Allen Park
Belleville
Brownstown Twp.
Dearborn Heights
Ecorse
Lincoln Park

Downriver Utility Wastewater Authority

25605 Northline Road ● Taylor, Michigan 48180

River Rouge
Riverview
Romulus
Southgate
Taylor
Van Buren Twp.
Wyandotte

REQUEST FOR PROPOSALS (RFP-2021-01) REBID

COMMERCIAL ROOFING CONSTRUCTION SERVICES FOR

2021 CRITICAL ROOF REPAIRS AT THE

DOWNRIVER WASTEWATER TREATMENT FACILITY
797 CENTRAL ST, WYANDOTTE, MI

Proposal Due Date: March 19, 2021 @ 2 p.m.

NOTICE TO COMMERCIAL ROOFING ENTITIES

OHM Advisors Inc. (OHM), on behalf of the Downriver Utility Wastewater Authority (DUWA), is requesting Proposals from Commercial Roofing Contractors entities to provide roof repairs to approximately 40,000 square feet of building area (the PROJECT) at the Downriver Wastewater Treatment Facility (DWTF) located at 797 Central Street, Wyandotte, MI 48192. It is DUWA's intent to award a single contract to a selected entity to deliver the PROJECT.

The PROJECT will be awarded to the contractor that provides the best value, based on cost and qualifications. Procurement and selection shall be made without any lobbying and/or direct contact with DUWA (and its 13 municipal members). All expenses associated with the preparation and submission of a Proposal for this PROJECT shall be the sole financial responsibility of the interested bidders.

SECTION 1 - SUBMISSION REQUIREMENTS

Submit an electronic bid package, including the bid form, to DUWA@ohm-advisors.com by the deadline. To be considered, Proposal packages must arrive by the time and date shown.

Proposal packages must be addressed and submitted to DUWA on or before:

2:00 p.m. EST on Friday, March 19, 2021

SECTION 2 – PROCUREMENT PROVISIONS

2.0 RFP PROCEDURES

2.1 Availability of RFP documents

The complete set of the RFP documents (including all attachments) are available for download from the DUWA website (www.duwauthority.com). Interested bidders will be notified of the posting by DUWA's System Manager via email. To be included on the 'interested bidders' list, you must e-mail your contact information to Lambrina Tercala at Lambrina.Tercala@ohm-advisors.com. Proposers are solely responsible for any reproduction costs.

2.2 Issuance and Acknowledgement of Receipt of Addendum

DUWA will notify interested bidders of available addenda via email. The addenda, when released, will be available for download from DUWA's website at: www.duwauthority.com

It is solely the responsibility of each of these proposers to ensure that they receive any and all addenda. Proposers shall acknowledge receipt of addenda in their Submissions.

2.3 Requests for Clarification

Proposers should submit Requests for Clarification in written form via email to Lambrina Tercala as set forth below. Requests for Clarification must be submitted prior to 12:00 p.m. local time on Friday, March 12, 2021. All questions received by this time and date will be responded to, in writing, by issuance of an addenda, no later than Tuesday, March 16, 2021. Requests for clarification received after this time and date will not receive a response, except in the sole discretion of DUWA. Anonymity of the source of specific questions will be maintained in the written responses. Responses to all questions will be emailed to all registered RFP recipients.

All requests for clarification must be sent via email to the following:

Lambrina Tercala, PE, DUWA System Manager, OHM Advisors
Phone: (734)-674-1607
Email: Lambrina.Tercala@ohm-advisors.com or DUWA@ohm-advisors.com
Subject: RFP-2021-01 DUWA – 2021 Critical Roof Repairs (REBID)

2.4 RFP Optional Pre-Proposal Site Meeting

DUWA will conduct an optional pre-proposal meeting with interested proposers on Wednesday, March 10, 2021 at 10 a.m. The meeting will be held at the PROJECT site and also via Zoom. A site visit is available after the pre-proposal meeting to tour the PROJECT areas. Proposers must email their interest for this PROJECT to Lambrina Tercala by Friday, March 5, 2021 and advise if they will also attend the pre-proposal meeting or not. The intent of the meeting would be to communicate PROJECT information or answer questions to clarify PROJECT requirements.

All personnel who want to participate in a site tour shall bring their own personal protective equipment, which includes as a minimum: hard hat, safety glasses, appropriate footwear, and facial covering. COVID screening (questions and temperature check) will be completed at admissions into the plant.

2.5 Proposal Validity for 90 Days

The offer represented by each proposer's Proposal will remain in full force and effect for ninety (90) days after the Proposal Due Date. If award has not been made within ninety (90) days after the Proposal Due Date, each proposer that has not previously agreed to an extension of such deadline shall have the right to withdraw its Proposal.

2.6 Procurement Schedule

The following is the anticipated RFP schedule and related project dates and is subject to change by DUWA:

Table 2.6: Procurement Schedule Milestones and Dates

Milestone	**Date**
Invitation to Submit Proposals	February 26, 2021
Online Pre-Proposal Meeting	March 10, 2021 @ 10 am
Requests for Clarification Deadline	March 12, 2021 @ 12 pm
Deadline for RFP Submittal	**March 19, 2021 @ 2 pm**
DUWA Board Approval of Selected Contractor	April, 2021 (estimate)
Negotiations	May 2021 (estimate)
Issue NTP	May 2021 (estimate)

DUWA reserves the right, at any time, to make additions, modifications or deletions to any of the events or dates that comprise the RFP Schedule. Such changes shall be made by RFP Addendum.

SECTION 3 - PROJECT TERMS and CONDITIONS

3.1 Regulatory Compliance

The construction must comply with the requirements of all applicable local, State and Federal agencies. Each portion of the work shall be performed by a person licensed, equipped and experienced to do work in the particular field. Please review Public Contract Code and Public Law, which include requirements for performance of the work by Contractors and Subcontractors. Both shall furnish certified payroll records and participate in an approved apprenticeship program as required by Federal and State requirements. The labor compliance and apprenticeship requirements will be monitored throughout the construction process. If the Contractor is not in compliance it shall be in default of its contract.

3.2 WIFIA Requirements

The Contract is expected to include WIFIA requirements including NEPA, Davis-Bacon, American Iron and Steel, and all other federal cross-cutter provisions apply. For further details see their website at: https://www.epa.gov/wifia

ATTACHMENTS

Attachment A – Bid Form (page 6 of 274 of this PDF)

Attachment B – Select Front End Documents (page 9 of 274 of this PDF)

Attachment C – Summary of Work (page 49 of 274 of this PDF)

Attachment D – Technical Specifications (page 59 of 274 of this PDF)

Attachment E – Site Plans and Details (page 180 of 274 of this PDF)

Attachment F – Sample Agreement with DUWA (page 190 of 274 of this PDF)

Attachment G – Exhibit A: General Conditions (page 214 of 274 of this PDF)

BID FORM

TO: DUWA@OHM-Advisors.com FROM:_____

_____

_____

_____

1. Pursuant to and in compliance with the invitation to bid and the proposed contract documents relating to:

2021 Critical Roof Repairs (REBID)

Including Addenda _____

The undersigned, having become thoroughly familiar with the terms and conditions of the proposed contract documents and with local conditions affecting the performance and cost of the work at the place where the work is to be completed and having fully inspected the site in all particulars, hereby proposed and agrees to fully perform the work within the time stated in strict accordance with the proposed contract documents, including furnishing any and all labor and materials, and to do all the work required to construct and complete said work in accordance with the contract documents, for the following sum of money:

A. Base Bid – Roof Recovery all Buildings:

All labor, materials, services, and equipment necessary for completion of the work as shown on the drawings and required by the specifications.

Work shall include, but not be limited to: The planned recovery of approximately 40,000 square feet. This work includes all general conditions (bonds, etc.), equipment, the vacuuming and removal of loose aggregate, removal of existing flashings, removal of existing metal flashings not specifically shown to remain, replacement of wet or damaged insulation (on a unit price basis), installation of new recovery insulation board (including tapered insulation) and installation of a new fully adhered 60 mil EPDM membrane, new flashings, new related sheet metal flashings, **and Unit Pricing Subtotal** as indicated on the plans and drawings for the buildings located at 797 Central Avenue, Wyandotte, Michigan.

Base Bid (Not Including Unit Price work): _____

_____ Dollars Lump Sum
(Written)

($ _____)
(Numbers)

Base Bid Unit Price Work: (See Page 2 of Bid Form) ($ _____)

Total For Base Bid and Unit Price Work **($ _____)**

Submitted By: _____

B Base Bid – Unit Pricing

For changing specified quantities of work from those indicated by the contract drawings and specifications, upon written instructions of the owner, the following unit prices shall prevail. The unit prices include all labor, overhead, and profit, materials, equipment, etc. Only a single unit price shall be given, and it shall apply for either more or less than shown on the drawings and called for in the specifications or included in the base bid. In the event of more or less units than so indicated or included, change orders shall be issued for the increased or decreased amount.

Unit Price Item No.	**Bid Quantity**	**Description**	**Unit Price**	**Item Bid Price**
1.	50 Sq. Ft	Rem and Rep Steel Deck	_____	_____
2.	120 Sq. Ft.	Apply Flat Stock Metal Repair	_____	_____
3.	150 Sq. Ft	Clean and Paint Rusted Metal Deck	_____	_____
4.	420 Board Ft	Remove and Replace Deteriorated Nailers	_____	_____
5.	5,150 Sq. Ft.	R&R Wet/Det. Fiberglass Insul (SF / inch)	_____	_____
6.	50 Each	Walkway Pads	_____	_____
7.	4 Each	Replace Drains	_____	_____
8.	21 Each	Install new drain extensions	_____	_____
9.	HVAC and Ductwork on Section NN (Lump Sum)		_____	_____
10	Masonry Through Wall on Connecting RR Roof (Lump Sum)		_____	_____
11.	New Metal Siding at Penthouse on RR (Lump Sum)		_____	_____
12.	1 LS	Permit Allowance	**$2,500.00**	**$2,500.00**
	Subtotal to be listed on Page 1 of Bid Form Lump Sum			_____

C. The following fees shall be used for lump sum pricing and actual cost pricing of additions and deletions to that work included in the bid namely:

_____% (Not to exceed 10%) fee shall be charged and added to the cost of labor, materials, supplies, equipment, and other such items purchased or supplied by contractor under instructions of the owner that are reasonable and necessary in the performance of the work. Such fee shall be total compensation for overhead, profit, and expenses for such services rendered.

_____% (Not to exceed 5%) fee shall be charged and added to the cost of all subcontracts let by the contractor and authorized by the owner. Such fee shall be total compensation for negotiation and execution of such subcontracts and shall also include overhead and profit.

D. Time of commencement, completion and damages:

1. Provided intent to award by no later than April 15, 2021, Contractor shall commence Base Bid work on or shortly after June 1, 2021. All work shall be substantially complete by August 31, 2021 with final completion by September 21, 2021.

Submitted By: _____

2. Time is expressly declared to be of the essence in completion of the work covered by these contract documents, and the contractor shall be liable for actual damages for delay in completion of work. Actual damages include, but are not limited to, increased construction management fees, additional inspection fees, and all other costs incurred as a result of the delay in completion. Where, under the contract, additional time is allowed for the completion of the work, the new time limits will be of the essence of the contract

2. Additional Information

A. I understand that the owner reserves the right to reject this bid, but that this bid shall remain open and not be withdrawn for a period of 90 days from the date prescribed for its opening.

B. If written notice of the acceptance of this bid is mailed or delivered to the undersigned within thirty days after the date set for the opening of this bid, or at any other time thereafter before it is withdrawn, the undersigned will execute and deliver the contract documents to the owner in accordance with this bid as accepted, and will also furnish and deliver to the owner any required documents or bonds, such as performance bond, labor and material payment bond, and proof of insurance coverage, all within fifteen days after personal delivery or after deposit in the mail of the notification of acceptance of this bid.

C. Notice of acceptance or requests for additional information may be addressed to the undersigned at the address set forth below.

D. The names of all persons interested in the foregoing bid as principals are:

IMPORTANT NOTICE: If the bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of President and Secretary; If a partnership, give name of firm and names of all individual copartners composing the firm; if bidder or other interested person is an individual, give first and last names in full.

_____

_____

_____

Business Address:

_____

_____

_____ Telephone Number: _____

Sign Here: _____

SIGNATURE OF BIDDER

Date of Proposal: _____

Required Attachments

1. 5% Bid Security

Submitted By: _____

PART ONE - GENERAL

1.01 General

A. This section is for general informational purposes only. The final construction schedule shall be as indicated in the contract agreement.

B. The contractor is expected to ensure that the manpower, materials and all other items necessary to adhered to this schedule is included in the bid.

1.02 Preliminary Construction Schedule

	DATE	PROJECT MILESTONE
A.	3-10-21	Pre-bid meeting 10:00 A.M. at the following location: Remote Conference call planned, with options for field walks to be determined. Contract documents available online at DUWA@ohm-advisors.com. Bidders should review the documents prior to the Pre-Bid Meeting Event.
B.	03-19-21	Bids from contractors are due by no later than 2:00 p.m.
C.	03-22-21	Post Bid Interviews (Week of 3/22/21 to 3/26/21)
D.	04-19-21	Owner to approve award of contract
E.	05-10-21	Contract to successful bidder by no later than this date.
F.	06-01-21	Contractor to start job contingent upon receipt and approval of all submittals and paperwork no later than this date (Note: start date may be delayed due to bad weather that week)
G.	08-31-21	Contractor to be ready for a punch list inspection.
H.	09-21-21	Job to be fully completed
I.	09-30-20	Contractor to submit final invoice as well as all close out documents (including warranties). Final payment for this project shall be within 30 days of receipt of completed close out documents.

PART TWO - PRODUCTS

- Not used -

PART THREE - EXECUTION

- Not used -

- End of Section –

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included - To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the consultant will conduct project meetings throughout the construction period.

1.02 REPRESENTATION

A. Each contractor and major subcontractor shall be represented at every meeting by a responsible member of his organization.

1.03 SUBMITTALS

A. The proceedings of these meetings will be recorded by the Consultant. Each representative at these meetings will be furnished one copy, in addition to the Owner.

B. The Consultant conducting meetings, recording and distributing meeting minutes on behalf of the Owner shall not be construed as coordinating or scheduling Contractor's work.

1.04 DECISIONS/INTERPRETATIONS:

A. All decisions and interpretations given by the Consultant at project meetings shall be on behalf of the Owner and shall be firm and binding on each Contractor affected.

PRODUCT TWO - PRODUCTS

No products are required in this section.

PART THREE - EXECUTION

3.01 MEETING SCHEDULE

A. Meeting Schedule shall be agreed to by Consultant and Contractors at pre-construction meeting. Based on the size and duration of this project, there will be an expectation for a progress meeting each week during active construction. The actual meeting schedule will be based on the Contractor’s submitted schedule and will include at least one Pre-Construction Meeting, weekly Progress Meetings and a Final Close Out Meeting.

B. Change in Meeting Date/Time: If a change of meeting date/time is required due to causes beyond control of the Owner or Consultant, the Consultant will advise each concerned party in advance of such change.

C. Unless otherwise notified, meetings will be held at the job site. [Note: Due to Covid-19, any meetings described in this entire section may be scheduled to be remote. Contractors shall not be paid more, nor reimbursed for travel should meetings be held at the site.]

3.02 PRE-CONSTRUCTION MEETING

A. Pre-construction meeting will be scheduled after the Owner has issued notice to proceed. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Consultant will advise other interested parties and request their attendance.

B. Minimum Agenda: Distribute data on and discuss:

1. Organizational arrangement of Contractor's forces and personnel and those of subcontractors, materials supplies, and consultants.

2. Channels and procedures for communications.

3. Construction schedule including sequence of critical work.

4. Contract documents including distribution of required copies of original documents, revisions, and project record of documents.

5. Processing of shop drawings and other data submitted to the Consultant for review.

6. Processing of field decisions and change orders.

7. Rules and regulations governing the performance of the work.

8. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

9. Scheduling of project meetings.

3.03 PROJECT MEETINGS

A. Attendance

1. Assign the same person or persons to represent the contractor and major subcontractors at project meetings throughout progress of the work. Subcontractors, material suppliers, and others may be invited to attend those project meetings in which their aspects of the work are involved.

B. Minimum Agenda

1. Review, revise as necessary, and approve minutes of previous meeting.

2. Review progress of the work since last meeting, including status of submittals for approval.

3. Identify problems that may impede planned progress.

4. Develop corrective measures and procedures to regain planned schedule.

5. Complete other current business.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Make all submittals as required by the contract documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related Work Described Elsewhere

1. Additional requirements for submittals not listed in this section are described in pertinent other sections of these specifications.

1.02 QUALITY ASSURANCE

A. Coordination of Submittals

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the contract documents. By affixing the contractor's signature to each submittal, certify this coordination has been performed.

1.03 SUBMITTALS

A. Procedures

1. Make submittals in strict accordance with the provisions of this section.

PARTS TWO - PRODUCTS

2.01 SHOP DRAWINGS AND COORDINATION DRAWINGS

A. Shop Drawings

1. Make all shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item.

2. Shop drawings are to reflect the contractors proposed construction parameters and the drawings are to be specific to this project. **Roofing manufacturer's standard detail drawings are not acceptable as shop drawings and will be rejected without review.**

3. Type of Prints Required: Electronic data files are acceptable in lieu of hard copies (paper copies) for this project.

4. All reviewed comments of the Consultant will be shown on the original submittal when it is returned to the Contractor. The Contractor shall make and distribute all copies required for his purposes.

5. All roof system details are to be approved by the roofing system manufacturer prior to submission to the Consultant for review.

2.02 MANUFACTURERS' LITERATURE

A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review. Submit two copies, one of which will be retained by the Consultant.

2.03 BONDS

A. Prior to the start of the work, submit executed copies of all bonds to the Consultant for distribution to the Owner, or submit directly to OHM-Advisors as required to establish and issue the Contract for the work.

2.04 SCHEDULE OF VALUES

A. Contractor shall submit a completed Schedule of Values for the work on AIA form G703, "Continuation Sheet".

B. As a minimum the following items shall be listed in the Schedule of Values. **All items shall list labor and material costs separately.**

1. Mobilization and project set-up

2. Roof removal and disposal, including metal edging

3. Rough carpentry and fasteners for wood nailers/blocking

4. Roof system including insulation, membrane and flashings

5. Roof related sheet metal including fasteners, new edge and new CF

6. Plumbing related work

7. Mechanical work (lifting and resetting units and ductwork, and/or all subcontracted work for mechanical work (including associated electrical work)

8. Payment - Labor and Material bonds

9. Warranties

10. Miscellaneous Materials, Supplies, Costs

11. Unit Price Work including Permit Allowance

2.05 SAMPLES

A. Samples shall be of the precise article proposed to be furnished.

B. Unless otherwise specified, submit two samples.

2.06 COLORS

A. Unless the precise color is specifically described in the contract documents, and whenever a choice of color is available in a specified product, submit accurate color charts to the consultant for review and selection.

2.07 SUBSTITUTIONS

A. Approval Required

1. The contract is based on the standards of quality established in the contract documents.

2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the Consultant before being specifically approved for this work by the consultant, in writing.

B. "Or Equal"

1. Where the phrase "or equal" or "or equal as approved by the Consultant" occurs in the contract documents, do not assume the item has been specifically approved for this work by the consultant.

2. The decision of the Consultant shall be final.

PART THREE - EXECUTION

3.01 TIMING OF SUBMITTALS

A. Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders securing delivery.

B. In scheduling, allow at least 10 calendar days for review by the Consultant following his receipt of submittal.

C. Delays caused by tardiness in receipt of submittals, or receipt of submittals in a

format not in compliance with these requirements will not be an acceptable basis for extension of the contract completion date.

3.02 CONSULTANT'S REVIEW

A. Review by the Consultant shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors that may exist.

B. The notations "Reviewed, no exceptions noted" or "Reviewed, exceptions noted" authorize the Contractor to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, if any, required by the Consultant's review comments.

C. Make all revisions required by the consultants. If the Contractor considers any required revision to be change, he shall notify the Consultant as provided for under "changes in the work" in the general conditions. Show each drawing. Make only those revisions directed or approved by the Consultant.

D. When the Consultant has reviewed a submittal, resubmittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

3.03 REQUIRED SUBMITTALS

A. Submit shop drawings as detailed in 2.01 for the following:

1. All Flashing Details (one for each Bid Detail Drawing). Contractor shall number their flashing details using the same number convention as provided in the Bid Package. If additional details are furnished, those details may be numbered or lettered as the Contractor would prefer.

B. Manufacturers' Literature

1. Color Chart for Sheet Metal

2. Submit list of all membrane and flashing products to be used.

3. Submit confirmation that proposed details will be warranted by the membrane manufacturer.

4. Submit product literature on all fasteners to be used on project.

5. Submit product literature on all caulking and sealants to be used on the project.

C. Samples

1. Provide field sample of new coping, minimum 3 pieces (two sections and one joint) for each flashing for approval.

2. Provide field sample of metal edging, minimum 2 pieces, including 1 joint for approval.

D. Material List

1. At the discretion of the Consultant, Contractor may be allowed to submit a list of materials to be incorporated into the work in lieu of manufacturer's literature and information as outlined in item B, above. As a minimum, the material list shall show the following information:

   - Name of each component and area of project where component will be installed
   - Description of intended use of each component
   - Product name (brand name)
   - Manufacturer
   - Product physical description including relevant information regarding the thickness, color, size, grade, etc. (as applicable)

2. Material list shall be submitted in the format as shown in attachment "A".

E. Submit executed bonds as described in 2.03.

F. Submit completed Schedule of Values as described in 2.04.

G. Submit valid certificate of insurance meeting the requirements of the General Conditions of the Contract.

H. Submit a Construction Schedule as required by Section 01310 - CONSTRUCTION SCHEDULE.

I. Submit emergency contact telephone numbers including; pagers (if available), home telephone numbers and cell phone numbers (if available) for each of the following personnel:

1. Project Field Superintendent
2. Project Estimator
3. Project Foreman

J. Submit Safety Data Sheets (SDS) for all materials scheduled to be used on the project.

K. Submit a site specific safety plan including safety precautions related to COVID-19.

L. Submit a Building Permit. <u>All bidders shall include an allowance in the Base Bid for a Building Permit and the "actual" costs of the Building Permit will be paid as a direct pass through (no markup) with provided backup of actual fees paid to the governing authority (see Bid Form).</u>

- End of Section -

SECTION 01300 - ATTACHMENT “A”

LIST OF MATERIALS

PROJECT NAME: _____ **DATE:** _____ **SUBMITTED BY:** _____

COMPONENT NAME	AREA OF USE	MANUFACTURER	BRAND NAME	PHYSICAL DESCRIPTION	NOTES
Roof Insulation	Penthouse	Apache	Pyrox	1" thick, 4' X 8' boards	
Insulation Fasteners	Main Roof	Dekfast	Insulfix	#12 self tapping screws, 1.5" long	
Roof Membrane	Main Roof	XYZ Company	Rainout PVC	50 mil, reinforced roof membrane	

ETC . . . . .

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. To assure adequate planning and execution of the work so the work is completed within the number of calendar days allowed in the contract, and to assist the Consultant in evaluating progress of the work, prepare and maintain the schedules and reports described in this section.

B. Definitions

1. "Day" used throughout the contract, unless otherwise stated means "calendar day."

1.02 RELIANCE UPON APPROVED SCHEDULE

A. Should any activity not be completed within ten days after the stated scheduled date, the Owner shall have the right to order the contractor to expedite completion of the activity by whatever means the owner deems appropriate and necessary, without additional compensation to the Contractor.

B. Should any activity be 15 or more days behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate. **All work is required to be complete by September 30, 2021 (See Preliminary Construction Schedule Section 00210 for other dates).**

C. Costs incurred by the Owner in connection with expediting construction activity under this article shall be reimbursed to Owner by the Contractor.

D. It is expressly understood and agreed that failure by the Owner to exercise the option to either order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered precedent setting for any other activities.

1.03 SUBMITTALS

A. General

1. Comply with the provisions of Section 01300.

B. Construction Schedule

1. Submit two prints of construction schedule prepared in accordance with Part Three of this section.

PART TWO - PRODUCTS

2.01 CONSTRUCTION ANALYSIS

A. Diagram

1. Legibly in either a typed or ink format, graphically show the order and interdependence of all activities necessary to complete the work, and the sequence in which each activity is to be accomplished, as planned by the contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.

2. The detail of information shall be such that duration times of activities shall be more than one day. The selection and number of activities shall be subject to the owner's approval.

PART THREE - EXECUTION

3.01 CONSTRUCTION SCHEDULE

A. At the preconstruction meeting, present the completed construction schedule.

3.02 PERIODIC REPORTS

A. On the first and fifteenth day of each month, submit two prints of the construction schedule updated as described below.

3.03 CONSTRUCTION SCHEDULE

A. Show activities or portions of activities completed during the reporting period.

B. State the percentage of work actually completed and schedule as of the report date, and the progress in terms of days ahead or behind the allowable dates.

C. If work is behind schedule, a narrative report that describes, but is not necessarily limited to:

1. A description of the problem areas, current and anticipated;

2. Delaying factors and their impact;

3. An explanation of corrective actions taken or proposed.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. To provide a continuous record of the progress of the work, the Contractor shall keep a daily roofing activity report.

B. Format of roofing activity reports shall be as provided by the Contractor at the pre-construction meeting for review and approval.

1.02 QUALITY ASSURANCE

A. Roofing activity reports are to be filled out in duplicate on a daily basis by the Contractor's job site representative, who shall be in a supervisory position.

B. Wherever possible, reports shall be completed by the same individual, throughout the duration of the project.

PART TWO - PRODUCTS

(No products used in this section.)

PART THREE - EXECUTION

3.01 COMPLETION OF ROOFING ACTIVITY REPORT

A. Contractor shall complete one form for each working day.

B. Forms shall also be completed for the following days:

1. Work days cancelled or foreshortened due to weather, material shortages, or labor conditions.

2. Holidays falling on weekdays.

C. Forms shall be legibly filled out in ink and all pertinent items completed.

D. Contractor shall deliver to owner's representative at the job site on a weekly basis, written daily reports in duplicate to include, but not be limited to, the following information:

1. Each subcontractor on the job and number of workman for each trade.

2. Weather conditions.

3. Pending strikes.

4. Description and amount of work completed.

5. Any work behind or ahead of schedule.

6. Delivery to the premises of any items of major equipment or materials.

7. Accidents.

- End of Section -

PART ONE - GENERAL

1.01 GENERAL REQUIREMENTS

A. Contractor shall establish and maintain throughout the life of the contract the quality control system as specified herein (referred to in this Section as the "System").

B. Requirements: The System shall provide for the performance of sufficient inspection and tests of all items of work, including the work of subcontractors, to ensure the conformance to the applicable specifications and drawings with respect to materials, workmanship, construction, finish, functional performance and identification. The System shall specifically include the surveillance and tests required by the technical provisions of the specifications.

1.02 OPERATIONS

A. Inspection: The System shall be designed to cover all construction operations, including both on-site fabrication, and shall be keyed to the proposed construction sequence. The System shall include at least three phases of inspection for all definable features of work, as follows:

1. Preparatory Inspection shall be performed prior to beginning performance of any definable feature of work and shall include: a review of the applicable requirements of this contract; a check to assure that all materials and/or equipment have been tested, submitted, and approved in accordance with such requirements; a check to assure that provisions have been made to provide required control testing; examination of the work area to ascertain that all materials and/or equipment are on hand. The Owner shall be notified at least 24 hours in advance of the preparatory inspection.

2. Initial Inspection shall be performed as soon as a representative portion of the particular feature of work has been accomplished and shall include examination of the quality of workmanship and a review of control testing for compliance with contract requirements, use of defective or damaged materials, omissions, and dimensional requirements. The Owner shall be notified at least 24 hours in advance of the initial inspection.

3. Follow-up Inspections shall be performed daily to assure continuing compliance with the requirements of this contract, including control testing until completion of the particular feature of work.

E. All such inspections shall be made a matter of record in the Contractor's quality control documentation.

F. Record and Submittals

1. Contractor shall maintain current records of inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including the type and number of inspections or tests involved; the results of inspections or tests; the nature of defects, causes for rejection and similar data; the proposed remedial action; and any corrective action taken. The contract shall not build upon or conceal any feature of the work containing uncorrected defects. These records shall cover both conforming and defective or deficient features and shall include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of this contract. Legible copies of these records shall be furnished to the Owner daily. The records shall cover all work placement subsequent to the previously furnished records and shall be verified by Contractor. Contractor shall document inspection and tests as specified in each technical section of the specifications, and these records shall be available for review by the Owner throughout the term of this contract. In addition, Contractor's quality control reports shall include a statement that material and equipment received at the site are properly stored for protection from the elements and construction activities.

2. Contractor shall submit to the Owner, no less 15 days prior to beginning performance of the work, a written statement of the System proposed to be established pursuant to this clause, including:

a) Detailed descriptions of all testing, inspection, and other quality control methods and procedures to be used by Contractor;

b) Quality control facilities and equipment to be provided;

c) Personnel to be assigned by the contractor to implement the System including a full-time chief of quality control and their respective qualifications, responsibilities and functions; and

d) All forms and other documentation to be used by Contractor in the implementation and administration of the System. Contractor shall not begin performance of any portion of the work until the prosed System (including all elements thereof listed in subparagraphs a through d above) with such modifications as the Owner may require, has been approved in writing by the Owner.

3. Owner may direct the contractor at any time to make such changes in the System, including changes in personnel, as Owner deems necessary or desirable to correct any inadequacies or deficiencies, and Contractor shall comply promptly with any such direction.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

- End of Section-

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Temporary facilities and controls required for this work includes, but is not necessarily limited to:

a) Temporary utilities such as heat, water, and electricity.

b) Contractor's sanitary facilities.

c) Enclosures such as tarpaulins, barricades and canopies.

d) Special hoisting or crane use protection

e) Exterior wall and ground protection

f) Existing roof protection

g) Vehicular and foot traffic control devices such as lighted Type II barricades, directional arrows, stop signs and caution tape (for ground storage areas).

1.02 PRODUCT HANDLING

A. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

1.03 JOB CONDITIONS

A. Make all required connections to existing utility systems with minimum disruption to services in the existing utility systems. When disruption of the existing service is required, do not proceed without the owner's approval and, when required, provide alternate temporary service.

PART TWO - PRODUCTS

2.01 UTILITIES

A. General: All temporary facilities shall be subject to the Owner's approval.

2.02 ELECTRICAL FACILITIES

A. The Contractor shall make arrangements with the Owner to connect into the existing electrical service for temporary power. Contractor shall furnish and install all temporary wiring and upon completion of the work, remove such temporary facility. If electrical power is not available by Owner, Contractor shall provide temporary power.

B. Unless otherwise designated by the Owner, the circuit provided for the Contractors use shall be limited to 110 volts for the operation of hand power tools and small machines. Motors are not to exceed 3/4 HP per unit of equipment.

C. Runs of the temporary power lines to the construction area shall not pass through areas of the facility open to the patrons of the Owner. These lines shall have adequate safety protection against harm to personnel and property.

2.03 HVAC/VENTILATOR UNITS

A. The disconnecting and reconnecting of mechanical units during the construction phase will be the Contractor's responsibility. This work shall be coordinated between Contractor and the Owner with Contractor giving a minimum of 7 days notice of mechanical systems needed to be shutdown during construction phase. Contractor shall also be required to follow the site’s guidelines for lockout/tagout for all electrical work, including raising and resetting curbs, fans and units.

B. For the HVAC unit on Section NN and OO, Contractor shall coordinate any out of service time with the site operations and shall provide temporary fresh air as may be needed and appropriate for the time period and weather during the interruption of service as part of the work.

2.04 WATER FACILITIES

A. The Owner shall designate a source for construction water and shall pay the cost of water used for construction purposes.

B. The Contractor shall provide temporary connections to the water source and all piping, fittings, and hoses required to extend the water supply to the work area, and remove same at the completion of the project.

2.05 SANITARY FACILITIES

A. Provide temporary sanitary facilities in the quantity required, for use of all personnel. Maintain in a sanitary condition at all times.

B. Locate temporary sanitary facilities in the area designated by the Owner.

2.06 ENCLOSURES

A. Furnish, install, and maintain for the duration of the project all required scaffolding, tarpaulins, barricades, warning signs, steps, ramps, bridges, platforms, and other temporary construction necessary for proper completion of the work in compliance with all OSHA standards, safety regulations and local codes.

B. Contractor is responsible for the structural integrity of all temporary construction. Temporary construction shall meet all pertinent OSHA standards and safety regulations.

2.07 FENCING OF THE CONSTRUCTION AREA/TRAFFIC CONTROL

A. Furnish and install temporary lighted Type II traffic barricades, directional arrows, stop signs and caution tape in the parking lot and sidewalks as directed by the owner in compliance with all safety regulations and local codes around ground located equipment including hoists, cranes, material storage areas and project staging areas.

PART THREE - EXECUTION

3.01 GENERAL

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit, or as directed by the Owner or Consultant.

B. Where tarps are installed as a means of temporary control of moisture infiltration, provide a means to route collected water to an interior drain, barrel or other collection device.

C. Material storage areas shall be confined and limited to the areas designated during the pre-bid meeting or as listed on the drawings.

D. Project staging areas for the temporary storage of contractor’s equipment including dumpsters, flat bed trucks, fork lifts, crane trucks, tool boxes, etc. shall be designated at the pre-bid meeting or as listed on the drawings.

E. Entrances/exits to building shall not be blocked with vehicles, equipment, materials and/or debris at any time during the project.

3.02 INTERIOR PROTECTION

A. While no special interior protection is required, Contractor shall regularly and routinely make an inspection of the inside of the building(s) below the areas being worked on and shall perform brooming and sweeping so as to collect and remove any debris that enters the building as a result of the roof construction.

B. Under no circumstances are the contractor personnel to wear bitumen-contaminated shoes or boots inside of the building.

3.03 EXTERIOR PROTECTION

A. The Contractor shall provide, install and maintain ballasted reinforced polyethylene or canvas tarps over the tops of all exterior walls where equipment, materials and/or debris is required to be raised or lowered from various roof elevations or from roof elevations to the designated staging areas on the ground during the construction project.

B. The Contractor shall be responsible for the cleaning of all masonry wall surfaces and adjacent building components that are scheduled to remain which have been soiled during the construction project. The cleaning shall be performed to the satisfaction of the Owner and as required by Section 01710 – Cleaning.

C. Walls and/or adjacent building components scheduled to remain that can not be cleaned to the satisfaction of the Owner shall be sandblasted, repainted, repaired or replaced at no additional cost to the Owner.

3.04 GROUND PROTECTION

A. The Contractor shall provide and maintain traffic barricades, signage and caution tape in front of and for a minimum distance of a twenty (20) foot arc around all entrances to the building whenever work in any form is taking place above these entrances. Signage shall direct pedestrians to alternate entrances where no work is being performed.

B. The Contractor shall provide, install and maintain ground protection as necessary in all material storage areas, staging areas and along haul routes that may exist between these areas.

C. All parking lot paving materials, sidewalks, curbs, walls, fences, windows, HVAC units, sodding, flower beds, trees etc. located in any material storage areas, staging areas and along all haul routes that may exist between these areas shall be protected.

D. Any and all of the Owner’s property on the ground that is damaged during the construction project shall be repaired to the satisfaction of the Owner or replaced at no additional cost to the Owner.

E. Photographic documentation of any existing deficiencies in the Owner’s property on the roof, walls, windows or on the ground is recommended.

3.05 PROTECTION OF EXISTING ROOFING

A. Roof Protection

1. Roof protection shall be provided, installed and maintained in all areas where scaffolding is required to be erected or where materials, equipment and/or debris will be transported across existing roof surfaces that are scheduled to remain.

2. Roof protection shall be provided, installed and maintained on the existing roof membrane surfaces that are schedule to remain under all materials, pallets and/or toolboxes required to complete the work.

3. Roof membrane protection shall consist of a minimum of 3/4" thick plywood loose laid over a minimum 1" thick foam insulation board.

4. Plywood shall be fully supported by foam insulation board over 100% of the surface of the plywood.

5. Canvass bags filled with sand shall be used as ballast to hold the plywood in place in all areas where the plywood may become airborne in the wind.

6. Roof membrane protection shall extend a minimum of 4' in width over the roof membrane adjacent to all work areas included in this project where heavy traffic over the existing roof membrane is required.

7. Roof membrane protection shall be in place prior to the start of roof demolition work.

8. Contractor shall maintain and secure the membrane protection throughout the course of the project.

9. Maintain all roof membrane protection as long as needed for the safe and proper completion of the work. Remove all such membrane protection as rapidly as progress of the work will permit, or as directed by the Owner or the Consultant.

10. The Contractor shall be responsible for the repair of any damage to the existing remaining roof surfaces, or the replacement any damaged roof surfaces as a result of construction project.

3.06 PROTECTION OF REPLACEMENT ROOFING

A. Heavy Construction Traffic over any replaced roof area shall not be allowed. No heavy foot traffic, hauling of heavy materials or storage of materials over the completed roof areas will be allowed unless membrane protection is provided, installed and maintained as described in Section 3.05 above.

B. The Contractor shall be responsible for the repair and/or removal and replacement of any damaged replacement roof system materials, metal flashing components and/or related roof insulation as a result of traffic.

3.07 GROUND STAGING

A. Ground staging for all roof areas are expected to require the use of cranes and other lift devices. Contractor shall include with their bid all costs for ground staging requirements to complete the scheduled work.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Provisions governing the delivery, storage and handling of equipment and materials required to complete the Work include, but are not limited to:

a) Ground staging and storage areas for materials and equipment.

b) Rooftop storage of materials and equipment.

c) Handling and protection of materials to be incorporated into the roof system.

1.02 RELATED SECTIONS

A. Section 06100 – Rough Carpentry

B. Section 07535 – Fully Adhered EPDM Roofing

C. Section 07620 – Roof Related Sheet Metal

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING - GENERAL

A. Protection

1. Use all means to protect the materials to be included in the Work before, during, and after installation and to protect the work and materials of all other trades.

B. Delivery and Storage

1. Deliver materials to the job site in original, unopened containers no sooner than thirty (30) days prior to start of job.

a) Materials and equipment are to be stored in the areas designated by the Owner. Contractor shall coordinate storage areas with other trades working at the site. Refer to the Drawings for specific areas for material storage.

b) Protection of materials and equipment stored on the job site from theft, damage or other loss is the sole responsibility of the Contractor. Contractor shall replace all lost, stolen or damaged materials, necessary for the proper completion of the work, at no cost to the Owner.

2. Materials to be incorporated into the roof system shall be stored up off of the roof deck or ground, and covered with weatherproof coverings anchored sufficiently so as to resist wind blow off. Materials damaged due to blown off coverings shall be replaced by the Contractor at no cost to the Owner.

3. When storing materials on the roof, do not overstress the roof deck. Materials shall not be stored within 12 feet from any perimeter edge of the roof.

1.04 STORAGE OF WOOD PRODUCTS

A. All wood products to be incorporated into the work shall be stored a minimum of 6" off of the ground or roof surface.

B. All wood products shall be secured together with rope, wire or twine (or otherwise ballasted) to prevent materials from being blown around the site.

C. All wood products shall be covered with permeable canvas tarps securely fastened or weighted in place to prevent blow off of the tarps.

PART TWO - PRODUCTS

- None required in this section -

PART THREE - EXECUTION

- Not required in this section -

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Provisions governing the coordination, sequencing and scheduling of the work to ensure that the work is completed in a timely manner and that the interior of the building remains free from leaks during the duration of the project. Work in this section includes, but is not limited to:

a) Coordination and scheduling all phases of the work.

b) Sequencing all portions of the work.

1.02 RELATED SECTIONS

A. Section 06100 – Rough Carpentry

B. Section 07241 – Roof Insulation

C. Section 07535 – Fully Adhered EPDM Roofing

D. Section 07620 – Roof Related Sheet Metal

PART TWO - PRODUCTS

- None required in this section -

PART THREE - EXECUTION

3.01 SITE ACTIVITIES AFFECTING SCHEDULING

A. During 2021 there will be an ongoing Biosolids Project at this site towards the “back” of the property. While there should be no significant impact on the planned roof repairs, Contractors shall understand that site activities may affect their operations from time to time.

3.02 SPECIAL COORDINATION AND SCHEDULING

A. Coordinate and schedule all phases of the Work of the Contract Documents with the Owner, Consultant, Subcontractors, Material Suppliers and other parties as necessary to ensure the smooth and orderly transition of separate phases, or portions, of the Work, the timely placement of components and materials, including the complete cooperation between parties and proper execution of the Work. Expected roof access and materials storage areas are approximately shown on the roof plan drawings.

