace Bathroom Fixtures	Low	No	\$7,000
Demolish Bathroom Fixtures	High	Yes	\$1,000
Replace Pump Room Sump Pump	High	Yes	\$11,000
Rehabilitate Pump Room floor Drains	High	Yes	\$14,000
Total Recommended Improvements			\$74,000

ELECTRICAL IMPROVEMENTS

Demolish unused conduits and electrical equipment

Priority: Medium

Cost: \$8,000

The unused conduits and electrical equipment should be removed for ease of construction and maintenance activities. Sealing the penetrations from unused conduits will help decrease water seepage and corrosive gases entering the electrical room from the headworks chamber and wet well.

Replace Electrical MCC/Gear

Priority: High

Cost: \$275,000

Due to the age and condition of the existing MCC, full replacement is recommended. This alternative includes VFD's for Pumps #1 and #2 and two-speed starters for Pumps #3, #4, and #5. A new housekeeping pad should be constructed prior to installation of the new MCC to protect them from any moisture present on the floors.

If the MCC is to be replaced, several ancillary improvements must also be made to bring the electrical service up to current code requirements. These improvements include replacing the electrical service entrance, replacing the main switchgear, and installing surge protection on the incoming power lines.

Lighting

Replace the explosion proof high pressure sodium light fixtures in the headworks chamber with LED type.

Priority: Medium

Cost: \$22,000

Replace existing interior and exterior light fixtures with LED type.

Priority: Medium

Cost: \$6,000

Install additional exterior LED light fixtures around the building for security and maintenance activities.

Priority: Medium

Cost: \$3,000

Install emergency lighting fixtures illuminating paths of egress inside and outside the building.

Priority: High

Cost: \$12,000

Install light pole on north side of building for additional security.

Priority: Medium

Cost: \$5,000

Guard Hoist Electrical Bus Bar

Priority: High

Cost: \$500

Adding an aluminum or non-metallic panel to shield the hoist electrical bus bar from accidental contact from the stairwell is an inexpensive but critical safety improvement.

Replace disconnects and conductors in Pump Room

Priority: High

Cost: \$15,000

Due to the age and condition of the disconnects located in the pump room, complete replacement is recommended. Existing disconnects to be replaced serve the hoist, sump pump. New disconnects should be installed for all five pumps as well. The copper wiring between the MCC and the electrical components is likely deteriorated as well and should be replaced when the disconnects are installed.

Replace Conduits in Headworks Chamber and in Wet Well with Explosion Proof Conduits

Priority: High

Cost: \$8,000

Demolish junction box and associated conduits that do not meet explosion proof installation. Install new conduits and conductors from headworks area to electrical room. Demolish and replace PVC conduit with rigid aluminum conduit, and install meeting Class I Division 1 requirements for hazardous locations.

A summary of the Electrical Improvements, including priority and estimated cost is provided in Table 8 below:

Table 8: Proposed Electrical Improvements

Electrical Improvements			
Description	Priority	Recommended?	Estimated Cost
Demo unused conduits and equipment	High	Yes	\$8,000
Replace MCC, Switchgear, and Service Conductors	High	Yes	\$275,000
Replace Explosion proof lighting in Headworks Chamber	Medium	Yes	\$22,000
Replace interior and exterior lights with LED lighting	Medium	Yes	\$6,000
Install additional exterior lighting on building	Medium	Yes	\$3,000
Install emergency egress lighting	High	Yes	\$12,000
Install new light pole near building	Medium	Yes	\$5,000
Guard hoist bus bar	High	Yes	\$500
Replace disconnects and conductors in pump room	High	Yes	\$15,000
Replace conduits in classified spaces with explosion proof conduits	High	Yes	\$8,000
Total Recommended Improvements			\$354,000

CONTROL IMPROVEMENTS

Replace Control and SCADA System

Priority: High

Cost: \$150,000

With the age and condition of the existing control panel, a completely new control system is recommended. The new control system would integrate the pump and grinder control, environmental monitoring, and flow measurement and allow for remote monitoring and control.

Install new ventilation monitoring and hazardous gas monitoring

Priority: High

Cost: \$25,000

Ventilation monitoring and hazardous gas detectors should be installed in both the headworks chamber and drywell. These systems are required by NFPA 820 and will alert operators of hazardous conditions prior to entering the lift station itself.

Replace Instrumentation

Priority: High

Cost: \$40,000

New level reading instrumentation in the lift station are necessary to accurately measure incoming flow and for controlling pump operation. If a new hatch is installed into the wet well, the backup floats could be relocated to be accessible from the hatch without entering the wet well. This instrumentation includes a new level sensor for the parshall flume, two new ultrasonic level sensors to monitor wet well levels, and new backup floats for the wet wells. These sensors would be connected to the new control panel for remote monitoring through SCADA.

Install additional environmental sensors

Priority: Medium

Cost: \$10,000

Installing Flood sensors in the headworks chamber and drywell can alert operators in the event of a pipe break, hydraulic backup or blockage, or other significant failure.

Temperature sensors in the headworks chamber and drywell can alert operators if there are extreme temperature conditions from a heating system failure prior to pipe freezing or electrical issues.

A summary of the Controls Improvements, including priority and estimated cost is provided in Table 4 below:

Table 9: Proposed Controls improvements

Control System Improvements			
Description	Priority	Recommended?	Estimated Cost
Replace Control and SCADA System	High	Yes	\$150,000
Ventilation and Hazardous Gas Monitoring	High	Yes	\$25,000
Replace Instrumentation	High	Yes	\$40,000
Install Flood and Temperature sensors	Medium	Yes	\$10,000
Total Recommended Improvements			\$225,000

Summary

SUMMARY

Memorial Lift Station requires several improvements to maintain reliable operation, meet current electrical and fire protection codes, and to protect worker health and safety. The recommended site improvements includes minor work around the perimeter of the lift station to address animals, vegetation, and drainage. Recommended process improvements include replacement of failed and failing equipment. Structural improvements include work to make the structure weather tight, reapply protective coatings, and patch minor concrete degradation. HVAC improvements include demolition of the unused odor control system, and improvements to ventilation in the drywell area to reduce hazardous gas buildup. Recommended plumbing improvements include replacement of the boiler circulation pumps and removal of the house water piping located above the electrical equipment. Recommended electrical improvements include complete replacement of the motor control center. Recommended Controls Improvements include complete replacement of the existing control system. A summary of the estimated costs is provided in Table 10 below.

Table 10: Summary of Estimated Costs for Recommended Improvements

Description	Estimated Cost
Site Improvements	\$1,800
Process Improvements	\$657,000
Structural Improvements	\$260,000
HVAC Improvements	\$177,000
Plumbing Improvements	\$74,000
Electrical Improvements	\$354,500
Controls Improvements	\$225,000
Subtotal	\$1,749,300
10% Contingency	\$175,000
Engineering, Legal, and Administrative Costs (Estimated 20%)	\$350,000
Total Estimated Project Cost	\$2,275,000

Financial Analysis

POTENTIAL FUNDING SOURCES

Community Development Block Grant

The Community Development Block Grant (CDBG) program is administered by the Iowa Economic Development Authority (IEDA) and allows municipalities to apply for grant funding on a competitive basis each year for water and wastewater improvements. The main criteria used in determining a community's grant eligibility revolves around the City's Low to Moderate Income (LMI) household percentage. To be eligible for funding, the community's LMI percentage needs to be greater than or equal to 51%. According to the IEDA's latest demographic information, the City of Storm Lake's LMI is 52%. Therefore, the City is eligible for a grant of up to \$600,000. The Grant requires a dollar-for-dollar local match, so in order to utilize the full \$600,000 the City would need to provide a minimum of \$600,000 in additional funding.

State Revolving Loan Fund, Clean Water Fund

The SRF is a revolving loan fund through the State of Iowa Finance Authority. Currently, the SRF interest rate is 1.75% for a 20-year loan. In some cases the loan term can be extended to 30 years if the project being funded has a lifespan greater than 30 years. Currently, 30-year rates are 2.75%. SRF loans have a 0.25% annual service fee, thus 2.00% and 3.00% should be expected for the 20-year and 30-year loan rates, respectively. This funding is subject to Federal Davis Bacon Prevailing Wages and has American Iron and Steel Requirements.

The SRF loan program also provides communities to apply for Disadvantaged Status. For clean water projects, the IDNR looks at the community's Median Household Income (MHI), number of rate payers, current and projected debt, along with additional criteria to determine eligibility. If determined eligible, the community can utilize the 30-year term at a discounted rate of 2.00%. The project is still subject to Federal Davis Bacon Prevailing Wages and American Iron and Steel Requirements.

The SRF loan program requires the City to enlist the services of a Municipal Advisor (MA) in order to be eligible for funding. The SRF will reimburse the City \$4,000 for the services of the MA. The MA's assistance is required through the program in an effort to ensure the City has the ability to repay the new debt service while maintaining a healthy wastewater fund balance. To meet the ability of the debt, an adjustment to sanitary sewer rates will be required to maintain a 1.10% debt coverage ratio. This means that the City needs to generate at least 10% more revenue than expenditures for the entire wastewater system on an annual basis.

State Revolving Loan Fund's Planning and Design Loan

SRF offers a Planning and Design (P&D) Loan that is a 0% interest loan for up to three years with no initiation or servicing fees. The P&D loan is intended to be utilized to pay for costs to produce reports such as this Facility Plan, legal/administration fees as necessary, and engineering design of the selected alternative. At the end of the three-year period (or before), the P&D loan can be rolled into a SRF Construction Loan.

SRF Sponsored Project Grant

SRF allows sewer utilities to finance water resource restoration sponsored projects in conjunction with a Clean Water Fund loan of \$1 million or more. On a Clean Water Fund loan with a sponsored project, the utility borrows money for both the wastewater improvements and the water resource improvements. However, SRF reduces the interest rate on the loan so that the debt service payment is the same as if only the wastewater improvements were funded. This effectively provides a grant for the water resources improvements. Total Sponsored Project funding is capped statewide and applications are selected on a competitive basis each fiscal year.