B. Owner will occupy the premises throughout the construction period. Contractor shall be responsible for coordinating with the Consultant's representative and/or the Owner's on-site operations personnel to schedule work in stages as necessary in order to ensure the proper execution of the Work with the absolute minimum of disruption to the Owners continued operations and business activities.

C. Work shall not be performed outside of normal business hours without the prior approval of the Consultant and/or Owner's representative.

3.03 SEQUENCING

A. Work is to be performed on a daily basis, with each section of roof removed must be made watertight by end of that day. Throughout the work the contractor shall be responsible for maintaining the roof in a watertight condition. (Note: A weather forecast for no rain shall not relieve the Contractor from installing and maintaining watertight seals at the end of each work day/shift.)

B. In no case shall the contractor remove more existing roofing than can be completely installed by the end of the working day.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Submit all forms required by this section to document the completion of the project.

B. Related Requirements Specified Elsewhere:

1. Completion: Waiver of Claims: General Conditions.
2. Cleaning: Section 01710.
3. Project Record Documents: Section 01720.
4. Warranties: Section 01750.
5. Closeout submittals required for trades: Respective Sections of Specifications.
6. Substantial completion: General Conditions.
7. Final Payment: General Conditions.

PART TWO - PRODUCTS

2.01 FORMS

A. Documentation shall be made on forms provided by the Consultant.

PART THREE - EXECUTION

3.01 SUBSTANTIAL COMPLETION

A. Contractors:

1. Submit written certification to the Owner through the Consultant, that project, or designated portion of project, is substantially complete.
2. Submit list of major items to be completed or corrected.

B Owner and Consultant will make an inspection after receipt of certification.

C. Should Owner and Consultant consider that work is substantially complete:

1. Contractor shall prepare and submit to Owner through the Consultant, a list of all items to be completed or corrected, as determined by the inspection.

2. Consultant will prepare and issue a certificate of substantial completion, containing:

   a) Date of substantial completion.

   b) Contractor's list of items to be completed, verified and amended by Owner and Consultant.

   c) The time within which Contractor shall complete or correct work of listed items.

   d) Time and date owner will assume possession of work or designated portion thereof.

3. Contractor: Complete work listed for completion or correction, within designated time.

D. Should Owner and Consultant consider that work is not substantially complete:

1. The Consultant shall immediately notify Contractor, in writing, stating reasons.

2. Contractor: Complete work, and send second written notice to Owner, certifying that project, or designated portion of project, is substantially complete.

3. Owner and Consultant will reinspect work.

3.02 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract documents have been reviewed.

2. Project has been inspected for compliance with contract documents.

3. Work has been completed in accordance with contract documents.

4. Project is completed and ready for final inspection.

B. Contractor shall indicate, with notice of completion to manufacturer, that a labor and material warranty is required for this project and is to be signed and sent to the Contractor for delivery to the Owner.

C. Owner and Consultant will make final inspection after receipt of certification.

D. Should Owner and Consultant consider that the work is finally complete in accordance with requirements of contract documents, Consultant shall request Contractor to make project closeout submittals.

E. Should Owner and Consultant consider that work is not finally complete:

1. Consultant shall notify Contractor, in writing, stating reasons.

2. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice to Owner certifying that work is complete.

3. Owner and Consultant will reinspect work.

3.03 REINSPECTION COSTS

A. Should Owner and Consultant be required to perform second inspections (or more) because of failure of work to comply with original certifications of Contractor, Contractor will compensate Owner and Consultant for additional services and expenses. Owner will deduct the compensation from the final payment to Contractor.

3.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: As required by Section 01720.

B. Warranties: As required by Section 01750.

C. Evidence of Payment and Release of Liens.

D. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.

E. Full Unconditional Waivers of Lien from all material suppliers.

F. Full Unconditional Waivers of Lien from all subcontractors.

G. Full Unconditional Waivers of Lien from all temporary equipment suppliers.

H. All submittals shall be duly executed before delivery to owner through the consultant.

3.05 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to owner through the Consultant.

B. Final statement shall reflect all adjustments, including:

1. Original contract sum.

2. Additions and deductions resulting from (if applicable):

a) Previous change orders.

b) Cash allowances.

c) Unit prices.

d) Other adjustments.

e) Deductions for uncorrected work.

f) Deductions for reinspection payments.

3. Total contract sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. Owner will prepare final change order, reflecting approved adjustment to contract sum not previously made by change orders.

3.06 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final application in accordance with conditions of the contract.

3.07 FINAL CERTIFICATE FOR PAYMENT

A. The Owner will issue final certificate in accordance with provisions of general conditions.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. Related Work Described Elsewhere

1. In addition to standards described in this Section, comply with all requirements for cleaning as described in various other Sections of these specifications.

1.02 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Consultant.

PART THREE - EXECUTION

3.01 PROGRESS CLEANING

A. Material Storage

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the protection required to maintain the materials in an undamaged condition.

B. General

1. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work.

2. At least once each week and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the surrounding site.

C. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site, restack, tidy, or otherwise service all arrangements to meet the requirements of subparagraph 3.01 A.1 above.

3. Maintain the site in a neat and orderly condition at all times.

3.02 FINAL CLEANING

A. Definition

1. Except as otherwise specifically provided, "clean" (for the purpose of this article) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. General

1. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in article 3.01 above.

C. Site

1. Unless otherwise specifically directed by the Consultant, clean all adjacent areas on the site. Completely remove all resultant debris.

D. Building Interior

1. Where owner has allowed contractor access through the building interior, visually inspect all access routes and remove all traces of soil, smudges, and other foreign matter. Any materials damaged as a result of this project shall be repaired to the satisfaction of the Owner or replaced at no additional cost to the Owner.

E. Building Exterior

1. Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary, to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Consultant may require light sandblasting or other cleaning at no additional cost to the Owner.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Throughout the work of this contract, maintain an accurate record of the following:

1. Contract documents (project manual with shop drawings).
2. Addendum.
3. Change orders and other modifications to the contract.
4. Field orders and instructions.
5. Construction schedule.
6. Product samples.
7. Shop drawings.
8. Progress reports.

1.02 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of record documents to one person on the contractor's staff as approved in advance by the owner.

B. Make all entries within 72 hours after receipt of information.

1.03 SUBMITTALS

A. Prior to submitting each request for progress payment, secure the Consultant’s approval of the record documents as currently maintained.

B. Prior to submitting request for final payment, submit the final record documents to the Consultant and secure his approval.

1.04 PRODUCT HANDLING

A. Use all means necessary to maintain the job set of record documents completely protected from deterioration and from loss and damage until completion of the work and transfer of the recorded data to the final record documents.

PART TWO - PRODUCTS

2.01 RECORD DOCUMENTS

A. Secure from the Owner’s website one complete set of all documents comprising the contract.

PART THREE - EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. Using the record documents described in paragraph 2.01 above, identify each of the documents with the title "Project Record Documents".

B. Maintain the record documents at the job site. Documents to be available to the owner and consultant during all working hours.

C. The Contractor shall use record document set to record day by day "as built" information. Where the drawings are diagrammatic, such drawings shall be corrected or redrawn to show actual installation.

D. During the phase of construction, if required by the Consultant, Contractor shall obtain a set of prints from the Consultant without cost and shall, in a neat and legible manner, transfer an "as built" information from the record set.

3.02 REVIEW AND APPROVAL

A. Submit the one set of record documents, to the Consultant for review. Participate in review meeting or meetings as required by the Consultant, make all required changes in the documents and promptly deliver the final project record documents through the Consultant to the Owner.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. The following items are to be submitted to the Consultant as part of this Section.

1. Copies of Consultant's punch list and documentation of completion.

2. Single ply manufacturer's twenty (20) year NDL system labor and material warranty to the Owner.

3. Contractor's written two-year guarantee covering all materials and workmanship. [Note: Date of two-year guarantee shall not commence until substantial completion of all work has been completed and has been accepted/approved by Owner's representatives. No exclusions or exceptions.]

1.02 RELATED WORK DESCRIBED ELSEWHERE.

A. For additional project closeout documentation, see Section 01701.

PART TWO - EXECUTION

2.01 FORMAT

A. All required documentation shall be in a format approved by the Consultant.

PART THREE - EXECUTION

3.01 Submit all required documentation upon completion of the work and prior to final payment.

3.02 All warranties are to be submitted to the Owner, through the Consultant.

- End of Section -

SECTION 01010 (EXHIBIT A)
SUMMARY OF WORK

PART ONE - GENERAL

1.01 DESCRIPTION

A. This section is intended for the contractor's general information only and is not intended to be a complete list of the work intended for this project.

B. The scope of work is indicated on the drawings and by the requirements of each section.

C. Project Description – **Base Bid Work**

The **Base Bid Work** includes Reroofing/Recovery of up to eleven roof building sections totaling approximately 22,000 square feet, per the Project Specification Manual dated 02-26-2021.

D. Project Description – **Alternate Bid Work**

Alternate No. 1. None

E. Processing Buildings and proposed overview scope for each area as follows:

1. Building Section NN. Approximately 614 square feet. Scope shall include:
   a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
   b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
   c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
   d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1” above the surface of the surrounding BUR membrane.
   e. Repair of wood blocking, as needed, on a unit price basis
   f. Repair of steel deck, as needed, on a unit price basis
   g. Furnish and install new perimeter wood blocking, as detailed.
   h. Raise and reset small curbs or fans on new blocking.
   i. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1” at all locations so as to meet warranty minimums.
   j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
   k. Furnish and install new perimeter edge metal, as detailed.
   l. Specific to Section NN, the work shall include lifting and resetting the existing RTU so as to install new base flashing to the rails. This work shall also include removing and replacing all the ductwork and all connections with new insulated ductwork of similar shape and size, and installation of new ductwork supports, set on membrane pads. This will include coordination with Owner of any interruption of service. Work shall include, as may be determined required any temporary service for fresh air supply while the unit and ductwork are not functional.
   m. Specific to Section NN, the new roofing membrane flashing shall extend up the wall to Section OO and shall tie into the membrane flashing that is on the wall to Section MM.

2. Roof Section OO. Approximately 2,799 square feet. Scope shall include:
   a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
   b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
   c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
   d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
   e. Repair of wood blocking, as needed, on a unit price basis
   f. Repair of concrete deck, as needed, on a unit price basis
   g. Furnish and install new perimeter wood blocking, as detailed.
   h. Raise and reset small curbs or fans on new blocking.
   i. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1" at all locations so as to meet warranty minimums.
   j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
   k. Furnish and install new perimeter edge metal, as detailed.
   l. Specific to Section OO, the work shall include lifting and resetting the short surface mounted ladder that leads to the higher elevation roof.
   m. Specific to Section OO, the work shall include providing special taper as may be determined necessary in the field to provide a minimum insulation thickness and positive drainage around the area of the raised concrete pad (see plan drawings).
   n. Specific to Section OO, raise and reset the RTU unit as necessary to install the new roof curb flashings. This will include coordination with Owner of any interruption of service.

3. Section PP. Approximately 2,398 square feet. Scope shall include:
   a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
   b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
   c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
   d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
   e. Repair of wood blocking, as needed, on a unit price basis
   f. Repair of concrete deck, as needed, on a unit price basis
   g. Furnish and install new perimeter wood blocking, as detailed.
   h. Raise and reset small curbs or fans on new blocking.
   i. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1" at all locations so as to meet warranty minimums.
   j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.

k. Furnish and install new perimeter edge metal, as detailed.
l. Specific to Section PP, the new roofing membrane flashing shall extend up the wall to Section OO.
m. Specific to Section PP, the work shall include lifting and resetting the surface mounted ladder that leads to the higher elevation roof.
n. Specific to Section PP, the work shall include providing a special door threshold detail flashing.
o. Specific to Section PP, the work shall include lifting and resetting any gas or electric conduit lines as necessary for the performance of the reroofing, including setting the lines on new conduit line supports.

4. SW Section QQ. Approximately 1,787 square feet. Scope shall include:
   a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain. For QQ the existing parapet stainless steel flashing detail is to be cut and the top portion of the existing stainless steel flashing is to remain.
   b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
   c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
   d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1” above the surface of the surrounding BUR membrane.
   e. Repair of wood blocking, as needed, on a unit price basis
   f. Repair of concrete deck, as needed, on a unit price basis
   g. Furnish and install new perimeter wood blocking, as detailed.
   h. Specific to Section QQ, this work includes a roof to wall expansion joint flashing as well as a roof to roof expansion joint flashing transition. This work included the installation of a vapor retarder and FG batt insulation as well as the installation of a new foam roll expansion flashing.
   i. Raise and reset small curbs or fans on new blocking.
   j. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1” at all locations so as to meet warranty minimums.
   k. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
   l. Furnish and install new perimeter edge metal, as detailed.
   m. Specific to Section QQ, the work shall include removing the old roof hatch and filling in the opening and installing new insulation to approximately match with the elevation of the surrounding BUR, as detailed.
   n. Specific to Section QQ, the work shall include raising the gas lines so as to exceed the elevation of the new recovery roof by approximately 4-8 inches, as well as installing new pipe supports for the raised gas line.
   o. Specific to Section QQ, raise and reset the RTU galvanized hood aprons as necessary to install the new roof curb flashings. This will include coordination with Owner of any interruption of service.

5. Section RR Main. Approximately 3,119 square feet. Scope shall include:
   a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
   b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.

c. Replacement of any wet or damaged insulation, as needed, on a unit price basis. **NOTE: Mechanical Fasteners shall not be allowed to be anchored down and into the tiles of Section RR Main.**
d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
e. Repair of wood blocking, as needed, on a unit price basis
f. Repair of concrete "tile" deck, as needed, on a unit price basis
g. Furnish and install new perimeter wood blocking, as detailed.
h. Raise and reset small curbs or fans on new blocking.
i. Furnish and install new 1.5" flat stock ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. In addition, install new tapered saddle insulation in the drain valley to better promote surface drainage (see roof plan for saddle size).
j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
k. Furnish and install new perimeter edge metal, as detailed.
l. Specific to Section RR Main, the work shall include lifting and resetting the unit set on sleepers so as to install new sleeper flashing.

6. Section RR Connecting Walkway. Approximately 800 square feet. Scope shall include:
a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
e. Repair of wood blocking, as needed, on a unit price basis
f. Repair of concrete deck, as needed, on a unit price basis
g. Furnish and install new perimeter wood blocking, as detailed.
h. Raise and reset small curbs or fans on new blocking.
i. Furnish and install new 1.5 inch ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR.
j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
k. Furnish and install new perimeter edge metal, as detailed.
l. Specific to Section RR Connecting Walkway, the work shall include the installation of new through wall flashing as well as an expansion joint flashing where detailed.
m. Specific to Section RR, the work shall include providing two new wall mounted roof ladders. One ladder to go from grade to the RR Connecting Walkway and one from the Connecting Walkway roof to the Upper Penthouse. See roof plan for approximate locations. This ladder work shall also include removing the existing wall mounted ladder that goes from grade to the Upper Penthouse.

7. Section RR. Upper Penthouse. Approximately 414 square feet. Scope shall include:
    a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
    b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
    c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
    d. Remove old drain flashing and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
    e. Repair of wood blocking, as needed, on a unit price basis
    f. Repair of concrete deck, as needed, on a unit price basis
    g. Furnish and install new perimeter wood blocking, as detailed.
    h. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1" at all locations so as to meet warranty minimums.
    i. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
    j. Furnish and install new perimeter edge metal, as detailed.

8. Section TT Main Roof. Approximately 7,439 square feet. Scope shall include:
    a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
    b. Removal of the existing aggregate surfaced BUR and insulation in the area previously identified as having "wet" insulation. Remove materials down to the deck and replace with three layers of 1.5" insulation so as to match the adjoining roof elevation. Adhered new ISO to the existing concrete tile deck using special adhesive. **NOTE: Mechanical Fasteners shall not be allowed to be anchored down and into the tiles of Section TT.**
    c. Vacuuming the remaining areas of existing aggregate surfaced BUR to remove loose aggregate surfacing.
    d. Replacement of any wet or damaged insulation, as needed, on a unit price basis
    e. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
    f. Repair of wood blocking, as needed, on a unit price basis
    g. Repair of concrete deck, as needed, on a unit price basis
    h. Furnish and install new perimeter wood blocking, as detailed.
    i. Raise and reset small curbs or fans on new blocking.
    j. Furnish and install new 1.5 inch ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR and/or the 3 layers of infill 1.5" ISO.
    k. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
    l. Furnish and install new perimeter edge metal, as detailed.
    m. Specific to Section TT Main Roof, the work shall include the installation of new plywood over stud walls and new 24 Gage Metal Panels to the 4 walls of the Section TT Penthouse.

9. Section TT Penthouse. Approximately 648 square feet. Scope shall include:
    a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
    b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
    c. Replacement of any wet or damaged insulation, as needed, on a unit price basis. **NOTE: Mechanical Fasteners shall not be allowed to be anchored down and into the tiles of Section TT Penthouse.**
    d. Repair of wood blocking, as needed, on a unit price basis
    e. Repair of concrete tile deck, as needed, on a unit price basis
    f. Furnish and install new perimeter wood blocking, as detailed.
    g. Furnish and install new 1.5 inch ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR.
    h. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
    i. Furnish and install new perimeter edge metal, as detailed.
    j. Specific to Section TT Penthouse, the work shall include the installation of new recovery flashing of the raised abandoned round stack.

10. Section UU. Approximately 948 square feet. Scope shall include:
    a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
    b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
    c. Replacement of any wet or damaged insulation, as needed, on a unit price basis
    d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1” above the surface of the surrounding BUR membrane.
    e. Repair of wood blocking, as needed, on a unit price basis
    f. Repair of concrete deck, as needed, on a unit price basis
    g. Furnish and install new perimeter wood blocking, as detailed.
    h. Raise and reset small curbs or fans on new blocking.
    i. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1” at all locations so as to meet warranty minimums.
    j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
    k. Furnish and install new perimeter edge metal, as detailed.
    l. Specific to Section UU, the work shall include lifting and resetting the surface mounted ladder that leads to the higher elevation roof.
    m. Specific to Section UU, the work shall include providing an overflow scupper, as detailed.

11. Section VV. Approximately 1,066 square feet. Scope shall include:
    a. Removal of the existing metal flashings, excluding those specifically shown on the project Detail Drawings to remain.
    b. Vacuuming the existing aggregate surfaced BUR to remove loose aggregate surfacing.
    c. Replacement of any wet or damaged insulation, as needed, on a unit price basis

d. Remove old drain flashings and all membrane and insulation immediately surrounding the existing roof drains out approximately 48 inches from the center of each drain for the specific purpose of installing a smooth tapered insulation from the elevation of the drain bowl to approximately 1" above the surface of the surrounding BUR membrane.
e. Repair of wood blocking, as needed, on a unit price basis
f. Repair of concrete deck, as needed, on a unit price basis
g. Furnish and install new perimeter wood blocking, as detailed.
h. Raise and reset small curbs or fans on new blocking.
i. Furnish and install new tapered ISO recovery insulation, set in special adhesive over the cleaned and prepared existing BUR. The new taper shall be a minimum of 1" at all locations so as to meet warranty minimums.
j. Furnish and install new fully adhered 60 mil reinforced EPDM single ply membrane system.
k. Furnish and install new perimeter edge metal, as detailed.
l. Specific to Section VV, the work shall include providing an overflow scupper, as detailed.

PART TWO - PRODUCTS

2.01 GENERAL

A. Products are specified in each of the technical specification sections and are shown on the drawings.

PART THREE - EXECUTION

3.01 DEMOLITION AND ROOF PREPARATION (General)

A. Provide and maintain all temporary utilities, enclosures, fencing of construction areas, interior protection, exterior protection, barricades, caution tape, temporary sanitary facilities and ground protection as necessary and as required by Section 01500 – Construction Facilities and Temporary Controls.

B. Provide and maintain a watertight barrier against moisture entry into the buildings. The buildings must remain watertight.

3.02 DEMOLITION AND ROOF PREPARATION (Base Bid)

A. For each of the included building sections, remove the roof system, flashings and sheet metal, as may be described or called for in the details. Remove all materials off site at an approved dump location. All asbestos related materials must be manifested.

B. Examine and replace any wet or damaged insulation on a unit price basis. [Special Note: This work shall require both a close visual examination of the existing membrane and insulation for moisture but may also include probing of the insulation for moisture in the insulation layers with an electrical resistance moisture meter tool.]

C. Examine and replace any rusted or deteriorated decking on a unit price basis.

D. Examine and replace any localized wood blocking on a unit price basis.

E. Remove abandoned equipment as may be noted in the Bid Package, or on the drawings.

F. Coordinate in advance any curb or penetration work that is electrical in nature. For this project, the Owner is requiring advanced notice for any work that is related to lifting, resetting or replacing curbs, fans, or HVAC that have electrical components. Owner is further requiring that following notice for planned work, that Contractor and Owners representatives will go through a standard lock-out/tag-out process to ensure safe work. Owner has made it clear that this will apply to even small fan curbs where it is common in the roofing industry to raise and reset the fan without any disruption of power.

3.03 ROUGH CARPENTRY

A. Install new nominal 1.5", 1.0", 0.75" or 0.5" wood blocking at the raised perimeter edges of the building or to select curbs using new wood fasteners as shown in the project details.

3.04 FIRE BARRIER AND VAPOR BARRIER INSTALLATION

A. None

3.05 INSULATION INSTALLATION

A. There are eleven different building roofs/sections. For specific materials (whether replacement or recovery) and the method of attachment of each of those layers, please refer to the construction drawings. In general, all new layers shall be placed with staggered and offset joints.

B. In general, for all work, new insulation shall be delivered to the site in a good and serviceable condition and shall be handled and stored so as to keep those materials in a good and serviceable condition. Insulation materials that become wet or otherwise damaged shall be marked in a manner so that they will not be used and shall be promptly removed from the site.

3.06 ROOF MEMBRANE / FLASHINGS (Base Bid)

A. For the low sloped areas planned for fully adhered EPDM systems: over the newly installed insulation, install new fully adhered reinforced 60 mil EPDM membrane including, as follows:

1. Over the completed insulation substrates, install a new fully adhered reinforced 60 mil EPDM (thermoset) single ply roof system per the requirements of Section 07535 – Fully Adhered EPDM Single Ply Roofing. The installed roof system shall meet the manufacturer's requirements for a 20 year "Full System" NDL labor and material warranty (excluding salvaged insulation materials). Contractor shall warrant roof system against defects in materials and workmanship for a period of two (2) years. Roof system shall meet UL Class A external fire resistance requirements. System shall include 6" field laps and 6" splice tape. Install the membrane manufacturer's approved 60 mil (minimum) base flashings, penetration flashings, perimeter flashings and stripping membrane as indicated on the detail drawings.

B. For the Penthouse Walls on Section TT, install new vertical 2x4 wood framing, plywood, underlayment and new 24 gage metal panels with exposed fasteners, as follows:

1. The new metal panel wall system shall have a 20-year coating warranty, but due to the exposed fasteners, there is no expectation for a watertight warranty. Work shall include new closure flashing at the tops and bottoms and at corners, as detailed or as necessary for a watertight installation.

C. Miscellaneous.

1. Provide and install new raised membrane walk pads. Contractor shall include the installation of 50 new membrane walk pads in the Base Bid. The installation of new walk pads will be paid for on a unit price basis. See table at the end of this section for estimates of walkway pads for each separate building area location.

3.06 ROOF RELATED SHEET METAL (Base Bid)

A. Install new edge metal (cleat and face), as detailed.

B. Install new pipe penetration flashing, as detailed.

C. Install new counterflashing, as detailed

3.07 PLUMBING (Base Bid)

A. Inspect all drains for damage to the bowl. Report damaged bowls to the Owner's representative.

B. Where bowls are otherwise undamaged, Contractor shall be responsible to clean the existing bowl and supply new clamping ring, bolts and strainer as part of the lump sum base bid.

C. Raise select (most) primary roof drain bowls with drain extension parts to an elevation where the rims are approximately 3" above the top surface of the steel roof deck.

D. Verify at completion of work to verify that all drains are flowing freely and without leaks in the interior piping.

3.08 MISCELLANEOUS WORK

A. Raise and reset all fans and vent curbs as necessary to remove and replace the roof membrane and flashings. Secure all fan cubs and vents with a minimum of one screw anchor on each side.

B. Raise and reset existing conduit penetrations on new blocking and approved membrane protection pads, as detailed.

C. Install new wall mounted ladders with cages on Sections RR Connecting Walkway (2 total).

D. Remove and reset existing short wall mounted ladders over new EPDM wall flashing.

E. Masonry repair and new through wall flashing

a. Remove 3 courses of brick masonry along the east wall of Section RR Connecting Walkway.
b. Install new EPDM membrane flashing up the wall as detailed and terminated at top.
c. Install new 24 gage stainless steel metal through wall flashing and flexible membrane with end dams.
d. Reinstall new masonry closely matching existing, providing weeps at every third head joint.]

3.09 ALTERNATE WORK

Alternate No. 1. None.

3.10 UNIT PRICING

A. The following items may be included in the scope of work and will be performed at unit prices. Set amounts of some items are to be included in the base bid and alternate bid prices.

1. Remove and replace existing deteriorated steel deck (per square foot)
2. Apply flat stock to deteriorated deck (per square foot)
3. Clean and paint rusted areas of steel deck (per square foot)
4. Remove and replace existing deteriorated wood nailer/wood blocking (per board ft)
5. Remove and replace wet insulation (per square foot per inch)
6. Install new membrane walk pads (each).
7. Replacement Drain Bowls (each)
8. New Drain Extensions (each)

B. The Base Bid shall include the following allowances for unit price work (see Bid Schedule Page). These are only assumptions for each building. Actual payment will be based on the actual amount of work which is needed, authorized and performed.

	R&R Deck (sf)	Flat Stock Deck Repair (sf)	Clean and Paint Rusted Deck	R&R Wood Nailers/ Blocking (board foot)	R&R Insulation (per square foot per inch)	Install New Walkpads (each)	Replace Drains. (each)	New Drain Extensions (Each)
NN	50	10	150	20	500	6	0	1
OO	0	10	0	30	500	8	0	4
PP	0	10	0	30	500	8	0	3
QQ	0	10	0	20	500	8	2	4
RR Main	0	10	0	30	500	4	0	2
RR Connecting	0	10	0	30	250	4	0	2
RR Penthouse	0	0	0	0	100	2	0	1
TT Main	0	50	0	100	2000	6	0	0
TT Penthouse	0	0	0	100	200	0	2	2
UU	0	0	0	30	500	2	0	1
VV	0	10	0	30	500	2	0	1
Total	50	120	150	420	5,150	50	4	21

- End of Section -

SECTION 02050
ROOF DEMOLITION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Provide all labor, material, equipment, and tools as required to prepare the existing roofing system for reroofing/recover as specified in this Section. As this section describes the roof demolition plan for more than one site/building, Contractors shall read this section carefully, as well as refer to the building drawings for descriptions of the roof demolition work.

B. Provide for the proper disposal of all existing materials designated to be removed. Provide approved trash receptacles in areas designated by the Owner's representative.

C. Coordinate the roof preparation work with the new roofing work in such a manner as to keep the new insulation and roofing materials, building, and building interior absolutely clean, dry and watertight.

1.02 REMOVAL, HANDLING AND DISPOSAL OF ASBESTOS CONTAINING ROOFING MATERIALS (IF REQUIRED)

A. Codes and Regulations:

1. General Applicability of Codes, Regulations, and Standards

a) Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

2. Contractor Responsibility

a) The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold the Owner, the Owner's Representative and the Consultant harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

[Note: Limited testing of the existing roof system has been performed and select various “caulks and sealants” were found to contain asbestos. A copy of the Asbestos Testing Lab report is provided immediately following this section and shall be considered as “included” in these specifications.]

PART TWO - PRODUCTS

(No products required in this Section).

PART THREE - EXECUTION

3.01 PROTECTION OF SURFACES (ALL SITES)

A. Contractor shall take all necessary precautions during roof preparation to protect the building and adjacent surfaces from being soiled or damaged.

B. When weather threatens, cease work under this Section and return roof to a watertight condition. Contractor must have sufficient materials on site to provide a temporary waterproof system in the event of unexpected rain/snow.

C. Contractor shall not remove any more roof than is intended to have the roof made watertight that same day. Contractor shall maintain on site temporary tarps and/or rolls of membrane that can be used in emergencies to provide a method of temporary waterproofing in case of unexpected threatening weather.

D. Contractor shall restore to original condition any damages caused during work performed in this Section.

E. Provide membrane protection when hauling materials over the existing and replacement roof systems. Membrane protection shall consist of minimum half inch plywood over a minimum 1” rigid insulation.

3.02 DISPOSAL (ALL SITES)

A. All loose roof related debris shall be removed from all roof surfaces on a daily basis. Overnight storage of debris will be permitted in dumpsters placed in the designated (or agreed to) material storage area(s).

B. Properly dispose of all debris from roof demolition and preparation on a daily basis.

C. Do not store debris on the roof. Contractor shall take care not to overstress roof deck.

D. Provide approved means for removal of debris. Materials shall not be “thrown” from the roof onto the unprotected ground below.

3.03 PREPARATION OF SURFACES (BASE BID WORK)

A. Remove all debris from the roof surfaces and dispose of off of the job site. This shall include any trash or loose debris that exists on the roof, including moss.

B. Power-vacuum the existing aggregate surfaced coal tar pitch built up roof, and dispose of the loose/removed aggregate from the site.

C. Remove all flashings and sheet metal edging, including clips. Existing stone coping pieces are to remain.

D. Remove all drain flashings, including gravel guard, strainers, clamping rings and leads. [Note: New recovery systems are scheduled to have new adjustable rings installed to raise the elevation of the new drain bowl to approximately 3 inches off the surface of the roof deck.]

E. Inspect the existing wood blocking and remove and replace any localized damaged pieces on a unit price basis (See Section 06100 for replacement work).

F. Inspect the existing insulation and remove and replace any “wet” or “damaged” areas on a unit price basis (See Section 07535 for replacement work). *Note that where on the drawings that insulation has already been found to be “wet” shall be removed and replaced as identified on the drawings and shall “not” be paid on a unit price basis. Specifically, on Section TT there is approximately 3,000 square feet of the existing roof that has been identified as having “wet” insulation. That entire approximate 3,000 square foot area shall have the BUR membrane and all layers of existing insulation removed down to the surface of the roof deck as part of the base bid pricing and none of that insulation removal (and eventual replacement) will be paid at the unit price allowance cost. This area of identified “wet” insulation was based on an infrared roof moisture survey performed in October, 2020. Further, where the old CTP membrane has to be “cut” and removed, Contractor shall apply seals to the cut edges so as to reduce or eliminate CTP bleeding out from the interplies and flowing down into the roof system and potentially into the building.*

G. Inspect any exposed steel deck and repair or replace rusted or otherwise deteriorated deck sections on a unit price basis (See Section 05315 for repair and replacement work).

H. Inspect any exposed concrete deck and install new flat stock metal plate over any discovered holes or abandoned penetrations. Secure new flat stock plate to the deck (See Section 05315 for concrete deck repair work).

I. Lift and temporarily support existing utility lines on temporary blocking, as needed to provide temporary support during the actual recovery roofing. [Note: New utility line supports shall be installed as described under a different technical section of this specification package.]

J. Work to remove and reset all existing flood lights and conduit that are mounted on top of the parapet walls are scheduled to be done by the Owner prior to the reroofing. Contractors shall not need to include costs in their bid for that related work.

K. At selected locations (such as where through wall flashings will be installed), remove a minimum of two courses of existing masonry brick so as to allow for the new through wall flashing membrane and metal to be installed. [Note: New through wall flashing and new brick shall be installed under different technical sections of this specification package.]

L. Remove the existing wall mounted ladder mounted on the existing wall next to the Connecting Walkway of Section RR (see notes on plans for location of this ladder).

M. Remove and reset the shorter wall mounted ladders that transition from roof to roof and reset them after the installation of the new EPDM roof membrane flashing. In addition, cut/remove bottom legs of the existing wall mounted ladders where those bottom legs will interfere with the new membrane and flashing installation of the recovery roof (see notes on plans for further information about the location of these areas).

3.04 CLEANUP (ALL SITES)

A. Prior to the completion of the work remove from the job site all tools, equipment, debris and waste.

B. Cleanup shall be performed on a daily basis, or more often as may be necessary. Contractor shall use a magnet bar to sweep all ground areas along and around the building where work was performed prior to leaving that area of work.

C. Conduct final cleaning to a broom clean condition.

- End of Section -

Pre-Renovation Asbestos /
Hazardous Materials Survey Report

of

Downriver Utility Waste Authority - Roof
797 Central Street,
Wyandotte, Michigan 48192

Prepared for
Downriver Utility Waste Authority
797 Central Street,
Wyandotte, Michigan 48192

7/21/2020

PSI Project No. 0166-1322-1

TABLE OF CONTENTS

TABLES AND FIGURES

LIST OF APPENDICES

1 EXECUTIVE SUMMARY

Professional Service Industries, Inc. (PSI), an Intertek company, was retained by the Downriver Utility Waste Authority (DUWA), to conduct a limited survey for asbestos-containing materials (ACM) and regulated or hazardous materials (HAZMATs) inventory at 797 Central Street, Wyandotte, Michigan 48192.

The subject building roof sections are approximately **41,000** square feet (SF) in size and were **Replaced in 1995**. The subject building was occupied during the assessment.

The purpose of the limited assessment was to provide information regarding the presence, condition, and estimated quantity of accessible ACMs and HAZMATs located on the subject property at the time of the survey. This survey was conducted in preparation for the upcoming renovations.

The assessment was conducted on **6/29/2020 and 7/1/2020**. A total of **75** samples/layers were collected from **38** suspect asbestos-containing homogeneous materials identified during the assessment. The samples were analyzed by polarized light microscopy (PLM). A material is considered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA) and the State of Michigan to be ACM if PLM results detect greater than one percent (>1%) asbestos.

Three ACMs (>1% asbestos) were identified through laboratory analysis during this investigation.

Material Number & Sample Number	Material Description	Adhesive	Material Location	Estimated Quantity
797-2A-B	Roof Vent Sealant (Silver/Black)	None	Section P.P.	120 LF
797-18A-B	Coping Sealant (Black/Tan)	None	Section T.T.	745 LF
797-27A-B	Expansion Joint w/Foam (Gray)	None	Lower Hallway	55 LF

One suspected HAZMAT category was identified through visual observation during this investigation:

Inspection Item	Constituent of Concern	Size/Quantity	Notes/Location:
Roof Vents	Lead	47	All Roof Sections

<u>Additional Issue Identified by Inspector:</u>

- **Exterior Plaster on Section T.T. Penthouse damaged and falling on roof. This material has the potential to be asbestos containing.**

Inaccessible Areas / Areas Not Included:

- **None**

Any areas that were noted as being inaccessible during this assessment or any concealed areas, such as behind walls, where suspect ACMs are discovered, will require a survey for ACM.

This summary does not contain all the information presented in the full report. The report should be read in its entirety to obtain a more complete understanding of the information provided and to aid in any decisions made or actions taken based on this information.

2 GENERAL BUILDING AND SURVEY INFORMATION

2.1 BUILDING INFORMATION

Subject Property:	**797 Central Street, Wyandotte, Michigan 48192**
Construction Date:	**Replaced in 1995**
Number of Floors:	**NA**
Square Footage	**Approximately 41,000 Square Feet**
Construction Type:	**Steel Frame and Block**
Building Occupant(s)	**DUWA**

2.2 INSPECTION INFORMATION

PSI Inspector(s): **Adam Smak**

Signature: 

State of Michigan Inspector No. A45615

Date(s) of Inspection: **6/29/2020 and 7/1/2020**

Report Reviewed By: **W. James Boland, PC**

Signature: 

3 FINDINGS

3.1 ASBESTOS RESULTS

A total of **75** samples/layers were collected from **38** suspect homogenous materials during the limited asbestos survey. In addition, several suspect homogeneous materials were observed during the limited asbestos survey but were not sampled, and are assumed to be ACM until sampling and laboratory analysis can be conducted.

The "Report of Bulk Sample Analysis for Asbestos," the "Asbestos Bulk Sample Log," Photographs, and OSHA Abatement Procedures are included in the Appendices. Table 1 attached to this report lists the suspect ACMs observed throughout the building that were sampled, along with the results of the inspection and laboratory analysis.

Table 1 provides descriptions of the materials, their general locations, condition, and friability, EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) category, OSHA abatement classification and estimated quantity.

3.1.1 INACCESSIBLE AREAS / AREAS NOT INCLUDED

The following areas were inaccessible and/or not included in the scope of the survey.

- **None**

Any areas that were noted as being inaccessible during this assessment or any concealed areas, such as behind walls, where suspect ACMs are discovered, will require a survey for ACM.

3.1.2 NON-SUSPECT MATERIALS

The following materials were observed but are considered 'non-suspect' ACM due to their composition (fiberglass, rubber, etc.) and were not sampled.

- Metal, plastic, and glass building components
- Rubber/foam pipe insulation
- Fiberglass roll/bat insulation
- Ceramic bathroom fixtures (sink, toilet, tub, etc.)

3.2 HAZMAT INSPECTION RESULTS

One suspected HAZMAT category was observed on the subject property as outlined in Table 2. Table 2 lists the component, container, or equipment that is suspected of containing hazardous or regulated substances, the suspected constituent of concern, and the approximate quantity. The items listed in the hazardous materials table can become hazardous during renovation.

The scope of work for this project did not include testing for lead-based paint. Based on the age of the subject structure it is presumed that lead based paints are most likely present in the structure. Although current regulations do not require removal of lead-based paint prior to renovation, PSI recommends testing for airborne lead during renovation activities to ensure that worker exposure does not exceed permissible exposure limits. In addition, PSI recommends avoiding activities that may increase worker exposure to potential airborne lead. Activities that can increase worker exposure include torch cutting, sanding, grinding, cutting, or abrading lead-based painted materials.

4 CONCLUSIONS & RECOMMENDATIONS

4.1 CONCLUSIONS

Three ACMs were identified on the subject property.

One suspected HAZMAT category was identified on the subject property.

Additional Issue Identified by Inspector:

- **Exterior Plaster on Section T.T. Penthouse damaged and falling on roof. This material has the potential to be asbestos containing.**

Inaccessible Areas / Areas Not Included:

- **None**

Any areas that were noted as being inaccessible during this assessment or any concealed areas, such as behind walls, where suspect ACMs are discovered, will require a survey for ACM.

4.2 RECOMMENDATIONS

ACM

Regulated ACM (RACM) and Category II Non-Friable ACM must be properly removed by a licensed asbestos abatement contractor prior to renovation that would disturb the material. Federal, State and Local regulations and guidelines should be strictly adhered to when removing the ACM.

Category I Non-Friable ACM may often be left in place during renovation if not made friable by cutting, grinding or sanding. If left in place, these materials cannot be recycled or used as clean fill.

PSI has provided the regulatory abatement methods as defined by OSHA in Appendix E for each class of work applied to the materials noted in this report. These procedures can be performed by the renovation contractor if they are licensed to perform abatement in Michigan.

HAZMATs

PSI recommends disposing the hazardous materials identified on the site in accordance to applicable regulations. Any unknown containers present on the site need to be verified through testing followed by proper disposal in accordance to applicable regulations.

TABLES AND FIGURES

TABLE 1 – SUSPECT ACMS – SAMPLED

Site:797 Central Street, Wyandotte, Michigan 48192 **Survey Date:6/29/2020 and 7/1/2020**

Material Number & Sample Number	Material Description [1]	Material Location [2]	F/NF [3]	Cond. [4]	% Asbestos & Type [5]	EPA NESHAP Category [6,7]	Osha Class Designation [8]	Estimated Quantity
797-1A-B	Concrete Coping w/Sealant (Gray/Black)	Section P.P.	NF	D	NAD	NA	NA	NA
797-2A-B	**Roof Vent Sealant (Silver/Black)**	**Section P.P.**	**NF**	**D**	**10%Ch**	**Cat II NF**	**Class II**	**120 LF**
797-3A-B	Roof Flashing Sealant (Black/Silver)	Section P.P.	NF	G	NAD	NA	NA	NA
797-4A-B	Roofing Material Core (Black/Yellow)	Section P.P.	F	G	NAD	NA	NA	NA
797-5A-B	Roof Flashing (Black/Silver)	Section P.P.	NF	G	NAD	NA	NA	NA
797-6A-B	Roof Vent Sealant (Gray/White)	Section O.O.	NF	D	NAD	NA	NA	NA
797-7A-B	Roof Flashing (Black)	Section O.O.	NF	G	NAD	NA	NA	NA
797-8A-B	Roofing Material Core (Black/Yellow/Brown)	Section O.O.	F	G	NAD	NA	NA	NA
797-9A-B	Roof Flashing (Black/Gray)	Section U.U.	NF	G	NAD	NA	NA	NA
797-10A-B	Roofing Material Core (Black/Yellow/Brown)	Section U.U.	F	G	NAD	NA	NA	NA
797-11A-B	Roof Flashing (Black)	Section V.V.	NF	G	NAD	NA	NA	NA
797-12A-B	Roofing Material Core (Black/Yellow/Brown)	Section V.V.	F	G	NAD	NA	NA	NA
797-13A-B	Roof Flashing Sealant (Silver)	Section N.N.	NF	G	NAD	NA	NA	NA
797-14A-B	Roof Flashing (Black/Gray)	Section N.N.	NF	G	NAD	NA	NA	NA
797-15A-B	Roofing Material Core (Black/Cream/Brown)	Section N.N.	F	G	NAD	NA	NA	NA

1 Homogeneous materials/systems may contain an indefinite/indistinguishable number of layers that may not be visually identified by the inspector at the time of the survey. Bulk sample analysis (Appendix B) will report all possible layers that may be contained within the homogeneous materials/system. Therefore, laboratory results may differ from the chain of custody (Appendix C) description.

2 **EA** = Exterior Area = Generally relating to sides of the principal structure on the site.
FS = Functional Space = A room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling, and the floor or roof deck above) designated by a person accredited to prepare management plans, design asbestos abatement projects, or conduct asbestos response actions.

3 **F** = Friable; **NF** = Non-friable

4 **Cond.** = Condition of Materials; Either Good (G), Damaged (D) or Significantly Damaged (SD)

5 **NAD** = No Asbestos Detected, **Ch** = Chrysotile, **Am** = Amosite, **Tr** = Tremolite, **Cr** = Crocidolite **PT** = Point Count Analysis

6 **NESHAP** Category - Regulated ACM (RACM), **Cat I NF**=Category I Non-Friable ACM, **Cat II NF**= Category II Non-Friable ACM

7 **NA** = Not Applicable

8 **OSHA/EPA Class Definitions:**

Class I Asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

Class II Asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos work means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV Asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

TABLE 1 – SUSPECT ACMS – SAMPLED

Site:797 Central Street, Wyandotte, Michigan 48192 **Survey Date:6/29/2020 and 7/1/2020**

Material Number & Sample Number	Material Description [1]	Material Location [2]	F/NF [3]	Cond. [4]	% Asbestos & Type [5]	EPA NESHAP Category [6,7]	Osha Class Designation [8]	Estimated Quantity
797-16A-B	Roof Flashing (Black)	Section Q.Q.	NF	G	NAD	NA	NA	NA
797-17A-B	Roofing Material Core (Black/Gray)	Section Q.Q.	F	G	NAD	NA	NA	NA
797-18A-B	**Coping Sealant (Black/Tan)**	**Section T.T.**	**NF**	**D**	**10%Ch**	**Cat II NF**	**Class II**	**745 LF**
797-19A-B	Roof Flashing (Black/Gray)	Section T.T.	NF	G	NAD	NA	NA	NA
797-20A-B	Roofing Martial Core (Black/Yellow)	Section T.T.	F	G	NAD	NA	NA	NA
797-21-A-B	Roof Flashing (Black/Silver)	Section T.T. Penthouse	NF	G	NAD	NA	NA	NA
797-22A-C	Exterior Plaster (Gray)	Section T.T. Penthouse	F	SD	NAD	NA	NA	NA
797-23A-B	Roofing Material Core (Black/Yellow/Brown)	Section T.T. Penthouse	F	G	NAD	NA	NA	NA
797-24A-B	Roof Flashing (Black/Silver)	Section R.R.	NF	G	NAD	NA	NA	NA
797-25A-B	Roofing Material Core (Black/Yellow/Brown)	Section R.R.	F	G	NAD	NA	NA	NA
797-26A-B	Coping Sealant (Black/Silver and White)	Lower Hallway	NF	D	NAD	NA	NA	NA
797-27A-B	**Expansion Joint w/Foam (Gray)**	**Lower Hallway**	**NF**	**D**	**2%Ch**	**Cat II NF**	**Class II**	**55 LF**
797-28A-B	Roof Flashing (Black/Silver)	Upper Penthouse and Lower Hallway	NF	G	NAD	NA	NA	NA
797-29A-B	Roofing Material Core (Black/Yellow)	Upper Penthouse and Lower Hallway	F	G	NAD	NA	NA	NA
797-30A-B	Coping Sealant (Red)	Upper Penthouse	NF	D	NAD	NA	NA	NA

1 Homogeneous materials/systems may contain an indefinite/indistinguishable number of layers that may not be visually identified by the inspector at the time of the survey. Bulk sample analysis (Appendix B) will report all possible layers that may be contained within the homogeneous materials/system. Therefore, laboratory results may differ from the chain of custody (Appendix C) description.

2 **EA** = Exterior Area = Generally relating to sides of the principal structure on the site.
FS = Functional Space = A room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling, and the floor or roof deck above) designated by a person accredited to prepare management plans, design asbestos abatement projects, or conduct asbestos response actions.

3 **F** = Friable; **NF** = Non-friable

4 **Cond.** = Condition of Materials; Either Good (G), Damaged (D) or Significantly Damaged (SD)

5 **NAD** = No Asbestos Detected, **Ch** = Chrysotile, **Am** = Amosite, **Tr** = Tremolite, **Cr** = Crocidolite **PT** = Point Count Analysis

6 **NESHAP** Category - Regulated ACM (RACM), **Cat I NF**=Category I Non-Friable ACM, **Cat II NF**= Category II Non-Friable ACM

7 **NA** = Not Applicable

8 **OSHA/EPA Class Definitions:**

Class I Asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

Class II Asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos work means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV Asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

TABLE 1 – SUSPECT ACMS –SAMPLED

Site:797 Central Street, Wyandotte, Michigan 48192 **Survey Date:6/29/2020 and 7/1/2020**

Material Number & Sample Number	Material Description [1]	Material Location [2]	F/NF [3]	Cond. [4]	% Asbestos & Type [5]	EPA NESHAP Category [6,7]	Osha Class Designation [8]	Estimated Quantity
797-31A-B	Coping Sealant (Black/Gray)	Section O	NF	D	NAD	NA	NA	NA
797-32A-B	Roof Sealant (White)	Section O	NF		NAD	NA	NA	NA
797-33A-B	Roof Flashing (Black/Silver)	Section O	NF	G	NAD	NA	NA	NA
797-34A-B	Roofing Material Core (Black/Yellow/Brown)	Section O	F	G	NAD	NA	NA	NA
797-35A-B	Roof Flashing (Black/Brown)	Section O	NF	G	NAD	NA	NA	NA
797-36A-B	Roofing Material Core (Black/Yellow)	Section O	F	G	NAD	NA	NA	NA
797-37A-B	Drain Pan Sealant (Gray)	All Sections	NF	D	NAD	NA	NA	NA
797-38A-C	Fire Proofing (White)	Interior Building Deck	F	G	NAD	NA	NA	NA

1 Homogeneous materials/systems may contain an indefinite/indistinguishable number of layers that may not be visually identified by the inspector at the time of the survey. Bulk sample analysis (Appendix B) will report all possible layers that may be contained within the homogeneous materials/system. Therefore, laboratory results may differ from the chain of custody (Appendix C) description.

2 **EA** = Exterior Area = Generally relating to sides of the principal structure on the site.
FS = Functional Space = A room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling, and the floor or roof deck above) designated by a person accredited to prepare management plans, design asbestos abatement projects, or conduct asbestos response actions.

3 **F** = Friable; **NF** = Non-friable

4 **Cond.** = Condition of Materials; Either Good (G), Damaged (D) or Significantly Damaged (SD)

5 **NAD** = No Asbestos Detected, **Ch** = Chrysotile, **Am** = Amosite, **Tr** = Tremolite, **Cr** = Crocidolite **PT** = Point Count Analysis

6 **NESHAP** Category - Regulated ACM (RACM), **Cat I NF**=Category I Non-Friable ACM, **Cat II NF**= Category II Non-Friable ACM

7 **NA** = Not Applicable

8 **OSHA/EPA Class Definitions:**

Class I Asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

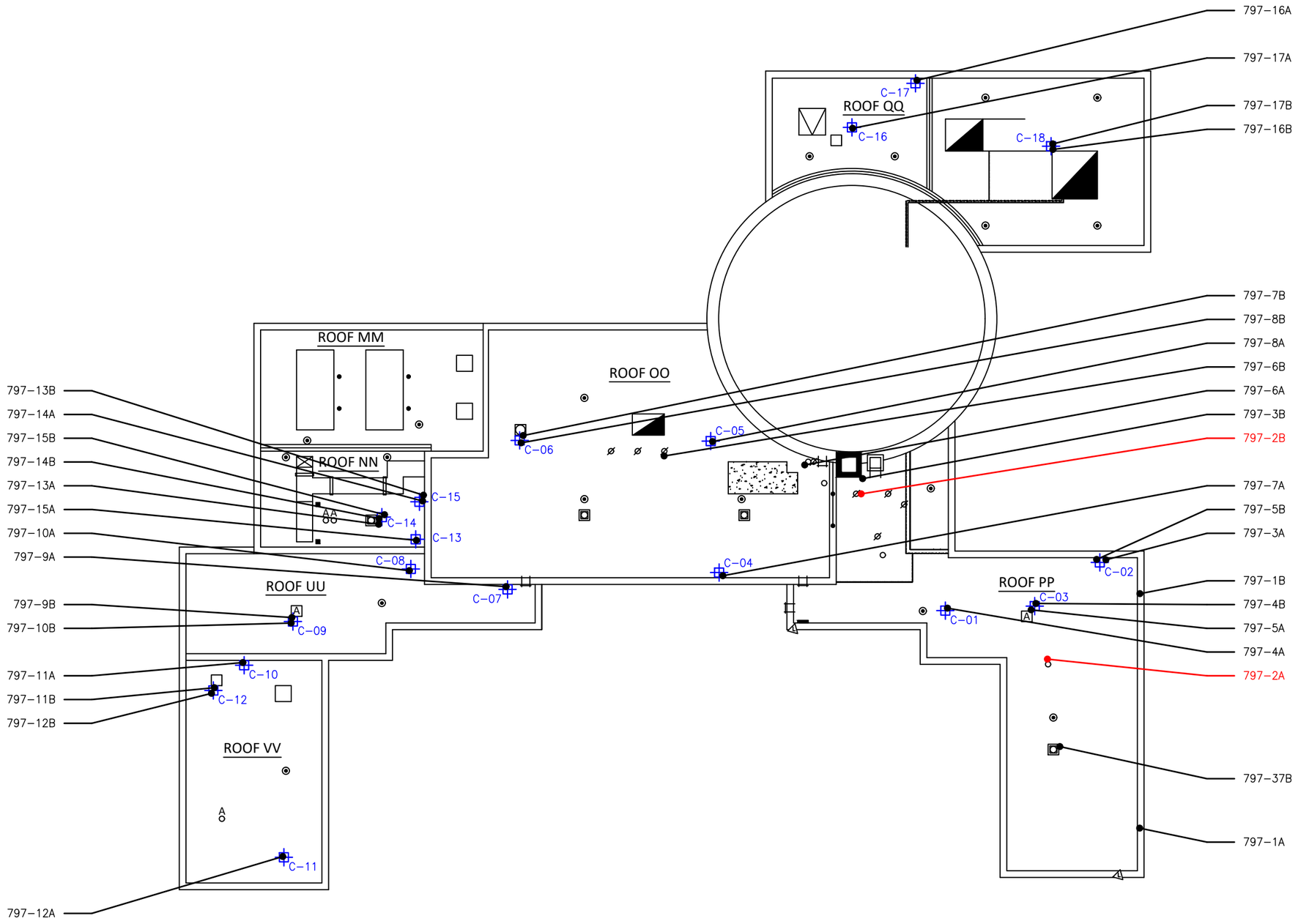
Class II Asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos work means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV Asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

Table 2: Suspected HAZMATS Inventory Checklist

Address: 797 Central Street, Wyandotte, Michigan 48192			
Inspection Item	**Constituent of Concern**	**Size/Quantity**	**Notes/Location:**
Above Ground Storage Tanks	Fuels / Chemicals	NA	NA
Air Conditioners	CFC / HCFC	NA	NA
Batteries	Lead	NA	NA
CRTs / TV Screens / Monitors/Major Appliances	Lead/Mercury	NA	NA
Dehumidifiers	CFC / HCFC	NA	NA
Drums	Varied	NA	NA
Exit Signs	Mercury / H-3	NA	NA
Fire Extinguishers / Compressed Gas Cylinder	CFC / HCFC	NA	NA
Flashing Molds	Lead	NA	NA
Leaded Glass	Lead	NA	NA
Light Ballasts	PCB	NA	NA
Miscellaneous Items (Glue, Solvents, Cleaners, etc.)	Varied	NA	NA
Paint Cans	Lead	NA	NA
Refrigerators	CFC / HCFC	NA	NA
Roof Vents	**Lead**	**47**	**All Roof Sections**
Security Systems	Mercury	NA	NA
Smoke Detectors	Mercury/ Radioactive	NA	NA
Thermostats	Mercury	NA	NA
Tires	Varied	NA	NA
Underground Storage Tanks	Fuels / Chemicals	NA	NA
Unlabeled Containers	Any	NA	NA
Fluorescent Light Bulbs	Mercury	NA	NA



LEGEND:

C–00 ROOF CORE LOCATION

797–00A ACM SAMPLE LOCATION

797–00A POSITIVE ACM SAMPLE LOCATION

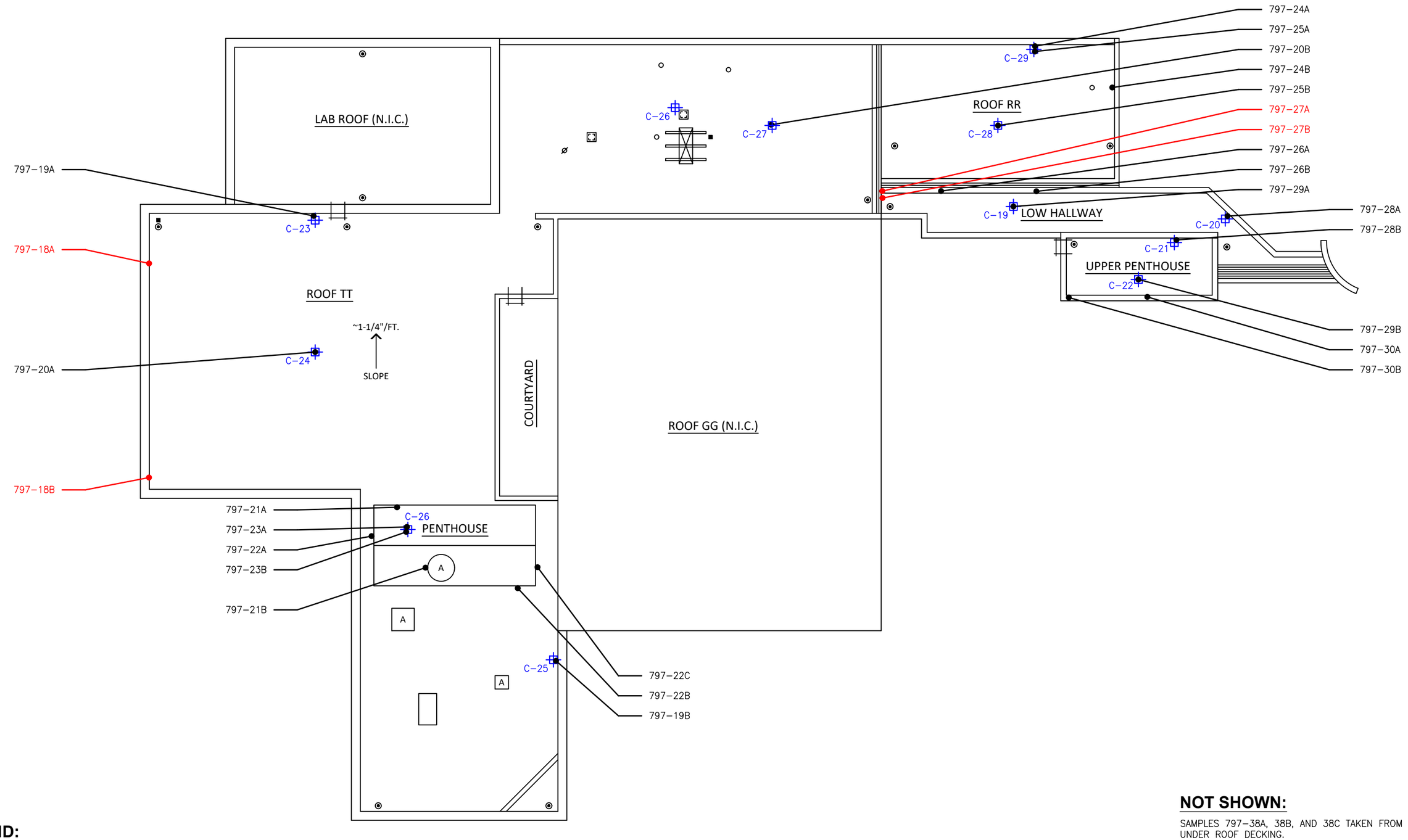
NOTE: All locations are approximate and must be field verified.

NOT SHOWN:

SAMPLES 797–38A, 38B, AND 38C TAKEN FROM UNDER ROOF DECKING.

intertek psi Environmental Services
37483 Interchange Dr. · Farmington Hills · Michigan · 48335 · Tel 248.957.9911

PROJECT NAME: Downriver Utility Waste Authority - Roof 797 Central Street, Wyandotte, Michigan 48192	DRAWN BY: A. Smak	DATE: 7-17-2020	DRAWING NO.: 1
TITLE: Sample Location Map	PROJECT MGR.: J. Boland	PROJECT NO: 0166-1322-1	



LEGEND:

C-00 ROOF CORE LOCATION

797-00A ACM SAMPLE LOCATION

797-00A POSITIVE ACM SAMPLE LOCATION

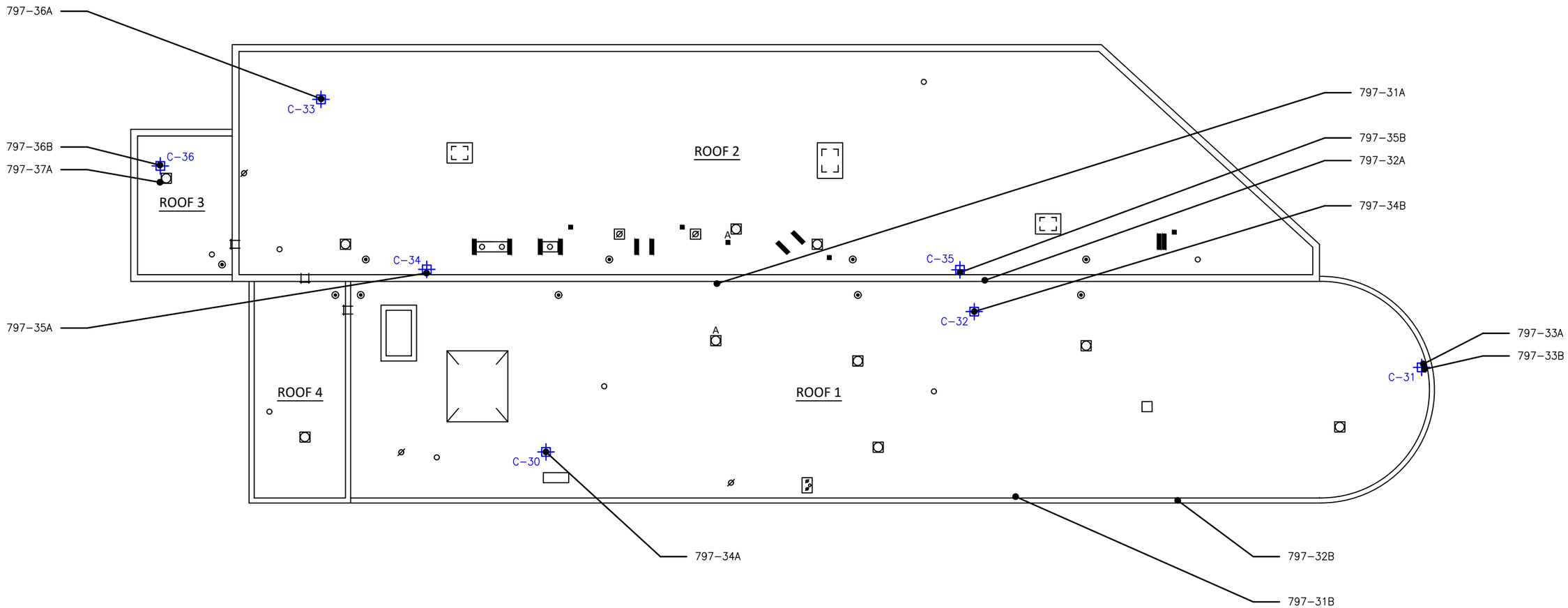
NOTE: All locations are approximate and must be field verified.

NOT SHOWN:

SAMPLES 797-38A, 38B, AND 38C TAKEN FROM UNDER ROOF DECKING.

intertek psi Environmental Services
37483 Interchange Dr. · Farmington Hills · Michigan · 48335 · Tel 248.957.9911

PROJECT NAME: Downriver Utility Waste Authority - Roof 797 Central Street, Wyandotte, Michigan 48192	DRAWN BY: A. Smak	DATE: 7-17-2020	DRAWING NO.: 2
TITLE: Sample Location Map	PROJECT MGR.: J. Boland	PROJECT NO: 0166-1322-1	



ROOF O

NORTH

LEGEND:

C–00 ROOF CORE LOCATION

797–00A ACM SAMPLE LOCATION

797–00A POSITIVE ACM SAMPLE LOCATION

NOTE: All locations are approximate and must be field verified.

NOT SHOWN:

SAMPLES 797–38A, 38B, AND 38C TAKEN FROM UNDER ROOF DECKING.

intertek psi Environmental Services
37483 Interchange Dr. · Farmington Hills · Michigan · 48335 · Tel 248.957.9911

PROJECT NAME: Downriver Utility Waste Authority - Roof 797 Central Street, Wyandotte, Michigan 48192	DRAWN BY: A. Smak	DATE: 7-17-2020	DRAWING NO.: 3
TITLE: Sample Location Map	PROJECT MGR.: J. Boland	PROJECT NO: 0166-1322-1	

APPENDIX A – SCOPE, METHODS, AND REGULATORY GUIDELINES

A1 INTRODUCTION

A1.1 SCOPE OF SERVICES

The scope of services for this project consisted of conducting a limited ACM and hazardous material assessment, sampling and analysis of accessible and exposed areas on the subject property.

The limited assessment included areas within the structure where building materials could potentially be impacted during scheduled renovation. The limited investigation included a visual inspection of the subject area(s), sample collection, PLM sample analysis, quantification of ACMs, suspected hazardous materials, and report preparation and review.

A1.2 PURPOSE

The purpose of this survey was to provide general information for the subject property regarding the presence, condition, and quantity of accessible and/or exposed friable and non-friable building materials that contain asbestos, as well as substances that would require special handling and disposal prior to renovation.

A1.3 AUTHORIZATION

Authorization to perform this work was given by the Downriver Utility Waste Authority (DUWA) through the issuance of a Notice to Proceed.

A1.4 LIMITATIONS

The asbestos survey was intended to meet the requirements of the EPA NESHAP regulation for renovation or renovation. The survey included a thorough inspection of all areas on the subject property.

Vermiculite Insulation was assumed to be asbestos containing for the purposes of this study. These materials can be treated as non-regulated renovation debris provided they are not rendered friable during the renovation process.

Destructive sampling, such as behind finished surfaces (plaster/drywall walls, above hard ceilings, etc.); inside mechanical chases, behind mirrored walls, under carpet or tiled floors, etc., was generally conducted to try to assess inaccessible or concealed materials. The inspection team selected representative areas to perform an intrusive evaluation of void spaces within the building or structure. Such inspections were made by creating an opening of sufficient size to determine the presence, condition and quantity of suspect ACM within. Void spaces which were evaluated included locations of suspected pipe or HVAC chases, wall cavities where fireproofing or other ACM was suspected, above finished ceiling systems where ACM was likely to exist, within pipe trenches or within concealed locations. Although PSI made an attempt to identify all areas of ACM, an exhaustive investigation of void spaces was not included in the scope of services for

this project. Inaccessible is defined as areas of the building that were locked, or where admittance was not possible. It also includes areas/materials that could not be tested (sampled) without destruction of the structure or a portion of the structure, and areas/materials that could not be safely reached by the inspector or inspection team. In the event that access to a portion of the building was not obtained (which otherwise would have been tested), such limitations specifically are identified in the Findings Section of this report.

PSI did not sample any system which presented a hazard to the inspection team such as energized electrical systems, confined spaces, or structurally unsafe areas.

The HAZMATs survey was visual only and did not include sampling of identified materials.

A1.5 WARRANTY

The field and laboratory results reported herein are considered sufficient in detail and scope to determine the presence of accessible and/or exposed suspect ACM/HAZMATs for the subject property. PSI warrants that the findings contained herein have been prepared in general accordance with accepted professional practices at the time of its preparation as applied by professionals in the community. Changes in the state of the art or in applicable regulations cannot be anticipated and have not been addressed in this report.

The survey and analytical methods have been used to provide the client with information regarding the presence of accessible and/or exposed suspect ACM/HAZMATs existing at the time of the inspection. Test results are valid only for the material(s) tested. There is a distinct possibility that conditions may exist which could not be identified within the scope of the study or which were not apparent during the site visit. This inspection covered only those areas that were exposed and/or physically accessible to the Inspector. The study is also limited to the information available from the client at the time it was conducted.

As directed by the client, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification. No other warrantees are implied or expressed.

A2 METHODOLOGY

Inspection and sampling procedures were performed in general accordance with the guidelines published by the EPA. The inspection and survey described below was performed by an EPA and Michigan accredited inspector.

A2.1 RECORD DOCUMENT REVIEW

Prior to conducting the visual inspection, PSI typically reviews documents provided by the client, including: drawings, floor plans, historical data, maintenance records, previous survey reports, laboratory reports, etc. for information regarding construction history and building materials.

No documents were provided by the client for review as a part of this Asbestos and HAZMAT Survey.

A2.2 VISUAL INSPECTION PROCEDURES

A2.2.1 Asbestos

An initial property walkthrough was conducted to determine the presence of suspect asbestos-containing materials that were accessible and/or exposed within all areas scheduled for upcoming activities.

Materials which were similar in color, texture, general appearance and which appear to have been installed at the same time were grouped in Homogeneous Sampling Areas. Such materials are termed "homogeneous materials" by the EPA. During this walkthrough, the approximate locations of these homogeneous materials were also noted.

The inspector evaluated the overall condition of the material and determined whether the materials were friable or non-friable by touching the material, where practical. A friable material is defined as any material able to be crushed, crumbled, pulverized or reduced to a powder by hand pressure when dry.

Each material was further assessed for overall condition. Conditions were rated as good, damaged or significantly damaged. PSI's inspector also identified the EPA NESHAP classification of the material based on the materials current condition. PSI's inspector provided estimated quantities of the materials identified as ACM, based only on materials that were accessible and exposed.

Homogeneous materials/systems may contain an indefinite/indistinguishable number of layers that may not be visually identified by the inspector at the time of the survey. Bulk sample analysis (Appendix B) will report all possible layers that may be contained within the homogeneous materials/system. Therefore laboratory results may differ from the chain of custody (Appendix C) description.

A2.2.2 HAZMAT Inventory

Materials or equipment that have been traditionally known to contain hazardous or regulated materials such as lead, PCBs, mercury, and CFCs are identified and quantified during the HAZMAT Inventory. These are materials that should be removed, reclaimed, and/or properly disposed of prior to renovation. In addition, inspectors noted containers observed with chemicals subject to disposal regulations or that would pose renovation worker exposure potential, such as cleaners, varnishes, glues, etc.

A2.3 ASBESTOS SAMPLING PROCEDURES

Following the walkthrough, the Inspector collected samples of suspect materials.

Exterior Area (EA) and Functional Space (FS) sampling locations were chosen to be representative of the homogeneous sampling area. While an effort was made to collect samples randomly, samples were taken preferentially from areas already damaged or areas which were the least visible to minimize disturbance of the material.

Each sample location was sprayed with amended water and was kept wet during the entire sampling process. Samples were collected by coring through the material from the surface down to the base substrate. All layers of the material were extracted and placed into a sample container for transport to the laboratory. Sample containers were sealed and labeled with a unique sample identification number. Where appropriate, sampled materials were sealed with an encapsulant or covered with tape after sampling. PSI is not responsible for restoring the sampled areas to their pre-sampled condition.

In accordance with the agreement between PSI and the client, vermiculite insulation was assumed to be an asbestos containing material as part of this survey.

A2.4 ASBESTOS ANALYSIS PROCEDURES

All samples were analyzed by one of the following four pre-approved laboratories:

- Professional Service Industries, Inc.
  850 Poplar Street,
  Pittsburgh, PA 15220
- Environmental Testing Laboratories, Inc.
  38900 Huron River Drive, Suite 200
  Romulus, MI 48174
- Eurofins-CEI Labs, Inc.
  730 Southeast Maynard Road,
  Cary, NC 27511
- Scientific Analytical Institute Inc.
  4604 Dundas Drive,
  Greensboro, NC 27407

These Laboratories are all National Voluntary Laboratory Accreditation Program (NVLAP) Accredited.

The samples were analyzed for asbestos on a "positive-stop" basis by PLM and in accordance with the "EPA Method for the Determination of Asbestos in Bulk Building Materials" (EPA/600/R-93/116 July 1993). Analysis was performed by observing the bulk samples and slide preparation(s) for microscopic examination and identification. The samples were mounted on slides and then analyzed for asbestos (chrysotile, amosite, crocidolite, anthophyllite, actinolite/tremolite), and fibrous non-asbestos constituents (mineral wool, fiberglass, cellulose, etc.). Asbestos was identified by refractive indices, morphology, color, pleochroism, birefringence, extinction characteristics, and signs of elongation. The same characteristics were used to identify the non-asbestos constituents.

Using a stereoscope, the microscopist visually estimated relative amounts of each constituent by determining the volume of each constituent in proportion to the total volume of the sample.

The EPA method allows samples which are visually determined to have less than 1% asbestos to be quantified using a Point Count procedure. An ocular reticule (cross hair or point array) is used to visually superimpose a point or points on the microscope field of view. A total of 400 points superimposed on either asbestos fibers or non-asbestos matrix material must be counted over at least eight different preparations of representative subsamples. If an asbestos fiber and matrix particle overlap so that a point is superimposed on their visual intersection, a point is scored for both categories. Point counting provides a quantification of the area percent asbestos. Point counted results supersede the results of the visual estimation.

It should be noted that some ACM might not be accurately identified or quantified by PLM. As an example, the original fabrication of vinyl floor tiles routinely involved milling of asbestos fibers to extremely small sizes. As a result, these fibers may go undetected under the standard PLM method. Transmission Electron Microscopy (TEM) is recommended for a more definitive analysis of these materials.

A2.4.1 Laboratory Quality Control Program

Each laboratory maintains an in-house quality control program. This program involves blind reanalysis of ten (10) percent of all samples, precision and accuracy controls, and use of standard bulk reference materials. In addition, the Laboratories are accredited by NVLAP, which also has quality control procedures inherent in its program.

A2.5 REGULATORY GUIDELINES:

ACM Definition –

The EPA and OSHA consider a material to be ACM if at least one sample from the homogeneous area shows asbestos in an amount greater than 1%.

Point Count Quantification –

If a material is found to contain less than 1% asbestos via PLM visual estimation, it can be treated as non-ACM per EPA Regulations, if verified to contain 1% or less asbestos by the Point Count Quantification Procedure. Please refer to the laboratory analyses for a more detailed description of the microscopic analysis of individual samples.

EPA NESHAP Category –

EPA classifies ACM into the following categories:

- ***RACM*** as defined by the Asbestos NESHAP is any (a) Friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of renovation or renovation operations.
- ***Category I Non-friable ACM*** includes packings, gaskets, resilient floor covering, and asphalt roofing products which contain more than one percent asbestos.
- ***Category II Non-friable ACM*** includes any material, except for a Category I non-friable ACM, which contains more than one-percent asbestos and cannot be reduced to a powder by hand pressure when dry.

OSHA –

OSHA requires all suspect materials to be analyzed by layer, even materials such as drywall/joint compound, which may sometimes be composited per the EPA. If any layer contains asbestos in a concentration >1%, the material is considered an ACM.

OSHA has a classification system (I thru IV) for ACM depending on the type of material and the disturbance as follows:

- ***Class I*** work is defined as activities involving the removal of ACM or presumed ACM (PACM) that is thermal system insulation (TSI) and surfacing materials.
- ***Class II*** activities involve removal of ACM/PACM other than TSI or surfacing material.
- ***Class III*** work includes repair and maintenance operations which are likely to disturb ACM/PACM.
- ***Class IV*** work includes maintenance and custodial activities during which employees contact but do not disturb ACM/PACM.

Materials where asbestos is detected, but where point counting is conducted and determined that the concentration is ≤1% asbestos, are not considered to be ACM by OSHA. However, these materials are considered unclassified asbestos work per OSHA. Some OSHA work control practices and prohibitions will still apply, with the extent depending on whether the worker's exposure to airborne asbestos exceeds the OSHA permissible exposure limit (PEL).

Additional details of the OSHA asbestos regulations related to the construction industry can be found in 29 CFR Part 1926.1101.

A2.6 QUANTIFICATION

Quantification of suspect ACMs and HAZMATs were conducted using visual estimation by an accredited asbestos inspector. This visual estimation was performed in accordance with generally accepted practices in the asbestos industry based on materials that were accessible and exposed. These values are sufficiently accurate for the purpose of documenting the presence of asbestos within its space for the purpose of identifying abatement control conditions or for general policy considerations. Actual quantities may differ between visually estimated values and physical measurements. If a licensed asbestos abatement contractor is engaged to remove the identified ACM, they should be made responsible for verifying reported quantities of ACM.

A2.7 HAZMAT CLASSIFICATION

By definition, EPA determined that some specific wastes are hazardous. These wastes are incorporated into lists published by the EPA. These lists are organized into three categories:

1. The F-list (non-specific source wastes). This list identifies wastes from common manufacturing and industrial processes, such as solvents that have been used in cleaning or degreasing operations. Because the processes producing these wastes can occur in different sectors of industry, the F-listed wastes are known as wastes from non-specific sources. Wastes included on the F-list can be found in the regulations at 40 CFR §261.31.

2. The K-list (source-specific wastes). This list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. Certain sludges and wastewaters from treatment and production processes in these industries are examples of source-specific wastes. Wastes included on the K-list can be found in the regulations at 40 CFR §261.32.

3. The P-list and the U-list (discarded commercial chemical products). These lists include specific commercial chemical products in an unused form. Some pesticides and some pharmaceutical products become hazardous waste when discarded. Wastes included on the P- and U- lists can be found in the regulations at 40 CFR §261.33.

Waste that have not been specifically listed may still be considered a hazardous waste if exhibits one of the four characteristics defined in 40 CFR Part 261 Subpart C - ignitability (D001), corrosivity (D002), reactivity (D003), and toxicity (D004 - D043).

1. Ignitability - Ignitable wastes can create fires under certain conditions, are spontaneously combustible, or have a flash point less than 60 °C (140 °F). Examples include waste oils and used solvents.

2. Corrosivity - Corrosive wastes are acids or bases (pH less than or equal to 2, or greater than or equal to 12.5) that are capable of corroding metal containers, such as storage tanks, drums, and barrels.

3. Reactivity - Reactive wastes are unstable under "normal" conditions. They can cause explosions, toxic fumes, gases, or vapors when heated, compressed, or mixed with water.

4. Toxicity - Toxic wastes are harmful or fatal when ingested or absorbed (e.g., containing mercury, lead, etc.). When toxic wastes are land disposed, contaminated liquid may leach from the waste and pollute ground water. Toxicity is defined through a laboratory procedure called the Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311). The TCLP helps identify wastes likely to leach concentrations of contaminants that may be harmful to human health or the environment.

Mercury-containing equipment, mercury containing lamps, batteries and pesticides that are classified as hazardous waste can be collected under the streamlined collection standards for Universal Waste as defined by the EPA in 40 CFR §273. Universal Waste identified as part of this investigation should be removed and either disposed of or recycled in accordance with the EPA.

Light fixture ballasts manufactured through 1979 and those without a "No PCBs" label should be assumed to contain polychlorinated biphenyls (PCBs). The capacitor in the ballast may contain two to three ounces of PCBs. Potting compound (used to dissipate heat from electrical components in the ballast) may be made of waste oil contaminated by PCBs. The Toxic Substances Control Act of 1976 (TSCA) regulates disposal and storage of PCB. Ballasts containing or suspected of containing PCBs should be disposed of at hazardous waste incinerators or chemical waste landfills.