Sponsored Project funding is available up to the lowest of the following:

- 10% of the requested Clean Water Fund loan amount.
- 10% of the final amount of the Clean Water Fund Construction loan.
- The amount requested on the sponsored project application.

Therefore, the City of Storm Lake could be eligible for approximately \$172,000 for water resources restoration projects in conjunction with the anticipated SRF Clean Water Fund Loan for the Memorial Lift Station Improvements. In order to be eligible for a Sponsored Project Grant, the City would need to identify project(s) and apply by March 2020. The Sponsored Project application would need to be closely coordinated with the Clean Water Fund Loan in order to maintain eligibility.

FINANCING SCENARIOS

The City plans to apply for a Community Development Block Grant (CDBG) to fund a portion of the project. The City is eligible for up to \$600,000 from CDBG for this project. The remaining balance will be funded through a State Revolving Fund (SRF) Loan. It has not been determined if the City qualifies for disadvantaged community status at this time. Table 11 shows the estimated annual payments that the City would make based on each funding scenario. The financing evaluation does not incorporate the additional 10% revenue that the City must generate for its own wastewater fund as required by SRF.

Table 11: Financing Scenarios

Program	Rate Term	Grant	Loan	Estimated Annual Debt Service ¹	Total Principal + Interest Paid
SRF 20-Year	2.00% 20-Year	-	\$2,275,000	\$138,000	\$2,762,000
SRF 20-Year + CDBG	2.00% 20-Year	\$600,000	\$1,675,000	\$102,000	\$2,034,000
SRF 30-Year	3.00% 30-Year		\$2,275,000	\$115,000	\$3,453,000
SRF 30-Year + CDBG	3.00% 30-Year	\$600,000	\$1,675,000	\$85,000	\$2,542,000
SRF Disadvantaged ²	2.00% 30-Year		\$2,275,000	\$101,000	\$3,027,000
SRF Disadvantaged ² + CDBG	2.00% 30-Year	\$600,000	\$1,675,000	\$74,000	\$2,229,000

¹ Does not include 110% debt coverage ratio required by SRF.

² Disadvantaged community eligibility to be determined.

Final Considerations and Preliminary Schedule

Based on the evaluation described in this report, it is recommended that the City of Storm Lake proceed with the listed improvements to Memorial Lift Station. The Recommended Financing Scenario is a Community Development Block Grant for \$600,000 with an SRF loan for the remainder of the project cost. If desired, the City could evaluate if they qualify for disadvantaged community status and a longer loan term. The City can also apply for an SRF Sponsored Project grant to fund a water resources improvement project based on the wastewater loan. The preliminary project schedule is as follows:

July 2019	Submit Facility Plan to Iowa DNR
August 2019	Begin Final Design
September 3, 2019	SRF IUP Application Deadline
October 1, 2019	CDBG Application Deadline
December 17, 2019	SRF IUP Approval
December 2019	CDBG Grant Award
January 2020	Submit Final Plans & Specifications to Iowa DNR
March 2020	Issue Plans & Specifications for Bidding
April 2020	Award Contract
Summer 2020	Contractor Procures Equipment and Materials
October 2020	Begin Bypass Pumping and Lift Station Improvements
December 2020	Substantial Completion,
March 2021	Final Completion

APPENDIX A: Existing Lift Station Drawings



APPENDIX B: Pipe Non-Destructive Testing Report

June 4, 2019

Mr. Mark Streed
City of Storm Lake
P.O. Box 1086, 620 Erie Street
Storm Lake, IA

**Subject: 24-inch Ductile Iron Pipe Header, Memorial Lift Station
Ultra Thickness Testing Results Report Letter**

Dear Mr. Mark Streed:

This letter details the findings from the Ultra Thickness Testing (UTT) conducted by Jan X-Ray Services Inc. (JanX) under the direction of Pure Technologies U.S. Inc., a Xylem Brand (Pure Technologies) of the 24-Inch Ductile Iron Pipe (DIP) header at the Memorial Lift Station in Storm Lake, Iowa. The lift station is owned and operated by the City of Storm Lake, Iowa.

Background and Location

The lift station header piping was originally installed in 1983 and has been in continuous use since its construction. The exterior of the DIP piping has noticeable areas of corrosion and chipped paint (see **Figures 1 and 2**). Replacing this piping would require bypass pumping around the entire lift station, which would add significant cost. Therefore, the City of Storm Lake contracted Pure Technologies to collect thickness measurements of the header piping in order to verify the condition of the wall of the pipe, potentially allowing it to remain in place. UTT, an ultrasonic inspection technology, was chosen in order to externally verify the wall thickness of the header piping.

The ultrasonic inspection spanned approximately 36.5 feet of 24-inch DIP pipe and five (5) 24-inch DIP tees (see **Figure 3**). Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the updated design thickness with the measured thickness for a more accurate analysis.



Figures 1 and 2: Exterior of the Lift Station Header Piping

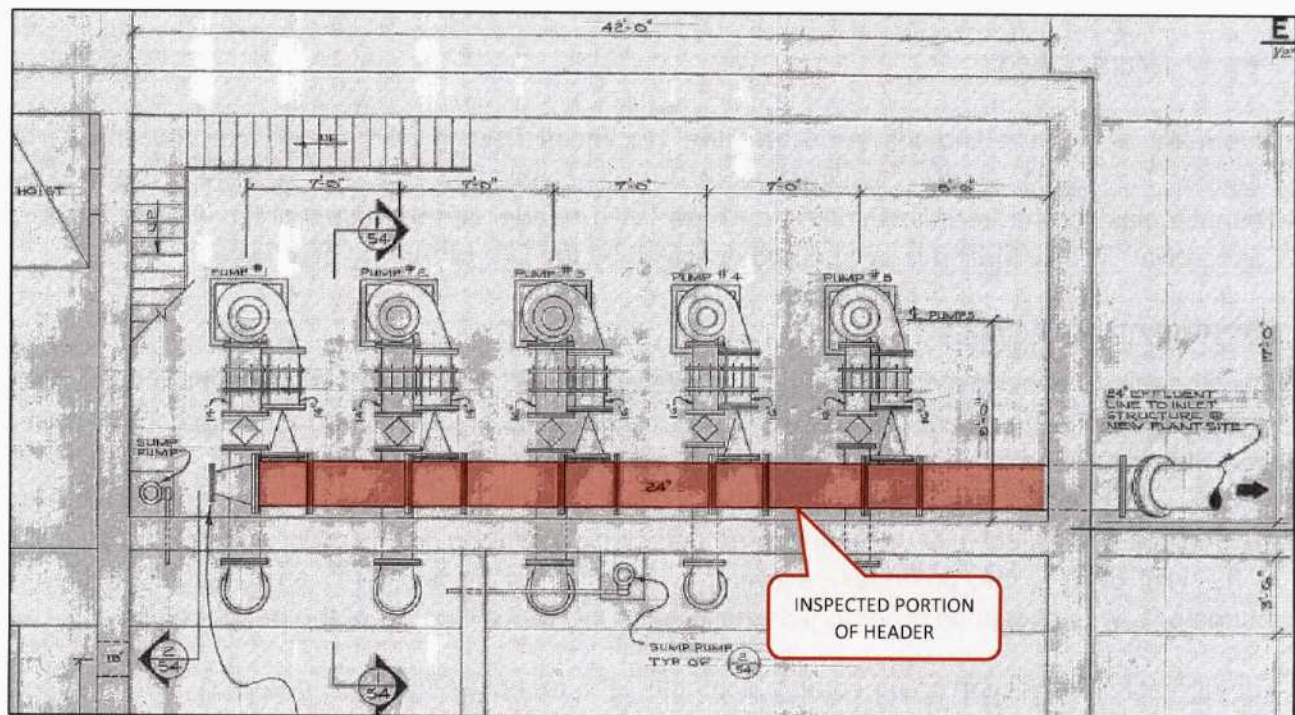


Figure 3: 24-inch DIP Lift Station Header

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

External Ultra Thickness Testing Results

The thickness measurements were taken using a model UM-1D ultrasonic thickness testing device. The transducer frequency was set to 5 MHz, with a single-element transducer sized at 0.250 inches. Thickness measurements were spaced evenly over the length of the pipes and tees, with nine (9) readings taken for each tee and twelve (12) readings taken for each pipe. A diagram of the measurement locations taken for tees and pipes is shown in **Figure 4**.

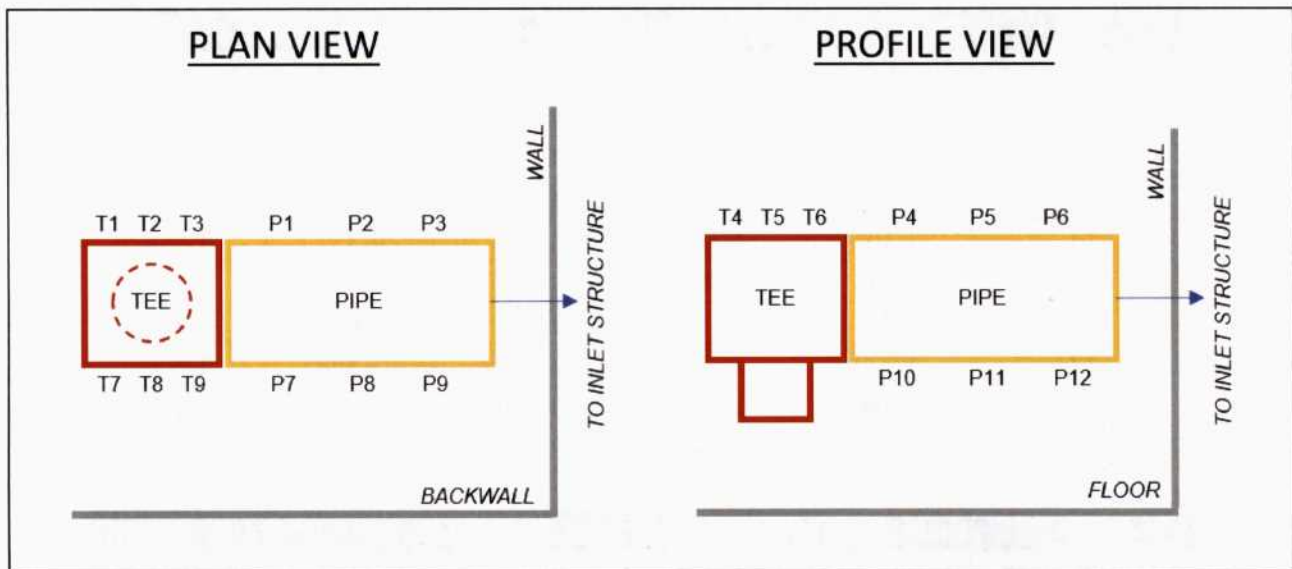


Figure 4: Diagram of Measurement Locations for Tees and Pipes

The tees and pipes were labeled one (1) through five (5), beginning at the sump pump and moving towards the inlet structure. A diagram of the labeled tees and pipes from the inspection is shown below in **Figure 5**. The results for the UTT thickness testing of the tees and the pipes are shown in **Tables 1 and 2**, respectively.

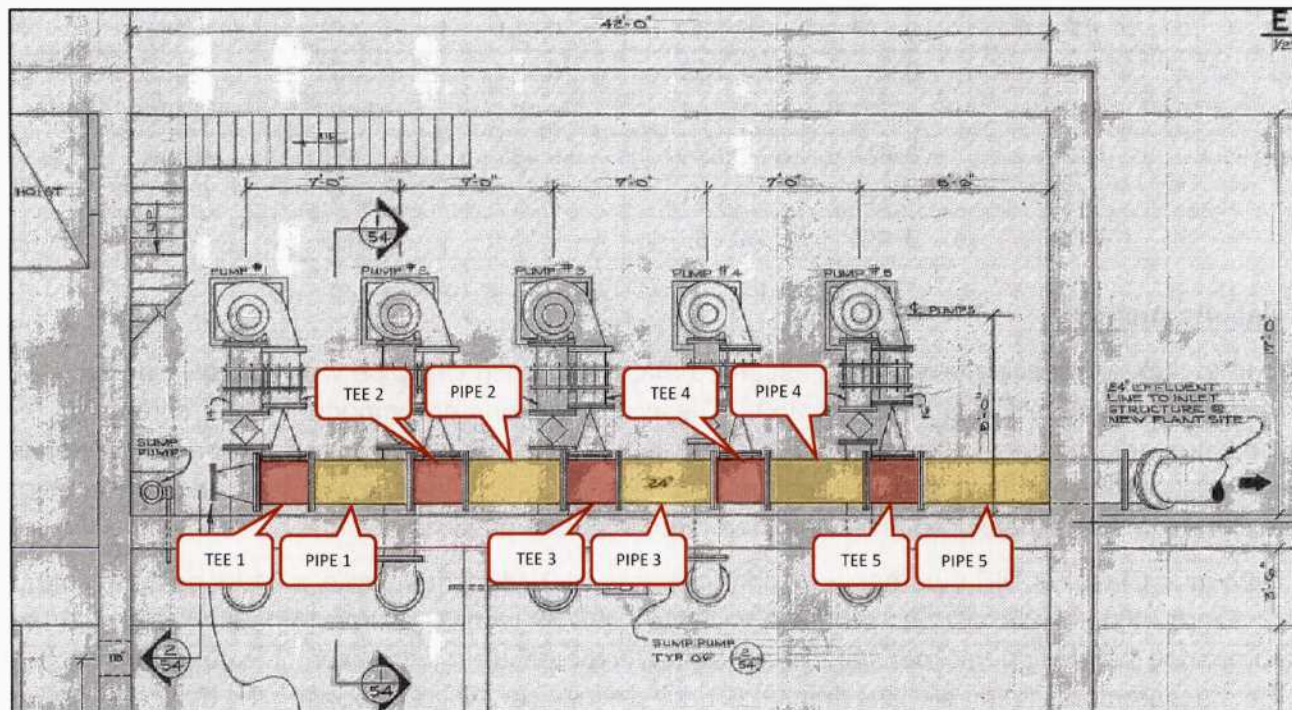


Figure 5: 24-inch DIP Lift Station Header (Labeled Tee & Pipe)

(Source: Sheet III-54, Prj. 60052S; "Pump Station Equipment and Piping Layout, Waste Treatment Facilities Storm Lake, Iowa"; Dated January 1983)

Table 1: Thickness Measurements for Tees (in inches)					
Measurement	Tee 1	Tee 2	Tee 3	Tee 4	Tee 5
T1	1.223	1.207	1.359	1.268	1.491
T2	1.241	1.268	1.294	1.306	1.469
T3	1.248	1.263	1.401	1.315	1.471
T4	1.301	1.321	1.338	1.331	1.454
T5	1.238	1.301	1.347	1.413	1.431
T6	1.287	1.331	1.353	1.442	1.299
T7	1.279	1.362	1.322	1.398	1.306
T8	1.296	1.371	1.359	1.365	1.322
T9	1.301	1.354	1.306	1.315	1.316

Table 2: Thickness Measurements for Pipes (in inches)					
Measurement	Pipe 1	Pipe 2	Pipe 3	Pipe 4	Pipe 5
P1	0.546	0.659	0.491	0.471	0.417
P2	0.554	0.651	0.479	0.454	0.421
P3	0.532	0.584	0.461	0.462	0.435
P4	0.559	0.631	0.468	0.471	0.421
P5	0.531	0.652	0.482	0.451	0.437
P6	0.601	0.591	0.499	0.449	0.435
P7	0.577	0.622	0.501	0.471	0.461
P8	0.587	0.668	0.477	0.465	0.458
P9	0.556	0.604	0.494	0.462	0.466
P10	0.577	0.684	0.481	0.458	0.417
P11	0.533	0.671	0.476	0.467	0.461
P12	0.482	0.665	0.473	0.471	0.509

Results Analysis

Due to lack of specifications, it was assumed that the 24-inch DIP pipe was Class 52 and the 24-inch DIP tees were Pressure Class 250. These assumptions are important when comparing the measured thicknesses to the design thickness. If the City of Storm Lake finds any additional details or specifications for the lift station header piping, Pure Technologies can compare the correct design thickness with the measured thickness for a more accurate analysis.

A 24-inch Class 52 DIP pipe has a design thickness of 0.44 inches, while a 24-inch DI Tee with a pressure rating of 250 psi has a design thickness of 0.89 inches (source: American Pipe). When comparing the design thickness of the tee to the field measurements taken, it is clear that none of the measurements taken are less than 0.89 inches. However, when comparing the design thickness of the pipe to the field measurements taken, it can be seen that "Pipe 5" (closest to the inlet structure wall) has multiple thicknesses less than 0.44 inches.

Seven (7) of the twelve (12) thickness measurements taken for "Pipe 5" are less than 0.44 inches. Out of those seven (7), the maximum wall loss percentage was roughly 5% which was located at

measurements "P1" and "P10" at 0.417 inches. A diagram indicating the measurements taken for "Pipe 5" is shown in **Figure 6**.

Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition.

It is Pure Technologies understanding that no pressure gauges are installed on the header piping in order to collect direct pressure readings at operating conditions. However, it was determined that a pressure relief valve exists on the header which is set to open at 65 psi. Assuming the valve is in good operating condition, 65 psi would be the maximum operating pressure for the header.

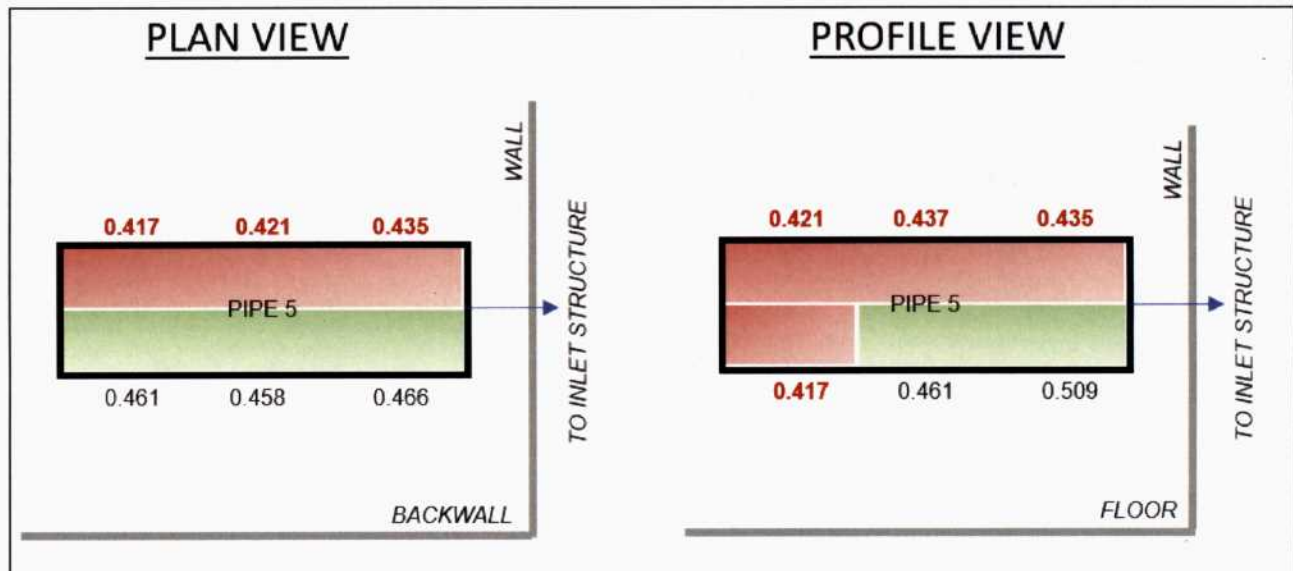


Figure 6: Thickness Measurements (in inches) of "Pipe 5"

Conclusion

Based on the findings from the JanX UTT external field testing, Pure Technologies concluded that only one (1) of the five (5) pipes tested were found to have wall thickness measurements less than the design thickness. The maximum wall loss percentage at this pipe was roughly 5% and was located at measurements "P1" and "P10" of "Pipe 5", at 0.417 inches. Though it is possible that wall loss may have occurred at this location, a wall thickness measurement of 0.417 inches (the minimum observed) for 24-inch DIP corresponds with a design pressure class of 300 pounds per square inch (psi)¹. This pressure class is defined as the rated water pressure of the pipe in psi. Therefore, if the City of Storm Lake is operating the header piping under 300 psi, it can be assumed that the header piping is in serviceable condition. Additionally, it was determined that under normal operating

¹ U.S. Pipe and Foundry Company. "Ductile Iron Pipe Design for Fire Protection, Water & Wastewater". Page P10. Table 2; Pressure Class. 2013 Edition.

conditions, the header piping experiences a maximum operating pressure of 65 psi. Therefore, under those operating conditions, it can be assumed that the header piping is in serviceable condition. Pure Technologies also concluded that none of the five (5) tees tested were found to have wall thickness measurements less than the design thickness. The JanX Field Log used to collect and document the data is included as an appendix to this letter.