APPENDIX B – REPORT OF BULK SAMPLE ANALYSIS FOR ASBESTOS AND NVLAP CERTIFICATION

eurofins | CEI

July 9, 2020

PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

CLIENT PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192
CEI LAB CODE: A208534

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on July 7, 2020. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,

Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP® TESTING
NVLAP LAB CODE 101768-0

eurofins | CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

LAB CODE: A208534

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
797-1A	Layer 1	A127627	Gray	Concrete Coping	None Detected
	Layer 2	A127627	Black	Sealant	None Detected
797-1B	Layer 1	A127628	Gray	Concrete Coping	None Detected
	Layer 2	A127628	Black	Sealant	None Detected
797-2A		A127629	Silver,Black	Roof Vent Sealant	Chrysotile 10%
797-2B		A127630		Sample Not Analyzed per COC	
797-3A		A127631	Black,Silver	Roof Flashing Sealant	None Detected
797-3B		A127632	Black,Silver	Roof Flashing Sealant	None Detected
797-4A	Layer 1	A127633	Black	Roofing Material Core	None Detected
	Layer 2	A127633	Yellow	Insulation	None Detected
797-4B	Layer 1	A127634	Black	Roofing Material Core	None Detected
	Layer 2	A127634	Yellow	Insulation	None Detected
797-5A	Layer 1	A127635	Silver	Silver Paint	None Detected
	Layer 2	A127635	Black	Roof Flashing	None Detected
797-5B	Layer 1	A127636	Silver	Silver Paint	None Detected
	Layer 2	A127636	Black	Roof Flashing	None Detected
797-6A		A127637	Gray,White	Roof Vent Sealant	None Detected
797-6B		A127638	Gray,White	Roof Vent Sealant	None Detected
797-7A	Layer 1	A127639	Silver	Silver Paint	None Detected
	Layer 2	A127639	Black	Roof Flashing	None Detected
797-7B	Layer 1	A127640	Silver	Silver Paint	None Detected
	Layer 2	A127640	Black	Roof Flashing	None Detected
797-8A	Layer 1	A127641	Black	Roofing Material Core	None Detected
	Layer 2	A127641	Yellow	Insulation	None Detected
	Layer 3	A127641	Brown	Insulation	None Detected
797-8B	Layer 1	A127642	Black	Roofing Material Core	None Detected
	Layer 2	A127642	Yellow	Insulation	None Detected
	Layer 3	A127642	Brown	Insulation	None Detected
797-9A	Layer 1	A127643	Silver	Silver Paint	None Detected
	Layer 2	A127643	Black,Gray	Roof Flashing	None Detected
797-9B	Layer 1	A127644	Silver	Silver Paint	None Detected

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

LAB CODE: A208534

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
	Layer 2	A127644	Black,Gray	Roof Flashing	None Detected
797-10A	Layer 1	A127645	Black	Roofing Material Core	None Detected
	Layer 2	A127645	Yellow	Insulation	None Detected
	Layer 3	A127645	Brown	Insulation	None Detected
797-10B	Layer 1	A127646	Black	Roofing Material Core	None Detected
	Layer 2	A127646	Yellow	Insulation	None Detected
	Layer 3	A127646	Brown	Insulation	None Detected
797-11A		A127647	Black	Roof Flashing	None Detected
797-11B		A127648	Black	Roof Flashing	None Detected
797-12A	Layer 1	A127649	Black	Roofing Material Core	None Detected
	Layer 2	A127649	Yellow	Insulation	None Detected
	Layer 3	A127649	Brown	Insulation	None Detected
797-12B	Layer 1	A127650	Black	Roofing Material Core	None Detected
	Layer 2	A127650	Yellow	Insulation	None Detected
	Layer 3	A127650	Brown	Insulation	None Detected
797-13A		A127651	Silver	Roof Flashing Sealant	None Detected
797-13B		A127652	Silver	Roof Flashing Sealant	None Detected
797-14A		A127653	Black,Gray	Roof Flashing	None Detected
797-14B		A127654	Black,Gray	Roof Flashing	None Detected
797-15A	Layer 1	A127655	Black	Roofing Material Core	None Detected
	Layer 2	A127655	Cream	Insulation	None Detected
	Layer 3	A127655	Brown	Insulation	None Detected
797-15B	Layer 1	A127656	Black	Roofing Material Core	None Detected
	Layer 2	A127656	Cream	Insulation	None Detected
	Layer 3	A127656	Brown	Insulation	None Detected
797-16A		A127657	Black	Roof Flashing	None Detected
797-16B		A127658	Black	Roof Flashing	None Detected
797-17A	Layer 1	A127659	Black,Gray	Roofing Material Core	None Detected
	Layer 2	A127659	Brown	Insulation	None Detected
797-17B	Layer 1	A127660	Black,Gray	Roofing Material Core	None Detected
	Layer 2	A127660	Brown	Insulation	None Detected

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

LAB CODE: A208534

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
797-18A		A127661	Black,Tan	Coping Sealant	Chrysotile 10%
797-18B		A127662		Sample Not Analyzed per COC	
797-19A		A127663	Black,Gray	Roof Flashing	None Detected
797-19B		A127664	Black,Gray	Roof Flashing	None Detected
797-20A	Layer 1	A127665	Black	Roofing Material Core	None Detected
	Layer 2	A127665	Yellow	Insulation	None Detected
797-20B	Layer 1	A127666	Black	Roofing Material Core	None Detected
	Layer 2	A127666	Yellow	Insulation	None Detected
797-21A		A127667	Black	Roof Flashing	None Detected
797-21B	Layer 1	A127668	Silver	Silver Paint	None Detected
	Layer 2	A127668	Black	Roof Flashing	None Detected
797-22A		A127669	Gray	Exterior Stucco	None Detected
797-22B		A127670	Gray	Exterior Stucco	None Detected
797-22C		A127671	Gray	Exterior Stucco	None Detected
797-23A	Layer 1	A127672	Black	Roofing Material Core	None Detected
	Layer 2	A127672	Yellow	Insulation	None Detected
	Layer 3	A127672	Brown	Insulation	None Detected
797-23B	Layer 1	A127673	Black	Roofing Material Core	None Detected
	Layer 2	A127673	Yellow	Insulation	None Detected
	Layer 3	A127673	Brown	Insulation	None Detected
797-24A	Layer 1	A127674	Silver	Silver Paint	None Detected
	Layer 2	A127674	Black	Roof Flashing	None Detected
797-24B	Layer 1	A127675	Silver	Silver Paint	None Detected
	Layer 2	A127675	Black	Roof Flashing	None Detected
797-25A	Layer 1	A127676	Black	Roofing Material Core	None Detected
	Layer 2	A127676	Yellow	Insulation	None Detected
797-25B	Layer 1	A127677	Black	Roofing Material Core	None Detected
	Layer 2	A127677	Yellow	Insulation	None Detected
797-26A	Layer 1	A127678	Black,Silver	Coping Sealant	None Detected
	Layer 2	A127678	White	Coping Sealant	None Detected
797-26B	Layer 1	A127679	Black,Silver	Coping Sealant	None Detected

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

LAB CODE: A208534

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
	Layer 2	A127679	White	Coping Sealant	None Detected
797-27A	Layer 1	A127680	Gray	Expansion Joint	Chrysotile 2%
	Layer 2	A127680	Gray	Foam	None Detected
797-27B		A127681		Sample Not Analyzed per COC	
797-28A	Layer 1	A127682	Silver	Silver Paint	None Detected
	Layer 2	A127682	Black	Roof Flashing	None Detected
797-28B	Layer 1	A127683	Silver	Silver Paint	None Detected
	Layer 2	A127683	Black	Roof Flashing	None Detected
797-29A	Layer 1	A127684	Black	Roofing Material Core	None Detected
	Layer 2	A127684	Yellow	Insulation	None Detected
797-29B	Layer 1	A127685	Black	Roofing Material Core	None Detected
	Layer 2	A127685	Yellow	Insulation	None Detected
797-30A		A127686	Red	Coping Sealant	None Detected
797-30B		A127687	Red	Coping Sealant	None Detected
797-31A	Layer 1	A127688	Black,White	Coping Sealant	None Detected
	Layer 2	A127688	Gray	Coping Sealant	None Detected
797-31B	Layer 1	A127689	Black,White	Coping Sealant	None Detected
	Layer 2	A127689	Gray	Coping Sealant	None Detected
797-32A		A127690	White	Roof Sealant	None Detected
797-32B		A127691	White	Roof Sealant	None Detected
797-33A	Layer 1	A127692	Silver	Silver Paint	None Detected
	Layer 2	A127692	Black	Roof Flashing	None Detected
797-33B	Layer 1	A127693	Silver	Silver Paint	None Detected
	Layer 2	A127693	Black	Roof Flashing	None Detected
797-34A	Layer 1	A127694	Black	Roofing Material Core	None Detected
	Layer 2	A127694	Yellow	Insulation	None Detected
	Layer 3	A127694	Brown	Insulation	None Detected
797-34B	Layer 1	A127695	Black	Roofing Material Core	None Detected
	Layer 2	A127695	Yellow	Insulation	None Detected
	Layer 3	A127695	Brown	Insulation	None Detected
797-35A		A127696	Black,Brown	Roof Flashing	None Detected

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

LAB CODE: A208534

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
797-35B		A127697	Black,Brown	Roof Flashing	None Detected
797-36A	Layer 1	A127698	Black	Roofing Material Core	None Detected
	Layer 2	A127698	Yellow	Insulation	None Detected
797-36B	Layer 1	A127699	Black	Roofing Material Core	None Detected
	Layer 2	A127699	Yellow	Insulation	None Detected
797-37A		A127700	Gray	Drain Pan Sealant	None Detected
797-37B		A127701	Gray	Drain Pan Sealant	None Detected
797-38A		A127702	White	Fire Proofing	None Detected
797-38B		A127703	White	Fire Proofing	None Detected
797-38C		A127704	White	Fire Proofing	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-1A Layer 1 A127627	Concrete Coping	Homogeneous Gray Non-fibrous Bound			80% 20%	Silicates Binder	None Detected
Layer 2 A127627	Sealant	Homogeneous Black Non-fibrous Bound			80% 20%	Binder Tar	None Detected
797-1B Layer 1 A127628	Concrete Coping	Homogeneous Gray Non-fibrous Bound			80% 20%	Silicates Binder	None Detected
Layer 2 A127628	Sealant	Homogeneous Black Non-fibrous Bound			80% 20%	Binder Tar	None Detected
797-2A A127629	Roof Vent Sealant	Homogeneous Silver,Black Fibrous Bound			80% 10%	Tar Paint	**10% Chrysotile**
797-2B A127630	Sample Not Analyzed per COC						
797-3A A127631	Roof Flashing Sealant	Homogeneous Black,Silver Fibrous Bound	5%	Cellulose	85% 10%	Binder Tar	None Detected
797-3B A127632	Roof Flashing Sealant	Homogeneous Black,Silver Fibrous Bound	5%	Cellulose	85% 10%	Binder Tar	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-4A Layer 1 A127633	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127633	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
797-4B Layer 1 A127634	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127634	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
797-5A Layer 1 A127635	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected
Layer 2 A127635	Roof Flashing	Homogeneous Black Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected
797-5B Layer 1 A127636	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 2 A127636	Roof Flashing	Homogeneous Black Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected
797-6A A127637	Roof Vent Sealant	Homogeneous Gray,White Fibrous Bound	5%	Cellulose	85% 8% 2%	Caulk Paint Tar	None Detected
797-6B A127638	Roof Vent Sealant	Homogeneous Gray,White Fibrous Bound	5%	Cellulose	85% 8% 2%	Caulk Paint Tar	None Detected
797-7A Layer 1 A127639	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected
Layer 2 A127639	Roof Flashing	Homogeneous Black Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected
797-7B Layer 1 A127640	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected
Layer 2 A127640	Roof Flashing	Homogeneous Black Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-8A Layer 1 A127641	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127641	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127641	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-8B Layer 1 A127642	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127642	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127642	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-9A Layer 1 A127643	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected

eurofins | CEI

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		 Non-Fibrous		ASBESTOS %
Layer 2 A127643	Roof Flashing	Homogeneous Black,Gray Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected
797-9B Layer 1 A127644	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	85% 10%	Paint Silicates	None Detected
Layer 2 A127644	Roof Flashing	Homogeneous Black,Gray Fibrous Bound	10%	Cellulose	70% 10% 10%	Tar Silicates Binder	None Detected
797-10A Layer 1 A127645	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127645	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127645	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-10B Layer 1 A127646	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 2 A127646	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127646	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-11A A127647	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	65% 13% 2%	Tar Binder Paint	None Detected
797-11B A127648	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	65% 13% 2%	Tar Binder Paint	None Detected
797-12A Layer 1 A127649	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127649	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127649	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-12B Layer 1 A127650	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127650	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127650	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-13A A127651	Roof Flashing Sealant	Homogeneous Silver Fibrous Bound	5%	Cellulose	95%	Binder	None Detected
797-13B A127652	Roof Flashing Sealant	Homogeneous Silver Fibrous Bound	5%	Cellulose	95%	Binder	None Detected
797-14A A127653	Roof Flashing	Heterogeneous Black,Gray Fibrous Bound	15%	Cellulose	60% 15% 10%	Tar Gravel Binder	None Detected
797-14B A127654	Roof Flashing	Heterogeneous Black,Gray Fibrous Bound	15%	Cellulose	60% 15% 10%	Tar Gravel Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-15A Layer 1 A127655	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127655	Insulation	Homogeneous Cream Non-fibrous Bound			100%	Foam	None Detected
Layer 3 A127655	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-15B Layer 1 A127656	Roofing Material Core	Heterogeneous Black Fibrous Bound	15%	Cellulose	85%	Tar	None Detected
Layer 2 A127656	Insulation	Homogeneous Cream Non-fibrous Bound			100%	Foam	None Detected
Layer 3 A127656	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-16A A127657	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	65% 13% 2%	Tar Gravel Paint	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-16B A127658	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	65% 13% 2%	Tar Gravel Paint	None Detected
797-17A Layer 1 A127659	Roofing Material Core	Homogeneous Black,Gray Fibrous Bound	20%	Cellulose	60% 10% 10%	Tar Silicates Binder	None Detected
Layer 2 A127659	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-17B Layer 1 A127660	Roofing Material Core	Homogeneous Black,Gray Fibrous Bound	20%	Cellulose	60% 10% 10%	Tar Silicates Binder	None Detected
Layer 2 A127660	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-18A A127661	Coping Sealant	Heterogeneous Black,Tan Fibrous Bound			45% 30% 15%	Caulk Silicates Binder	**10% Chrysotile**
797-18B A127662	Sample Not Analyzed per COC						
797-19A A127663	Roof Flashing	Homogeneous Black,Gray Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-19B A127664	Roof Flashing	Homogeneous Black,Gray Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected
797-20A Layer 1 A127665	Roofing Material Core	Heterogeneous Black Fibrous Bound	15% 10%	Cellulose Fiberglass	65% 10%	Tar Binder	None Detected
Layer 2 A127665	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
797-20B Layer 1 A127666	Roofing Material Core	Heterogeneous Black Fibrous Bound	15% 10%	Cellulose Fiberglass	65% 10%	Tar Binder	None Detected
Layer 2 A127666	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
797-21A A127667	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected
797-21B Layer 1 A127668	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	75% 20%	Paint Silicates	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 2 A127668	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected
797-22A A127669	Exterior Stucco	Homogeneous Gray Non-fibrous Bound	<1%	Cellulose	85% 15%	Silicates Silicates	None Detected
797-22B A127670	Exterior Stucco	Homogeneous Gray Non-fibrous Bound	<1%	Cellulose	85% 15%	Silicates Silicates	None Detected
797-22C A127671	Exterior Stucco	Homogeneous Gray Non-fibrous Bound	<1%	Cellulose	85% 15%	Silicates Silicates	None Detected
797-23A Layer 1 A127672	Roofing Material Core	Heterogeneous Black Fibrous Bound	15% 10%	Cellulose Fiberglass	65% 10%	Tar Binder	None Detected
Layer 2 A127672	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
Layer 3 A127672	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-23B	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127673		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127673		Yellow					
		Fibrous					
		Bound					
Layer 3	Insulation	Homogeneous	70%	Cellulose	15%	Perlite	None Detected
A127673		Brown	5%	Fiberglass	10%	Binder	
		Fibrous					
		Bound					
797-24A	Silver Paint	Homogeneous	5%	Cellulose	75%	Paint	None Detected
Layer 1		Silver			20%	Silicates	
A127674		Fibrous					
		Bound					
Layer 2	Roof Flashing	Homogeneous	10%	Cellulose	60%	Tar	None Detected
A127674		Black	10%	Synthetic Fiber	10%	Gravel	
		Fibrous			10%	Binder	
		Bound					
797-24B	Silver Paint	Homogeneous	5%	Cellulose	75%	Paint	None Detected
Layer 1		Silver			20%	Silicates	
A127675		Fibrous					
		Bound					
Layer 2	Roof Flashing	Homogeneous	10%	Cellulose	60%	Tar	None Detected
A127675		Black	10%	Synthetic Fiber	10%	Gravel	
		Fibrous			10%	Binder	
		Bound					

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-25A	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127676		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127676		Yellow					
		Fibrous					
		Bound					
797-25B	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127677		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127677		Yellow					
		Fibrous					
		Bound					
797-26A	Coping Sealant	Heterogeneous	5%	Cellulose	65%	Tar	None Detected
Layer 1		Black,Silver			15%	Binder	
A127678		Fibrous			15%	Metal Foil	
		Bound					
Layer 2	Coping Sealant	Homogeneous			100%	Caulk	None Detected
A127678		White					
		Non-fibrous					
		Bound					
797-26B	Coping Sealant	Heterogeneous	5%	Cellulose	65%	Tar	None Detected
Layer 1		Black,Silver			15%	Binder	
A127679		Fibrous			15%	Metal Foil	
		Bound					

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 2 A127679	Coping Sealant	Homogeneous White Non-fibrous Bound			100%	Caulk	None Detected
797-27A Layer 1 A127680	Expansion Joint	Heterogeneous Gray Fibrous Bound			60% 25% 13%	Caulk Silicates Binder	**2% Chrysotile**
Layer 2 A127680	Foam	Homogeneous Gray Non-fibrous Bound			100%	Foam	None Detected
797-27B A127681	Sample Not Analyzed per COC						
797-28A Layer 1 A127682	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	75% 20%	Paint Silicates	None Detected
Layer 2 A127682	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected
797-28B Layer 1 A127683	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	75% 20%	Paint Silicates	None Detected
Layer 2 A127683	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-29A	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127684		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127684		Yellow					
		Fibrous					
		Bound					
797-29B	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127685		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127685		Yellow					
		Fibrous					
		Bound					
797-30A	Coping Sealant	Homogeneous			95%	Caulk	None Detected
A127686		Red			3%	Tar	
		Non-fibrous			2%	Non-Fibrous	
		Bound				Debris	
797-30B	Coping Sealant	Homogeneous			95%	Caulk	None Detected
A127687		Red			3%	Tar	
		Non-fibrous			2%	Non-Fibrous	
		Bound				Debris	
797-31A	Coping Sealant	Homogeneous	20%	Cellulose	50%	Caulk	None Detected
Layer 1		Black,White			20%	Tar	
A127688		Fibrous			10%	Binder	
		Bound					

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 2 A127688	Coping Sealant	Homogeneous Gray Non-fibrous Bound			95% 5%	Caulk Paint	None Detected
797-31B Layer 1 A127689	Coping Sealant	Homogeneous Black,White Fibrous Bound	20%	Cellulose	50% 20% 10%	Caulk Tar Binder	None Detected
Layer 2 A127689	Coping Sealant	Homogeneous Gray Non-fibrous Bound			95% 5%	Caulk Paint	None Detected
797-32A A127690	Roof Sealant	Homogeneous White Non-fibrous Bound			97% 3%	Caulk Paint	None Detected
797-32B A127691	Roof Sealant	Homogeneous White Non-fibrous Bound			97% 3%	Caulk Paint	None Detected
797-33A Layer 1 A127692	Silver Paint	Homogeneous Silver Fibrous Bound	5%	Cellulose	75% 20%	Paint Silicates	None Detected
Layer 2 A127692	Roof Flashing	Homogeneous Black Fibrous Bound	10% 10%	Cellulose Synthetic Fiber	60% 10% 10%	Tar Gravel Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-33B	Silver Paint	Homogeneous	5%	Cellulose	75%	Paint	None Detected
Layer 1		Silver			20%	Silicates	
A127693		Fibrous					
		Bound					
Layer 2	Roof Flashing	Homogeneous	10%	Cellulose	60%	Tar	None Detected
A127693		Black	10%	Synthetic Fiber	10%	Gravel	
		Fibrous			10%	Binder	
		Bound					
797-34A	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127694		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127694		Yellow					
		Fibrous					
		Bound					
Layer 3	Insulation	Homogeneous	70%	Cellulose	15%	Perlite	None Detected
A127694		Brown	5%	Fiberglass	10%	Binder	
		Fibrous					
		Bound					
797-34B	Roofing Material Core	Heterogeneous	15%	Cellulose	65%	Tar	None Detected
Layer 1		Black	10%	Fiberglass	10%	Binder	
A127695		Fibrous					
		Bound					
Layer 2	Insulation	Homogeneous	95%	Fiberglass	5%	Binder	None Detected
A127695		Yellow					
		Fibrous					
		Bound					

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
Layer 3 A127695	Insulation	Homogeneous Brown Fibrous Bound	70% 5%	Cellulose Fiberglass	15% 10%	Perlite Binder	None Detected
797-35A A127696	Roof Flashing	Heterogeneous Black,Brown Fibrous Bound	25%	Cellulose	65% 10%	Tar Binder	None Detected
797-35B A127697	Roof Flashing	Heterogeneous Black,Brown Fibrous Bound	25%	Cellulose	65% 10%	Tar Binder	None Detected
797-36A Layer 1 A127698	Roofing Material Core	Heterogeneous Black Fibrous Bound	10% 5%	Fiberglass Fiberglass	85%	Tar	None Detected
Layer 2 A127698	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected
797-36B Layer 1 A127699	Roofing Material Core	Heterogeneous Black Fibrous Bound	10% 5%	Fiberglass Fiberglass	85%	Tar	None Detected
Layer 2 A127699	Insulation	Homogeneous Yellow Fibrous Bound	95%	Fiberglass	5%	Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI Engineering, Consulting, Testing
37483 Interchange Dr.
Farmington Hills, MI 48335

Lab Code: A208534
Date Received: 07-07-20
Date Analyzed: 07-08-20
Date Reported: 07-09-20

Project: 0166-1322-1 797 Central Street, Wyandotte, Michigan 48192

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
797-37A A127700	Drain Pan Sealant	Homogeneous Gray Fibrous Bound	5%	Cellulose	90% 5%	Binder Tar	None Detected
797-37B A127701	Drain Pan Sealant	Homogeneous Gray Fibrous Bound	5%	Cellulose	90% 5%	Binder Tar	None Detected
797-38A A127702	Fire Proofing	Homogeneous White Fibrous Loosely Bound	90%	Fiberglass	8% 2%	Binder Non-Fibrous Debris	None Detected
797-38B A127703	Fire Proofing	Homogeneous White Fibrous Loosely Bound	90%	Fiberglass	8% 2%	Binder Non-Fibrous Debris	None Detected
797-38C A127704	Fire Proofing	Homogeneous White Fibrous Loosely Bound	90%	Fiberglass	8% 2%	Binder Non-Fibrous Debris	None Detected

eurofins | CEI

LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Information provided by customer includes customer sample ID and sample description.

ANALYST: Michael Hoxie
Michael Hoxie

APPROVED BY: Tianbao Bai
Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP TESTING
NVLAP LAB CODE 101768-0

APPENDIX C – ASBESTOS BULK SAMPLE LOG/CHAIN OF CUSTODY

A208534 (78)
A127627-A127704

intertek psi

1938 Franklin Street, Suite 101
Detroit, Michigan 48207
Phone: 248-957-9911

CHAIN OF CUSTODY

Client Name:	**Downriver Utility Waste Authority**	**Date of Survey:**	**6/29/2020 and 7/1/2020**
Address:	**797 Central Street,**	**Project Name:**	**797 Central Street, Wyandotte, Michigan 48192**
City, St., Zip	**Wyandotte, Michigan 48192**	**Project Number:**	**0166-1322-1**
Phone/Fax:		**Contact Person:**	**Jim Boland/Nick George/Matt Sherrard**

TURN AROUND TIME

Rush		24 Hour		**Asbestos:**	Bulk	X	Wipe		Pnt. Cnt.		PCM						
48 Hour	X	72 Hour		**Lead:**	Bulk		Wipe		Air		Paint		Soil				
Other		TTP	X	**Mold:**	Bulk		Tape		BioCell		BioSis		Other				
				TEM:	AHERA	7400		Bulk/NOB		EPA	Level II						

Analytical Method(s) Requested:

Lab ID#	Client ID #	Material/Description	Volume	Area	Results
	797-1A-B	Concrete Coping w/Sealant (Gray/Black)			
	797-2A-B	Roof Vent Sealant (Silver/Black)			
	797-3A-B	Roof Flashing Sealant (Black/Silver)			
	797-4A-B	Roofing Material Core (Black/Yellow)			
	797-5A-B	Roof Flashing (Black/Silver)			
	797-6A-B	Roof Vent Sealant (Gray/White)			
	797-7A-B	Roof Flashing (Black)			
	797-8A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-9A-B	Roof Flashing (Black/Gray)			
	797-10A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-11A-B	Roof Flashing (Black)			
	797-12A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-13A-B	Roof Flashing Sealant (Silver)			
	797-14A-B	Roof Flashing (Black/Gray)			
	797-15A-B	Roofing Material Core (Black/Cream/Brown)			
	797-16A-B	Roof Flashing (Black)			
	797-17A-B	Roofing Material Core (Black/Gray)			
	797-18A-B	Coping Sealant (Black/Tan)			
	797-19A-B	Roof Flashing (Black/Gray)			
	797-20A-B	Roofing Matrial Core (Black/Yellow)			

EUROFINS CEI, LLC
SAMPLES ACCEPTED
JB

Relinquished By: _____ **Received By:** _____ **Relinquished By:** _____ **By:** _____

Date: 7-2-2020 **Date:** 7/7 9:20 **Date:** _____ **Date:** _____

AZ8534

intertek psi

1938 Franklin Street, Suite 101
Detroit, Michigan 48207
Phone: 248-957-9911

CHAIN OF CUSTODY

Client Name:	**Downriver Utility Waste Authority**	**Date of Survey:**	**6/29/2020 and 7/1/2020**
Address:	**797 Central Street,**	**Project Name:**	**797 Central Street, Wyandotte, Michigan 48192**
City, St., Zip	**Wyandotte, Michigan 48192**	**Project Number:**	**0166-1322-1**
Phone/Fax:		**Contact Person:**	**Jim Boland/Nick George/Matt Sherrard**

TURN AROUND TIME

Rush		24 Hour		**Asbestos:**	Bulk	X	Wipe		Pnt. Cnt.		PCM						
48 Hour	X	72 Hour		**Lead:**	Bulk		Wipe		Air		Paint		Soil				
Other		TTP	X	**Mold:**	Bulk		Tape		BioCell		BioSis		Other				
				TEM:	AHERA	7400		Bulk/NOB		EPA	Level II						

Analytical Method(s) Requested:

Lab ID#	Client ID #	Material/Description	Volume	Area	Results
	797-21-A-B	Roof Flashing (Black/Silver)			
	797-22A-C	Exterior Plaster (Gray)			
	797-23A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-24A-B	Roof Flashing (Black/Silver)			
	797-25A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-26A-B	Coping Sealant (Black/Silver and White)			
	797-27A-B	Expansion Joint w/Foam (Gray)			
	797-28A-B	Roof Flashing (Black/Silver)			
	797-29A-B	Roofing Material Core (Black/Yellow)			
	797-30A-B	Coping Sealant (Red)			
	797-31A-B	Coping Sealant (Black/Gray)			
	797-32A-B	Roof Sealant (White)			
	797-33A-B	Roof Flashing (Black/Silver)			
	797-34A-B	Roofing Material Core (Black/Yellow/Brown)			
	797-35A-B	Roof Flashing (Black/Brown)			
	797-36A-B	Roofing Material Core (Black/Yellow)			
	797-37A-B	Drain Pan Sealant (Gray)			
	797-38A-C	Fire Proofing (White)			

Relinquished By: _____ **Received By:** _____ **Relinquished By:** _____ **By:** _____

Date: 7-2-2020 **Date:** 7/7 9:20 **Date:** _____ **Date:** _____

APPENDIX D – PHOTOGRAPHIC LOG

Downriver Utility Waste Authority - Roof
797 Central Street,
Wyandotte, Michigan 48192

View of Typical Roof Vents

View of Roof Vent Sealant (Silver/Black)

View of Section T.T. Coping and Sealant

View of Coping Sealant (Black/Tan)

View of Lower Hallway Roof Section

View of Expansion Joint w/Foam (Gray)

Additional View of Expansion Joint w/Foam

View of Typical Lead Roof Vent

PSI Project No.:
«Project_Number»

Prepared by:
Adam Smak

APPENDIX E – OSHA ABATEMENT PROCEDURES

Subpart Z—Toxic and Hazardous Substances

AUTHORITY: Sec. 107, Contract Work Hours and Safety Standards Act (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order Nos. 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736), 1–90 (55 FR 9033), or 6–96 (62 FR 111), as applicable; 29 CFR part 1911.
Section 1926.1102 not issued under 29 U.S.C. 655 or 29 CFR part 1911; also issued under 5 U.S.C. 553.
SOURCE: 58 FR 35190, June 30, 1993, unless otherwise noted.

§ 1926.1100 [Reserved]

§ 1926.1101 Asbestos.

(5) *Specific control methods for Class I work.* In addition, Class I asbestos work shall be performed using one or more of the following control methods pursuant to the limitations stated below:
(i) Negative Pressure Enclosure (NPE) systems: NPE systems may be used where the configuration of the work area does not make the erection of the enclosure infeasible, with the following specifications and work practices.
(A) *Specifications:*
(*1*) The negative pressure enclosure (NPE) may be of any configuration,
(*2*) At least 4 air changes per hour shall be maintained in the NPE,
(*3*) A minimum of ´0.02 column inches of water pressure differential, relative to outside pressure, shall be maintained within the NPE as evidenced by manometric measurements,
(*4*) The NPE shall be kept under negative pressure throughout the period of its use, and
(*5*) Air movement shall be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or a collection device.
(B) *Work Practices:*
(*1*) Before beginning work within the enclosure and at the beginning of each shift, the NPE shall be inspected for breaches and smoke-tested for leaks, and any leaks sealed.
(*2*) Electrical circuits in the enclosure shall be deactivated, unless equipped with ground-fault circuit interrupters.
(ii) Glove bag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:
(A) *Specifications:*
(*1*) Glovebags shall be made of 6 mil thick plastic and shall be seamless at the bottom.
(*2*) Glovebags used on elbows and other connections must be designed for that purpose and used without modifications.
(B) *Work Practices:*
(*1*) Each glovebag shall be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.
(*2*) Glovebags shall be smoke-tested for leaks and any leaks sealed prior to use.
(*3*) Glovebags may be used only once and may not be moved.
(*4*) Glovebags shall not be used on surfaces whose temperature exceeds 150 °F.
(*5*) Prior to disposal, glovebags shall be collapsed by removing air within them using a HEPA vacuum.
(*6*) Before beginning the operation, loose and friable material adjacent to the glovebag/box operation shall be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact,
(*7*) Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which shall withstand pressure of ACM waste and water without losing its integrity:
(*8*) Sliding valve or other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected:
(*9*) At least two persons shall perform Class I glovebag removal operations.
(iii) *Negative Pressure Glove Bag Systems.*
Negative pressure glove bag systems may be used to remove ACM or PACM from piping.
(A) *Specifications:* In addition to specifications for glove bag systems above, negative pressure glove bag systems shall attach HEPA vacuum systems or other devices to bag to prevent collapse during removal.
(B) *Work Practices:* (*1*) The employer shall comply with the work practices for glove bag systems in paragraph (g)(5)(ii)(B)(*4*) of this section.
(*2*) The HEPA vacuum cleaner or other device used to prevent collapse of bag during removal shall run continually during the operation until it is completed at which time the bag shall be collapsed prior to removal of the bag from the pipe.
(*3*) Where a separate waste bag is used along with a collection bag and discarded after one use, the collection bag may be reused if rinsed clean with amended water before reuse.
(iv) Negative Pressure Glove Box Systems: Negative pressure glove boxes may be used to remove ACM or PACM from pipe runs with the following specifications and work practices.
(A) *Specifications:*
(*1*) Glove boxes shall be constructed with rigid sides and made from metal or other material which can withstand the weight of the ACM and PACM and water used during removal:
(*2*) A negative pressure generator shall be used to create negative pressure in the system:
(*3*) An air filtration unit shall be attached to the box:
(*4*) The box shall be fitted with gloved apertures:
(*5*) An aperture at the base of the box shall serve as a bagging outlet for waste ACM and water:
(*6*) A back-up generator shall be present on site:
(*7*) Waste bags shall consist of 6 mil thick plastic double-bagged before they are filled or plastic thicker than 6 mil.
(B) *Work practices:*
(*1*) At least two persons shall perform the removal:
(*2*) The box shall be smoke-tested for leaks and any leaks sealed prior to each use.
(*3*) Loose or damaged ACM adjacent to the box shall be wrapped and sealed in two layers of 6 mil plastic prior to the job, or otherwise made intact prior to the job.
(*4*) A HEPA filtration system shall be used to maintain pressure barrier in box.
(v) *Water Spray Process System.* A water spray process system may be used for removal of ACM and PACM from cold line piping if, employees carrying out such process have completed a 40-hour separate training course in its use, in addition to training required for employees performing Class I work. The system shall meet the following specifications and shall be performed by employees using the following work practices.
(A) *Specifications:*
(*1*) Piping shall be surrounded on 3 sides by rigid framing,
(*2*) A 360 degree water spray, delivered through nozzles supplied by a high pressure separate water line, shall be formed around the piping.
(*3*) The spray shall collide to form a fine aerosol which provides a liquid barrier between workers and the ACM and PACM.
(B) *Work Practices:*
(*1*) The system shall be run for at least 10 minutes before removal begins.
(*2*) All removal shall take place within the water barrier.
(*3*) The system shall be operated by

at least three persons, one of whom shall not perform removal, but shall check equipment, and ensure proper operation of the system.
(*4*) After removal, the ACM and PACM shall be bagged while still inside the water barrier.
(vi) A small walk-in enclosure which accommodates no more than two persons
(mini-enclosure) may be used if the disturbance or removal can be completely
contained by the enclosure with the following specifications and work practices.
(A) *Specifications:*
(*1*) The fabricated or job-made enclosure shall be constructed of 6 mil plastic or equivalent:
(*2*) The enclosure shall be placed under negative pressure by means of a HEPA filtered vacuum or similar ventilation
unit:
(B) *Work practices:*
(*1*) Before use, the mini-enclosure shall be inspected for leaks and smoketested
to detect breaches, and any breaches sealed.
(*2*) Before reuse, the interior shall be completely washed with amended water and HEPA-vacuumed..
(*3*) During use, air movement shall be directed away from the employee's breathing zone within the mini-enclosure.
(6) *Alternative control methods for Class I work.* Class I work may be performed using a control method which is not referenced in paragraph (g)(5) of this section, or which modifies a control method referenced in paragraph (g)(5)of this section, if the following provisions are complied with:
(i) The control method shall enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.
(ii) A certified industrial hygienist or licensed professional engineer who is also qualified as a project designer as defined in paragraph (b) of this section, shall evaluate the work area, the projected
work practices and the engineering controls and shall certify in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements
of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria in paragraph (g)(4)(ii)(B) of this section.
(A) Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less , the evaluation required
in paragraph (g)(6) of this section may be performed by a ''competent person'', and may omit consideration of perimeter or clearance monitoring otherwise required.
(B) The evaluation of employee exposure
required in paragraph (g)(6) of this section, shall include and be based on sampling and analytical data representing
employee exposure during the use of such method under worstcase conditions and by employees whose training and experience are equivalent to employees who are to perform the current job.
(iii) Before work which involves the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material is begun
using an alternative method which has been the subject of a paragraph (g)(6) of this section required evaluation and certification, the employer shall send a copy of such evaluation and certification to the national office of OSHA, Office of Technical Support, Room N3653, 200 Constitution Avenue, NW, Washington, DC 20210. The submission shall not constitute approval by OSHA.
(7) Work Practices and Engineering Controls for Class II work.
(i) All Class II work shall be supervised by a competent person as defined in paragraph (b) of this section.
(ii) For all indoor Class II jobs, where the employer has not produced a negative
exposure assessment pursuant to paragraph (f)(2)(iii) of this section, or where during the job, changed conditions
indicate there may be exposure above the PEL or where the employer does not remove the ACM in a substantially
intact state, the employer shall use one of the following methods to ensure
that airborne asbestos does not migrate from the regulated area;
(A) Critical barriers shall be placed over all openings to the regulated area; or,
(B) The employer shall use another barrier or isolation method which prevents
the migration of airborne asbestos from the regulated area, as verified by perimeter area monitoring or clearance monitoring which meets the criteria set out in paragraph (g)(4)(ii)(B) of this section.
(C) Impermeable dropcloths shall be placed on surfaces beneath all removal activity;
(iii) [Reserved]
(iv) All Class II asbestos work shall be performed using the work practices and requirements set out above in paragraph (g)(1) (i) through (g)(1)(iii) of this section.
(8) *Additional Controls for Class II work.* Class II asbestos work shall also be performed by complying with the work practices and controls designated for each type of asbestos work to be performed, set out in this paragraph. Where more than one control method may be used for a type of asbestos work, the employer may choose one or a combination of designated control methods. Class II work also may be performed using a method allowed for Class I work, except that glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed.
(i) For removing vinyl and asphalt flooring materials which contain ACM or for which in buildings constructed no later than 1980, the employer has not verified the absence of ACM pursuant
to paragraph (g)(8)(i)(I) of this section. The employer shall ensure that employees comply with the following work practices and that employees are trained in these practices pursuant to paragraph (k)(9):
(A) Flooring or its backing shall not be sanded.
(B) Vacuums equipped with HEPA filter,
disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.
(C) Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of resilient sheet floor material is prohibited.
(D) All scraping of residual adhesive and/or backing shall be performed using wet methods.
(E) Dry sweeping is prohibited.
(F) Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of paragraph (g)(5)(i) of this section.
(G) Tiles shall be removed intact, unless the employer demonstrates that intact removal is not possible.
(H) When tiles are heated and can be removed intact, wetting may be omitted.
(I) Resilient flooring material including associated mastic and backing
shall be assumed to be asbestos-containing
unless an industrial hygienist

determines that it is asbestos-free using recognized analytical techniques.
(ii) For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed:
(A) Roofing material shall be removed in an intact state to the extent feasible.
(B) Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.
(C) Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
(D) When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.
(E) Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist:
(*1*) Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.
(*2*) Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.
(F) Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.
(G) Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.
(H) Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material nonintact are used to remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.
(iii) When removing cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors (other than roofs, where paragraph (g)(8)(ii) of this section applies) the employer shall ensure that the following work practices are followed:
(A) Cutting, abrading or breaking siding, shingles, or transite panels, shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.
(B) Each panel or shingle shall be sprayed with amended water prior to removal.
(C) Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.
(D) Nails shall be cut with flat, sharp instruments.
(iv) When removing gaskets containing ACM, the employer shall ensure that the following work practices are followed:
(A) If a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be undertaken within a glovebag as described in paragraph (g)(5)(ii) of this section.
(B) [Reserved]
(C) The gasket shall be immediately placed in a disposal container.
(D) Any scraping to remove residue must be performed wet.
(v) When performing any other Class II removal of asbestos containing material for which specific controls have not been listed in paragraph (g)(8)(iv) (A) through (D) of this section, the employer shall ensure that the following work practices are complied with.
(A) The material shall be thoroughly wetted with amended water prior to and during its removal.
(B) The material shall be removed in an intact state unless the employer demonstrates that intact removal is not possible.
(C) Cutting, abrading or breaking the material shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release are not feasible.
(D) Asbestos-containing material removed, shall be immediately bagged or wrapped, or kept wetted until transferred to a closed receptacle, no later than the end of the work shift.
(vi) *Alternative Work Practices and Controls.* Instead of the work practices and controls listed in paragraph (g)(8)(i) through (v) of this section, the employer may use different or modified engineering and work practice controls if the following provisions are complied with.
(A) The employer shall demonstrate by data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the PELs under any anticipated circumstances.
(B) A competent person shall evaluate the work area, the projected work practices and the engineering controls, and shall certify in writing, that the different or modified controls are adequate to reduce direct and indirect employee exposure to below the PELs under all expected conditions of use and that the method meets the requirements of this standard. The evaluation shall include and be based on data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by employees whose training and experience are equivalent to employees who are to perform the current job.
(9) *Work Practices and Engineering Controls for Class III asbestos work.* Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work and to bystander employees.
(i) The work shall be performed using wet methods.
(ii) To the extent feasible, the work

shall be performed using local exhaust ventilation.
(iii) Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, the employer shall use impermeable dropcloths, and shall isolate the operation using mini-enclosures or glove bag systems pursuant to paragraph (g)(5) of this section or another isolation method.
(iv) Where the employer does not produce a ''negative exposure assessment'' for a job, or where monitoring results show the PEL has been exceeded, the employer shall contain the area using impermeable dropcloths and plastic barriers or their equivalent, or shall isolate the operation using a control system listed in and in compliance with paragraph (g)(5) of this section.
(v) Employees performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where the employer does not produce a ''negative exposure assessment'' or where monitoring results show a PEL has been exceeded, shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.
(10) *Class IV asbestos work.* Class IV asbestos jobs shall be conducted by employees trained pursuant to the asbestos awareness training program set out in paragraph (k)(9) of this section. In addition, all Class IV jobs shall be conducted in conformity with the requirements set out in paragraph (g)(1) of this section, mandating wet methods, HEPA vacuums, and prompt clean up of debris containing ACM or PACM.
(i) Employees cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.
(ii) Employers of employees who clean up waste and debris in, and employers in control of, areas where friable thermal system insulation or surfacing material is accessible, shall assume that such waste and debris contain asbestos.
(11) *Alternative methods of compliance for installation, removal, repair, and maintenance of certain roofing and pipeline coating materials.* Notwithstanding any other provision of this section, an employer who complies with all provisions of this paragraph (g)(11) when installing, removing, repairing, or maintaining intact pipeline asphaltic wrap, or roof flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds shall be deemed to be in compliance with this section. If an employer does not comply with all provisions of this paragraph (g)(11) or if during the course of the job the material does not remain intact, the provisions of paragraph (g)(8) of this section apply instead of this paragraph (g)(11).
(i) Before work begins and as needed during the job, a competent person who is capable of identifying asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate such hazards, shall conduct an inspection of the worksite and determine that the roofing material is intact and will likely remain intact.
(ii) All employees performing work covered by this paragraph (g)(11) shall be trained in a training program that meets the requirements of paragraph (k)(9)(viii) of this section.
(iii) The material shall not be sanded, abraded, or ground. Manual methods which do not render the material non-intact shall be used.
(iv) Material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist. All such material shall be removed from the roof as soon as is practicable, but in any event no later than the end of the work shift.
(v) Where roofing products which have been labeled as containing asbestos pursuant to paragraph (k)(8) of this section are installed on non-residential roofs during operations covered by this paragraph (g)(11), the employer shall notify the building owner of the presence and location of such materials no later than the end of the job.
(vi) All removal or disturbance of pipeline asphaltic wrap shall be performed using wet methods.
(h) *Respiratory protection.* (1) *General.* For employees who use respirators required by this section, the employer must provide respirators that comply with the requirements of this paragraph. Respirators must be used during:
(i) Class I asbestos work.
(ii) Class II asbestos work when ACM is not removed in a substantially intact state.

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included: Removal of damaged turf and plantings and replacement of materials damaged by the Contractor during the performance of Work is included in this Section.

B. Repair of damaged concrete, damaged by the contractor during the performance of the Work.

C. Repair of damaged hot mix asphalt paving, damaged by the contractor during the performance of the Work.

[NOTE: Contractor is expected to protect the concrete and asphalt paving from damage from construction traffic and materials.]

1.02 QUALITY ASSURANCE

A. Qualifications of Workmen: Provide at least one person who shall be present at all times during execution of this portion of the Work, who shall be thoroughly familiar with the type of materials being installed and the proper materials and methods for their installation, and who shall direct all work performed under this Section.

B. Standards:

1. All plants and planting material shall meet or exceed the specifications of federal, state, and county laws requiring inspection for plant disease and insect control.

2. Quality and size shall conform to the current edition of *Horticultural Standards* for number one grade nursery stock as adopted by the American Association of Nurserymen.