If you have any questions or require additional information, please contact us.

Sincerely,

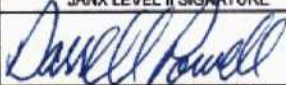
William Barloon

Bill Barloon, P.E.
Area General Manager, Xylem

cc: Steve Bruskiewicz, Business Development Manager, Xylem

Attachments

Appendix A: JanX Field Log

DATE: 5/20/2019		CLIENT: Pure Technologies US, Inc.																		
REPORT No: 1 of 1		JOB LOCALE- CITY, STATE: Storm Lake, IA																		
CLIENT PO No: #2019-052		JANX JOB No:																		
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1																		
CLIENT JOB No:		ACCEPTANCE CRITERIA: Information only																		
ULTRASONIC THICKNESS TESTING TECHNIQUE																				
Instrument Mfg: <u>Landmark</u> Model: <u>UM-1D</u> Serial No: <u>5102212</u> Cal. Date: <u>1/15/2019</u>																				
Transducer Mfg: <u>Landmark</u> Transducer Frequency: <u>5</u> MHz Due Date: <u>1/15/2020</u>																				
Transducer Size: <u>.250"</u> Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line																				
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)																				
Scan Description: <u>Thickness readings; looking for wall loss</u> Max. Scan Rate (in./sec.): <u>N/A</u> Scan Overlap %: <u>N/A</u>																				
Couplant Brand or Type: <u>Sonagel</u> Remarks:																				
PART DESCRIPTION																				
Material: <u>C/S</u> Thickness: <u>.500"</u>																				
Inspection Area Description: <u>24" x .500wt pipe</u>																				
Surface Condition: <u>Clean</u>																				
Surface Preparation: <u>Coating removed and brushed</u>																				
Temp. of Part and Cal. Block within ± 25°F of each other: ☒																				
Calibration Block No: <u>3972</u> Material: <u>C/S</u>																				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th></th> <th>Step 1</th> <th>Step 2</th> <th></th> </tr> <tr> <td>Cal Block Actual Thickness:</td> <td><u>.250"</u></td> <td><u>1"</u></td> <td>Time</td> </tr> <tr> <td>Cal. Reading at Start:</td> <td><u>.250"</u></td> <td><u>.500"</u></td> <td><u>10:30AM</u></td> </tr> <tr> <td>Cal. Reading at End:</td> <td><u>.250"</u></td> <td><u>.500"</u></td> <td><u>2PM</u></td> </tr> </table>						Step 1	Step 2		Cal Block Actual Thickness:	<u>.250"</u>	<u>1"</u>	Time	Cal. Reading at Start:	<u>.250"</u>	<u>.500"</u>	<u>10:30AM</u>	Cal. Reading at End:	<u>.250"</u>	<u>.500"</u>	<u>2PM</u>
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4	24	44	64	84																
5	25	45	65	85																
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SKETCH / PICTURE / REMARKS - AS NEEDED																				
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ADDRESS:																				
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN																
				Darrell Powell																
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE																
Steve Bruskiewicz (262)305-5238		550	10	Yes																
				TOTAL ITEMS INSPECTED																
				0																
Kenny Cox !																				
Form: UTT Report 14-06 CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED. JANX (517) 531-8210 P.O. Box 190 Parma, MI 49269																				

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Transducer Mfg: <u>Landmark</u>		Transducer Frequency: <u>5</u> MHz		Due Date: <u>1/15/2020</u>					
Transducer Size: <u>.250"</u>		Transducer Type: ☐ Dual Element ☒ Single Element ☐ Delay Line							
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam ☒ Spot Thickness Readings Only ☒ Area Scan (see below)									
Scan Description: <u>Thickness readings; looking for wall loss</u>		Max. Scan Rate (in./sec.): <u>N/A</u>		Scan Overlap %: <u>N/A</u>					
Couplant Brand or Type: <u>Sonagel</u>		Remarks:							
PART DESCRIPTION									
Material: <u>C/S</u> Thickness: <u>.500"</u>									
Inspection Area Description: <u>Looking for wall loss; thickness readings</u>									
<u>24" x .500wt pipe</u>									
Surface Condition: <u>Clean</u>									
Surface Preparation: <u>Coating removed and brushed</u>									
Temp. of Part and Cal. Block within ± 25°F of each other: ☒									
THICKNESS READINGS									
1	Pipe 1	21	Pipe 2	41	Pipe 3	61	Pipe 4	81	Pipe 5
2	0.546	22	0.659	42	0.491	62	0.471	82	0.417
3	0.554	23	0.651	43	0.479	63	0.454	83	0.421
4	0.532	24	0.584	44	0.461	64	0.462	84	0.435
5	0.559	25	0.631	45	0.468	65	0.471	85	0.421
6	0.531	26	0.652	46	0.482	66	0.451	86	0.437
7	0.601	27	0.591	47	0.499	67	0.449	87	0.435
8	0.577	28	0.622	48	0.501	68	0.471	88	0.461
9	0.587	29	0.668	49	0.477	69	0.465	89	0.458
10	0.556	30	0.604	50	0.494	70	0.462	90	0.466
11	0.577	31	0.684	51	0.481	71	0.458	91	0.417
12	0.533	32	0.671	52	0.476	72	0.467	92	0.461
13	0.482	33	0.665	53	0.473	73	0.471	93	0.509
14		34		54		74		94	
15		35		55		75		95	
16		36		56		76		96	
17		37		57		77		97	
18		38		58		78		98	
19		39		59		79		99	
20		40		60		80		100	
SKETCH / PICTURE / REMARKS - AS NEEDED									
Drive in and out of Storm Lake, IA.....									
(9) Readings per "TEE"									
(12) Readings per "PIPE"									
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbia MD 21045									
ADDRESS:									
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN					
				Darrell Powell					
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE					
Steve Bruskiewicz (262)305-5238		300	14	Yes					
				TOTAL ITEMS INSPECTED					
				10					
Kenny Cox I									
Form: UTT Report 14-05		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.		JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269					

DATE: 5/22/2019		CLIENT: Pure Technologies US, Inc.			
REPORT No: 1 of 1		JOB LOCALE- CITY, STATE: Storm Lake, IA			
CLIENT PO No: #2019-052		JANX JOB No:			
CLIENT W/O No:		JANX PROCEDURE No: UTT-1, Rev. 1			
CLIENT JOB No:		ACCEPTANCE CRITERIA: information only			
ULTRASONIC THICKNESS TESTING TECHNIQUE					
Instrument Mfg: <u>Landmark</u>		Model: <u>UM-1D</u> Serial No: <u>5102212</u>		Cal. Date: <u>1/15/2019</u>	
Transducer Mfg: <u>Landmark</u>		Transducer Frequency: <u>5</u> MHz		Due Date: <u>1/15/2020</u>	
Transducer Size: <u>.250"</u>		Transducer Type: ☐ Dual Element ☒ Single Element		☐ Delay Line	
☒ Contact ☐ Angle 0° to Surface ☒ Straight Beam		☒ Spot Thickness Readings Only		☒ Area Scan (see below)	
Scan Description: <u>Thickness readings; looking for wall loss</u>		Max. Scan Rate (in./sec.): <u>N/A</u>		Scan Overlap %: <u>N/A</u>	
Couplant Brand or Type: <u>Sonagel</u>		Remarks:			
PART DESCRIPTION					
Material: <u>C/S</u>		Thickness: <u>.500"</u>			
Inspection Area Description: <u>24" x .500wt pipe</u>					
Surface Condition: <u>Clean</u>					
Surface Preparation: <u>Coating removed and brushed</u>					
Temp. of Part and Cal. Block within ± 25°F of each other: ☒					
Calibration Block No: <u>3972</u>		Material: <u>C/S</u>			
		Step 1 Step 2			
Cal Block Actual Thickness:		<u>.250"</u>	<u>1"</u>	Time	
Cal. Reading at Start:		<u>.250"</u>	<u>.500"</u>	<u>10:30AM</u>	
Cal. Reading at End:		<u>.250"</u>	<u>.500"</u>	<u>2PM</u>	
Gate Height: _____ %		☒ Not Applicable			
Gain: _____ dB		☒ Not Applicable			
THICKNESS READINGS					
1		21	41	61	81
2		22	42	62	82
3		23	43	63	83
4		24	44	64	84
5		25	45	65	85
6		26	46	66	86
7		27	47	67	87
8		28	48	68	88
9		29	49	69	89
10		30	50	70	90
11		31	51	71	91
12		32	52	72	92
13		33	53	73	93
14		34	54	74	94
15		35	55	75	95
16		36	56	76	96
17		37	57	77	97
18		38	58	78	98
19		39	59	79	99
20		40	60	80	100
SKETCH / PICTURE / REMARKS - AS NEEDED					
Drive from Storm Lake, IA.....					
BILLING Pure Technologies US, Inc., Attn: William Barloon, 8920 State Route 108; Suite D, Columbe MD 21045					
ADDRESS:					
CLIENT SIGNATURE		JANX LEVEL II SIGNATURE		LEVEL II TECHNICIAN	
				Darrell Powell	
CLIENT REP NAME & PHONE NUMBER		TRAVEL MILES	TOTAL HOURS INCLUDING TRAVEL AND WORK	PER DIEM APPLICABLE	TOTAL ITEMS INSPECTED
Steve Bruskiwicz (262)305-5238		550	10		0
				Kenny Cox 1	
Form		CUSTOMER'S SIGNATURE CERTIFIES THAT TIME AND MILEAGE ARE CORRECT AND MATERIALS AND INTERPRETATION ARE ACCEPTED.		JANX P.O. Box 190 (517) 531-8210 Parma, MI 49269	
UTT Report 14-06					

APPENDIX C: Forcemain Evaluation Methods

Transient Pressure Monitoring

The occurrence of pressure transients within a pressure pipeline can have adverse effects on the integrity of a pipe section as they can cause damage such as fatigue stress or even a pipe failure depending on the magnitude of the transient and current condition of the pipe. Accumulated damage of this nature can eventually decrease the structural integrity of the pipe. Therefore, it is important to understand the frequency and magnitude of pressure transients in the 300 mm watermain to ensure that operational protocols can be implemented to maintain the pressures below the specified design. An understanding of the actual pressure in a line will also permit knowledgeable decisions regarding future modifications to the line or facilities that affect the performance of the pipeline.

Traditional pressure monitors collect data in intervals of seconds while transients may occur in fractions of seconds. Pure's transient pressure monitoring system addresses the sampling frequency issue by continuously monitoring pressure and while under normal operating conditions, only recording data every few minutes (based on user defined intervals). However, when a transient occurs in the pipeline, the device detects the transient and begins sampling at a high rate of up to 20 samples per second (20 hertz). This provides periodic pressure readings as well as data on transient events.

Pure requires the subject watermain to be in-service during the monitoring period. The transient pressure monitors require an existing 1/4-inch tap or larger for installation. Pure will install one monitor at location to be determined during the project planning, for thirty (30) days of monitoring. At the end of the data collection period, Pure will analyze the data and include the results in the final condition assessment report to client.



SmartBall® Technology

A free-swimming tool for long distance water and wastewater inspections

How SmartBall works?

The SmartBall® platform is a free-flowing tool for the assessment of pressurized water and wastewater pipelines 8 inches and larger. It can complete long assessments in a single deployment without disruption to regular pipeline service.

The tool is inserted into a live pipeline and travels with the product flow for up to 21 hours while collecting pipeline condition information. It requires only two access points for insertion and extraction, and is tracked throughout the inspection at predetermined fixed locations on the pipeline.

Applications

Owners of water and wastewater pipelines deal with a variety of infrastructure challenges; the SmartBall platform can collect a variety of pipeline condition information in a single deployment that helps owners manage their assets more effectively.

Leak Detection

The tool is equipped with a highly sensitive acoustic sensor that can detect pinhole-sized leaks on pressurized pipelines. The SmartBall platform has been able to identify leaks as small as 0.028 gal/min (0.11 liters) and has a typical location accuracy of within 6 feet (1.8 meters).

Gas Pocket Detection

The acoustic sensor is also able to identify the sound of trapped gas within pressurized mains. The presence of trapped gas can adversely affect pipeline flow or lead to degradation of the pipe wall in sewer force mains.

Inspection Benefits

- Easy to deploy through existing pipeline features
- No disruption to regular pipeline service
- Can complete long inspections in a single deployment
- Highly sensitive acoustic sensor that can locate very small leaks
- Can identify features relevant to the operation and mapping of the pipeline
- Indicates the position of leaks, and gas pockets relative to known points





PipeDiver[®] Condition Assessment

An innovative, free-swimming condition assessment tool that operates while a pipeline remains in service

PipeDiver Technology

The PipeDiver platform is ideal for critical large-diameter pipelines that cannot be removed from service due to lack of redundancy or operational constraints. It can be effectively deployed for long inspections on several types of pipe to determine baseline condition; on concrete pressure pipe, the tool can identify and locate broken wire wraps, which are the main indication that this type of pipe will eventually fail; for metallic pipes that utilize a steel cylinder as the main structural component, the tool can locate and detect areas of corrosion and cylinder defects.

When inserted into a live pipeline through a hot tap connection, an existing access or a submerged tank, the tool travels with the product flow and is able to navigate most butterfly valves and bends in the pipeline.

Inspection Benefits

- No disruption to regular pipeline service
- Long inspection distances can be covered in a single deployment
- Accurate results that pinpoint areas of distress help optimize repair planning
- Effective on a variety of pipe materials
- More cost-effective than methods that require shutdown and dewatering



RESOLUTION NO. 76-R-2019-2020

**A RESOLUTION ENDORSING AN APPLICATION FOR
COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS
FOLLOWING PUBLIC HEARING**

WHEREAS, the City of Storm Lake is eligible to apply for Iowa Community Development Block Grant funding under the Water/Sewer portion of the program, and;

WHEREAS, the City Council has held a public hearing as required for submission of a CDBG guidelines on May 18, 2020 to hear public comments on the submission of the grant application, and;

WHEREAS, the City has an immediate need to conduct a project to rehabilitate and develop redundancy elements at the Memorial Lift Station, and;

WHEREAS, the City Council has decided to submit an application to the CDBG program for the Memorial Lift Station Rehabilitation Project;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF STORM LAKE, IOWA:

SECTION 1. The City Council endorses the submission of an application for CDBG grant funds to the Iowa Economic Development Authority in the amount of \$600,000.00 for the Storm Lake Memorial Lift Station Rehabilitation Project.

SECTION 2. The City Council certifies that the provided public hearing announcements were made prior to consideration of the grant application, as per CDBG guidelines.

SECTION 3. The Mayor is authorized to sign all paperwork and forms necessary for the submittal of the grant application.

PASSED AND APPROVED this 18th day of May 2020.

Michael Porsch, Mayor

ATTEST:

Mayra A. Martinez, City Clerk

Staff Summary

5/18/2020

Agenda Item # 15.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Keri Navratil, City Manager

SUBJECT: **Motion Approving Agreement with St. Mary's Catholic School For Memorial Ballfield**

BACKGROUND: St. Mary's Catholic School has in the past leased the Memorial Ballfields from the City. The lease will terminate November 30, 2022. The terms are as follows:

- In lieu of rent, St. Mary's will be responsible for maintaining the property
- St. Mary's will submit a written plan for improvements including the cost estimates to the City prior to making any improvements.
- St. Mary's will provide insurance verification annually.

FISCAL IMPACT: There is no fiscal impact by approving this lease

RECOMMENDATION: Motion Approving the Lease agreement for Memorial Ball field.

ATTACHMENTS:

Description	Type
▢ Lease Agreement	Lease

LEASE AGREEMENT

This Lease Agreement ("Agreement") made and entered into this 4th day of February, 2019, and between the CITY OF STORM LAKE, IOWA, party of the first part, hereinafter referred to as LESSOR; and St. Mary's Catholic School, Storm Lake, IA, party of the second part, hereinafter referred to as LESSEE.

WITNESSETH:

WHEREAS, the Memorial Ballfields hereinafter called Memorial Ballfields are owned by the City of Storm Lake; a municipal corporation situated in Buena Vista County, Iowa, and subject to the management and control of the LESSOR; and

WHEREAS, St. Mary's Catholic School, Storm Lake, IA has in the past leased the Memorial Ballfields from the City; and

WHEREAS, St. Mary's Catholic School, Storm Lake, IA has again offered to rent said property from the City; and

NOW, THEREFORE, in consideration of the mutual terms, agreements, and covenants herein contained, and other valuable considerations, LESSOR does hereby demise and let unto LESSEE, and LESSEE does hereby hire and take from LESSOR certain premises and facilities, rights, licenses, services and privileges in connection with and as follows:

ARTICLE I - PREMISES

A. LESSOR, in consideration of the rents herein reserved and of the terms, covenants and conditions herein contained and expressed on the part of the LESSEE, to be kept and performed, demises, leases and rents unto the LESSEE, and the LESSEE hereby leases, hires and takes of and from the LESSOR the following described premises, to-wit: See Attachment "A".

- 1) In addition to the premises described on Attachment "A", the parties acknowledge that the premises is a landlocked parcel. The parties also understand that a long-standing method of vehicular and pedestrian ingress-egress access has been established to the baseball parking lot and the softball parking lot. LESSOR does not covenant nor guaranty in any way that LESSOR has legal title to any such ingress-egress areas. However, to the extent that LESSOR has such ingress-egress access by operation of law, LESSOR hereby leases and rents to LESSEE such continued ingress-egress access.

B. LESSEE agrees to pay LESSOR for the use of the demised premises, facilities, rights, licenses, services and privileges granted hereunder the rentals, fees and charges set forth in this Agreement, all within the time periods required for payment.

C. LESSEE will use the demised premises as a baseball/softball complex, and shall be used by the LESSEE in the operation of the purpose hereinbefore stated, except by written consent of the LESSOR. LESSEE will not permit any person to use the same for any unlawful purpose, nor for any activity deemed extra-hazardous on account of fire, nor commit any act which will invalidate any policy of insurance on said demised premises.

D. LESSEE may place any signs, decorations or objects on the demised premises which is consistent with the usage of the demised premises as a baseball/softball complex, which may include advertising signage, either by attaching the same to the building or placing them on the adjacent grounds, unless such signage violates city code or regulations, or federal or state law.