3. State of Michigan, Department of Transportation (MDOT) Standards, latest edition for Asphalt Repair Work.

4. American concrete Institute (ACI) Standards for Concrete Work

1.03 SUBMITTALS

A. General: Comply with the provisions of Section 01300.

1.04 PRODUCT HANDLING

A. Delivery and Storage:

1. Deliver all items to the job site in their original containers with all labels intact and legible.

2. Use all means necessary to protect plant materials before, during, and after installation and to protect the work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's representative and at no additional cost to the Owner.

PART TWO - PRODUCTS

2.01 TOPSOIL

A. Protect structures, utilities, roads, trees and vegetation from damages caused by landscaping operations.

B. Topsoil required to complete the work of planting shall be natural, friable topsoil, characteristic of representative soils in the vicinity that produce heavy growths of crops, grass or other vegetation. It shall not be extremely acidic nor alkaline nor contain toxic substances, harmful to plant growth. All topsoil used for this project shall be without admixtures of subsoil; free from clay lumps, stones, roots, debris and other objects over one inch in diameter.

2.02 FERTILIZER

A. Fertilizer shall meet the applicable sections of the State Highway Specifications.

B. Fertilizer shall be uniform in composition, free flowing and suitable for application with approved equipment.

2.03 SOD

A. Product Delivery and Handling:

1. Sod shall be placed within 48 hours of cutting and shall be protected and maintained during transit or storage on site as necessary to ensure vigorous growth after placement.

2. Sod remaining on the site unplaced after 48 hours will be rejected. All yellowing or otherwise discolored sod will be rejected.

3. The Contractor shall inform the Owner's representative 24 hours in advance of any delivery of sod.

B. Description

1. Sod shall be well established and shall contain all the dense root system of the grasses and shall exhibit vigorous healthy root growth free of noxious weeds, objectionable grasses, grubs, diseases or injurious insects.

2. Sod shall meet the applicable sections of the State Highway Specifications unless specifically called for otherwise by the consultant.

2.04 CONCRETE

A. Concrete shall be commercially produced material and shall be air entrained, with a minimum compressive strength of 3500 psi at 28 days.

B. Accessories such as expansion joint materials and tie bars shall be installed in the repaired concrete to match the materials damaged during the work.

C. All products shall meet current ACI and MDOT standards for new construction.

D. Concrete curing compound shall be white pigmented, free of paraffin or petroleum, Type

2 curing compound conforming to AASHTO M148 “Standard Specification for Liquid Membrane – Forming Compounds”.

2.05 HOT MIX ASPHALT

A. Hot mix asphalt shall be commercially produced material and shall be an 1100 or 1300 mix design for both the bottom (leveling course) and the top (wearing course) materials.

B. Tack coat shall be SS-1h material.

2.06 COLD MIX ASPHALT

A. Cold mix asphalt materials for contained holes shall be POUR-PATCH as manufactured by Revere Products (800) 343-7318.

B. Cold mix asphalt materials for depressions and chipped out areas shall be EPOXI-TAR PATCH as manufactured by Revere Products (800) 343-7318.

PART THREE - EXECUTION

3.01 INSPECTION

A. Ground preparation shall not be started until all stones, debris, and similar material larger than "1" in diameter have been removed, depressions and ruts filled and the entire area to be seeded and/or sodded has been accepted by the consultant.

3.02 PROTECTION OF PERSON AND PROPERTY

A. Protection of Existing Plant Materials

1. Existing trees, shrubs, and plant materials to remain shall be protected by acceptable means.

2. Damage to above plant material shall be repaired by qualified nurserymen or replaced with approved equal material.

3.03 SODDING

A. General lawn repair shall be performed by personnel familiar with the accepted procedures of planting and under the supervision of a qualified planting foreman.

B. Preparation of Sod:

1. Immediately prior, but not in excess of 24 hours before sod is to be placed, the soil surface shall be worked until it is relatively free from debris, washes, gullies, clods and stones and is in satisfactory condition.

2. The surface shall be worked to depth of not less than 3" with a disc, tiller, or other equipment approved by the Owner's representative.

3. Prepared surfaces that become crusted shall be reworked to an acceptable condition for sodding.

C. Application of Fertilizer

1. Commercial fertilizer shall be applied in accordance with the State Highway Specifications.

D. Application of Sod

1. Laying: Fit sod pieces tightly together so that no joint is visible, alternate courses staggered, and tap firmly to eliminate all air pockets, provide a true and even surface and ensure knitting without displacement of sod or deformation of the surface of sodded areas. Edges shall be buried flush with adjacent soil. Following compaction, screened topsoil shall be used to fill all cracks between sod pieces. Excess soil shall be worked into grass.

2. Watering: Within five hours after the sod has been placed, it shall be saturated to a depth of 2" by watering with a fine spray.

3. Maintenance: Sod shall be watered each day such that it shall be saturated to a depth of ½" by watering with a fine spray until project is accepted by the Owner, but not for a period of more than 21 days. If after 21 days the sod is determined to not be acceptable to the Owner it shall be removed and replaced.

3.04 CONCRETE REPAIR

A. Damaged concrete shall be saw cut a distance of at least 1 foot beyond the damaged areas. The saw cut shall be at least 1/3rd the depth of the material being removed.

B. The exposed subgrade materials shall be leveled and compacted prior to the application of the new concrete. Subgrade materials shall also be moistened to prevent quick loss of moisture soon after application.

C. Forms shall be provided to maintain a clean and vertical face for the installation of new materials, as needed.

D. New joints shall be laid out in areas of replaced materials. Spacing of joints shall not exceed 15 times the depth of the concrete.

E. Expansion joint material shall be installed at all locations where the repaired concrete meets a structure, curb, sidewalk, forms an intersection or at 50-ft. intervals in a continuous slab. Expansion joint materials shall cover the entire gap of the joint. The top of the expansion joint materials must be slightly below concrete grade. Anchor expansion joint material to prevent displacing during concrete placing and finishing.

F. Materials shall be delivered and installed in accordance with the American Concrete Institute (ACI) Standards.

G. Concrete curing compound shall be applied within 1 hour or finial finishing or before the concrete has dried.

H. Apply pigmented, membrane forming, curing compound in two coats at right angles to each other. Apply compound by spray only. Rate of application shall be 200 square feet per gallon for each coat.

I. Any areas covered with compound that is disturbed during curing shall be re-sprayed immediately.

J. Contractors shall provide protection from rapid curing and from physical damage for a period of not less than 3 days following the application of the new concrete.

K. Replacement of any existing pavement marking within the repaired area will be included as part of any repair.

3.05 HOT APHALT REPAIRS - To be performed in all areas where asphalt damage occurs. (Cold patch repairs shall be installed as a temporary measure only until hot asphalt repairs can be scheduled and performed.)

A. Damaged bituminous concrete shall be saw cut a distance of at least 1 foot beyond the limits of damage. The saw cut shall be a minimum of 2" in depth, but not less than ¾ of the depth of the existing materials.

B. The old pavement shall be carefully removed for its full depth, but not less than 4 inches.

C. The exposed substrate material shall be leveled and compacted prior to the application of the new hot mix asphalt. Subgrade materials that are too sort (due to moisture) shall be allowed to dry or removed and replaced with dryer materials.

D. The exposed edges of the surrounding asphalt shall be brush coated with tack coat prior to the application of the new hot mix asphalt.

E. The hot mix asphalt shall be delivered and installed in accordance with MDOT standards. The placement of asphalt shall be as follows:

1. The top course of thickness shall be not less than 1.5" compacted thickness, nor more than 2.5" compacted thickness.

2. The bottom course thickness shall not be less than 2.0" thickness, and shall not be installed in any thickness greater than 3.0" compacted thickness for any one layer.

3. The total thickness of the pavement shall meet or exceed the surrounding materials, but shall not be less than 4.0" total compacted thickness.

4. If dirt is allowed to lie on any one layer, the layer must be swept and a tack coat applied prior to the application of a subsequent layer.

F. Contractor shall provide protection for the new hot mix asphalt for a minimum of 4 hours following application.

G. Contractor is responsible for the proper drainage of the patched asphalt. Any water in excess of 1/8" in depth following 30 minutes after a rain will be considered as unacceptable.

H. Replacement of any stripping or other pavement marking shall be included as part of the repair work.

3.06 Clean Up

A. Cleanup shall be performed on a daily basis, or more often as may be necessary. Contractor shall use a magnet bar to sweep all ground areas along and around the building where work was performed prior to leaving that area of work.

- End of Section -

PART ONE – GENERAL

1.01 DESCRIPTION

A. Section includes maintenance of unit masonry and cleaning as follows:

1. Repairing unit masonry, including replacing units for new through wall construction.
2. Saw-cut existing masonry expansion joints to widen for new sealants.

1.02 RELATED SECTIONS

A. Section 02220 – Selective Demolition

B. Section 07920 – Joint Sealants

1.03 DEFINITIONS

A. Very Low-Pressure Spray: Under 100 psi (690 kPa).

B. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

C. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

D. High-Pressure Spray: 800 to 1200 psi (5510 to 8250 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

E. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

F. Significant cracking: extent of cracking observed in sandstone which would not allow proper installation of water proofing/sealant materials.

1.04 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced, masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.

B. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that restoration and cleaning work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.

C. Restoration Worker Qualifications: Persons who are experienced in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

D. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

E. Source Limitations: Obtain each type of material for masonry restoration (cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

F. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

G. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

1. Include methods for keeping pointing mortar damp during curing period.
2. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

H. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

I. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by Owner or Owners Representative.

J. Field Samples: Prepare test areas of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Complete test sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each test area not smaller than 2 adjacent whole units or approximately 32 inches (1200 mm) in least dimension. Perform test sample areas in existing walls at areas as directed by Owners Representative unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

   a. Stone Patching:
      1) Provide at two (2) areas, minimum 1 ft x 1ft, to determine the required patching material color and texture. (None planned this project!)

2. Repointing: Rake out joints in designated area, approximately 36 inches (900 mm) high by 48 inches (1200 mm) wide and repoint; cleaned and finished.

a. Install mortar sample that contains a close color range, aggregate type, and finish that will produce a mortar matching the cleaned masonry when cured and dry.
b. Install up to three (3) samples with varying shades of color, aggregate, and finish.
c. Repeat process, up to 3 times, until acceptable.

3. Cleaning: Clean two (2) areas approximately 25 sq. ft. (2.3 sq. m) for each type of masonry and surface condition.
   a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect without providing all appropriate protections.
   b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
   c. Repeat, using same of different leaning methods up to 3 times, until acceptable.

4. Approval of test areas does not constitute approval of deviations from the Contract Documents contained in test areas unless Owners Representative specifically approves such deviations in writing.

5. Approved test areas may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Samples for Verification: For the following:

1. Each type of masonry unit to be used for replacing existing units. Include sets of Samples as necessary to show the full range of shape, color, and texture to be expected.

C. Hardware List: Submit a complete list of incidental materials to be provided under this Section.

D. Repair Procedures: Submit written procedures for the remedial work including materials, methods, and equipment that will be used.

E. As provided in Section 01300.

1.06 DELIVERY, STORAGE, AND PRODUCT HANDLING

A. Deliver materials to the job site in original, unopened containers. Materials are to be stored in a protected area between 40 - 80 degrees F.

B. Do not retain on the job site any material that has exceeded the shelf life recommended by its manufacturer.

C. Protect all surfaces from staining or damage. All damaged work shall be repaired or replaced as directed by the Consultant and at no additional cost to the Owner.

D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

E. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

F. Store sand where grading and other required characteristics can be maintained, and contamination avoided.

1.06 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:

1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.

D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

F. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.07 WARRANTY

A. Furnish a written guarantee signed by the application contractor or firm, warranting the materials and workmanship to be watertight for a period of two (2) years from date of completion of the Work.

PART TWO – PRODUCTS

2.01 MORTAR

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray or both where required for color matching of exposed mortar.

a. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144 unless otherwise indicated.

1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color with no more than 50 parts per million chloride ions and free of organic contaminants.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
4. For joints narrower than 1/4 inch, use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent passing the No. 16 sieve.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars. Pigments shall conform to ASTM C 270 and C 979. Integral coloring material shall consist of inert, non-fading, finely ground, alkali-fast mineral oxides, made specifically for cement/lime mortars. Limit coloring additive so as to no exceed 10% of the weight of Portland cement. Do not use carbon black as a coloring additive.

E. Water: Potable.

F. Admixtures

1. Admixtures such as air-entraining agents, accelerators, retardants, water repellent agents, antifreeze compounds, and other admixtures shall not be added to mortar unless specified.
2. Do not use admixtures containing more than 0.2% chloride ions.

2.02 STONE PATCHING AND REPAIR MATERIALS

A. N/A

2.03 MORTAR MIXES

A. Preparing Lime Putty: Slake quicklime and prepare lime putty according to appendix to ASTM C 5 and manufacturer's written instructions.

B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

C. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Owners Representatives approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

D. Do not use admixtures in mortar unless otherwise indicated.

E. Mortar Proportions: Mix mortar materials in the following proportions:

1. Pointing Mortar for Brick: Proportions shall be consistent with those identified in preconstruction testing.

a. Add mortar pigments to produce mortar colors required.

2. Rebuilding (Setting) Mortar: Same as pointing mortar.
a. Add mortar pigments to produce mortar colors required.

2.04 MASONRY UNITS

A. Face Brick (Solid Masonry Units Made from Clay or Shale):

1. ASTM C 216, Grade SW, Type FBS, unless otherwise indicated.
2. Size, Texture and Color: To match adjacent, existing masonry units as approved by owner.
3. Properties:

a. Initial Rate of Absorption: 6 to 15 grams of water per minute per 30 square inches.
b. Efflorescence: Perform as described in ASTM C 67. Units shall have a rating of “Not Effloresced”.

4. Use: Provide as needed for replacement of existing damaged units.
5. Provide special units for corners and other similar exposed applications.

2.05 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.

D. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.

E. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products; Light Duty Cleaner
b. Dominion Restoration Products, Inc; Bio-Cleanse
c. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
d. Prosoco; Enviro Klean 2010 All Surface Cleaner.

F. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no muriatic (hydrochloric), hydrofluoric, or sulfuric acid; or ammonium bifluoride or chlorine bleaches.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products; Bio Cleaner
b. Dominion Restoration Products, Inc; DR-60 Stone and Masonry Cleaner
c. Diedrich Technologies Inc.; Envirorestore 100.
d. Prosoco; Enviro Klean Biowash

G. Acidic Cleaner: Manufacturer's standard acidic masonry cleaner composed of hydrofluoric acid or ammonium bifluoride blended with other acids, detergents, wetting agents, and inhibitors.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products; Heavy Duty Cleaner
b. Diedrich Technologies Inc.; Diedrich 101 Masonry Restorer
c. Dumond Chemicals, Inc.; Safe n' Easy Ultimate Stone and Masonry Cleaner.
d. Prosoco; Enviro Klean Restoration Cleaner

2.06 ACESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

B. Reinforcement and Anchorage: All screws, bolts, nuts, washers, rivets, ties, and pins shall be hot-dipped galvanized steel (ASTM A 153, Class B), or Type 304 stainless steel

PART THREE – EXECUTION

3.01 GENERAL

A. Examine each area of work and verify that existing conditions are acceptable for the specified installation procedures. Report, in writing, adverse conditions that could affect the performance of the Work within five calendar days. Absence of written notification will indicate the Contractor's acceptance of existing project conditions.

B. Masonry workmanship shall comply with all applicable recommendations of the Brick Industry Association (BIA, formerly the Brick Institute of America), the Indiana Limestone Institute of America, and Masonry Structures ACI 530.1, except as modified below. Report any damage to new or existing flashings within the work area to the Consultant, and provide for repairs by appropriately skilled tradesmen, at no cost to the Owner.

C. Manufacturer's Recommendations: Comply with the manufacturer's written approved installation instructions and with any governing regulations and industry standards applicable to the work.

D. Proceed when project conditions are acceptable and implement any cold / hot weather provisions specified herein.

E. Conduct all masonry work in a neat and workmanlike manner, to prevent staining any surface with mortar or other spills. Avoid dropping mortar on completed masonry work or other elements of the building. If mortar drops or spills, spot-clean immediately using a sponge and clean water.

F. Tolerances:

1. External corners and other conspicuous lines and levels: Maximum deviation from plumb or level ± 1/4 inch in any 10 ft section with a maximum cumulative amount of 3/8 inch in any one direction beyond 10 ft.
2. Variation from Level: Maximum 1/2 inch in 20 feet, or 3/4 inch in 40 feet or more.
3. Mortar bed joint thickness: 3/8 inch or match existing adjacent construction. Maximum deviation ± 1/16 inch
4. Mortar head joint thickness: 3/8 inch or match existing adjacent construction. Maximum deviation ± 1/16 inch
5. Vertical alignment of the center line of corresponding head joints in alternate courses when using other than stacked bond. Maximum deviation ± 1/4 inch
6. Vertical alignment of the center line of all head joints in total assemblage height when using other than stacked bond. Maximum deviation ± 1 inch

3.02 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian entrance and exit that must remain in service during course of restoration and cleaning work, as required.

B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

C. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.

3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

D. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

D. Prevent mortar from staining face of surrounding masonry and other surfaces.

3.03 REPOINTING MASONRY

A. General: Tuckpoint mortar joints containing static cracks, deterioration, holes or voids. New bedding and pointing mortar mix should not have a compressive strength that exceeds existing mortar or masonry materials.

B. Rake out and repoint joints to the following extent:

1. Joints where mortar is missing or where they contain holes.
2. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
3. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
4. Joints where they have been filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved test area:

1. Remove mortar from joints to depth of 2-1/2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.

D. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

E. Notify Consultant of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

F. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

G. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

H. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

I. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

J. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.04 MASONRY UNIT REPLACEMENT

A. Match existing construction tolerances, corners, and recess. Install masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line.

B. Provide shoring and support, as required, prior to removing existing masonry units.

C. Use full units without cutting whenever possible. Cut new masonry units as required to fit adjoining work neatly. Avoid the use of less than half size units at corners, jambs, and at other locations. Perform job site cutting of masonry units with proper masonry saw to provide straight, clean, unchipped edges. Prevent broken masonry unit corner or edges. Do not break masonry units with a hammer.

D. Mortar Bedding and Jointing

1. Provide new ties to replace damaged ties, in like-kind. All masonry reinforcement and anchors should be completely bedded in mortar. Direct masonry unit-to-anchor contact is not permitted.
2. Lay new units with completely filled bed and head joints. Butter ends with sufficient mortar to fill head joints and lay into place. Do not slush head joints. Tooth new units into existing masonry work, to match existing bonding patterns.

3. Spaces between masonry units and backup materials are to remain free and clear of mortar.
4. Repoint head joints and top joints where new work adjoins existing masonry work.

E. Establish lines, levels, and coursing indicated. Protect from displacement.

F. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

G. Placing and Bonding

1. Do not lay mortar bed more than 2 ft ahead of work.
2. Do not furrow bed joints.
3. Completely butter the ends and head of each unit with mortar and shove the unit into place so that mortar squeezes out the top of the head joint and bed joint. Do not slush head joints.
4. At cavity wall sections, cut off and scoop out the mortar that extrudes from bed and head joints on outer and inner faces of the wythe.
5. Do not disturb, tap, shove or push units once they are laid in their final position. Where adjustment must be made, remove mortar and replace.
6. Tooth masonry at intersections and external corners.
7. Strike exterior of mortar joints flush during laying. When mortar is thumb print hard on exposed surfaces, tool joints concave with a cylindrical pointing tool slightly larger than the masonry joint to compact the mortar thoroughly.
8. Slightly bevel bed joint mortar away from the cavity space before placing the unit to minimize mortar protrusions into any cavity space intended to be free of mortar. Back parge or strike mortar extrusions in the cavity space.

3.05 STONE PATCHING

A. N/A

3.06 CLEANING, GENERAL

A. Proceed with cleaning in an orderly manner; work from bottom to top or top to bottom in a manner as specified by product manufacturers requirements, of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Perform cleaning to the extent necessary to remove existing mildew, efflorescence, dirt, plant fungi, etc. so that the wall appearance is uniform, and acceptable to the water repellent sealer manufacturer. Begin with the least caustic cleaning method. Adjust cleaning methods as required. In general:

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
   a. Equip units with pressure gages.
3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.

4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
5. For high-pressure water-spray application, use fan-shaped spray tip that disperses water at an angle of at least 40 degrees.
6. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.
7. For steam application, use steam generator capable of delivering live steam at nozzle.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.
2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Steam Cleaning: Apply steam to masonry surfaces at the very low pressures indicated for each type of masonry material. Hold nozzle at least 6 inches (150 mm) from surface of masonry and apply steam in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

F. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush application. Do not spray apply at pressures exceeding 50 psi (345 kPa). Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

G. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

H. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.07 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing too dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, tar and various other roof coatings.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove paint and caulking with alkaline paint remover.
   a. Comply with requirements in "Paint Removal" Article.
   b. Repeat application up to two times if needed.

3.08 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

C. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.08 PAINTING

A. N/A

3.09 FIELD QUALITY CONTROL

A. Owners Representatives: Owner will assign Project representatives to help carry out responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Consultant use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work completed.

B. Notify Consultant in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Consultant have had reasonable opportunity to make observations of work areas at lift device or scaffold location.

C. Contractor shall maintain or exceed levels of workmanship and material acceptability in regard to surface preparation, cleaning, and coating application as established by mock up/test samples.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. The Scope of Work includes preparing and prime painting rusted steel deck surfaces and repairing localized areas of BOTH steel and concrete deck with flat stock sheet metal, as well as possible localized infill of abandoned curbs/penetrations.

1. See Bid Form and Summary of Work 01010 for the total number of square feet to be included in Base Bid for preparing and prime painting rusted steel deck surfaces. A unit price is to be provided per square foot to provide for an Add or Deduct.

2. See Bid Form and Summary of Work 01010 for the total number of square feet included in Base Bid for repairing localized areas of decking (both steel decking and concrete decking) with flat stock sheet metal. A unit price is to be provided per square foot to provide for an Add or Deduct

3. See Bid Form and Summary of Work 01010 for the total number of square feet to be included in Base Bid for localized removal and replacement of the steel deck due to rusting and deterioration. A unit price is to be provided per square foot to provide for an Add or Deduct.

1.02 RELATED SECTIONS

A. Section 02050 - Roof Demolition

1.03 REFERENCES

A. Perform work in accordance with the recommendations of the Steel Deck Institute.

B. All steel deck repair and replacement shall conform to Factory Mutual *Loss Prevention Data Sheet 1-28* and shall meet 1-90 wind uplift requirements.

1.04 SUBMITTALS

A. As provided in Section 01300.

B. Product Data:

1. Manufactured Deck Panels.
2. Finish.

1.05 QUALITY ASSURANCE

A. As provided in Section 01400.

B. Qualifications of Workmen

1. Provide sufficient workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of contraction involved and the materials and techniques specified.

C. Rejections

1. In the acceptance or rejection of the work, the Owner will make no allowance for lack of skill on the part of workmen.

1.06 PRECONSTRUCTION CONFERENCE

A. As designated in Section 01200.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. As designated in Section 01600.

B. Coordinate deliveries with Consultant.

C. Keep all materials clearly identified with identifying marks legible. Keep damaged material clearly identified as damaged and stored separately to prevent its inadvertent use.

D. Do not allow installation of damaged or otherwise non-complying material.

E. Make necessary damage repairs and replacements at no additional cost to the Owner.

1.08 SEQUENCING AND SCHEDULING

A. As designated in Section 01300.

B. Coordinate roof demolition and roofing replacement work in a manner for deck replacement or repair to proceed unimpeded.

PART TWO - PRODUCTS

2.01 PRIMING PAINT

A. Priming paint for surface rust on the top side of existing steel deck shall be Rust-oleum 769 damp-proof red primer. Dry coat 1 to 2 mils thick.

B. No paint is needed to be applied for new deck patching.

2.02 PATCHING MATERIALS

A. Metal screws shall be cadmium plated self-drilling, self-tapping, hardened steel screws, minimum size 1/4 - #14 x 3/4".

B. Flat stock deck filler material shall be 18 gauge G90 galvanized steel for holes less than 18 inch in diameter. Flat stock deck filler material shall be 1/8” steel for holes larger than 18” but

less than 36 inches. For all curbs or openings larger than 36 inches, a fluted metal roof deck shall be installed. For “concrete deck” areas, a flat fill of 1/4” thick steel materials may be used for openings that are larger than 18” and less than 36” where that “flatter material” may fit the project conditions better than the installation of a fluted metal roof deck.

2.03 DECK REPLACEMENT MATERIALS

A. Where entire new sections of standard steel deck are determined to be needed, the new deck shall be minimum 20 gage galvanized.

B. For the replacement of the entire steel deck, the new deck shall be a Type A , Type B or Type F steel deck panel, in color to nearly match the existing. [Note: Some building areas may have narrow rib deck and others may have medium rib steel deck. Bidders shall be responsible to measure the deck at each building roof area prior to start of tear off so as to have the matching deck available on site if needed.]

C. For localized replacement of steel deck, the new deck shall be of similar shape as the existing deck. Deck shall be prime painted. Painting on the underside of the repaired/replaced deck to match the existing is not required. [Note: Some buildings may have narrow rib deck and others may have medium rib steel deck. Bidders shall be responsible to measure the deck at each site prior to start of tear off so as to have the matching deck available on site if needed.]

D. Decking shall be by Vulcraft, or other pre-approved equal.

PART THREE - EXECUTION

3.01 CLEANING AND PREPARATION

A. Where rust has penetrated into metal more than 3 mils or where existing decking exhibits extensive pitting or rust perforations. Contractor shall notify Owner.

B. Contractor is to provide protection to building interior, contents, and occupants to assure that debris does not enter building and to prevent harm to occupants.

3.02 PAINTING OF SURFACE RUST

A. Where rust has not penetrated more than 3 mils into steel decking, perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations.

B. Install one coat of Rust-oleum 769 damp-proof red primer uniformly over properly prepared surface.

3.03 INSTALLATION OF FLAT METAL DECK PATCHES

A. Prior to the application of flat metal deck patches where the existing deck is a fluted steel type, contractor shall first clean and paint the deck as described in Item 3.02 above. New flat deck patches shall be fastened to existing steel deck at 6" centers using metal screws. Overlap existing steel deck by a minimum of 6" in each direction.

B. Where flat metal or fluted deck patches are to be installed over concrete deck, the deck shall be cleaned and the new metal patch extended a minimum of 6 inches onto the edge of the concrete deck and the new patch shall be anchored at a minimum of 4 corners. For concrete “tile” decks, those anchors may only be installed into the thickened rib portions of the concrete tile and those anchors may not strike or impact the reinforcing steel in those same ribs.

B. Cut and neatly fit filler material around roof top projections. [**Note:** If new ribbed steel deck is used for the purpose of flat stock repair, the work shall be paid per the unit price for flat deck repair and not the price for removal and replacement of steel deck.]

3.04 INSTALLATION OF NEW REPLACEMENT DECK

A. Where existing deck was determined to be in such poor condition that it was removed, new deck shall be required

B. Steel deck units shall be anchored to supporting members, including bearing walls, to provide lateral stability to the top flange of the supporting structural members.

C. Steel deck units shall be anchored to supporting members to resist the gross uplift force of 90 pounds per square foot minimum.

1. Provide additional deck securement in corner and perimeter areas of the roof per the requirements of FM Global.

D. All deck shall be securely fastened to supporting structural members by the use of self drilling metal screws.

E. All roof deck shall be attached at a maximum of 6" O.C. at ends and intermediate supports of each deck unit.

F. For spans 6 feet, or less, side laps shall be fastened together at the center point of lap; and for spans greater than 6 feet, side laps shall be fastened together at the third points.

G. End laps shall be overlapped a minimum of two (2) inches where new deck is laid, else shall extend 12 inches onto the surrounding deck to remain.

H. Ensure that fasteners do not penetrate conduit or miscellaneous piping located at bottom of the decking.

I. Place deck in straight alignment for entire length of run with adjoining deck units.

J. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

K. Cut and neatly fit deck around roof top projections.

L. Provide approved structural supports at all penetrations larger than 6" on any side. (See plan details for minimum dimensions for deck at the abandoned curb areas.)

3.05 VERIFICATION OF EXISTING DECK SECUREMENT

A. Inspect existing deck securement for broken or missing fasteners or welds. Report any of these conditions to the Owner's representative.

B. Where existing deck securement is found to be deficient refasten deck to support structure in accordance with the requirements of this Section, or as needed to fit field conditions. Cost related to securing the deck shall be paid for under the Contingency Allowance.

3.06 COORDINATION

A. Coordinate all work closely with Owner's representative, including providing information in advance on where work will be occurring and making certain to protect the areas below when performing work.

B. Work cannot disrupt Owners activities. Care shall be taken that no work is done without Owner's approval on a daily basis.

C. In the event that any "concrete deck tiles" which exist on Section TT and portions of RR are found to be damaged and may need replacement, Contractor shall identify those panel areas to the Owner's representative for review and evaluation. How best to address cracked or damaged concrete deck tiles will then be evaluated on an individual basis and a price shall then be negotiated for the work that is determined to be "necessary" and/or "performed".

3.07 CLEAN UP

A. Protect the interior from spills or damage, and clean building interior where soiled by work of this Section on a daily basis.

B. At completion of all deck replacement work, remove all construction debris and equipment from job site.

3.08 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all components are complete and properly installed. Verify that fasteners are properly located and securely anchored.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included: Installation of all wood blocking, wood shims, and sheathing as indicated on the drawings. Include the amount of the allowance work board feet of removal and replacement of wood nailers/blocking in the Base Bid. Some of this work shall be performed on a unit price basis.

B. Related Work Described Elsewhere

1. Section 02050 - Roof Demolition

2. Section 07535 - Fully Adhered EPDM

3. Section 07920 - Sealants and Caulking

1.02 QUALITY ASSURANCE

A. Qualifications of Workmen: Provide sufficient workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

B. Rejections: In the acceptance or rejection of rough carpentry, the owner will make no allowance for lack of skill on the part of workmen.

C. All rough carpentry work shall conform to pertinent standards of Factory Mutual *Loss Prevention Data Sheet 1-49*.

1.03 PRODUCT HANDLING

A. Protection

1. Store all materials up, off of the roof deck or ground, and covered with a weatherproof covering anchored sufficiently so as to resist wind blow-off.

2. Keep all materials clearly identified with all grade marks legible. Keep all damaged material clearly identified as damaged and stored separately to prevent its inadvertent use.

3. Do not allow installation of damaged or otherwise non-complying material.

B. Replacement: In the event of damage, immediately make all necessary repairs and replacements to the approval of the owner and at no additional cost to the owner.

PART TWO - PRODUCTS

2.01 NAILERS/WOOD BLOCKING

A. All nailers/wood blocking shall be construction grade or better dimensional lumber. Do not use asphalt, arsenic, ACQ, MCQ or creosote based treated wood blocking.

B. Nailers/wood blocking size to be as indicated on the drawings, or as required to match existing building conditions (when replacing deteriorated nailers/blocking on a unit price basis).

2.02 NEW PLYWOOD SHEATHING

A. New plywood (if used for blocking) shall be CDX type and nominal 3/4" thick, 5/8” thick, 1/2” thick or 1/4” thick as may be needed or as shown in the detail drawings.

2.04 FASTENERS

A. All fasteners must have corrosion resistant coating.

B. Masonry/Concrete Fasteners

1. Hook Bolts for installation in the CMU walls

a) No hook bolts are required for this project.

C. Threaded Steel/Wood Fasteners

1. Corrosion-resistant, self-tapping, self-drilling screw with low profile head.

2. Screw type fastener to be Factory Mutual approved.

3. Approved Products

a) Dekfast by Construction Fasteners

b) Roof Grip by Buildex

c) Insul Fixx by Fabco

D. Wood to Wood Fasteners

1. Nails

a) 8d to 16d, hot-dipped, galvanized steel or 304 stainless steel ring shank as minimum size.

b) Minimum embedment to base substrate to be 1½".

2. Screws

a) #12, 300 series stainless steel wood screw or #12 Phillips Pan 300 series stainless steel sheet metal screws as minimum size. [Note: #12 zinc coated screws may be substituted for stainless steel, provided the screws do not anchor into treated wood. Note: special coated screws that are listed as able to be used with treated wood shall be allowed.]

b) Minimum embedment to base substrate to be 1 5/8".

PART THREE - EXECUTION

3.01 WOOD NAILERS AND/OR BLOCKING

A. Nailers and/or blocking shall be installed as per detailed drawings.

B. Nailers and/or blocking shall be anchored to resist a pull of 175 lbs/Foot.

C. Nailers and/or blocking shall be installed with joints true and tight.

D. Unless shown in the detail at a higher/closer spacing, fasteners to be spaced a maximum of 18" O.C., staggered, for all nominal 2x blocking, and 12” O.C. for all nominal 5/4” and all nominal 3/4”, 1/2” or 1/4” wood nailers and/or wood blocking.

3.02 CLEANUP

A. Premises shall be kept in a neat and orderly condition.

B. Cleanup shall be performed on a daily basis, or more often as may be necessary. Contractor shall use a magnet bar to sweep all ground areas along and around the building where work was performed prior to leaving that area of work.

C. After installation of all rough carpentry, contractor shall remove all construction debris and equipment from job site.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Provide and install all roof insulation as shown on the roof plan and detail drawings and as specified herein.

1.02 RELATED SECTIONS

A. Section 02050 – Roof Demolition

B. Section 06100 – Rough Carpentry

C. Section 07535 – Fully Adhered EPDM

1.03 REFERENCES

A. FM – Roof Assembly Classifications

B. UL – Fire Hazard Classification

1.04 SYSTEM DESCRIPTION

A. U.L. Class A System

B. F. M. Wind Uplift Resistance:

1. 1-60 rated and approved insulation and fastening assembly.

1.05 REGULATORY REQUIREMENTS

A. As provided in the General Conditions

1.06 SUBMITTALS

A. As provided in Section 01300 – Submittals.

1. Flat isocyanurate insulation (infill of damaged or wet materials)

2. Flat isocyanurate board insulation (recover)

3. Tapered isocyanurate board insulation (recover)

1.07 PRECONSTRUCTION CONFERENCE

A. As provided in Section 01200 – Project Meetings

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

A. As provided in Section 01600 – Material and Equipment.

B. Coordinate delivery with Consultant.

C. Prevent wrappers and packaging materials from inclusion in the insulation system.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Insulation installation shall not commence during inclement weather.

B. Insulation installation shall not commence on a day when precipitation is imminent or probable.

C. Insulation installation shall not proceed over damp or frozen substrates. [Note: Trace amounts of moisture, such as light dew or light frost on the deck shall not be considered a cause for delay of installation.]

1.11 SEQUENCING AND SCHEDULING

A. Proceed with insulation application concurrently with Section 07535 – Fully Adhered EPDM Single Ply Roofing

B. Phasing of insulation will not be acceptable. Insulation shall not be left exposed to the weather overnight at any time in the project.

1.12 GUARANTEE AND WARRANTIES

A. The Contractor shall warrant the work performed under this section for a period of two (2) years from the date of substantial completion. The Contractor shall accept the responsibility for the correction of defects in the materials and workmanship and the repair of same upon notice by the Owner or his Representative and at no cost to the Owner.

B. The EPDM Manufacturer shall warrant the work performed under this section for a period of twenty (20) years from the date of substantial completion under the terms of the Twenty (20) Year “Full System” NDL Manufacturers Labor and Material Warranty. The Manufacturer shall accept the responsibility for the correction of defects in the materials and workmanship and the repair of same upon notice by the Owner or his Representative and at no cost to the Owner.

PART TWO - PRODUCTS

2.01 INSULATION MATERIALS

A. Insulation materials to be of the type and minimum thickness as listed here.

2.02 POLYISOCYANURATE INSULATION

A. Insulation is to be a closed-cell, polyisocyanurate foam core with factory laminated fiberglass reinforced facers. Polyisocyanurate insulation shall meet the physical property requirements of ASTM C-1289, Type II, Class 1, Grade II. Polyisocyanurate insulation foam core is to have a rated flame spread of 25 or less. Polyisocyanurate insulation is to be FM Global and UL approved and as required by the roof system manufacturer to obtain the required 20 Year “Full System” NDL Labor and Material Warranty as listed elsewhere.

B. Polyisocyanurate insulation thickness and board size

1. Flat polyisocyanurate insulation, minimum thickness of 1.0”. Boards may be 1.0”, 1.5”, 2”, or as may be needed to replace wet or damaged insulation in the existing roof system or as listed for new recovery or replacement insulation).

2. 1/8, 1/4 or 1/2” per foot tapered polyisocyanurate insulation with minimum total thickness of 0.5” at the low end. Maximum board size shall be 4’ x 4’. These boards shall be used to provide slope in the recovered roof, and as saddles, and around drains. (See roof plan drawings for minimum taper thickness at valleys and drains where full taper is to be installed and for locations of crickets and saddles.)

C. Approved ISO Products

1. ISO 3™ Polyisocyanurate by Johns-Manville
2. Tapered ISO 3™ Polyisocyanurate by Johns-Manville
3. ISO by Versico Roofing Systems
4. Tapered ISO by Versico Roofing Systems
5. Carlisle HP Polyisocyanurate by Carlisle Syntec
6. Tapered Carlisle HP-T by Carlisle Syntec.
7. Firestone ISO 95+ by Firestone Building Products
8. Tapered Firestone ISO 95+ by Firestone Building Products
9. ISO by GenFlex Roofing Systems
10. Tapered ISO by GenFlex Roofing Systems

D. Other insulation

1. Tapered 0-1.5” ISO in 12” wide strips to provide transitions to drains, or at other elevation transitions.

2.04 APPROVED ADHESIVE PRODUCTS AND MANUFACTURERS

A. J/M 2 Part Urethane Insulation Adhesive by Johns-Manville

B. OLYBond 500 by Olympic Manufacturing Group

C. Carlisle FAST Adhesive-LV by Carlisle Syntec.

D. I.S.O. Stick Insulation Adhesive by Firestone Building Products

E. Other Pre-Approved material

2.05 FIRE BARRIER BOARD

A. Fire Barrier

1. The only “fire barrier” as part of any of these buildings would be immediately above any steel roof deck. Should that existing insulation (whether FG or Perlite) be found as damaged and/or “wet”, replacement fire barrier board shall be installed.

2. Fire Barrier insulation shall be 5/8” Dens-Deck Prime, as manufactured by Georgia

Pacific, U.S. Gypsum Company or 5/8" Securock by USG or approved equal.

2.06 ROOF MEMBRANE MANUFACTURER'S APPROVAL

A. All insulation shall be approved in writing by the roof membrane manufacturer as an acceptable substrate to receive their roof system in order to meet the specified code requirements and to obtain all manufacturer warranties as specified.

PART THREE - EXECUTION

3.01 GENERAL

A. The latest manufacturer specifications and installation techniques are to be followed.

3.02 INSTALLATION (FIRE BARRIER)

A. Should for any reason the exiting fire barrier insulation on the steel roof deck be identified as wet or damaged, remove and replace with an initial mechanically fastened layer of new gypsum/fire board. Set new replacement pieces with staggered and offset joints. Above the new mechanically attached fire barrier board, install new "infill" insulation so as to meet the surrounding roof elevations. Fire barrier replacement and "infill" insulation shall be paid on a unit price basis.

3.03 INSTALLATION

A. For buildings areas scheduled for recovery membrane installations, following membrane preparation, inspect the existing insulation for areas of wet or deteriorated pieces.

B. For wet or deteriorated board replacement, the existing mechanical fasteners (if any) shall be backed out and removed so as to allow the wet or deteriorated pieces to be lifted and removed.

C. Replacement materials shall be paid for on a per square foot, per inch basis. Example, if two layers of 2.0" insulation need to be replaced over an area of 10'x10', that would result in 400 square-foot-inches of replaced materials. [Note: Replacement of the approximately 4,000 square foot area on Section TT shall be removed and replaced as part of the base bid and shall NOT be paid as part of the unit price work for replacing localized areas of wet or damaged insulation.]

D. Inspect the substrate for uneven surfaces that will not allow the new insulation to lay flat. Report conditions that cannot be easily corrected to the Owners representative.

E. For the roofs/buildings which are scheduled to have a fully adhered recovery board installed, the existing aggregate is to be vacuumed and the new insulation shall be laid in ribbons of special adhesive, bonded to the prepared surface of the existing BUR. Pattern for the new special adhesive shall be a minimum of 12" on center in the field, and 6" on center in the perimeters and corners. Contractor provide a letter document from the proposed roof system manufacturer clearly listing the minimum pattern for adhesive so as to meet the warranty and FM 1-60 requirements (but shall not be less than the described 12" and 6" spacing).

F. For building areas which are scheduled to have all layers of insulation replaced, or when mechanically attaching a recovery insulation board, Contractor shall install system fasteners so as to achieve a FM 1-60 wind uplift system rating.

G. Once the new insulation (either recovery or replacement) is installed, install any new layers of tapered insulation saddles, per the roof taper plan drawing. Adhere the new tapered insulation saddles in beads of special adhesive. Pattern for new adhesive shall meet the recommendations of the manufacturer to meet FM 1-60, but shall not be space more than 1 bead every 12 inches in the field and 1 bead every 6 inches in the perimeters and corners.

3.05 INSULATION INSTALLATION (GENERAL)

A. Examine the top surfaces of the cleaned and prepared decking (or insulation) for suitability to receive layers of new insulation. Do not begin installation until the surfaces to receive new insulation has been properly prepared.

B. For multiple layers of insulation, verify that the top surface of the previously installed layer of insulation is dry, clean, and free of dirt, dust and foreign materials that could negatively impact the next layer.

C. Verify that roof drains, roof curbs, nailers, equipment supports, vents, and other roof accessories are secured properly and installed in conformance with drawings and submittals.

D. Cut all layers of new roof insulation on all roof sections to fit tightly at all perimeter, curbs and penetrations. Gaps between boards and at curbs shall not be greater than 1/4”.

3.04 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all components are complete and properly installed.

- End of Section -

SECTION 07535
FULLY ADHERED EPDM
SINGLE PLY ROOFING

PART ONE - GENERAL

1.01 Description

A. Furnish and install a weathertight and watertight reinforced Fully Adhered EPDM roof system complete, in place, as shown on the drawings and as specified herein.

B. Related Work Described Elsewhere

1. Section 02050 - Roof Demolition

2. Section 07241 - Roof Insulation

3. Section 07920 - Sealants and Caulking

4. Section 15410 - Roof Drains

1.02 Quality Assurance

A. Standards: Comply with standards specified in this Section and as listed in the general requirements.

B. Qualifications of Manufacturer: Products used in the work included in this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Owner.

C. Qualifications of Contractor: The contractor and his personnel shall be currently approved by the manufacturer of these approved products as qualified to install the materials of this Section.

D. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.

E. Roofing Inspections: Make all required notifications and secure all required inspections by the manufacturer of the approved materials to facilitate issuance of the specified roof warranty.

1.03 References: Materials used in this Section shall be listed in the latest addition of the following:

A. Factory Mutual System Approval Guide - Equipment, materials, services for conservation of property.

B. Underwriters Laboratories, Inc. - Roofing Materials and Systems

1.04 Submittals

A. General: Comply with the provisions of the Section 01300.

B. Product Data: After award of contract, submit:

1. Complete material list of all items proposed to be furnished and installed under this Section.

2. Manufacturer's specifications and other data required demonstrating compliance with specified requirements.

3. Manufacturer's recommended methods of installation.

   When approved by the Owner, the manufacturer's recommended methods of installation (unless superseded by the specification) will become the basis for inspecting and accepting or rejection of the actual installation procedures used on this work.

4. Contractor shall supply insulation attachment design calculations and detailed membrane attachment plan layout from the Manufacturer of the EPDM system to document and confirm system attachment will achieve fastening to meet FM1-60. Fastener pull testing should be performed in all areas where new fasteners are installed through the steel roof deck and results provided with the calculations.

1.05 Product Handling

A. Delivery and Storage:

1. Deliver all packaged materials to the job site in their original, unopened containers with all labels intact and legible at the time of the inspection. Labels shall contain manufacturer's name, brand name and such identifying numbers as are appropriate.

2. Store all materials in an approved manner, up off of the roof deck or ground and protected from exposure to the elements.

3. All adhesives primers and caulking shall be stored between 60 degrees F. and 80 degrees F. Should they be exposed to lower temperatures, restore to room temperature prior to use.

B. Protection: Use all necessary means to protect the materials in this Section before, during, and after installation, and to protect the work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of and at no additional cost to the Owner.

1.06 Scheduling

A. Work is to be performed on a daily basis, with each section completed before progressing to the next days work.

B. Completion of work shall be defined as the installation of all specified roof preparation, insulation, field membrane, flashings, counterflashings, sheet metal, fasteners, and caulking.

C. Contractor shall complete roofing work on a daily basis unless specifically directed otherwise by the Owner's representative.

1.07 Cautions

A. Do not use oil base or plastic roof cement in connection with EPDM roofing system.

B. Waste products (petroleum, grease, oil and solvents, vegetable or mineral oil and animal fat - direct contact with steam venting) shall not be allowed to come in contact with the

EPDM roofing system.

C. Cements and bonding adhesive contain petroleum distillates; avoid breathing vapors.

D. Cements and bonding adhesives are extremely flammable. Do not use near fire or flame.

E. Do not install the roofing system when the temperature is falling below 40 degrees F. Follow precautions as stated for storage and expose only enough cement and adhesive to be used within a four (4) hour's period.

F. Seam primers may contain toxic substances; workmen should wear impermeable gloves to prevent absorption of toxic substances. Check with manufacturer for further information.

1.08 Environmental Conditions

A. Elastomeric roofing, flashings, insulation and adhesives shall not be applied when the surrounding air and surface temperature, relative humidity, or wind velocity is not within the range acceptable under the manufacturer's recommendations.

1.09 Warranty

A. All new roof insulation, membrane and flashings installation on all areas shall be such as to provide for a 20 year roof membrane manufacturer's "Full System NDL" warranty. As part of the work of this Section, pay all required fees, secure all required inspections, and complete all items necessary to secure and deliver to the Owner the 20 Year, "Full Systems" warranty per Section 01750. (NDL limit shall not be required to cover salvaged insulation materials)

PART TWO - PRODUCTS

2.01 General

A. Minimum product requirements have been listed. All of these components must be used and bid. Products not supplied by the manufacturer are to be purchased from a manufacturer approved source.

B. Roof Membrane Manufacturer

1. Base Bid: The new elastomeric roofing shall be a **reinforced 60 mil EPDM** (Ethylene Propylene Diene Terpolymer) single-ply membrane. Roof system components specified shall be as manufactured by the following companies:

a) Rubbergard System by Firestone Building Products.

b) Sure Seal System by Carlisle SynTec, Inc.

c) UltraGard EPDM by Johns-Manville.

C. The following roof membrane and related accessories are to be supplied by the manufacturer or purchased from a manufacturer approved source.

1. 60 Mil (.060 inch thick) reinforced EPDM membrane. [**Note**: Material does not need to be the fire-retardant (FR) classification provided that the membrane, in combination with the insulation substrate, slope and deck combine to provide a Class A fire rated roof system.]

2. Base flashing shall be 60 Mil (.60 inch thick) cured or uncured EPDM membrane as supplied by membrane manufacturer.

   a. Where approved by the manufacturer, base flashings may be a continuation of the field membrane.

3. Seam primer to be specially formulated and designed as a preparation for seam surfaces to increase ultimate seam strength. Seam primer shall be supplied by the manufacturer or from a manufacturer approved source.

4. Splice adhesive used for bonding EPDM sheet together as supplied by the manufacturer. Manufacturer's approved seam tape for membrane to membrane laps shall be used in lieu of splice adhesive when offered by the manufacturer.

   [**Special Note**: 6" tape shall be used at the field laps.]

5. Lap sealant is to be used to seal all field seams and laps where required by the manufacturer. Sealant is to be of gun consistency and as supplied by the manufacturer.

6. Butyl based mastic used to seal membrane sheeting at roof drains and flashing terminations is to be as supplied by the manufacturer.

7. Pourable sealer is to be a one or two component polyurethane used to fill and seal pitch pans. Pourable sealer is to be as supplied by manufacturer.

8. Night-seal used to construct temporary water cut-offs is to be as supplied by manufacturer or manufacturer approved source.

9. Substrate adhesive used to bond roof membrane and base flashings to insulation substrates, walls and projections is to be as supplied by the manufacturer.

10. Prefabricated Flashing Accessories

    a) Pre-fabricated flashing accessories such as inside and outside corner pieces and pipe flashing boots are to be used where possible; use field fabricated flashing transitions elsewhere.

11. Reinforced membrane perimeter securement strips shall be used to secure the field membrane at all curbs, wall and other perimeter locations.

2.02 Other Materials

A. Provide minimum 30"x30" manufacturer approved walkpads.

B. All other materials not specifically described but required for a complete and proper installation of the work in this Section shall be as selected by the contractor, approved by the manufacturer, and subject to the approval of the Owner.

PART THREE - EXECUTION

3.01 General

A. The latest manufacturer specifications and installation techniques are to be following along with the following requirements. These specific minimum requirements must be included in your bid and are not to be altered.

3.02 Inspection

A. Examine the areas and conditions under which work in this Section will be installed. Correct conditions detrimental to the proper and timely completion of work. Do not proceed until such conditions have been corrected.

3.03 Surface Conditions

A. Surfaces scheduled to receive roofing are to be free of any moisture, frost, snow, or dust and debris. (Including keeping the adhered surfaces from becoming contaminated with wind blown insulation debris)

B. Substrate is to be smooth, free of sharp projections, and free to obvious depressions.

C. All metal fittings specified or shown on drawings are to be in place before roofing.

D. All nailers shall be securely installed prior to roofing.

E. All surfaces scheduled to receive EPDM membrane must be free of physical contact with any bituminous surfaces, clean, and smooth.

3.05 Membrane Installation - General

A. Perform all related work specified elsewhere necessary for the installation of the specified membrane system.

B. Membrane Bonding

1. Execute work such that the membrane can be temporarily sealed on a down slope surface at the end of each day according to daily seal procedures.

2. Position EPDM membrane over the insulation substrate without stretching and allow membrane to relax approximately ½ hour prior to bonding.

3. Membrane sheets shall be positioned in a manner to facilitate the flow of water over the field seams wherever possible. Sheets shall also be laid to allow for a minimum 6” seam lap.

4. Fold sheet back so that half of the underside of the sheet is exposed. Sheet fold shall be smooth without wrinkles or buckles.

5. Apply bonding adhesive evenly, without globs or puddles, with a 9 inch wide plastic core short nap paint roller to both the sheet and the substrate at the rate specified on the container label. If a spray applicator is used, paint rollers shall be used in combination with the spray applicator. DO NOT APPLY BONDING ADHESIVE TO THE SPLICE AREA.

6. Allow adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

7. Roll the coated membrane into the coated substrate while avoiding wrinkles.

8. BRUSH down the bonded half of the sheet, immediately after rolling the sheet into the adhesive, with a soft bristle push broom to achieve maximum contact.

9. Fold back the un-bonded half of the sheet and repeat the bonding procedure.

10. Install adjoining sheets in the same manner, overlap edges a minimum of 4 inches.

C. Membrane Seaming (Using Cured Membrane Tapes)

1. Seaming area is to be clean and free of dust, dirt, or debris.

2. Fold the top sheet back and clean both surfaces at the splice area using clean rags with manufacturer's approved splice wash.

3. Apply specified primer to both parts of the surface in strict accordance with manufacturer's printed instructions.

4. Apply the manufacturer approved membrane 6” seam tape, properly positioned in the lap area. Roll the surface of the release paper per manufacturer's instructions. Remove the release paper once tape is in position and has been rolled. If required, install in-seam sealant on the edge of the lower sheet per the manufacturer's requirements.

5. Allow the top sheet to fall freely in place avoiding stretching and wrinkling of the membrane. Roll the seam again per the manufacturer's recommendations.

6. Wrinkles in seam area are to be cut out and patched with approved material.

7. All seams are to be checked for voids, repairs made, and lap sealant applied on a daily basis.

8. EPDM cover pieces are to be installed at all "T" joints in the EPDM field seams and at laps in the seam tape as required by the manufacturer.

3.06 Membrane Termination

A. Mechanically fasten the reinforced EPDM field sheet at the roof perimeters, curbs, walls, all projections, and at changes in plane greater than 15 degrees with manufacturer approved fasteners and seam plates in accordance with the manufacturer’s details and specifications.

OR

B. Mechanically fasten the reinforced EPDM field sheet at the roof perimeters, curbs, walls, all projections, and at changes in plane greater than 15 degrees with manufacturer approved fasteners and polymer or metal batten bars in accordance with the manufacturer’s details and specifications.

OR

C. Install manufacturer approved minimum 6" wide 60 mil reinforced EPDM perimeter securement strips at the roof perimeter, curbs, walls, all projections, and at changes in plane greater than 15 degrees.

1. Fully adhere and mechanically fasten the reinforced EPDM perimeter securement strips with manufacturer approved fasteners and seam plates in accordance with the manufacturer's details and specifications.

2. Clean and prepare the reinforced EPDM perimeter securement strip and the corresponding backside of the EPDM field membrane and/or flashing piece in accordance with the manufacturer’s details and specifications.

3. Adhere the reinforced EPDM perimeter securement strip to the corresponding backside of the EPDM field membrane and/or the flashing piece in accordance with the manufacturer’s details and specifications.

3.07 Membrane Flashings

A. Flashings must be a continuation of the field membrane sheet wherever possible.

B. Where a separate piece of flashing material is required, the perimeter base flashing and flashing around vents, curbs, etc. shall be fabricated with minimum 60 Mil material.

C. All flashings are to be totally bonded to substrate. Where a separate piece of flashing material is required, complete the splice between the flashing and the main roof membrane before bonding or mechanically fastening the flashing to the vertical surface.

D. Where a separate piece of flashing material is required, the flashings are to extend a minimum of 4" onto the field membrane and seamed per item 3.05, C. The splice must be sealed at least three (3) inches beyond membrane securement fasteners.

E. The installed elastomeric flashing shall be fastened at the top (12) inches on center maximum under metal counterflashing or cap.

F. All roof drains are to be flashed with both cured and uncured material as per appropriate detail.

3.08 Membrane Walkpads

A. Layout new walkpads as either shown on the roof plans, or as directed by Owners Representative during the project. Walkpads shall typically be set a minimum of 2” and a maximum of 6” apart. Adhere new walkpads as recommended by the manufacturer.

3.09 Temporary Water Cut-off

A. Temporary water cut-offs are to be constructed at the end of each working day to protect the insulation and roofing from damage due to wind and moisture. Temporary water cut-offs are to be as detailed by the contractor and approved by the manufacturer and Owner.

3.10 Cleanup

A. The contractor shall clear the construction areas and shall provide for the removal from the building site of all the construction debris.

B. All debris shall be removed from the premises promptly and the construction area left clean daily. Contractor is also responsible to assure that his subcontractors have properly removed and disposed of all debris relating to their contract. Cleanup shall be performed on a daily basis, or more often as may be necessary.

C. At the completion of the contract, contractor is to remove and dispose of all equipment related to his contract.

- End of Section -

PART ONE - GENERAL

1.01 DESCRIPTION

A. Provide new sheet metal work in connection with roofing as indicated on the drawings and specified herein.

B. Work includes but is not limited to

1. Counterflashings/Curb flashings
2. Edging
3. Overflow scuppers
4. Pipe penetration flashings and Through-Wall flashings

1.02 RELATED SECTIONS

A. Section 02050 - Roof Demolition

B. Section 04012 – Maintenance of Masonry

C. Section 06100 - Rough Carpentry

D. Section 07241 - Roof Insulation

E. Section 07535 – Fully Adhered EPDM

F. Section 07920 - Sealants and Caulking

1.03 REFERENCES

A. Copper, Brass, and Bronze Handbook Sheet Copper Applications, published by the Copper development Associations, Inc., (CED), New York, NY.

B. Factory Mutual Loss Prevention Data Sheet 1-49.

C. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) Architectural Sheet Metal Manual - Fourth Edition

1.04 SUBMITTALS

A. As provided in Section 01300 and 01340.

B. Product samples

1. Color chips for pre-painted steel.

C. Shop drawings

1. Dimensioned drawings, and details, including gauges, fasteners, and construction data.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.

6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.

D. Mock-Up for Verification: For each type of metal profile.
1. Sheet Metal Edge Flashing and Counterflashings: Min. 10 feet long by actual width of unit, including at least one (1) finished seam and in required profile, and at least one inside corner and one outside corner. Include underlayment, fasteners, cleats, clips, closures, splice plates, and other accessories for a complete detail.
a). Do not install roof flashing strippings over installed metal deck flanges so that the Mock Up can be easily observed and approved.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Mock-Ups shall be constructed from the specified metal and approved metal color.
5. Re-build mock-ups as required until approved by Consultant. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 QUALITY ASSURANCE

A. Standards: Comply with standards specified in this Section and as listed in the general requirements.

B. Qualifications of Manufacturer: Products used in the work included in this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Owner.

C. Qualifications of Contractor: The contractor and his personnel shall be currently approved by the manufacturer of these approved products as qualified to install the materials of this Section.

D. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.

E. Roofing Inspections: Make all required notifications and secure all required inspections by the manufacturer of the approved materials to facilitate issuance of the specified roof warranty.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery with Owner’s on-site representative.

B. Prevent wrappers and packaging materials from inclusion in the roofing system.

C. Ensure that materials are properly stored on dunnage on roof surfaces in such a manner that none of the existing or new roof membrane is damaged as result of the storage and handling procedures.

D. Ensure that all materials stored on the roof are adequately tied and ballasted at all time to prevent blow off.

E. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

F. Material containers, mixing, and dilution

1. Containers shall be closed and sealed except when materials are being removed.
2. Follow Manufacturers' instructions for mixing and stirring.
3. Cements, adhesives, primers, coatings, and sealants which have been diluted or cut-back, after their manufacture shall not be incorporated into the Work.

1.07 SEQUENCING AND SCHEDULING

A. Proceed with permanent sheet metal installations concurrently with membrane roofing.

B. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

C. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.08 GUARANTEE AND WARRANTIES

A. Contractor shall warrant all sheet metal against defects in materials and workmanship for a period of not less than 2 years.

B. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a). Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b). Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c). Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART TWO - PRODUCTS

2.01 SHEET METAL MATERIALS

A. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

B. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural

movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

C. Counterflashings

1. Minimum 24 gage pre-finished (Kynar coated), galvanized steel as shown on the drawings. Color as selected from manufacturer's stand color samples.

D. Edging/Scuppers

1. Minimum 24 gage pre-finished (Kynar coated), galvanized steel as shown on the drawings. Color shall be submitted and approved by Owner.
2. Minimum 22 gage galvanized steel continuous cleat where detailed.

E. Pipe/Wall penetration flashings

1. Prefabricated Rain Collars
   a). Type 304, 26 ga Stainless Steel, type 304, 2B finish ASTM A240.
   b). Basis of Design: SBC Industries, 1765 Opa Locka Blvd, Opa Locka, FL 33054, (800) 228-2580; "Umbrella with Clamp" or approved substitute.

2. Shop Fabricated Penetration Pockets
   a). Type 304, 24 ga Stainless Steel, type 304, 2B finish ASTM A240.

3. Shop Fabricated Through Wall Flashing
   a). Type 304, 24 ga Stainless Steel, type 304, 2B finish ASTM A240.

F. Termination Bar

1. Size, 1/8 inch by 1 inches (minimum)
2. Slotted holes, 4 inches on center.
3. Top edge with caulk cup.

2.02 SOLDER

A. Not Applicable this project.

2.03 FASTENERS

A. All fasteners must have corrosion resistant coating.

B. Nail systems

1. Galvanized roofing nail, 12 gauge, 3/8 inch head.

C. Screw, screw/plate, anchor systems

1. HWH Teks Series by Buildex
2. Wafer head Teks/3 series by Buildex.
3. Flat head Teks/4 series by Buildex.
4. HWH Trupgrip series with EPDM washers by Buildex.
5. Tapcon series by Buildex.
6. Screws to be #12, minimum size

2.04 SHEET METAL - FABRICATION PROCEDURES

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
5. Edge face size shall be as required to cover the exterior face of the wall to prevent water entry by wind driven rain and shall be no shorter that the old metal which is being replaced.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Cleats

1. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
2. When applied as an exposed covering, fasten sheet metal to wood nailers with continuous cleats as detailed.

D. Seams

1. Fabricate nonmoving seams with flat-lock seams. Finish seams neatly with lines trimmed true and sharp. Number of joints shall be as few as is consistent with commercial size of materials. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use
2. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.

E. Soldering

1. Not applicable this project.

F. Counterflashings/Curb Flashings: Shall not exceed 10-foot-long sections. Lap 4” minimum on ends with double bead of approved sealant in lap area. Shop fabricate interior and exterior corners.

G. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Shall have a nominal 4" nailing flange. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate as indicated on the drawings.
2. Fabricate overflow scuppers placed where noted on the drawings, to dimensions required with 4-inch-wide flanges and base extending 4 inches (100 mm) beyond

cant or tapered strip into field of roof.

H. Do not use graphite pencils to mark metal surfaces.

2.05 NEW SIDING

A. For covering the walls of Section TT penthouse, a new 1.5” galvanized steel panel shall be installed. Metal panel siding shall be McElroy R panel or pre-approved equal.

B. The new underlayment for installation below new metal siding shall be a synthetic fabric, meeting physical properties of ASTM D226 and ASTM-E108 Class A fire resistance.

2.06 UNDERLAYMENT MATERIALS (THROUGH-WALL FLASHING)

A. Flexible Sheet Flashing for Through Wall Flashing: Self, adhering, reinforced, rubberized asphalt sheet membrane; minimum 40 mil thick;
   1. Perma-A-Barrier Wall Flashing by WR Grace or approved substitute.
   2. Primer: “Perma-A-Barrier Surface Conditioner” or as recommended by the sheet Manufacturer.
   3. Seam and lap Joints Membrane: Rubberized, asphalt based liquid membrane
      a. Bituthene Liquid Membrane by WR Grace or approved substitute.

PART THREE - EXECUTION

3.01 PRE-CONSTRUCTION SITE INSPECTION

A. Examine site and determine satisfactory conditions for work.

B. Write Consultant to notify of defects and conditions which may adversely influence performance or completion of Work. Absence of written notice will constitute the Contractor's acceptance of site.

D. Verify

1. Dry and acceptable surfaces to receive the Work.

2. Undamaged surfaces, straight and true, and free from defects which may lead to distortion of the metal work
3. Curbs, pipes, sleeves, ducts, vents, nailers, and blocking as secure and acceptable.
4. Cut reglets and receivers are in place and acceptable.

3.02 SELECTIVE DEMOLITION AND SURFACE PREPARATION

A. As specified in Section 02050 - Roof Demolition.

B. Existing perimeter edge metal scheduled to be removed shall be salvaged and provided to the Owner.

C. Ensure roof flashings or specified underlayment is in place and completely covering perimeter wood blocking as detailed.

3.04 SHEET METAL – INSTALLATION

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
4. Torch cutting of sheet metal flashing and trim is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet (as may be needed).

C. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."

D. Counterflashings

1. Install as shown on the detail drawings.
2. Install and secure new counterflashing as shown on the detail drawings
3. Lap 4” minimum on ends with double bead of approved sealant in lap area.

E. Termination Bars

1. Install as shown on the detail drawings.
2. Install along top edge of base flashing after installing butyl sealant behind the base flashing membrane as shown on the detail drawings.
3. Fasten 6” on center.
4. Caulk top edge of termination bar with approved sealant as shown on the detail drawings.

F. Edging: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

1. Interlock exterior bottom edge of fascia or coping with continuous cleat anchored to substrate as detailed. (Cleat required for face dimensions of 6 inches or greater).
2. Lock metal edging/coping onto cleat where cleat is required/shown and secure as shown on the detail drawings.

G. Rain Collars

1. Apply bead of specified butyl sealant to perimeter of pipe, and position rain collar flange over sealant, and secure clamping following manufacturer’s written instructions.
2. Apply sealant at lip at top of collar as shown on the detail drawings.

H. Siding Panels

1. Install new siding panels as per the manufacturer’s recommendations. As these panels are over small limited areas and are to fill in very tight spaces, some fabrication and installation to fit the field conditions shall be expected. In general, each panel shall be secured with one screw fastener per vertical rib and the spacing in the vertical rib dimension shall not exceed 36 inches.

2. Fabricated or install vertical closures and then caulk them watertight with new sealant to prevent wind driven rain.

3. Work shall include new cutting and trimming the siding to fit at tops, bottoms and sides. Due to the corner siding transitions at the Penthouse were this new metal panel will be installed, there will be some adjustments to wrap the siding around the 4 sides and additional special detailing where the siding will be mounted directly above the parapet wall in one corner.

4. Fabricate new surface mounted counterflashing at the top edges of the new siding, as needed for a watertight installation.

3.05 THROUGH WALL FLASHING INSTALLATION

A. Remove existing mortar and clean surfaces that are to receive flashings.

B. Install prefabricated pan flashings with maximum 24 inch legs with soldered seams at transitions and corners. Incorporate soldered end dams at all flashing terminations. Otherwise, fabricate and install flashings with maximum available lengths.

C. In field of walls, overlap pan flashing ends a minimum four (4) inches. Set overlapped ends in full bed of waterproofing liquid mastic compatible with flexible sheet membrane.

D. Fully adhere flexible sheet membrane to horizontal leg of metal pans and to clean, sound inboard wall surfaces. Use primer on inboard wall surfaces as required for proper adhesion. Lap ends of sheet flashing a minimum six (6) inches. Seal all flashing ends and terminations with compatible liquid mastic.

E. Install termination bar to top of flexible sheet membrane with masonry anchors at maximum 12 inches on center and encapsulate top edge with compatible liquid mastic.

F. At masonry expansion joints, flashing system shall run continuously through without termination.

3.06 PROTECTION

A. Roof surfaces shall be adequately protected to prevent damage. Keep scrap metal off of roof surface at all times.

3.07 CLEANUP

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

E. Debris from sheet metal work shall be removed from the roof and grounds on a daily basis. Leave job site absolutely clean at completion of work and properly dispose of all construction debris.

- End of Section -

PART ONE - GENERAL

1.01 Description

A. Caulk and seal all joints where shown on the drawings and elsewhere as required to provide a positive barrier against passage of air and passage of moisture. This work is primarily concentrated in the caulking of stone coping joints, exposed sheet metal flashings, including termination bar and all penetration flashings.

B. Related Work Described Elsewhere

1. Adhere strictly to the caulking and sealant specifications and to the detail drawings.

1.02 Quality Assurance

A. Qualifications of Manufacturer: Products used in this work shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the consultant.

B. In acceptance or rejection of the work of this Section, the consultant will make no allowance for lack of skill on the part of the workmen.

1.03 Product Handling

A. Deliver materials to the job site in original, unopened containers. Materials are to be stored in a protected area between 40 - 80 degrees F.

B. Do not retain on the job site any material that has exceeded the shelf life recommended by its manufacturer.

C. Protect all surfaces from staining or damage. All damaged work shall be repaired or replaced as directed by the consultant and at no additional cost to the Owner.

1.04 Job Conditions

A. Do not apply caulking or sealants when the surface temperature is below 40 degrees F. or above 125 degrees F. Do not apply materials when surface is damp or during cold, rainy, or frosty weather.

1.05 Submittals

A. Product data and a color chart for each sealant will be delivered to the consultant. The Owner will select colors for each sealant from the manufacturer’s standard colors.

1.06 Warranty

A. Furnish a written guarantee signed by the application contractor or firm, warranting the materials and workmanship to be watertight for a period of two (2) years from date of completion of the Work.

PART TWO - PRODUCTS

2.01 Sealants

A. General: Except as specifically otherwise directed by the consultant. Use only the type of sealants described in this Section.

B. Sealant shall be one of the following:

1. "Sonolatic NP-1", manufactured by Sonneborn, 7711 Computer Avenue, Minneapolis, Minnesota, 55435.

2. "Dymonic", manufactured by Tremco, Inc., Cleveland, Ohio.

3. “Vulkem 116” by Mameco of Cleveland Ohio

2.02 Back-Up Materials

A. General: Use only those back-up materials that are specifically recommended for this installation by the manufacturer of the sealant used, and which are non-absorbent and non-staining. Back-up materials must be 1.5 times the width of the joint.

B. Acceptable Types Include:

1. Closed-Cell, Resilient Urethane or Polyvinylchloride Foam.

2. Closed-Cell, Polyethylene Foam.

3. Closed-Cell sponge of vinyl or rubber.

2.03 Cleaner: Xylol, toluene, or commercial solvent recommended by the sealant manufacturer.

2.04 Primer: Shall be as recommended by sealant manufacturer, if required.

2.05 Other Materials

A. All other materials not specifically described but required for complete and proper caulking and installation of sealants shall be first quality of their respective kinds, new, and as selected by the contractor subject to the approval of the Owner.

PART THREE - EXECUTION

3.01 Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 Preparation

A. Steel Surfaces

1. Use solvent to remove oil and grease, wiping the surfaces with clean rags.

2. Remove protective coatings on steel by sandblasting or by a solvent that leaves no residue.

B. Aluminum Surfaces

1. Aluminum surfaces in contact with sealant shall be cleaned of temporary protective coatings, dirt, oil, and grease.

2. When masking tape is used for a protective cover, remove the tape just prior to applying the sealant.

3. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work and which are non-staining.

C. Concrete and Masonry Surfaces

1. All surfaces to come in contact with new sealants shall be dry, sound, well brushed and free from dust.

2. Where surfaces have been treated remove the surface treatment by use of sandblasting or wire brushing.

3. Where back-up material is required inset the backer rod or bond breaker tape in the joint cavity to the depth required.

3.03 Installation of Back-Up Material

A. Use only the back-up material recommended by the manufacturer of the sealant and approved by the Owner for the particular installation, compressing the back-up material 25% to 50% to secure a positive and secure fit. When using back-up of tube or rod stock, avoid lengthwise stretching of the material. Do no twist or braid hose or rod backup stock.

3.04 Joint Design

A. Joint depth shall never be greater than width.

1. Joint width is 1/4" to 1/2" wide; sealant depth at midpoint is to be 1/4".

2. Joint width is 1/2" to 1" wide; sealant depth at midpoint is to be 3/8" to 1/2".

3. Joint width is 1" to 2" wide; sealant depth at midpoint is to be 1/2".

B. In deep joints, the sealant depth shall be controlled by the use of back-up materials to maintain the recommended depth.

C. Where depth of joint does not permit the use of back-up material then a bond breaker strip must be installed to prevent three-point bonding.

3.05 Installation of Sealants

A. General: Prior to the start of installation in each joint, verify the joint type according to the details in the drawings and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment: Apply sealant under pressure with hand or power-actuated gun or other appropriate means. Guns shall have nozzle of proper size and shall provide sufficient

pressure to completely fill joints as designed.

C. Masking: Thoroughly and completely mask all joints where the appearance of sealant on adjacent surfaces would be objectionable.

D. Installation of Sealant: Install the sealant in strict accordance with the manufacturer's recommendations as approved by the Owner, thoroughly filling all joints to the recommended depth.

E. Tooling: Tool all joints to the profile shown on the details in the drawings. Tooling to be done immediately after sealant application.

3.06 Cleaning Up

A. Remove masking tape immediately after joints have been tooled.

B. Cleanup shall be performed on a daily basis, or more often as may be necessary. Contractor shall use a magnet bar to sweep all ground areas along and around the building where work was performed prior to leaving that area of work.

C. Keep adjacent surfaces clean and free from sealant as the installation progresses. Use solvent or cleaning agent as recommended by the sealant manufacturer.

- End of Section -

PART ONE – GENERAL

1.01 DESCRIPTION

A. During the roofing project, save and re-use the existing cast iron roof drain bowls during the schedule roof rehabilitation. Reset the elevation of the existing bowls up from the top of the roof deck (where needed) using drain extensions. If existing drains are found to be damaged and unusable, furnish and install new replacement drain assemblies, connected to the salvaged interior drain lines. Work shall include cleaning and reuse the existing drain bowls, and shall include new bolts, clamping rings and strainers, as well as new extensions.

1.02 RELATED SECTIONS

A. Section 02050 - Roof Demolition

B. Section 06100 - Rough Carpentry

C. Section 07535 - Fully Adhered EPDM

D. Section 07620 - Roof Related Sheet Metal

1.03 SUBMITTALS

A. As provided in Section 01300.

1.04 QUALITY ASSURANCE

A. As provided in Section 01400.

1.05 REGULATORY REQUIREMENTS

A. All roof drains and plumbing work shall be installed by a licensed plumber in accordance with all applicable local and State building codes and regulations. [Note: Plumbing work would include either adding a new drain, removing an old drain and replacing the entire drain bowl, or repairs to the internal drain line.] Cleaning and reuse of existing drains and drain parts may be performed by trained roofing contractor staff and would NOT require a licensed plumber. Similarly, installation of a drain extension piece would NOT require a licensed plumber.

1.06 SEQUENCING AND SCHEDULING

A. Proceed with permanent plumbing installations concurrently with membrane roofing.

1.07 GUARANTEE AND WARRANTIES

A. The Contractor shall warrant all Work performed under this Contract for a period of two (2) years from the date of Substantial Completion. The Contractor shall accept responsibility for the correction of defects in materials and workmanship and shall repair leaks promptly upon notice by the Owner or his Representative and at no cost to the Owner.

PART TWO - PRODUCTS

2.01 ROOF DRAIN PARTS

A. For all drain bowls, supply and install new bolts, clamping rings and strainers. Plastic strainers shall not be allowed. Contractor shall be responsible to determine needed parts to match the old building drain bowls.

B. Should the existing roof drain be in good condition, but not extend up a minimum of 2” up from the surface of the existing top of the deck, furnish and install a new adjustable extension that is a matching size to the existing bowl shall be utilized and installed. The cost for new extensions shall be performed on a unit price basis. New extensions are expected to be utilized at the vast majority of the roof drain locations for this project.

C. Should cleaning and re-use of the existing drains and/or a drain extension not be able to be done and made watertight (ie, a broken drain bowl), and a drain bowl is determined to need replacement, the new drain shall be a 4” cast iron bowl, with adjustable extension sleeve, along with a sump receiver and underdeck clamp with cast iron clamp and drain strainer with no hub connection. If new replacement drains are needed, those will be performed on a unit price basis.

D. Approved Manufacturers of cast iron replacement drain bowls, adjustable drain extensions, or makers of replacement parts.

1. Smith
2. Josam
3. Zurn
4. Pre-Approved equal

PART THREE - EXECUTION

3.01 INSTALLATION - ROOF DRAIN PARTS

A. Clean the existing roof drain of debris. Scrape clean and wire brush the top of the drain bowl to remove materials that would hinder the installation of the new roof membrane flashing and seal. New strainer and clamping ring are to be provided and installed. Contractor shall install new bolts as part of installation of the new clamping ring. If drain bolts snap or cannot otherwise be removed, Contractor shall tap the bowls to receive new bolts..

B. Where drains are to be raised, Contractor shall install new adjustable extensions so as to place the new upper bowl elevation at approximately 3 inches above the elevation of the roof deck (for locations where the existing drains are set in a recessed sump pan, the new extension bowl elevation will be approximately 4.5 inches above the recessed sump pan).

C. Reset the rigid roof insulation immediately surrounding the roof drains. (See roof drain flashing drawings for installation of tapered insulation immediately around each drain. Coordinate with the roof insulation and roof membrane technical sections.)

D. Install new roof membrane in a solid bead of butyl base sealant and install the new clamping ring with new bolts. Once clamping ring is tightened, secure the new drain strainer.

E. If the existing drain is found to be damaged, replace the entire drain bowl with a new drain of similar style and size (new bowl, new clamping ring, new bolts and new strainer). Connect existing drain line piping to the new replacement drain bowl as part of the drain replacement.

[**Note**: Drain bowl replacement, if needed, shall be performed by a licensed plumber. The installation of drain extension rings or just the installation of new clamping rings and bolts may be done by the roofing contractor as part of what is normal roofing work.]

3.02 QUALITY CONTROL

A. The building is to remain absolutely watertight during installation of new drains.

B. Be careful not to damage any interior or exterior finishes, including floors, ceilings, and walls. Contractor to carefully monitor the interior drain line conditions during all drain work extension or replacement work to confirm that the building remains in a watertight condition.

C. Restore all surfaces damaged by the operations of this Section to like new condition, at no additional cost to the owner.

3.03 VERIFICATION

A. Visually inspect and verify that all components are complete and properly installed.

B. Prior to completion of the work, test all existing drain lines to ensure that lines are completely functional, with no leaks.

3.04 CLEANUP

A. At completion of all plumbing work, remove all construction debris and equipment from job site.

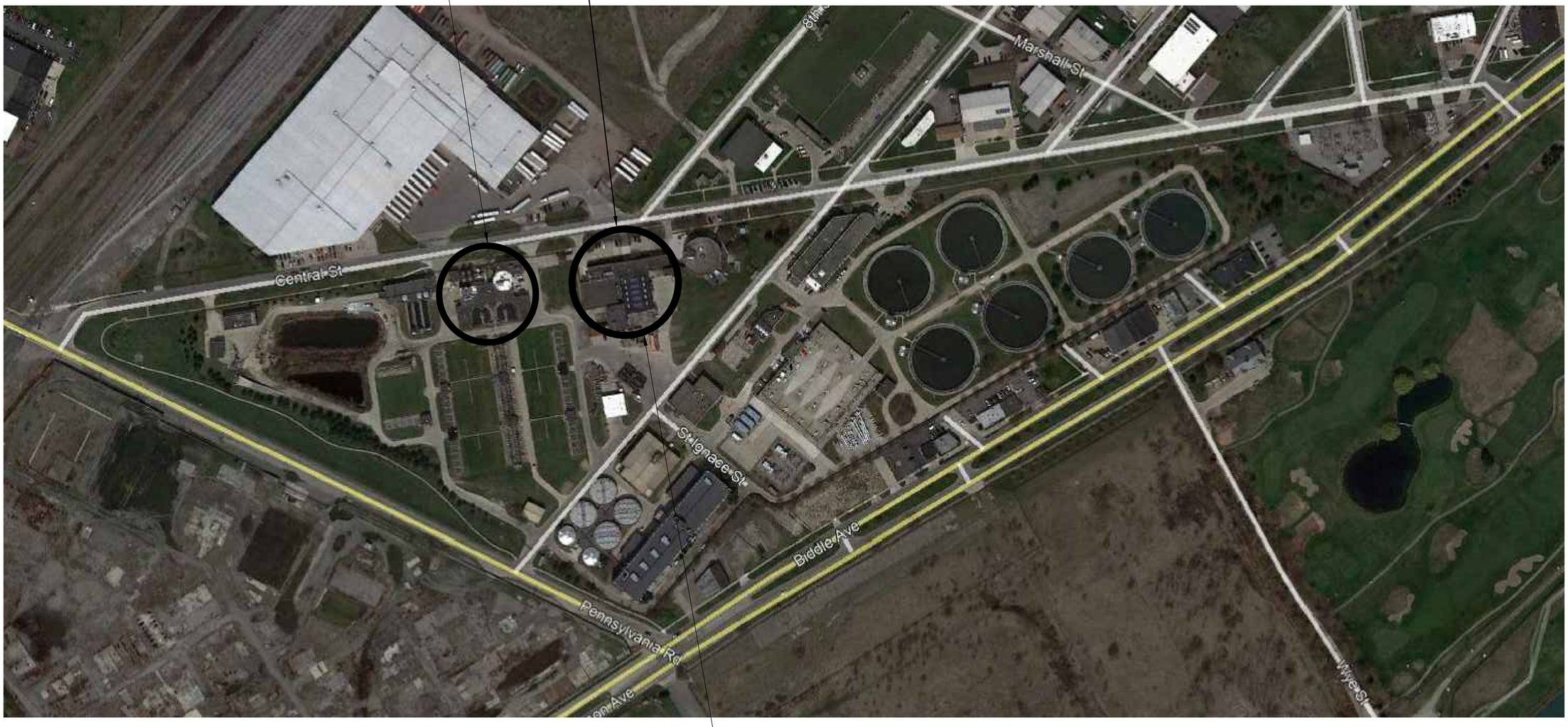
B. Cleanup shall be performed on a daily basis, or more often as may be necessary.

- End of Section -

2021-CRITICAL ROOF REPAIRS

PROCESSING BLDG.
(SECTIONS NN OO, PP AND QQ - SEE RP-1 AND TP-1)

VISITOR PARKING
(IN FRONT OF
ADMINISTRATION
BLDG.)



ADMINISTRATION BLDG.
(SECTIONS RR AND TT - SEE ROOF PLAN RP-2)

797 CENTRAL STREET, WYANDOTTE, MI SITE PLAN

01 SP-1

SCALE: N.T.S.