E. That LESSEE shall have the right, with written permission of the LESSOR, which permission shall not be unreasonably withheld, to construct and maintain improvements on said demised Premises. All improvements and buildings constructed by LESSEE shall be at the LESSEE'S sole cost and expense, shall be constructed in good and workmanlike manner and the LESSEE shall not permit the creation or existence of any lien upon the demised premises by reason thereof. Nothing contained herein is intended or shall be construed to constitute LESSEE as the agent for the LESSOR for the purpose of imposing any lien on LESSOR'S interest in the demised premises or for the purpose of imposing any liability on LESSOR to other persons. No work, labor or material placed upon the demised premises can give rise to a mechanic's lien against said demised premises so far as the LESSOR is concerned. **LESSEE will submit a written plan for improvements including cost estimates to the LESSOR prior to making said improvements. LESSEE will submit to LESSOR actual costs for improvements made. LESSEE will maintain a log of all improvements made, the date of the improvement and the actual cost of the improvement. Unless otherwise agreed by the parties in writing, all improvements made by the LESSEE to the demised premises shall remain with the demised premises during and following the lease term and shall be the property of LESSOR.**

ARTICLE II - TERM

A. LESSEE shall have and hold all of the privileges hereinbefore described for a term of onthree (+3) years, commencing effective on the 1st day of December, 2018⁹ and ending on the 30th day of November, 20+9²².

ARTICLE III - RENTAL AND FEES

A. In consideration of the leasing aforesaid, the LESSEE will pay the LESSOR at such place as the LESSOR shall in writing designate as and for the rental for said demised premises, the sum of \$1.00 per year on the first day of December, 20189.

ARTICLE IV - MAINTENANCE OF DEMISED PREMISES

A. LESSEE shall operate, maintain and keep in good repair the demised premises described in Attachment "A" and all appurtenances, facilities and services now or hereafter connected with the foregoing.

- 1) Notwithstanding the foregoing, LESSOR shall maintain and keep in good repair, or otherwise cause to maintain and keep in good repair, all ingress-egress areas.

B. LESSOR may at all reasonable times enter to view the condition the demised premises described in Attachment "A" without advance notice to LESSEE.

C. LESSEE shall furnish, at its own cost and expense, all utilities necessary and convenient for LESSEE'S use of the demised premises. It shall be the duty of the LESSEE to maintain and keep in good state of repair all utility services including water pipes, wiring and heat pipes to the extent that the same are not kept and maintained by the particular utility company extending such service. This duty shall extend to the utility facilities outside the buildings as well as within.

D. LESSEE agrees to use the demised premises leased to it hereunder in a proper manner consistent with the purposes for which said demised premises are leased to it, and to return said demised premises to LESSOR at the end of the term hereof, in good condition.

E. LESSEE shall suffer no waste or injury to the demised premises, nor obstruct the streets or sidewalks adjacent thereto, that it will do nothing which will be liable to cause structural injury to the buildings.

F. HAZARDOUS WASTE.

- 1) LESSOR and LESSEE shall strictly comply with and obey all environmental laws, including but not limited to those laws with respect to the creation, storage and disposal of hazardous materials. LESSEE is strictly prohibited from creating, utilizing, storing or disposing of any material or substance which may be hazardous without prior notice to and written consent from LESSOR, except for those substances reasonably related to LESSEE'S uses.

- 2) LESSOR and LESSEE shall defend, hold harmless and indemnify each other from and against all claims, losses, costs, damages, expenses or liabilities, including reasonable attorney's fees and costs of defense, for any injury or such injury or damage which has been caused by the act, neglect, fault or omission of either the LESSOR or the LESSEE or their agents, servants, employees or invitees, resulting from the creation, utilization, storage or disposal of any material or substance. This indemnification is intended to operate as indemnity under 42-U.S.C. 9607(e) (1). This indemnification is intended to be an absolute cross-indemnification between the LESSOR and the LESSEE against any claims either made against the LESSOR for the acts of the LESSEE or claims made against the LESSEE for acts of the LESSOR. This indemnification is intended to survive the termination or expiration of this Agreement for five (5) years. Said indemnification shall operate as indemnity for any claim or damage set forth herein and against all claims, losses, costs, damages, expenses or liabilities, including reasonable attorney's fees and costs of defense incurred after the termination or expiration of the Agreement caused by the act, negligence, fault or omission of LESSOR or the LESSEE including their agents, servants, employees or invitees for events which have occurred during the term of the Agreement. LESSEE shall indemnify and save harmless the LESSOR from any and all losses that may result to the LESSOR because of any acts on the part of the LESSEE, its agents, servants, invitees and licensees.

G. LESSEE shall provide a complete and proper arrangement for the adequate sanitary handling and disposal, away from the premises, of all trash, garbage and other refuse caused as a result of the operation of its business. LESSEE shall provide and use suitable covered metal receptacles for all such garbage, trash and other refuse. Piling of boxes, cartons, barrels or other similar items, in an unsightly or unsafe manner, on or about the demised premises shall not be permitted. **LESSEE is responsible for off season clean up of trash, garbage, debris and refuse.**

ARTICLE V - CANCELLATION

A. The invalidity or unenforceability of any provision hereof shall not affect or impair any of the other provisions herein contained. That no waiver or breach of any of the covenants of this Agreement shall be construed to be a waiver of any succeeding breach of the same covenant.

B. The LESSOR may cancel the Lease at any time, without cause, subject to the following provisions:

- 1) All scheduled games in a season underway would be allowed without interruption;

- 2) Notification to address set out in Article IX.

ARTICLE VI - INDEMNITY

A. LESSEE agrees to indemnify and hold LESSOR harmless from and against all liability for injuries to persons or damage to property caused by LESSEE'S use or occupancy of the demised premises; and provided further that LESSOR shall give LESSEE prompt and timely notice of any claim made or suit instituted which in any way, directly or indirectly, contingently or otherwise, affects or might affect LESSEE and LESSEE shall have the right to compromise and defend the same to the extent of its own interest only upon prior written consent of LESSOR.

B. It is understood and agreed that the City of Storm Lake, Iowa is named as "Additional Insured" in respect of the insured's occupancy of the demised premises, and such policy of insurance which shall bear the following endorsement in words or substance:

"It is understood and agreed that the City of Storm Lake is named as "Additional Insured" in respects to the insured's occupancy of the premises.

LESSEE shall provide proof of such insurance to the Lessor upon the execution of this lease by both parties.

C. LESSEE agrees to carry liability insurance during the existence of the term for personal injury and property damage in a sum not less than \$ 1,000,000.00 single limit for each accident or occurrence for the protection of the LESSOR and LESSEE. The City of Storm Lake shall be an additional named insured on such policy of insurance, and proof of said insurance shall be delivered to the LESSOR at the time of each renewal of said policy. **LESSEE shall provide verification to the LESSOR annually.**

D. If LESSOR incurs any costs or attorneys fees on account of successfully enforcing LESSEE'S covenants and other agreements set forth in this Agreement, all such reasonable costs and attorneys fees, when paid by the LESSOR, shall be so much additional rent due on the next day after such payment or payments, shall be due and payable, and shall be collectible beginning the next day in the same manner as the rent payable under Article III above.

ARTICLE VII - NON-DISCRIMINATION

A. LESSEE for itself, and its successors in interest and assigns, as a part of the consideration hereof, does hereby covenant and agree as a covenant running with the land that:

- 1) No person on the basis of race, color, national origin, gender, religion, or, other basis of illegal discrimination shall be excluded for participation in, denied benefits of, or otherwise be subjected to illegal-discrimination in the operation of said facilities.
- 2) In the construction of any improvements on, over, or under such land, no person shall be excluded from participation in, denied the benefits of, or otherwise be subject to discrimination based upon race, color, national origin, or other basis of illegal discrimination.

B. LESSEE further covenants and agrees with respect to any service furnished to the public, if any, LESSEE will furnish the same on a fair, equal and not unjustly discriminatory basis to all users thereof and will charge a fair, reasonable and not unjustly discriminatory price for each unit or service, provided, however, that LESSEE may be allowed to make reasonable and non-discriminatory discounts, rebates or other similar types of price reduction to volume purchasers.

ARTICLE VIII - ASSIGNMENT

LESSEE shall not at any time assign this Agreement or any part thereof without the express written approval of the LESSOR; provided that this shall not prevent the assignment of this Agreement to any corporation with which LESSEE may merge or consolidate or which may succeed to the business assets of LESSEE or a substantial part thereof. LESSEE shall not at anytime sub-let space in any demised premises now or hereafter leased exclusively to LESSEE without the express written consent of the LESSOR in advance.

ARTICLE IX - NOTICES

Notices to LESSOR provided for herein shall be sufficient if sent by registered mail, postage prepaid, addressed as follows:

Storm Lake City Clerk
P.O. Box 1086
Storm Lake, IA 50588

and notices to LESSEE if sent by registered mail, postage prepaid, addressed as follows:

H.S. Principal
St. Mary's Catholic School
320 Seneca Street
Storm Lake, IA 50588

or such other respective addresses as the parties may designate to each in writing from time to time.

ARTICLE X - GENERAL CONDITIONS

A. That LESSEE and LESSOR are not relying on any statement or representations of each other or of any other party in entering into this Agreement, and that all of the negotiations between the parties are merged into this Agreement and that there are no understandings, terms or agreements of any kind or nature that are not set out herein and that this Agreement and the provisions herein contained are the only agreements and understandings between the parties hereto.

B. All the covenants, stipulations and agreements in this Agreement shall extend to and bind the legal representatives, successors and assigns of the respective parties hereto.

C. No modification of this Agreement shall be binding unless evidenced by an agreement in writing by LESSOR and LESSEE.

D. No waiver or a breach of any of the covenants of this Agreement shall be construed to be a waiver of any succeeding breach of the same covenant.

E. All rights and remedies of the LESSEE and LESSOR under this Agreement shall be cumulative and that none thereof shall exclude other rights and remedies allowed by law.

ARTICLE XI - SPECIAL PROVISIONS & CONDITIONS

A. Provisions of the "Special Provisions & Conditions" shall be controlling in the case of conflict with any other section or provision of this lease.

B. The LESSEE will make the facilities available for use to other organized, nonprofit entities such as Little League on a limited basis when such use does not interfere with LESSEE'S use of the Premises. LESSEE may charge costs directly associated with said use to the user. Under the terms of this Lease, the LESSEE is not required to have the facility open for general public use.

C. LESSEE is encouraged and expected to make capital expenditures for improvements during the term of the Lease in order to maintain the facilities in at least their current conditions. Should there be a major capital expenditure (having a cost in excess of \$1,500), LESSEE shall provide thirty (30) day advance notice to LESSOR, who shall, within fourteen (14) days thereafter provide LESSOR'S express approval or disapproval of any such capital expenditure.

D. In the event that the LESSEE violates or allows violation of the lease, local, state or federal law on the demised premises, LESSOR shall have the right to cancel the lease immediately, subject only to the following provisions:

1) Notification of LESSEE.

E. Both parties agree that the premises are serviceable and in good condition at the time of execution of this document and that LESSEE will return the property in its present condition or better.

F. LESSEE has installed a water meter at LESSEE'S expense. LESSOR will not assess sanitary sewer costs on the water bill but will assess normal charges for storm water and landfill fee. Should rest room facilities be installed, normal sanitary sewer fees will be assessed.

G. LESSOR reserves the right to remove, at any time, the mobile bleachers for LESSORS use.

H. LESSOR shall have access to the property to perform work associated with storm water maintenance or storm water handling improvements.

ARTICLE XII - SAVING CLAUSE

A. Should any part or provisions of this Agreement be rendered invalid by reason of any existing or subsequently enacted legislation, such invalidation of any part of provision of this Agreement shall not invalidate the remaining portions thereof and they shall remain in full force and effect.

CITY OF STORM LAKE, IOWA

ST. MARY'S CATHOLIC SCHOOLS

Michael Porsch, Mayor

Rev. Timothy Friedrichsen
Lingle, Pastor

ATTEST:

Mayra Martinez, City Clerk

ATTACHMENT "A"

LEGAL DESCRIPTION

Lot Seven (7) of the Plat of Huber Extension of Storm Lake City Limits, being a tract of land located in the SW $\frac{1}{4}$ of Section 2, Township 90 North, Range 37 West of the 5th P.M., and more particularly described as follows: Starting at the Southeast Corner of Section 2, Township 90 North, Range 37 West of the 5th P.M., Thence West for 3,191.5 Feet, thence North for 229.5 Feet, thence North $00^{\circ} 53'$ East for 287.2 Feet to the Point of Beginning; Thence South $89^{\circ} 69'$ West for 259.1 Feet, thence South $00^{\circ} 11'$, East 186.5 Feet to the North Right-of-Way line of Federal Highway No. 71, thence North $67^{\circ} 36'$ West along the North Right-of-Way line of Federal Highway No. 71 for 627.6 Feet, Thence North $1^{\circ} 05'$ East for 402.65 feet along the West Line of Government Lot 1 of the SW $\frac{1}{4}$ of Section 2, Township 90 North, Range 37 West of the 5th P.M., Thence South $89^{\circ} 07'$ East for 836.9 Feet, Thence South $0^{\circ} 53'$ West for 446.45 Feet to the Point of Beginning, and containing 9.5 Acres, more or less; **EXCEPT** three parcels of the above described tract, said excepted parcels are described as follows:

Parcel #1: Beginning at the Southeast corner of the said Lot 7, where the East line of the said

Lot 7 intersects the North Right-of-Way line of Federal Highway No. 71, Thence North $67^{\circ} 36'$ West for 150 Feet along the said Right-of-Way line, Thence North $0^{\circ} 11'$ West for 129.8 Feet, Thence North $89^{\circ} 39'$ East for 138.9 Feet, thence South $0^{\circ} 11'$ East for 186.5 Feet to the Point of Beginning.

Parcel #2: A strip of land 120 Feet in width along the South side of the said Lot 7 and adjacent to Federal Highway No. 71, from the West line of Parcel #1 as above described to the West line of the said Lot 7.

Parcel #3: A strip of land 190 Feet in width along the West side of the said Lot 7, from the North line of Parcel #2 as above described, to the North line of said Lot 7.

Staff Summary

5/18/2020

Agenda Item # 16.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: Keri Navratil, City Manager

SUBJECT: **Resolution No. 77-R-2019-2020 Supporting Workforce Housing Tax Incentive Program**

BACKGROUND: Storm Lake Apartments, LLC is submitting an application to the Iowa Economic Development Authority (IDEA) for the Workforce Housing Tax Incentive Program. The project located on 10th Street (next to the 10th Street Townhomes) consists of 3 buildings with 12 units each for a total of 36 market rate rental units. The total capital investment is expected to be \$4,335,000.

The City supports this project and understands that the project will qualify for a property tax exemption in the form of a multi-residential housing tax abatement which allows for a 10 year exemption of 100% of actual valued added.

FISCAL IMPACT: There is no fiscal impact by approving this resolution

RECOMMENDATION: Approve Resolution No. 77-R-2019-2020

ATTACHMENTS:

Description	Type
□ Resolution No. 77-R-2019-2020	Resolution
□ Resolution No. 77-R-2019-2020	Resolution
□ Resolution No. 77-R-2019-2020	Resolution

RESOLUTION NO. 77-R-2019-2020

**A RESOLUTION IN SUPPORT OF A WORKFORCE HOUSING TAX
INCENTIVE APPLICATION TO BE SUBMITTED TO THE IOWA
ECONOMIC DEVELOPMENT AUTHORITY (IDEA) BY STORM LAKE
APARTMENTS, LLC FOR A HOUSING PROJECT LOCATED ON 10th
STREET**

WHEREAS, Storm Lake Apartments, LLC plans on a \$4,335,000 capital investment for a housing development located on 10th Street; and

WHEREAS, the project consists of 3 buildings with 12 units each for a total of 36 market rate rental units; and

WHEREAS, the project will add new assessable tax valuation to Storm Lake; and

WHEREAS, the City of Storm Lake will assist the project by providing tax abatement of 100% for ten (10) years; and

WHEREAS, Storm Lake Apartments, LLC intends to submit an application for Workforce Housing Tax Incentive through the Iowa Economic Development Authority; and

WHEREAS, the City of Storm Lake is a duly recognized political subdivision of the State of Iowa action under the laws of the State of Iowa; and

WHEREAS, the City Council is the duly elected governing body of Storm Lake, Iowa; and

IT IS HEREBY RESOLVED by the City Council of Storm Lake Iowa as follows:

1. The City Council is in full support of the opportunity to promote housing development in Storm Lake, Iowa and fully supports the Application for Workforce Housing Tax Incentives.
2. City staff is authorized to assist in the preparation of the application and related materials deemed necessary.

PASSED AND APPROVED this 18th day of May, 2020.

Michael Porsch, Mayor

ATTEST

Mayra A. Martinez, City Clerk

RESOLUTION NO. 77-R-2019-2020

**A RESOLUTION IN SUPPORT OF A WORKFORCE HOUSING TAX
INCENTIVE APPLICATION TO BE SUBMITTED TO THE IOWA
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Michael Porsch, Mayor

ATTEST

Mayra A. Martinez, City Clerk

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PASSED AND APPROVED this 18th day of May, 2020.

Michael Porsch, Mayor

ATTEST

Mayra A. Martinez, City Clerk

Staff Summary

5/18/2020

Agenda Item # 17.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM: David Derragon, Assistant City Manager

SUBJECT: **Motion Approving Professional Services Agreement for Final Design Engineering with Bolton & Menk for the Highway 7 & 110 Intersection Upgrade Project**

BACKGROUND: The intersection of Highways 7 and 110 has experienced a recent increase in motor vehicle crashes. The Storm Lake Community School District is also intending to construct a new facility north of this intersection which will create additional vehicle traffic within this intersection. To address current and future safety concerns, the City has been working with the Iowa Department of Transportation (DOT) to make improvements to the intersection, including a traffic signal.

The City Council previously authorized Bolton & Menk to perform preliminary engineering services for the field data collection, conceptual design, and coordination with the DOT. The conceptual design has been approved by the DOT and entails signal improvements, railroad signal improvements, turn lane modifications, and related improvements.

This professional services agreement will provide final design engineering services for the aforementioned public infrastructure improvements. The scope of services includes federal environmental/cultural resources reviews, construction drawings/specifications production, utility coordination, permitting, and bidding/contract award services. Following the provisions of our current two (2) year agreement with Bolton & Menk for infrastructure engineering, this agreement under consideration is project specific to the public infrastructure improvements project.

FISCAL IMPACT: Estimated \$165,580; \$143,000 fixed fee for final design engineering and bidding services, \$17,250 estimated fee for property acquisition services, and \$5,330 estimated fee for subsurface geotechnical evaluation services.

RECOMMENDATION: Staff recommends that Council approve the Professional Services Agreement with Bolton & Menk for the final design engineering of the Highway 7 & 110 Intersection Upgrade Project

ATTACHMENTS:

Description		Type
	Agreement	Contract

**CITY OF STORM LAKE, IOWA AND BOLTON & MENK, INC.
AMENDMENT TO TASK ORDER TO AGREEMENT FOR PROFESSIONAL SERVICES**

TASK ORDER NO: 4 – 2021 Highways 7 & 110 Intersection Improvements

AMENDMENT NO: 1 – Final Design Engineering and Bidding Services

CLIENT: City of Storm Lake, Iowa

CONSULTANT: Bolton & Menk, Inc.

DATE OF AMENDMENT: May 18, 2020

DATE OF TASK ORDER: January 6, 2020

DATE OF MASTER AGREEMENT FOR PROFESSIONAL SERVICES: November 5, 2018

Whereas, CLIENT and CONSULTANT entered into a Master Agreement for Professional Services (“Master Agreement”) and into a Task Order as dated above; and CONSULTANT agrees to perform and complete the following Services for CLIENT in accordance with this Amendment and the terms and conditions of the Task Order and Master Agreement. CLIENT and CONSULTANT agree as follows:

1.0 Scope of Services:

CONSULTANT shall perform the Services listed within the attached Exhibit I. All terms and conditions of the Master Agreement are incorporated by reference in this Amendment, except as explicitly modified in writing herein.