PAUL M. MAJKOWSKI
ENGINEER
No. 39183

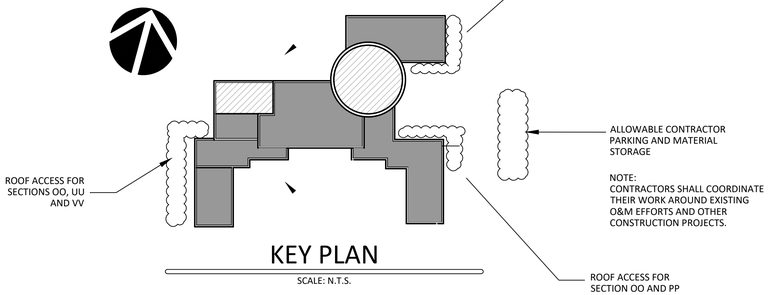
DRAWING NO: SP-1
DATE: 1/13/2021
PROJECT NO: 0416496
DRAWN BY: MER
SCALE: N.T.S.

PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
BUILDING NN, OO, PP AND QQ

TITLE: 797 CENTRAL STREET, WYANDOTTE, MI COVER SHEET/SITE PLAN

No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911



KEY PLAN

SCALE: N.T.S.

ROOF AREAS	
ROOF	APPROX. SQ. FT.
NN	614
OO	2,799
PP	2,398
QQ	1,787
UU	948
VV	1,066
TOTAL	9,612

01 RP-1 ROOF PLAN - SECTIONS NN, OO, PP, QQ, UU AND VV

SCALE: 1/8"=1'-0"

SYMBOL LEGEND

○	PLUMBING VENT (SOIL STACK)	■ ●	PITCH PANS		EXHAUST FAN	A	ABANDONED	1	DETAIL No.		ROOF DRAIN
⌀	HOODED VENT		ROOF HATCH		CURB	A	ABANDONED UNIT		LADDER		LIGHT
	AIR CONDITIONER		SCUPPER		PARAPET		EXPANSION/ CONTROL JOINT		CHIMNEY		VENTILATOR

NOTE: THE SYMBOLS SHOWN ARE USED ON OUR DRAWINGS TO INDICATE ROOF FEATURES. ADDITIONAL SYMBOLS MAY BE SHOWN ON THE DRAWING FOR SPECIFIC PROJECTS.

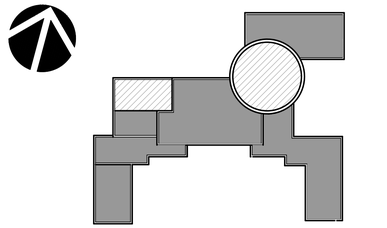
DRAWING NO: RP-1
DATE: 1/13/2021
PROJECT NO: 0416496
DRAWN BY: MER
SCALE: 1/8" = 1'-0"

PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
2021 REROOFING PACKAGE

TITLE: PROCESSING BUILDING ROOF PLAN

No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive - Farmington Hills - Michigan - 48335 - Tel 248.957.9911



KEY PLAN

SCALE: N.T.S.

ROOF AREAS	
ROOF	APPROX. SQ. FT.
NN	614
OO	2,799
PP	2,398
QQ	1,787
UU	948
VV	1,066
TOTAL	9,612

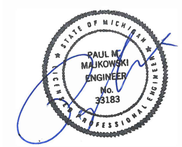
01 TP-1 TAPERED ROOF PLAN - SECTIONS NN, OO, PP, QQ, UU AND VV

SCALE: 1/8"=1'-0"

SYMBOL LEGEND

○	PLUMBING VENT (SOIL STACK)	■ ●	PITCH PANS		EXHAUST FAN	A	ABANDONED		DETAIL No.		ROOF DRAIN
⌀	HOODED VENT		ROOF HATCH		CURB	A	ABANDONED UNIT		LADDER		LIGHT
	AIR CONDITIONER		SCUPPER		PARAPET		EXPANSION/ CONTROL JOINT		CHIMNEY		VENTILATOR

NOTE: THE SYMBOLS SHOWN ARE USED ON OUR DRAWINGS TO INDICATE ROOF FEATURES. ADDITIONAL SYMBOLS MAY BE SHOWN ON THE DRAWING FOR SPECIFIC PROJECTS.



DRAWING NO: TP-1
DATE: 1/13/2021
PROJECT NO: 0416496
DRAWN BY: MER
SCALE: 1/8" = 1'-0"
PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
2021 REROOFING PACKAGE
TITLE: PROCESSING BUILDING TAPERED ROOF PLAN

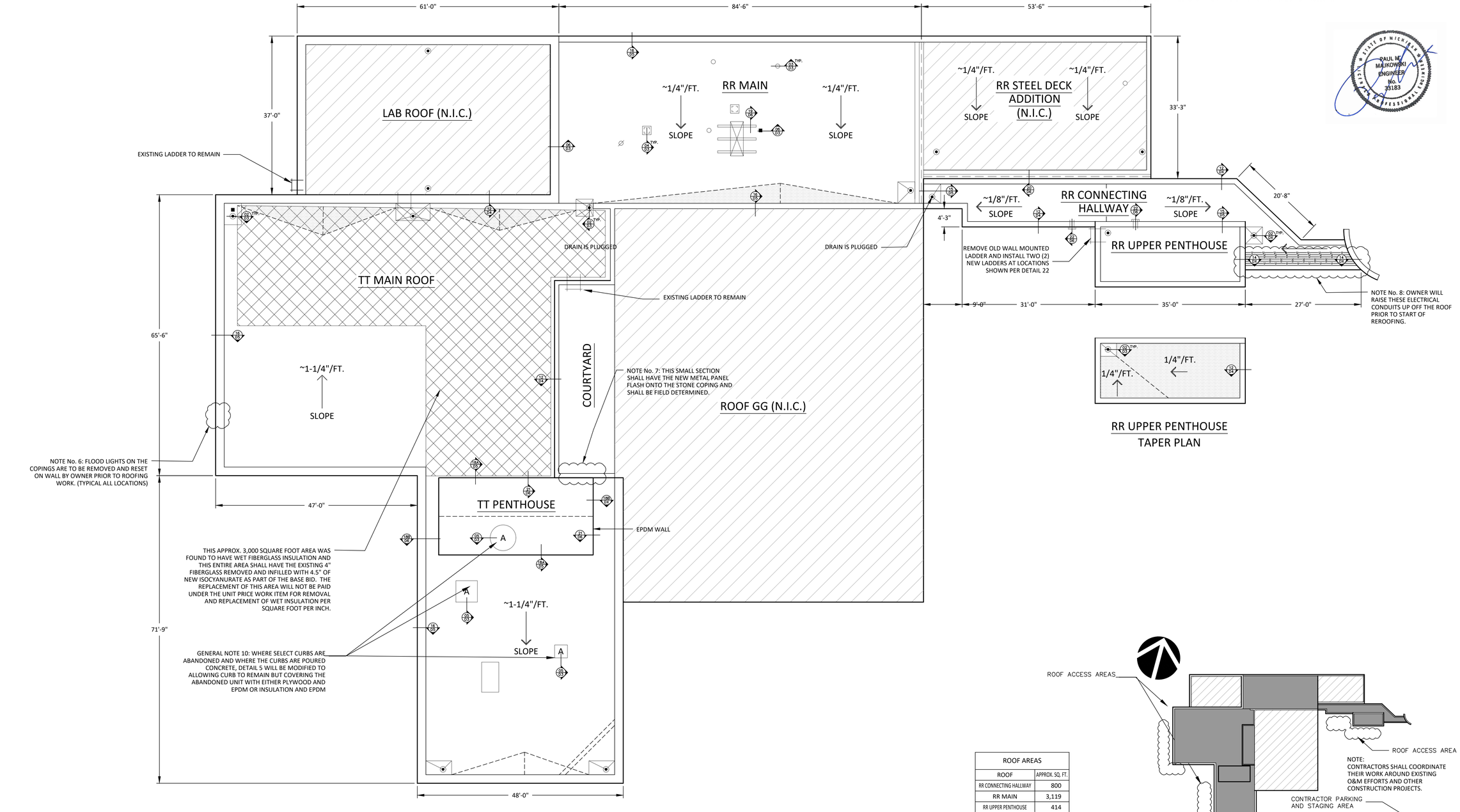
No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911

SYMBOL LEGEND

○	PLUMBING VENT (SOIL STACK)	▪ ▪	PITCH PANS	◯	EXHAUST FAN	A	ABANDONED	◇	DETAIL No.	◉	ROOF DRAIN
⌀	HOODED VENT	▨	ROOF HATCH	□	CURB	A	ABANDONED UNIT	▭	LADDER	◁	LIGHT
◪	AIR CONDITIONER	═	SCUPPER	═	PARAPET	═	EXPANSION/ CONTROL JOINT	▣	CHIMNEY	◯	VENTILATOR

NOTE: THE SYMBOLS SHOWN ARE USED ON OUR DRAWINGS TO INDICATE ROOF FEATURES. ADDITIONAL SYMBOLS MAY BE SHOWN ON THE DRAWING FOR SPECIFIC PROJECTS.



01 RP-3 ROOF PLAN - BUILDING RR AND TT

SCALE: 3/32"=1'-0"

RR UPPER PENTHOUSE
TAPER PLAN

ROOF AREAS	
ROOF	APPROX. SQ. FT.
RR CONNECTING HALLWAY	800
RR MAIN	3,119
RR UPPER PENTHOUSE	414
TT MAIN	7,439
TT PENTHOUSE	648
TOTAL	12,420

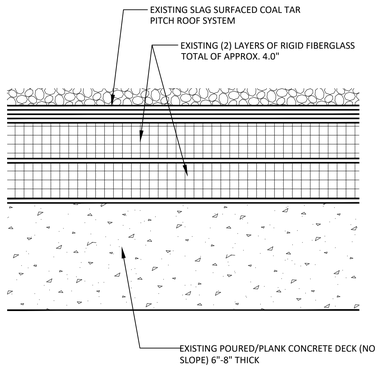
KEY PLAN

SCALE: N.T.S.

DRAWING NO: RP-2
DATE: 1/13/2021
DRAWN BY: MER
PROJECT NO: 0416496
SCALE: 3/32" = 1'-0"
PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY 2021 REROOFING PROJECT
TITLE: ROOF PLAN - ADMINISTRATION BLDG.

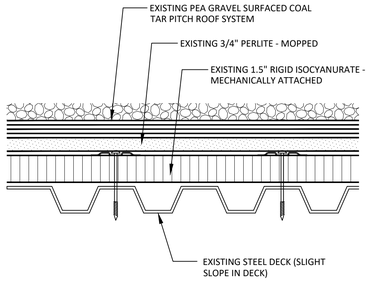
No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911



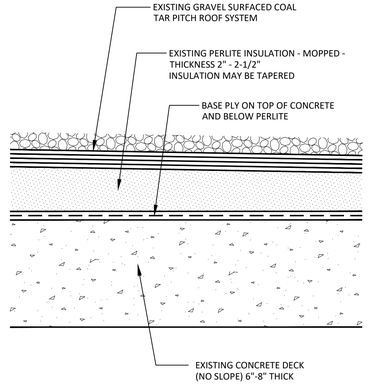
E1A D1

EXISTING CONSTRUCTION PROFILE
BLDGS. PP, OO, U VV AND RR (UPPER PENTHOUSE)



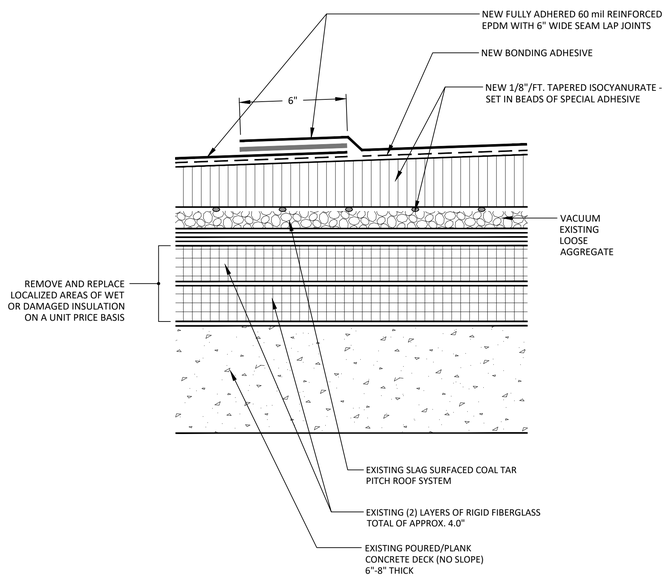
E1B D1

EXISTING CONSTRUCTION PROFILE
ROOF SECTION NN



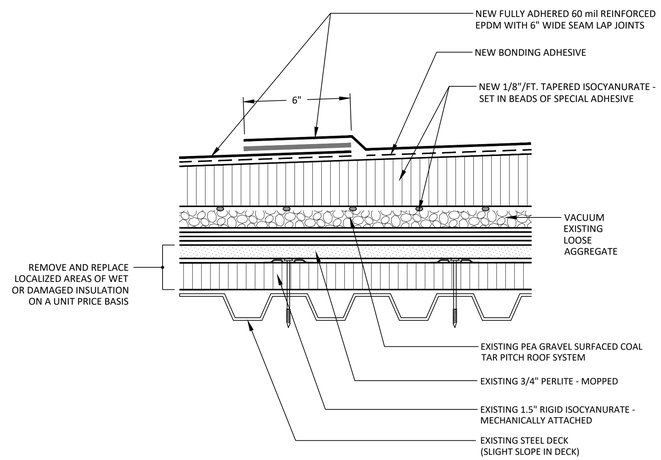
E1C D1

EXISTING CONSTRUCTION PROFILE
BLDG. QQ



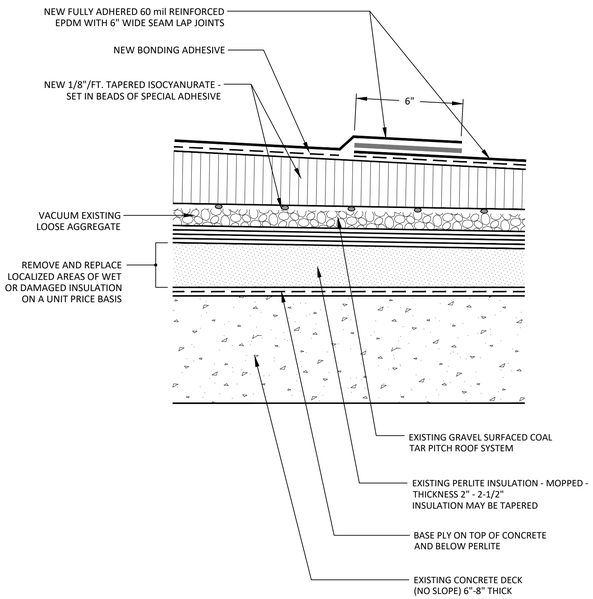
01A D1

NEW PROPOSED CONSTRUCTION PROFILE
BLDGS. PP, OO, U VV AND RR (UPPER PENTHOUSE)



01B D1

NEW PROPOSED CONSTRUCTION PROFILE
ROOF SECTION NN



01C D1

NEW PROPOSED CONSTRUCTION PROFILE
BLDG. QQ

STATE OF MICHIGAN — LICENSED PROFESSIONAL ENGINEER
PAUL M. MAJKOWSKI
ENGINEER
No. 33183

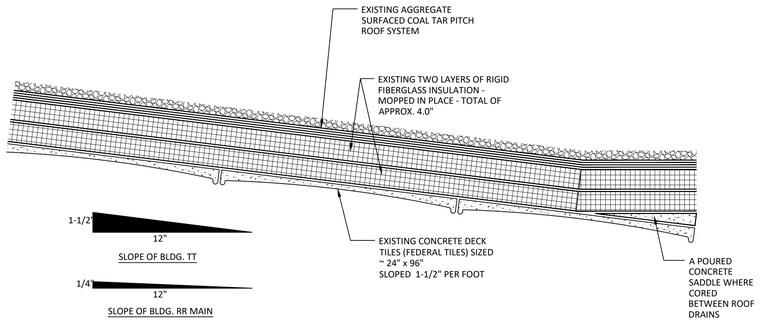
DRAWING NO: D1
DATE: 1/13/2021
DRAWN BY: MER
PROJECT NO: 04116496
SCALE: N.T.S.

PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
2021 REROOFING PROJECT

TITLE: ROOF DETAILS

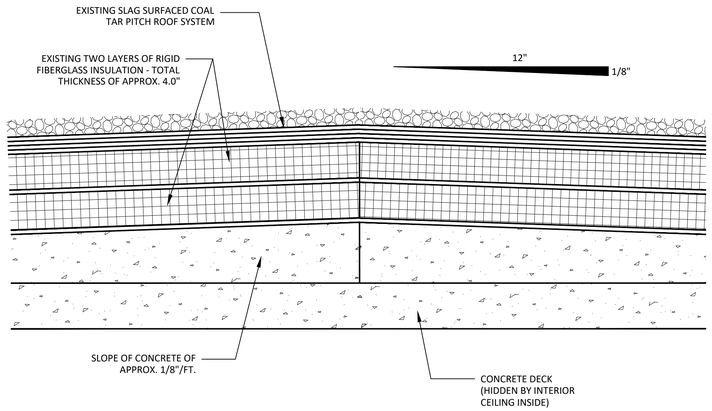
No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911



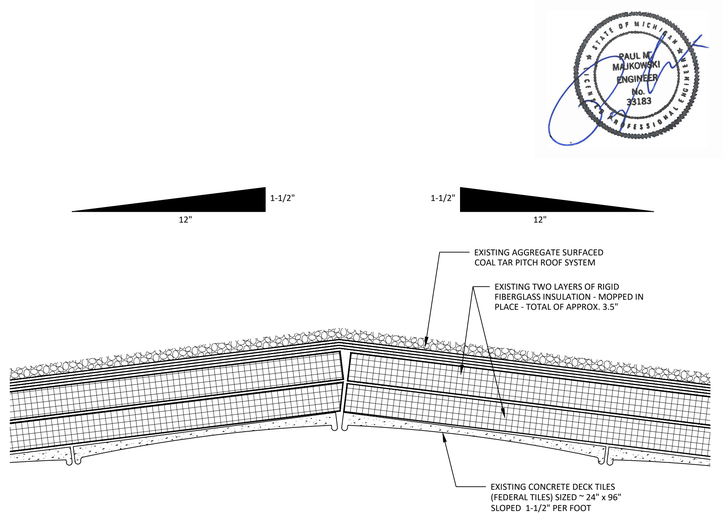
E1D D2

EXISTING CONSTRUCTION PROFILE
BLDGS. TT ADN RR MAIN SIM.



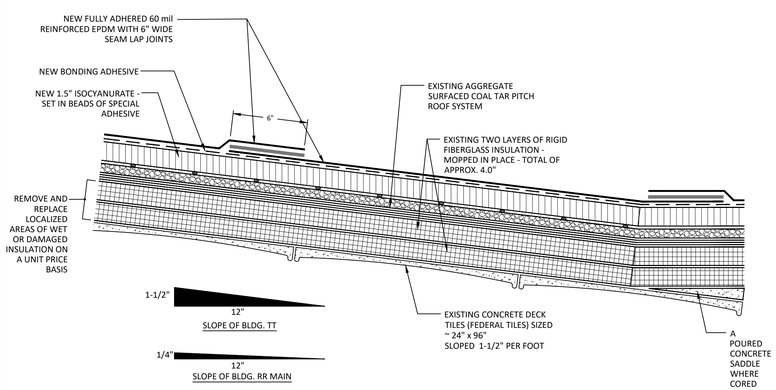
E1E D2

EXISTING CONSTRUCTION PROFILE
CONNECTING HALLWAY PORTION OF BLDG. RR



E1F D2

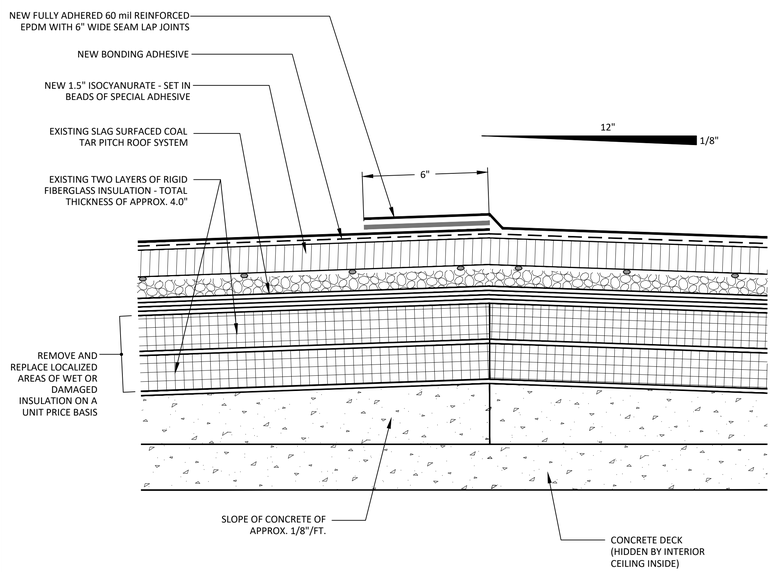
EXISTING CONSTRUCTION PROFILE
PENTHOUSE ON BLDG. TT-TT



NOTE 1: VERIFY POSITIVE DRAINAGE IN DRAIN VALLEY, INSTALL NEW ¼" TAPER IF POSITIVE DRAINAGE DOES NOT EXIST.

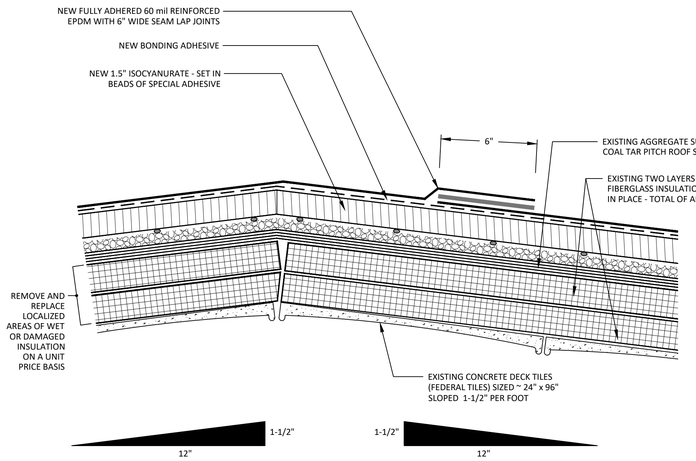
01D D2

NEW PROPOSED CONSTRUCTION PROFILE
BLDGS. TT ADN RR MAIN SIM.



01E D2

NEW PROPOSED CONSTRUCTION PROFILE
CONNECTING HALLWAY PORTION OF BLDG. RR



01F D2

NEW PROPOSED CONSTRUCTION PROFILE
PENTHOUSE ON BLDG. TT

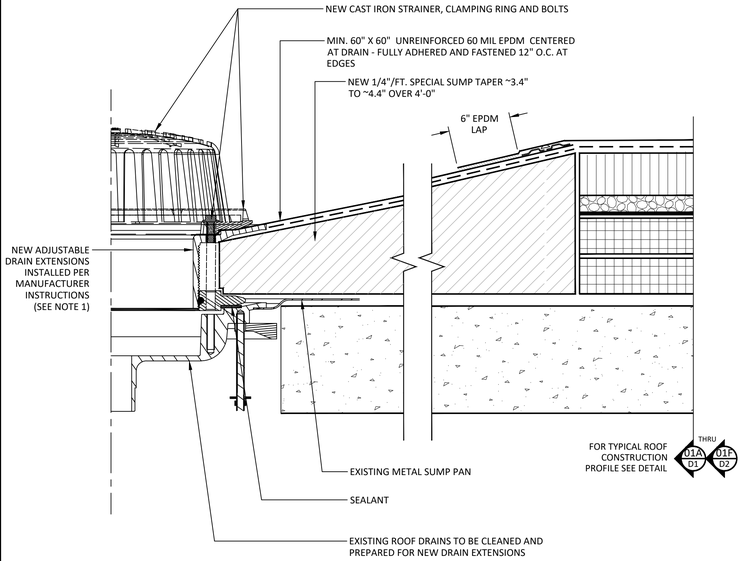
DRAWING NO: D2
DATE: 1/13/2021
DRAWN BY: MER
SCALE: N.T.S.
PROJECT NO: 0416496

PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
2021 REROOFING PROJECT

TITLE: ROOF DETAILS

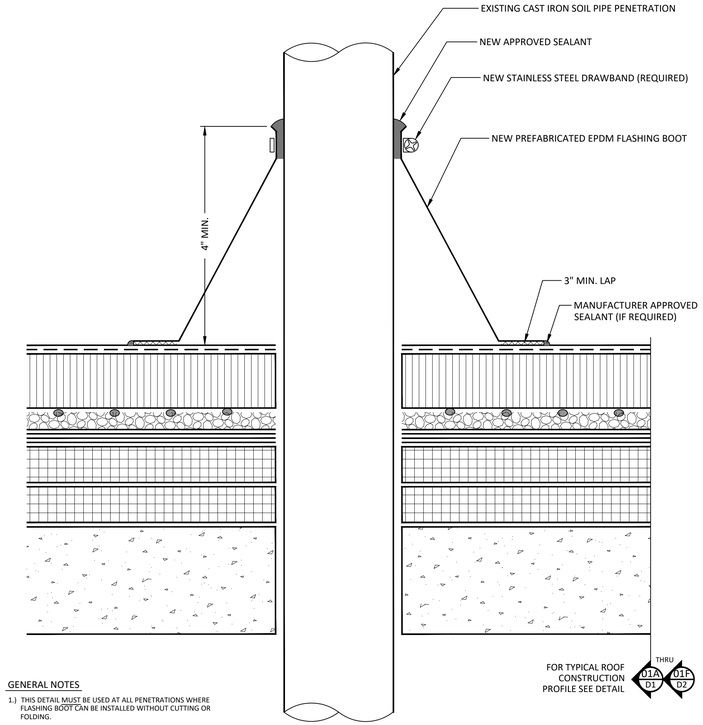
No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911



NOTE 1: NEW DRAIN EXTENSIONS ARE EXPECTED TO BE INSTALLED AT MOST ROOF DRAIN LOCATIONS

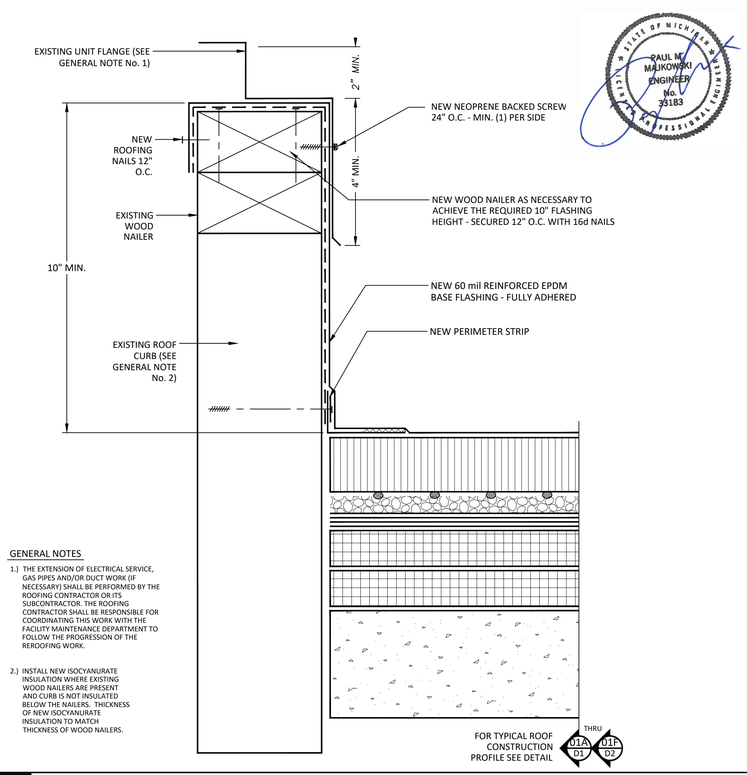
02 D3 ROOF DRAIN



GENERAL NOTES

1.) THIS DETAIL MUST BE USED AT ALL PENETRATIONS WHERE FLASHING BOOT CAN BE INSTALLED WITHOUT CUTTING OR FOLDING.

03 D3 SOIL PIPE / PIPE

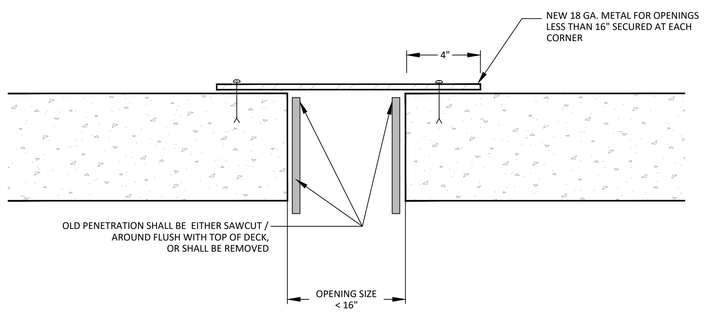


GENERAL NOTES

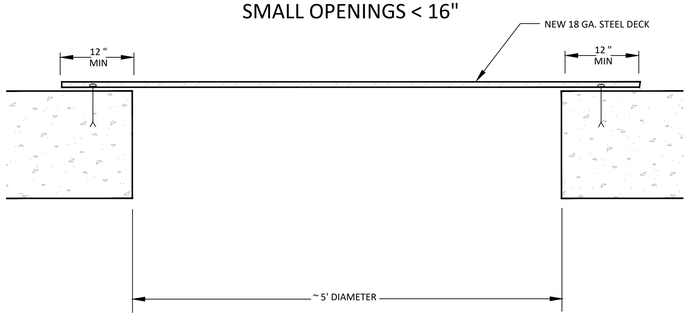
1.) THE EXTENSION OF ELECTRICAL SERVICE, GAS PIPES AND/OR DUCT WORK (IF NECESSARY) SHALL BE PERFORMED BY THE ROOFING CONTRACTOR OR ITS SUBCONTRACTOR. THE ROOFING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THIS WORK WITH THE FACILITY MAINTENANCE DEPARTMENT TO FOLLOW THE PROGRESSION OF THE REROOFING WORK.

2.) INSTALL NEW ISOCYANURATE INSULATION WHERE EXISTING WOOD NAILERS ARE PRESENT AND CURB IS NOT INSULATED BELOW THE NAILERS. THICKNESS OF NEW ISOCYANURATE INSULATION TO MATCH THICKNESS OF WOOD NAILERS.

04 D3 ROOF CURB/CAP/LOUVER

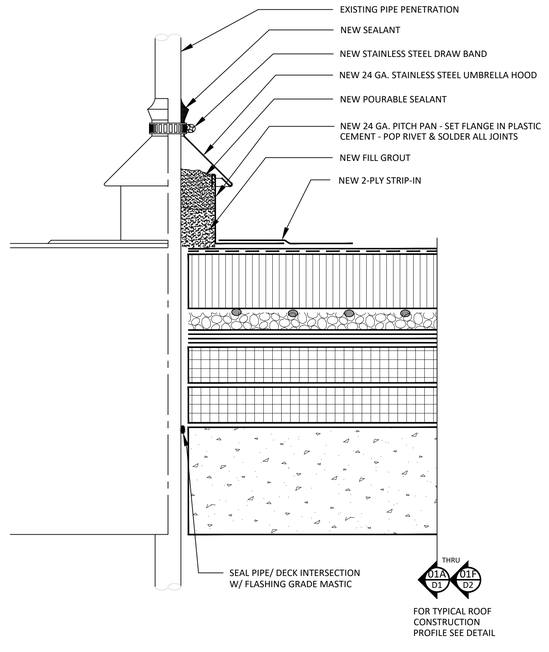


SMALL OPENINGS < 16"

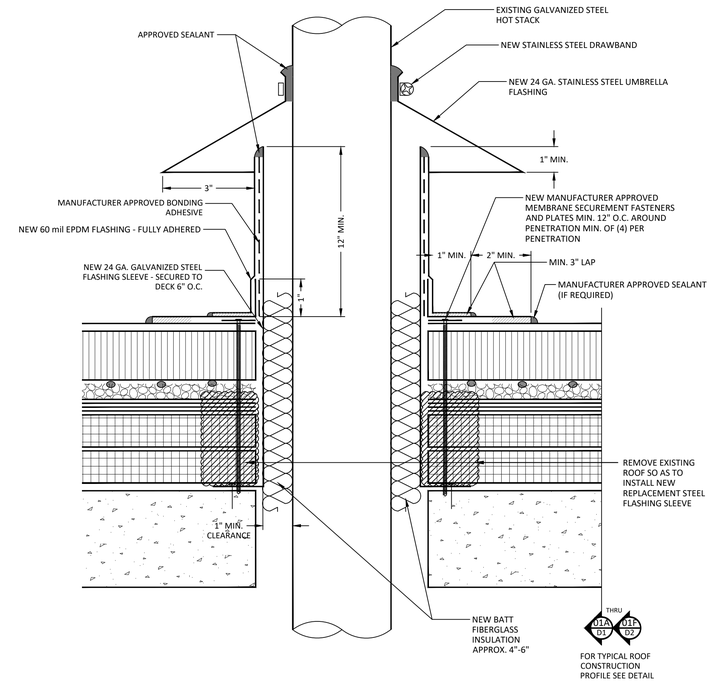


LARGE OPENINGS

05 D3 ABANDONED CURBS



06 D3 PITCH PAN



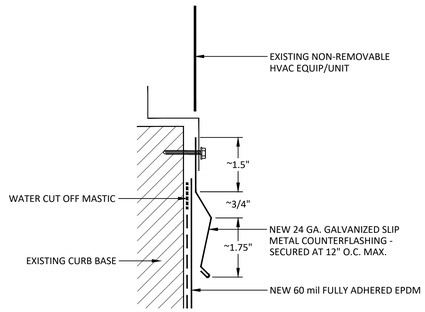
07 D3 HOT STACK

PAUL M. MAJKOWSKI ENGINEER No. 39183

DRAWING NO: D3
DATE: 1/13/2021
PROJECT NO: 04164496
DRAWN BY: MER
SCALE: N.T.S.
PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY 2021 REROOFING PROJECT
TITLE: ROOF DETAILS

NO.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 interchange Drive - Farmington Hills - Michigan - 48335 - Tel 248.957.9911



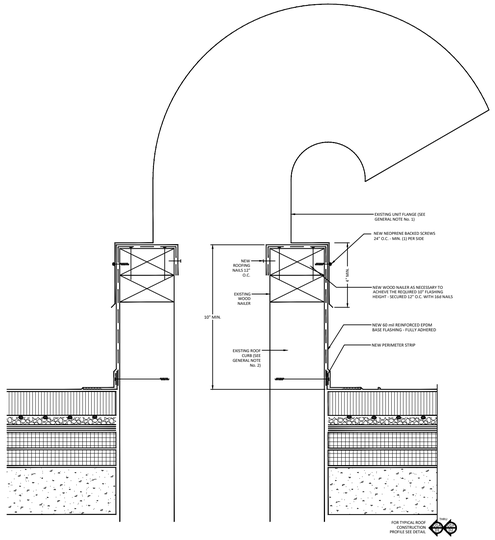
08 D4

NON-REMOVABLE CURB (HVAC)

GENERAL NOTES

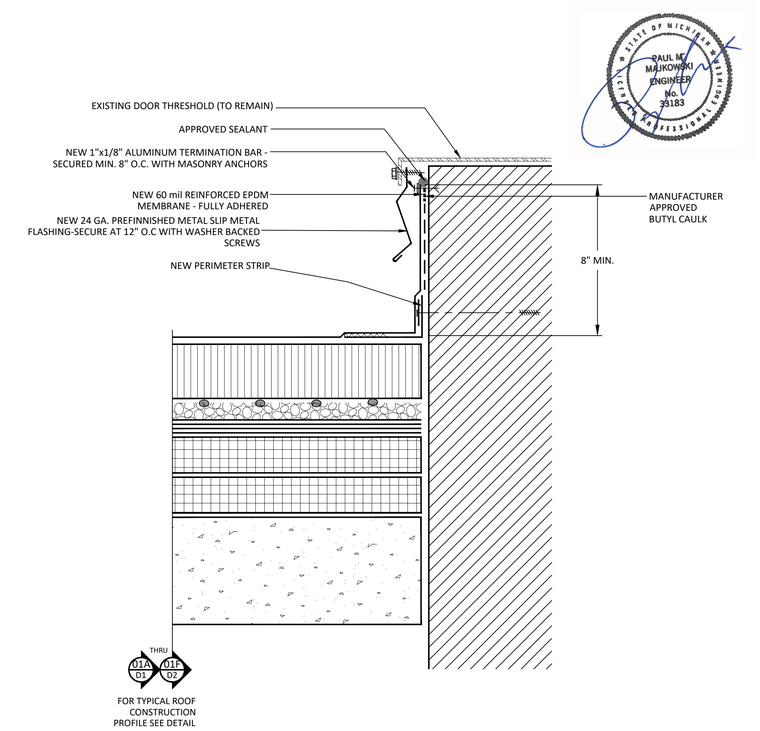
1.) THE EXTENSION OF ELECTRICAL SERVICE, GAS PIPES AND/OR DUCT WORK (IF NECESSARY) SHALL BE PERFORMED BY THE ROOFING CONTRACTOR'S SUBCONTRACTOR. THE ROOFING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THIS WORK WITH THE FACILITY MAINTENANCE DEPARTMENT TO FOLLOW THE PROGRESSION OF THE REROOFING WORK.

2.) INSTALL NEW ISOCYANURATE INSULATION WHERE EXISTING WOOD NAILERS ARE PRESENT AND CURB IS NOT INSULATED BELOW THE NAILERS. THICKNESS OF NEW ISOCYANURATE INSULATION TO MATCH THICKNESS OF WOOD NAILERS.



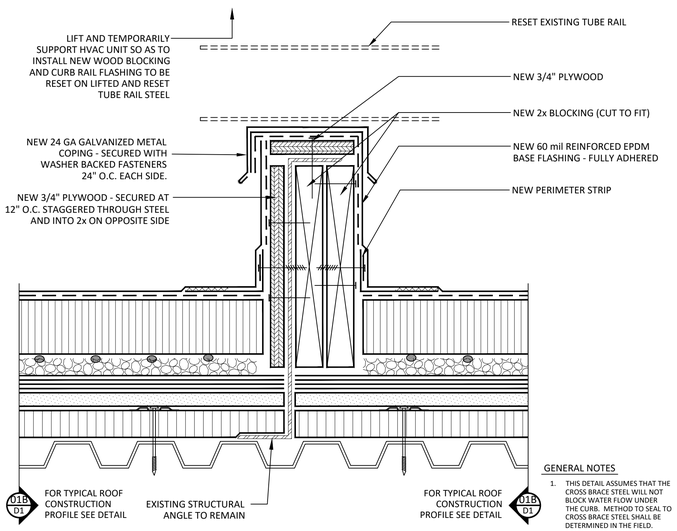
09 D4

GOOSENECK DUCT



10 D4

DOOR THRESHOLD

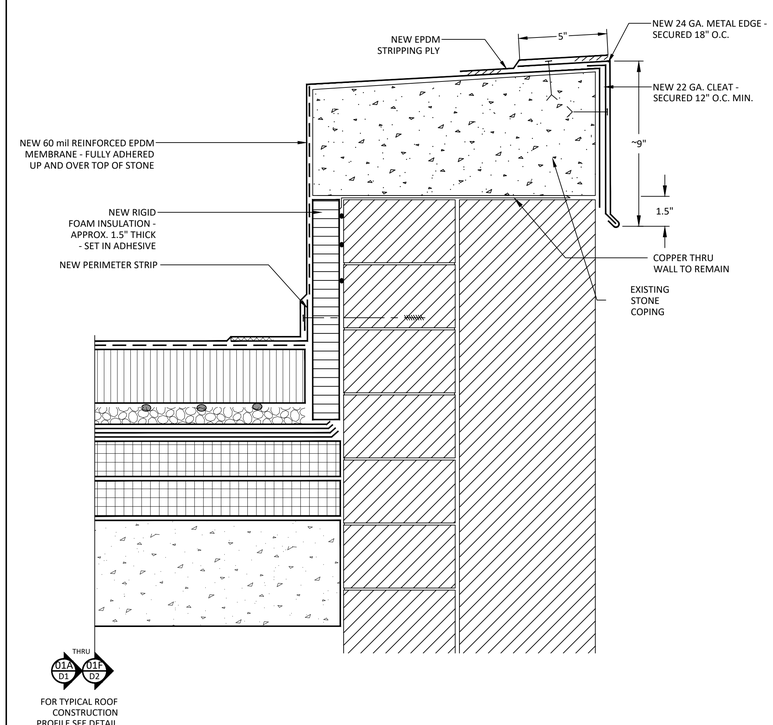


GENERAL NOTES

1. THIS DETAIL ASSUMES THAT THE CROSS BRACE STEEL WILL NOT BLOCK WATER FLOW UNDER THE CURB. METHOD TO SEAL TO CROSS BRACE STEEL SHALL BE DETERMINED IN THE FIELD.