2.0 Fees:

CLIENT shall pay CONSULTANT in accordance with Section III of the Master Agreement and as follows.

TASK	DESCRIPTION	Total Cost
3	Final Design Engineering and Bidding Services	\$143,000
4	Property Acquisition Services	\$17,250
5	Geotechnical Evaluation Services	\$5,330
TOTALS		\$165,580

Task 3 shall be invoiced on a fixed fee basis, subject only to adjustment for a change in scope of services performed that are agreed upon in writing by the CLIENT and CONSULTANT. The scope of services detailed within Exhibit I generally include project administration, federal environmental/cultural resources reviews, construction drawings/specifications production, utility coordination, permitting, and bidding/contract award services.

Tasks 4 and 5 are estimated amounts entailing property acquisition and geotechnical evaluation subconsultant services. Actual costs will be invoiced in accordance with Section III.A.3 of the Master Agreement.

3.0 Schedule:

Schedule for performance of Services will be as follows, such that all services will be completed by September 30, 2021.

May 2020	• Authorization of engineering for final design engineering and bidding services
July 2020	• 30% Construction documents submitted for review
September 2020	• 60% Construction documents submitted for review
November 2020	• 95% Construction documents submitted for review
December 2020	• Final Plan Approval • Neighborhood Meeting
July 1, 2021	• Acquisition Services Complete
July – August 2021	• Project Bidding and Contract Award

4.0 Deliverables

Deliverables will be as set forth within the attached Exhibit I.

5.0 Term

In the event that the Schedule for this Amendment extends beyond the term of the Master Agreement, either intentionally or unintentionally by Amendment Scope or by Amendment extension, then this Amendment shall operate to extend the Master Agreement through the completion of CONSULTANT'S obligations under this Amendment or until a new Master Agreement is executed incorporating this Amendment.

6.0 Other Matters

NONE

7.0 Project Managers

Project managers and contact information for the CLIENT and CONSULTANT for this Amendment, if different than the Master Agreement, are as follows:

CITY OF STORM LAKE, IOWA
David Derragon
620 Erie Street
Storm Lake, Iowa 50588
Office Phone: 712-732-8000
Email: derragon@stormlake.org

BOLTON & MENK, INC.
Josh Pope, P.E.
218 11th Street SW Plaza
Spencer, Iowa 51301
Office Phone: 712-580-5075
Email: Joshua.Pope@bolton-menk.com

CITY OF STORM LAKE, IOWA

BOLTON & MENK, INC.

By: _____

By: _____

Printed Name: Michael Porsch

Printed Name: Joshua Pope, P.E.

Title: Mayor

Title: Principal Engineer

ATTACHMENTS TO THIS AMENDMENT:
Exhibit I – Consultant's Services

EXHIBIT I – CONSULTANT’S SERVICES

TASK ORDER NO. 4, AMENDMENT 1 **2021 HIGHWAYS 7 & 110 INTERSECTION IMPROVEMENTS**

STORM LAKE, IOWA

DESCRIPTION OF PROJECT AND SCOPE OF IMPROVEMENTS

The CONSULTANT agrees to provide civil engineering services required for the final design and bidding associated with intersection and signal improvements of the Highway 7 and 110 intersection. CONSULTANT will also provide property acquisition and geotechnical evaluation services associated with the improvements.

I.A. BASIC SERVICES

For purposes of this Project, Basic Services to be provided by the CONSULTANT are as follows:

Task 3: Final Design Engineering and Bidding Services

Task 3.1: Project Administration and Coordination

CONSULTANT will offer regular updates on next steps and upcoming project requirements. CONSULTANT will also prepare and provide miscellaneous project correspondence, scheduling, invoicing, and budget management necessary for expediting work products and project decision-making. Schedule updates will be provided on a regular basis.

Task 3.2: Threatened and Endangered Species Review

CONSULTANT will review state and federal lists of protected species/critical habitat and evaluate if any are present in the project area (and may be impacted by the project). CONSULTANT will prepare the *Determination of Effect for Threatened and Endangered Species for Local Public Agencies* form as outlined in *Instructional Memorandum 4.110*.

Task 3.3: Cultural Resource Review

CONSULTANT will perform a cultural resources evaluation as outlined in *Instructional Memorandum 4.120*. It is anticipated that the evaluation will suffice compliance with DOT requirements and further investigation will not be warranted. If, however, further action is recommended by state/federal agencies, CONSULTANT will coordinate (and secure) compliance as an Additional Service.

Task 3.4: Construction Plan Sheets

CONSULTANT will prepare comprehensive, detailed construction plans for the proposed improvements. This includes preparation of applicable plan sections including:

- Title Sheet
- Legend
- Typical Sections/Construction Details
- General Layout
- Statement of Estimated Quantities
- Tabulations

- Erosion Control and Stormwater Pollution Prevention Plans
- Construction Plan and Profile
- Existing Conditions Plan
- Survey Control Points Plan
- Traffic Control Plan
- Intersection and Jointing Details
- Utilities Plan and Profile
- Signing Plan
- Removal Plan
- Signal Plan
- Cross Sections

The construction documents will conform to DOT requirements described in *Instructional Memorandum 3.700* and will be provided for CLIENT and DOT review. CONSULTANT will prepare public interest finding(s) and/or design exception documentation (if warranted). CONSULTANT will coordinate with Canadian National Railway and Iowa Department of Transportation to locate the railroad signals with gates.

Task 3.5: Project Specifications

CONSULTANT will prepare special provisions to submit with the final construction plan for CLIENT and DOT review.

Task 3.6: Engineer's Estimate

CONSULTANT will prepare an engineer's cost estimate based on the final construction plans specifications for CLIENT and DOT review.

Task 3.7: Submittals

CONSULTANT will submit design plans and other documents for review at the following stages of completion:

- 30% Plan Review – submittal to include preliminary design plans and preliminary cost estimate.
- 60% Plan Review – submittal to include preliminary design plans and preliminary cost estimate. CONSULTANT will incorporate CLIENT and DOT comments from the 30% plan review.
- 95% Plan Review – submittal to include final design plans, specifications, and engineer's estimate. CONSULTANT will incorporate CLIENT and DOT comments from the 60% plan review.
- Final Plan Approval – submittal of final design plans, specifications, and engineer's estimate for approval and signatures. Any final CLIENT and DOT comments will be addressed in this submittal.

Task 3.8: Community Outreach

The CONSULTANT shall organize and facilitate a public informational meeting (with assistance and participation by the CLIENT). The meeting will be held prior to bidding in order to communicate to impacted stakeholders the proposed project scope, gather additional input, and address access and other property owner concerns. The meeting will be conducted in an informal setting with a brief presentation followed by an "open house" format to encourage participation by the property owners and to provide an opportunity to meet one-on-one with members of the project team. The CONSULTANT may also schedule individual property owner meetings as required to maintain communication and gather pertinent information for issues that will directly impact specific property owners.

Task 3.9: Utility Relocation Coordination

CONSULTANT will notify private utility entities and provide the Construction Plans for their review. CONSULTANT will facilitate a Utility Design Meeting involving CLIENT staff and impacted private entities. CONSULTANT will provide coordination assistance associated with the relocation of private infrastructure impacted by the project.

Task 3.10: Agency Permitting and Authorizations/Notifications

CONSULTANT will prepare permit applications associated with the improvements and submit for approval. The permit application fees will be the responsibility of the CLIENT. The following permit applications and requisite notification are anticipated:

- Iowa Department of Natural Resources
 - National Pollutant Discharge Elimination System Permit
 - Water Supply Construction Permit
 - Wastewater Construction Permit
- Iowa Department of Transportation
 - Utility Accommodation Permit
 - Application to Perform Work Within State Highway Right-of-Way

Task 3.11: Bidding Services

CONSULTANT will prepare and publish the advertisement for bid and distribute the bid documents. CONSULTANT will provide responses to questions from contractors and issue addenda as required. CONSULTANT will attend the bid opening, prepare the resultant bid tabulation, and provide verification of submitted bids as part of the contract award recommendation to be provided to the CLIENT. Upon Council award, CONSULTANT will distribute the Contract to the selected contractor and secure the required contractor submittals necessary to commence construction.

Task 4: Property Acquisition Services

CONSULTANT will provide services associated with the acquisition of property within three individual parcels. Services include title research and associated review, acquisition appraisals and associated review, preparation of compensation estimates and acquisition documents, negotiations with landowners/tenants, and provide facilitate negotiations with landowners.

Task 5: Geotechnical Evaluation Services

CONSULTANT will perform geotechnical exploration entailing the collection of soil borings and roadway cores. The subsurface soil properties/groundwater information will be analyzed. Recommendations will be provided for pavement subgrade preparation, suitability of material for pipe bedding/trench backfill, and pavement section thickness.

I.B. ADDITIONAL SERVICES

Consulting services performed other than those authorized under Section 1.A shall be considered not part of the Basic Services and may be authorized by the CLIENT as Additional Services. Additional Services consist of those services that are not generally considered to be Basic Services; or exceed the requirements of the Basic Services; or are not definable prior to the bidding of the project; or vary depending on the technique, procedures or schedule of the project contractor.

Additional services may include:

1. Professional services associated with supplemental cultural resource analysis including (but not limited to) identification, preservation, evaluation, avoidance, or mitigation of cultural resource(s).

2. Professional services associated with condemnation proceedings related to property acquisition.
3. Professional services associated with construction administration and engineering.

Staff Summary

5/18/2020

Agenda Item # 18.



City of Storm Lake
PO Box 1086
Storm Lake, IA 50588
p (712) 732-8000
f (712) 732-4114

REPORT TO: Honorable Mayor and City Council

FROM:

SUBJECT: **City Council Requested Items**

BACKGROUND: Future City Council Work Sessions:
1. Commercial Trash Collection Review - Scheduled July 6, 2020
2. Urban Chickens Review- Scheduled June 1, 2020

FISCAL IMPACT: No Fiscal Impact at this time.

RECOMMENDATION: Concurrence for each item to be considered for a specified City Council Meeting work session or deny work session consideration for the following items:

None at this time