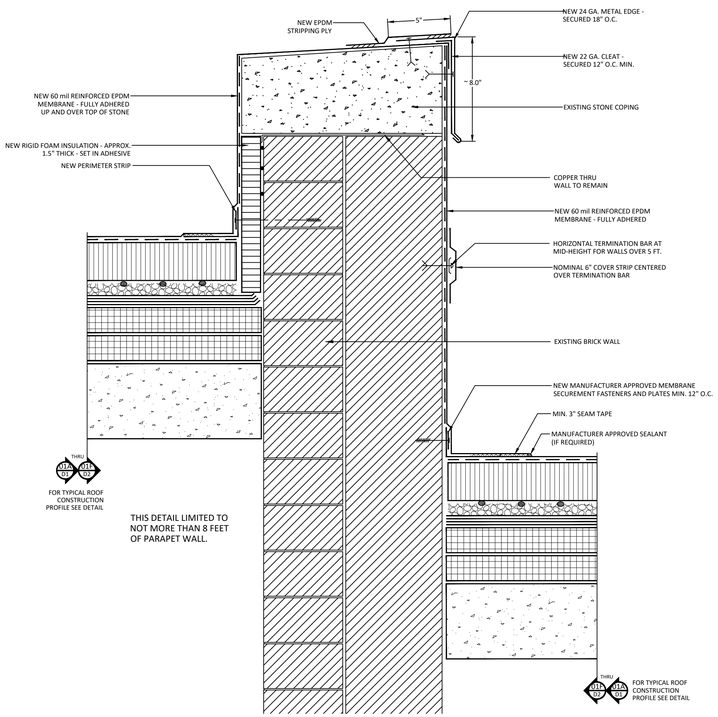
11 D4

ROOF NN CURB RAIL



12 D4

LOW PARAPET WALL (TYP.)



13 D4

HIGH PARAPET WALL (STYLE 1)

STATE OF MICHIGAN
PAUL M. MAJKOWSKI
ENGINEER
No. 35183
TECHNICAL PROFESSIONAL ENGINEER

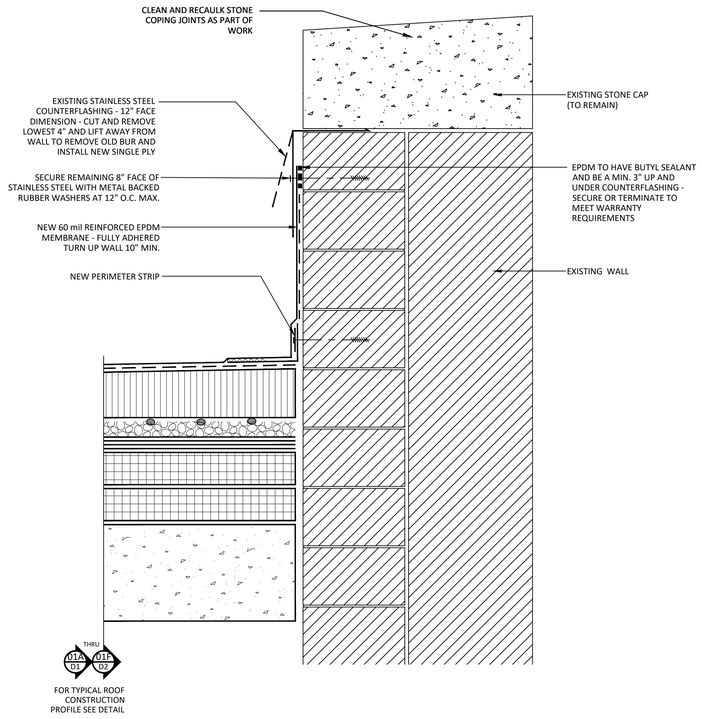
DRAWING NO: D4
DATE: 1/13/2021
DRAWN BY: MER
SCALE: N.T.S.
PROJECT NO: 0416496

PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY
2021 REROOFING PROJECT

TITLE: ROOF DETAILS

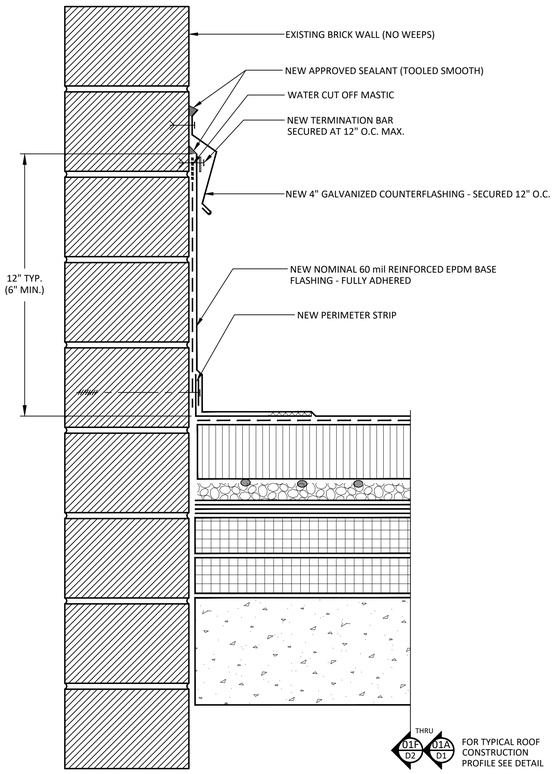
No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.9911



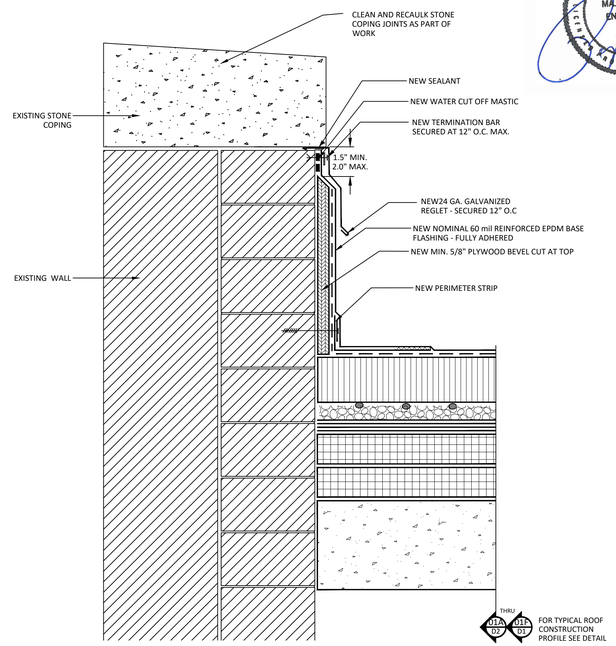
14 D5

HIGH PARAPET WALL (SECTION QQ)



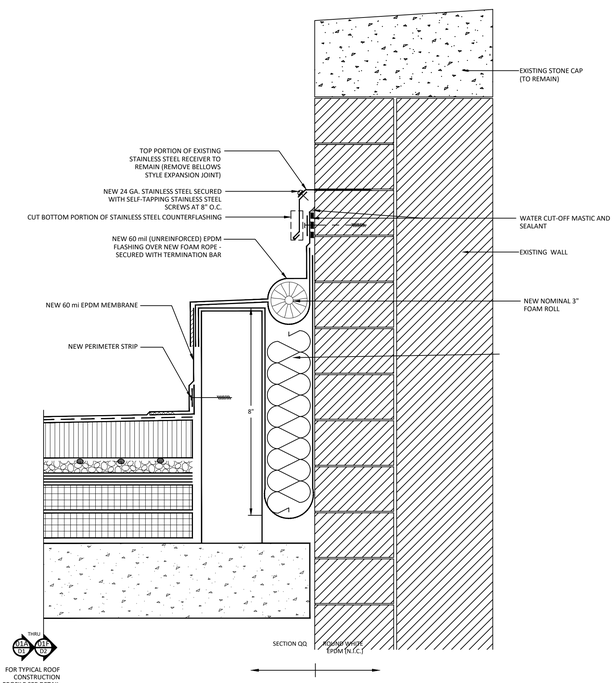
15 D5

ADJOINING WALL (STYLE 1)



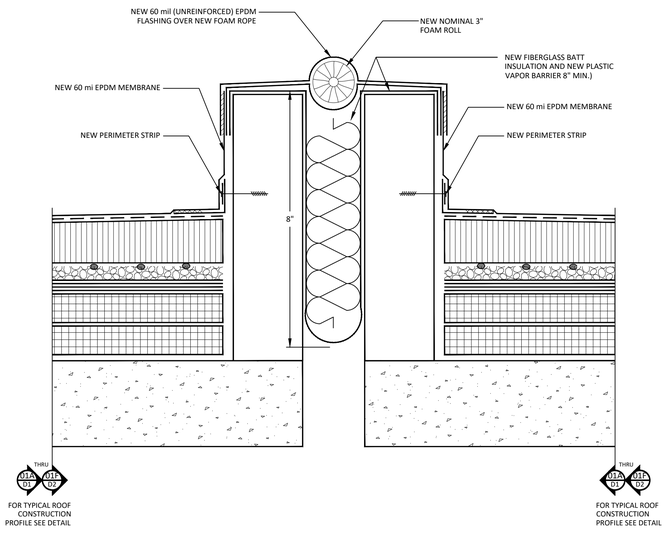
16 D5

ADJOINING WALL (STYLE 2)



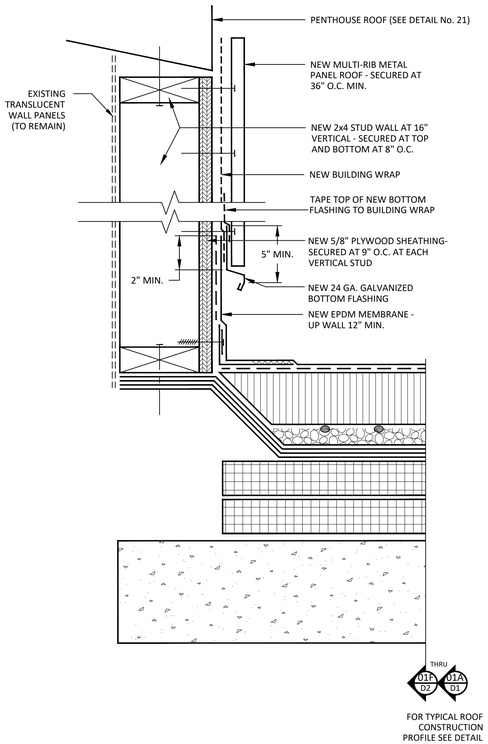
17 D5

EXPANSION JOINT ROOF TO WALL (SECTION QQ)



17A D5

EXPANSION JOINT ROOF TO ROOF



18A D5

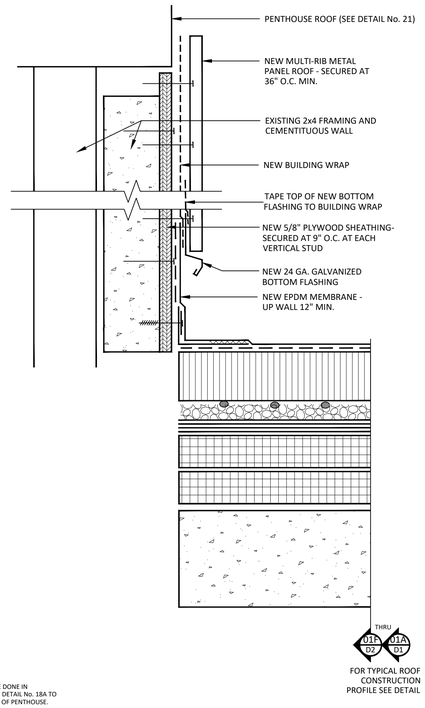
PENTHOUSE WALL LONG SIDES (SECTION TT)

STATE OF MICHIGAN
PAUL M. MAJKOWSKI
ENGINEER
No. 33183
PROFESSIONAL ENGINEER

DRAWING NO: D5
DATE: 1/13/2021
PROJECT NO: 0416496
DRAWN BY: MER
SCALE: N.T.S.
PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY 2021 REROOFING PROJECT
TITLE: ROOF DETAILS

No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive - Farmington Hills - Michigan - 48335 - Tel 248.957.9911

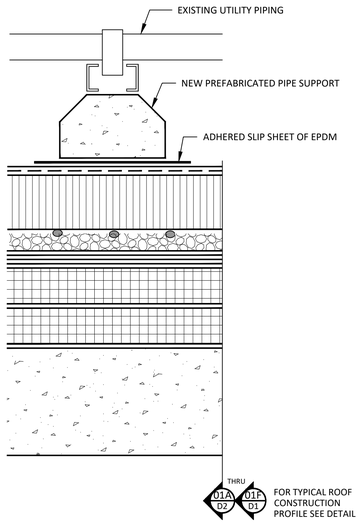


GENERAL NOTES

1.) THIS WORK SHALL BE DONE IN COMBINATION WITH DETAIL No. 18A TO WRAP ALL (4) WALLS OF PENTHOUSE.

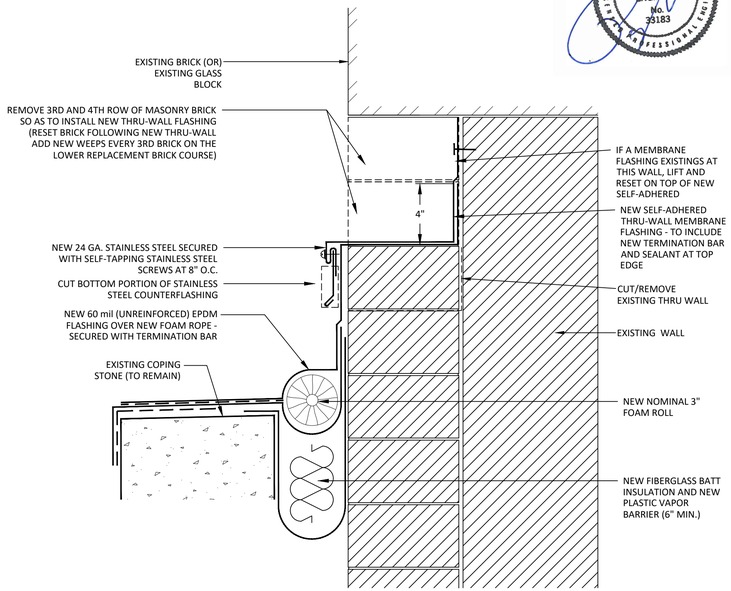
18B D6

PENTHOUSE WALL



19 D6

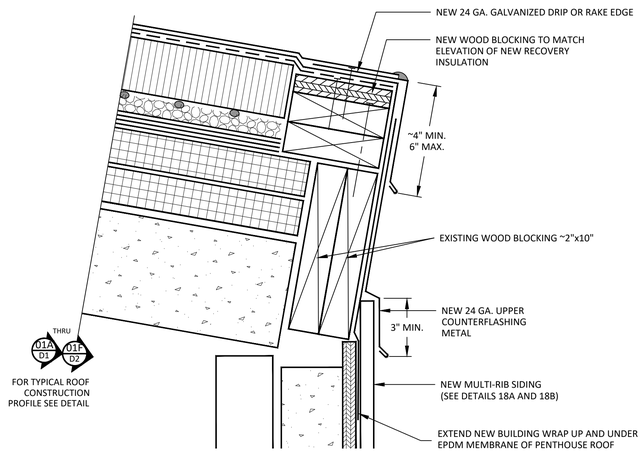
SLEEPER SUPPORTS FOR PIPING/CURBS



NOTE: WORK SHALL INCLUDE CONSTRUCTION OF END DAMS

20 D6

ROOF TO WALL EXPANSION JOINT WITH THROUGH WALL



GENERAL NOTES

1.) FIELD MEMBRANE AND ADJUST SHAPE OF NEW UPPER COUNTERFLASHING TO FIT WITH NEW MULTI-RIB SIDING ON EACH SIDE.

21 D6

DRIP EDGE/RAKE EDGE PENTHOUSE

NOTE: LADDERS SHALL BE COTTERMAN SERIES FW STANDARD FIXED STEEL LADDERS WITH WALK THROUGH HANDRAILS OR PRE-APPROVED EQUALS. CONTRACTOR SHALL MEASURE EACH WALL PRIOR TO ORDERING THE LENGTH/SIZE. SHALL MEET OR EXCEED ANSI A14.3, OSHA 1910.27 AND 1926.1053 STANDARDS. EXACT LOCATIONS OF LADDER PLACEMENT SHALL BE FIELD DETERMINED DURING THE PROJECT.

22 D6

WALL MOUNTED LADDER

PAUL M. MAJKOWSKI ENGINEER No. 35183

DRAWING NO: D6
DATE: 1/13/2021
PROJECT NO: 0416496
DRAWN BY: MER
SCALE: N.T.S.
PROJECT NAME: DOWNRIVER WASTEWATER TREATMENT FACILITY 2021 REROOFING PROJECT
TITLE: ROOF DETAILS

No.:	DATE:	REVISIONS:
1	1/13/2021	OUT FOR BID SET

Building Science Solutions
Building and Construction
37483 Interchange Drive · Farmington Hills · Michigan · 48335 · Tel 248.957.5911

Agreement

This Agreement by and between: Downriver Utility Wastewater Authority, Inc., ("DUWA") and_____, the "Contractor" or "Contractor." DUWA and the Contractor may be referred to in this Contract collectively as the "Parties" or singularly as a "Party."

In exchange for the mutual covenants and obligations contained herein, DUWA and the Contractor agree as set forth below.

1. General

1.1 **Engagement.** DUWA hereby engages the Contractor and the Contractor hereby agrees to faithfully and diligently perform the Work in accordance with the terms and conditions contained in this Agreement and the Contract Documents. The Agreement shall be administered by DUWA and the Contractor shall perform the work at the direction of DUWA and its Project Representative.

1.2 **Definitions**. The terms, words and phrases used in this Agreement and the Contract Documents shall have the meanings given them in the General Conditions.

1.3 **The Work**. The Contractor shall fully execute the Work described in the Contract Documents, except as specifically defined in the Contract documents to be the responsibility of others.

1.4 The Project.

1.5 **Water Infrastructure Finance and Innovation Act.** All or portions of the Project may be funded by a loan provided under the Water Infrastructure Finance and Innovation Act ("WIFIA" or the "Act"). As such, this Agreement is subject to the requirements of the Act, 33 U.S.C. 3901 et seq., as amended and the implementing regulations at 40 CFR 35.10000 et seq., including the Davis Bacon Act, 40 U.S.C. 3141 et seq., and implementing regulations. The specific WIFIA compliance requirements are included as Exhibit A to this Agreement.

2. Contract Documents.

2.1 This Agreement, together with the documents referenced below form the Contract Documents. The Contract Documents form the entire agreement between DUWA and Contractor and are incorporated into the Agreement by reference as though fully set forth herein. If a conflict exists between the provisions of the Contract Documents, the provision in the Contract Document first listed below shall govern:

a) Change Orders and Construction Change Directives
b) Addenda, including but not limited to any addenda, modifications or amendments to this Agreement
c) This Agreement and the incorporated Exhibits listed below
    i) Exhibit A: WIFIA Requirements
    ii) Exhibit B: Insurance and Bond Requirements

d) Drawings
e) Specifications

All prior agreements with respect to the matters contained in this Agreement are superseded hereby and each Party confirms that it is not relying on any representations or warranties of the other Party except as specifically set forth in this Agreement. The Contract Documents are intended to be fully complementary. The Contractor shall carefully review all the Contract Documents for any conflicts or ambiguities and will promptly notify DUWA in writing through a request for clarification or information if it notices any conflict between or among Contract Documents.

2.2 The Contract Documents are intended to permit the parties to complete the Work and all obligations required by the Contract Documents within the Contract Time for the Contract Price. The Contract Documents are intended to be complementary and interpreted in harmony so as to avoid conflict, with words and phrases interpreted in a manner consistent with construction and design industry standards.

2 **Contract Time**.

3.1 **Date of Commencement**. The Date of Commencement of the Work shall be the date a notice to proceed is issued by DUWA to Contractor.

3.2 **Substantial Completion**. Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the Work not later than days from the Date of Commencement. If the Contractor fails to achieve Substantial Completion as provided in this Section 1.5, liquidated damage shall be assessed as set forth in Section 3.5.

3.3 **Time is of the Essence**. Time is of the essence in the performance of this Work. Contractor shall make whatever adjustments in working hours, manpower, equipment and any other resources deemed necessary to complete the Work, at Contractor's expense, in accordance with the terms of the Agreement and the specific schedule requirements hereof.

3.4 **Delay.** Delays caused solely by DUWA shall entitle the Contractor to an extension of the Project schedule, but there shall be no adjustment in the Contractor's compensation unless such delay is both unreasonable under the circumstances and beyond the contemplation of the parties as of the Effective Date of this Agreement.

3.5 **Liquidated Damages.** Contractor understands that if Substantial Completion as set forth in section 3.2 is not achieved by the specified dates that DUWA will suffer damages which are difficult to determine and accurately specify. Contractor agrees that if Substantial Completion is not attained on the date set forth in Section 4.3(b), that the Contractor will be assessed One-Thousand Dollars ($1,000) as liquidated damages for each day Substantial Completion is delayed. Contractor shall not be liable for liquidated dames to the extent any failure to meet Substantial Completion is not due to the fault of Contractor.

3.6 **Force Majeure**. Delays caused as a result of force majeure shall temporarily excuse nonperformance of obligations during the period of time the force majeure prevents performance, other than payment obligations; provided that DUWA may suspend payment with respect to the time period of the force majeure if Contractor is unable to complete the Work. The Party invoking force majeure shall notify the other Party as soon as reasonably possible of the force majeure, and shall specify the particulars thereof (including the expected duration thereof) and what actions have or will be undertaken to correct the force majeure. The Parties shall exercise reasonable good faith efforts to remove the cause or mitigate the effect of the force majeure. The Contractor shall resume performance of the obligations under this Agreement immediately upon passing of the force majeure event. Force majeure events shall include acts of God; (b) flood, fire, earthquake or explosion; (c) war, invasion, hostilities (whether war is declared or not), terrorist threats or acts, riot or other civil unrest; (d) government order or law; (e) actions, embargoes or blockades in effect on or after the date of this Agreement; (f) action by any governmental authority; (g) national or regional emergency; (h) strikes, labor stoppages or slowdowns; (i) shortage of adequate power or transportation facilities; and (j) other similar events beyond the reasonable control of the party impacted by the force majeure event.

3.7 **Normal Working Hours**. DUWA will determine the normal working hours for the Work.

4 **Contract Price**.

4.1 **Contract Price**. Subject to the performance by the Contractor of its obligations hereunder, DUWA agrees to pay the Contractor for the performance of the Work a not to exceed amount of____Dollars ($_____). The Contract Price includes all applicable federal and/or state sales, use, franchise, excise, assessments and other taxes which may now or hereafter be levied. Payments of the Contract Price will be allocated and disbursed on the basis of percentage completion of the major tasks and in the amounts set forth below:

4.2 **Allowances.** Allowances, if any, included in the Contract Price:

Item	**Price**

4.3 **Unit Prices.** Unit prices, if any included in the Contract Price:

Item	**Units**	**Price per Unit**

4.4 **Procedure for Payment.** Subject to the conditions in this Article 4 and elsewhere in the Contract Documents, DUWA shall make payment within sixty (60) days after receipt of each properly submitted, accurate and approved Application for Payment (invoice).

4.4.1 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

4.4.2 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Price among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

4.4.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

4.5 **Retainage**. Each and any invoice submitted or the Work will be subject to a ten percent (10%) retainage by DUWA. Upon fifty percent (50%) completion of the Phase 2 Work, DUWA shall no longer withhold retainage such that at the time of Substantial Completion, the retainage withheld by DUWA shall have been reduced to five percent (5%). The cumulative retainage invoice shall be paid upon completion and acceptance of the Work by DUWA.

4.6 **Payment to Subcontractors**. Contractor will pay amounts due to its Subcontractors (if any) no later than fifteen (15) Business Days after receipt of payment from DUWA. Contractor shall certify to DUWA in writing at the time of submittal of each invoice that all Sub-Subcontractors, Subcontractors and Suppliers have been paid for work and material from previous progress payments received, less any retainage, prior to receipt of any further progress payments. This provision in no way creates any contractual relationship between any Sub-Subcontractor, Subcontractor or Supplier and DUWA or any liability on DUWA for Contractor's failure to make timely payments to them.

4.7 **Final Payment Conditions**. As a condition precedent to DUWA's Final Payment under this Agreement, Contractor shall furnish certifications, satisfactory to DUWA, that state that no liens of any kind, including, but not limited to, mechanics' liens or other claims arising directly or indirectly out of any act or omission of such Contractor or any of its Subcontractors, Sub-Subcontractors or Suppliers, have been made or attached against the Work or upon any property owned by DUWA. DUWA, at any time, without notice, may pay and discharge liens, claims, and encumbrances filed by the Contractor's Sub-Subcontractors or Suppliers and deduct the amount paid, together with costs and attorneys' fees, from compensation due to the Contractor hereunder.

4.8 **Final Payment Acceptance**. The acceptance by Contractor of the final payment under this Agreement shall constitute and operate as a release to DUWA for all claims and liability to the Contractor, its representatives, subcontractors, sub-subcontractors, supplies and assigns for any additional compensation or payment relating to any and all things done or furnished to the services rendered by the Contractor, except for claims then pending of which notice has been provided in writing to DUWA. However, final payment shall in no way relieve the Contractor of liability for its obligations or for faulty or defective work discovered after final payment.

4.9 **Disputes**. If DUWA disagrees with any portion of a billing, DUWA will notify the Contractor within ten (10) business days of the disagreement, and the Parties will attempt to resolve the disagreement using the methods set forth in the General Conditions. DUWA's payment of any amounts will not constitute a waiver of any disagreement with an invoice.

5 Insurance and Bonds.

5.1 **Insurance and Bond Requirements.** On or before the date specified in the Notice to Proceed, Contractor shall provide financial security for the performance of its obligations under this contract through one or more payment and performance bonds that guarantee the Contractor's timely performance of its obligations under this Agreement for the benefit of DUWA. The Contractor shall secure such bonds from a company holding Certificates of Authority as acceptable sureties on Federal Bonds and as Acceptable Reinsuring Companies as published in the Department of Treasury Circular 570. The Contractor shall provide the insurance and bonds required in Exhibit B attached hereto and made a part hereof. The Contractor acknowledges that it has read and understands the insurance and bonding requirements set forth in Exhibit B and agrees that it shall comply with the terms and conditions thereof at no additional cost to DUWA.

6 Ownership.

6.1 **Work Product.** All drawings, specifications and other documents and electronic data furnished by Contractor to DUWA under this Agreement ("Work Product") are deemed to belong to DUWA, and DUWA shall retain the ownership and property interests therein, including the copyrights thereto, in perpetuity.

6.2 **Project Ownership.** All of the Project equipment, materials and facilities that are designed and constructed by Contractor will be the property of DUWA. Contractor may not treat itself as the owner of the Work or any of the capital improvements thereof for federal tax or any other purpose and will not be entitled to borrow against, or mortgage or otherwise encumber any interest in the Work.

7 Notices.

All notices required or permitted by this Agreement shall be in writing, signed by an authorized representative of DUWA or Contractor and personally delivered, sent by electronic communications via e-mail , sent by recognized overnight courier, or mailed by registered or certified mail, postage prepaid, return receipt requested, addressed to the respective parties at the addresses listed below:

If to DUWA:
Gail McLeod, Chair
Downriver Utility Wastewater Authority
25605 Northline Road
Taylor, MI 48180

With copies to:
OHM Advisors
c/o Lambrina Tercala
34000 Plymouth Road
Livonia, MI 48150
Lambrina.tercala@ohm-advisors.com

James G. Fausone
Fausone Bohn, LLP
41700 W. Six Mile Road, Ste. 101
Northville, MI 48168
jfausone@fb-firm.com

If to Contractor :

_____
_____
_____

Notice shall be deemed served upon 1) the date of personal delivery, 2) the date of transmission of the electronic correspondence provided that the sender has received a confirmation of electronic transmission, 3) one day after delivery by a recognized overnight courier, or 4) two days after mailing by registered or certified mail.

8 Miscellaneous Provisions.

8.1 **Interpretation.** All the terms and provisions of this Agreement shall be deemed and construed to be "covenants" and "conditions" as though the words specifically expressing or imparting covenants and conditions were used in each separate term and provision. The headings in this Agreement are for convenience only and shall not be used to construe or interpret the scope or intent of the Agreement or in any way affect the same. As used herein, the singular shall include the plural, and the plural include the singular. Unless the context otherwise expressly requires, the words "herein", "hereof", and "hereunder" and other words of similar import refer to the Agreement as a whole and not to any particular Article, Section or other subdivision.

8.2 **Amendments.** Except for Change Orders, no amendment or modification of this Agreement shall be binding unless in writing and duly executed by all Parties.

8.3 **Waiver.** No waiver by any Party hereto of any one or more defaults by any other Party in the performance of any provision of this Agreement shall operate or be construed as a waiver of any future default, whether of like or different character. No failure on the part of any Party hereto to complain of any action or non-action on the part of any other Party, no matter how long the same may continue, shall be deemed to be a waiver of any right hereunder by the Party (or Parties) so failing. A waiver of any of the provisions of this Agreement shall only be effective if made in writing and signed by the Party who is making such waiver.

8.4 **Remedies Cumulative**. The remedies reserved for DUWA herein shall be cumulative and additional to any other or further remedies provided in law or equity. Any waiver by DUWA of any provision of this Agreement shall not constitute a waiver of any other provisions of the Agreement.

8.5 **Assignment**. The Contractor shall not assign all or any part of the Agreement, nor any Work, nor any payments due or to become due hereunder, without first obtaining consent in

writing from DUWA, which consent may be withheld in DUWA's sole and absolute discretions.

8.6 **Severability.** If any clause, provision or section of this Agreement is ruled invalid by any court of competent jurisdiction (or arbitral tribunal), the invalidity of such clause, provision or section shall not affect any of the remaining provisions hereof, and the Parties shall substitute such invalid provision(s) with valid ones, which in their economic effect come so close to the invalid provisions that it can be reasonably assumed that the Parties would have executed this Agreement including those new provisions.

8.7 **Survival.** The provisions of Article 8 of this Agreement shall survive the expiration or termination of this Agreement.

8.8 **Setoff**. DUWA is authorized to deduct any sums owed it by Contractor (whether or not the debt arises out of this Agreement) from the payments due Contractor under this Agreement. DUWA may also withhold payment from Contractor in an amount sufficient to protect DUWA from any claims of third parties or any liens which arise as a result of Contractor's or its subcontractors' and sub-subcontractors' performance of the Work.

8.9 **Counterparts.** This Agreement may be executed in counterparts each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the date first above written.

DOWNRIVER UTILITY WASTEWATER AUTHORITY

By:_____ By: _____

Name:_____ Name: _____

Title:_____ Title: _____

\\SERVER4\WPDocs\JGF\DUWA\Procurement\Emergency Roof repairs\Agreement.docx

EXHIBIT A

WIFIA REQUIREMENTS

WIFIA ADDENDUM

This WIFIA Addendum to the Purchase Agreement ("Addendum") is entered into this ____ day of June, 2020, by and between Downriver Utility Wastewater Authority ("DUWA") and Contractor Waters Pollution Control, Inc., ("Contractor"), each a "Party" and together the "Parties."

WHEREAS, DUWA and Contractor entered into the Alkali Sewer Rehabilitation Project Agreement to which this Addendum is attached as Attachment B, for certain repair and rehabilitation work on the Alkali Sewer; ("Agreement"),

WHEREAS, Paragraph 13 of the Agreement specifies that the Project may be funded through a loan provided under the federal Water Infrastructure Finance and Innovation Act ("WIFIA"), and therefore the Agreement is subject to the requirements of the WIFIA;

WHEREAS, as part of the application process United States Environmental Protection Agency ("U.S. EPA") has provided specific contractual requirements that must be included in each contract for any project funded under the WIFIA; and

WHEREAS, this Addendum provides the specific WIFIA requirements.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises of the Parties hereto and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and intending to be legally bound, the Parties agree as follows:

1. Debarment and Suspension, Executive Order 12549, 51 FR 6370, February 21, 1986

Contractor certifies that it will not knowingly enter into a contract with anyone who is ineligible under 2 CFR part 180 and part 1532 to participate in the Project. Contractor represents and warrants that it has or will include a term or conditions requiring compliance with this provision in all of its subcontracts under this Agreement.

2. Federal Restrictions on Lobbying, 31 U.S.C. 1352

Recipients of federal financial assistance may not pay any person for influencing or attempting to influence any officer or employee of a federal agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress with respect to the award, continuation, renewal, amendment, or modification of a federal grant, loan, or contract. Within ten (10) days of the execution of this First Addendum, Contractor shall complete and submit to DUWA the certification and disclosure forms in Appendix A and Appendix B to 40 C.F.R. Part 34. Contractor shall also require all Subcontractors and Suppliers of any tier awarded a subcontract over $100,000 to similarly complete and submit the certification and disclosure forms pursuant to the process set forth in 40 C.F.R. 34.110.

3. Non-discrimination, Equal Employment Opportunity Requirements

A. Statutory Requirements. In addition to the requirements set forth in the General Conditions included as Exhibit A to the Agreement, Contractor shall comply with the following federal non-discrimination requirements:

(1) Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency (LEP).

(2) Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination against persons with disabilities.

(3) The Age Discrimination Act of 1975, which prohibits age discrimination.

(4) Section 13 of the Federal Water Pollution Control Act Amendments of 1972, which prohibits discrimination on the basis of sex.

(5) 40 C.F.R. Part 7, as it relates to the foregoing.

(6) Executive Order ("EO") No. 11246

B. Executive Order 11246. Contractor shall comply with Executive Order 11246, entitled 'Equal Employment Opportunity,' as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 C.F.R. Part 60). Contractor's compliance with Executive Order 11246 shall be based on implementation of the Equal Opportunity Clause, and specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 C.F.R. Part 60-4. During the performance of the Agreement, Contractor agrees as follows:

(1) Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. 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 identity, 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. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(2) Contractor will, in all solicitations or advancements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with Contractor's legal duty to furnish information.

(4) 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 by the agency contracting officer, advising the labor union or workers' representative of Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) Contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, the Agreement may be cancelled, terminated, or suspended in whole or in part and Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) Contractor will include the provisions of paragraphs B(1) through B(8) of this section 3 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 No. 11246 of September 24, 1965, so that such provisions will be binding upon each Subcontractor or vendor. Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, Contractor may request the United States to enter into such litigation to protect the interests of the United States.

C. Segregated Facilities, 41 CRF 60-1.8. Contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. Contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. Contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under Contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; provided that separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

D. Participation by Disadvantaged Business Enterprises. Contractor shall make a good faith effort to allow disadvantaged businesses to have the opportunity to compete for Project procurements. EPA provide six good faith efforts in the contractor rule and website at: https://www.epa.gov/resources-small-businesses/disadvantaged-business-enterprise-program-resources.

4. American Iron and Steel Requirements

Contractor hereby represents, warrants and covenants to and for the benefit of DUWA and the EPA that (a) Contractor has reviewed and understands the American Iron and Steel requirement that all of the iron and steel products used in the Project must be produced in the United States, (b) all of the iron and steel products used in the Project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel requirement, unless a waiver of the requirement is approved, and (c) Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel requirement, as may be requested by the DUWA or the EPA. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by Contractor shall permit DUWA or the EPA to recover as damages against Contractor any loss, expense, or cost including, without limitation, attorney's fees incurred by DUWA or the EPA resulting from any such failure, including without limitation any impairment

or loss of funding, whether in w-hole or in part, from the EPA or any damages owed to the EPA by DUWA While Contractor has no direct contractual privity with the EPA, as a lender to DUWA for the funding of the Project, DUWA and Contractor agree that the EPA is a third-party beneficiary.

5. Davis Bacon and Related Acts

A. Davis Bacon Act. In any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in 29 C.F.R. § 5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, provided that such modifications are first approved by the Department of Labor):

(1) Minimum wages.

a) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), 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 regulations issued 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 equivalents 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 (a)(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 § 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 paragraph (a)(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 be easily seen by the workers.

b) The WIFIA assistance recipient, DUWA, on behalf of the U.S. Environmental Protection Agency, 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. DUWA 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.

c) If Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and DUWA 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 to the Administrator of the Wage and Hour Division (WHD Administrator), U.S. Department of Labor, Washington, DC 20210. The WHD Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise DUWA or will notify DUWA within the 30-day period that additional time is necessary.

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

e) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, 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.

f) 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, 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.

g) If Contractor does not make payments to a trustee or other third person, 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 Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. DUWA, shall upon written request of the WIFIA Director or an authorized representative of the Department of Labor withhold or cause to be withheld from 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 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 the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the WIFIA Director may, after written notice to 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.

a) Payrolls and basic records relating thereto shall be maintained by 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 (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). 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 section 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 C.F.R. 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, Contractor shall maintain records which 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 records which show the costs anticipated or the actual cost incurred in providing such benefits. If employing apprentices or trainees under approved programs, Contractor 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.

i) Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to DUWA. 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 http://www.dol.gov/esa/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 DUWA, for transmission to the EPA, 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 Contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to DUWA.

ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by 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) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or 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) That 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.

iii) 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 (a)(3)(ii)(B) of this section.

iv) The falsification of any of the above certifications may subject 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.

b) Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of [name of the borrower, EPA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If Contractor or subcontractor fails to submit the required records or to make them available, the EPA may, after written notice to DUWA, 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 –

a) 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, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 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 Office of Apprenticeship Training, Employer and Labor Services 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 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 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 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 WHD 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 Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, 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.

b) 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 WHD Administrator determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who 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, 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.

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

(6) Subcontracts. Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA

may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 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 the Agreement shall not be subject to the general disputes clause of the Agreement. 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 Contractor (or any of its subcontractors) and DUWA, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

a) By entering into the Agreement, Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in 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).

b) No part of the Agreement 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).

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

B. Contract Work Hours and Safety Standards Act. The following clauses set forth in paragraphs (B)(1), (2), (3), and (4) of this section shall be inserted in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. Contractor or any 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 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 (B)(1) of this section 5 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 inparagraph (B)(1) of this section 5, in the sum of $25 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 (B)(1) of this section 5.

(3) Withholding for unpaid wages and liquidated damages. DUWA shall upon its own action or upon written request of an authorized representative of the Department of Labor, or the EPA, withhold or cause to be withheld, from any moneys payable on account of work performed by Contractor or subcontractor under any such contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same 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 (b)(2) of this section.

(4) Subcontracts. Contractor shall insert in any subcontracts the clauses set forth in paragraphs (B)(1) through (4) of this section 5 and also a clause requiring Subcontractors to include these clauses in any lower tier subcontracts. Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

C. Contractor shall maintain payrolls and basic payroll records during the course of the Project and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the Project. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the EPA shall cause or require DUWA to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of DUWA, EPA and the Department of Labor, and Contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

6. Capitalized terms not otherwise defined herein shall have the meanings set forth in the Agreement.

EXHIBIT B

INSURANCE AND BOND REQUIREMENTS

Contractor shall procure and maintain for the duration of the Agreement, insurance against claims for injuries to persons or damages to property which may arise from, or in connection with, the performance of the Work hereunder by the Contractor, its agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

A. MINIMUM INSURANCE COVERAGE

1. Without in any way limiting Contractor's liability hereunder, Contractor shall maintain the following minimum limits of insurance at its own expense during the performance of the Work, with insurance companies rated A-VII or higher by A.M. Best's, to cover the risk of losses associated with this Agreement:

Coverage	**Limits**
(i) Workers Compensation	Statutory; including requirements of the Labor Code of the State of Michigan and Employers Liability insurance
(ii) Employers Liability	$1,000,000 each accident $1,000,000 each employee $1,000,000 policy limit
(iii) Commercial General Liability written on ISO CG 00 01 coverage form or its equivalent. No limiting or exclusionary endorsements material to the Contractor's obligations in the Agreement may be attached. Coverage shall include a) contractual liability; b) explosion, collapse & underground perils (XCU); c) third-party over action coverage; d) Riggers Liability endorsement for the use of cranes, booms or other rigging equipment, if applicable; and e) amendment of the aircraft exclusion to include coverage for the use of commercial UAVs (drones), if applicable.	$5,000,000 each occurrence for property damage and bodily injury (PD/BI) $5,000,000 general aggregate $5,000,000 products/completed operations aggregate
(iv) Automobile Liability – covering all owned, hired and non-owned autos (Policy shall be endorsed with MCS-90)	$2,000,000 combined single limits – each accident
(v) Umbrella/Excess Liability providing coverage at least as broad as the underlying policy(ies)	May be utilized to meet limits outlined above

(vi) Property	Contractor shall be solely responsible for protecting and insuring all property owned or leased or used by the Contractor in conjunction with the Work during the term of this Agreement
(vii) Professional Liability (Errors & Omissions), if applicable to the Work – Coverage shall not exclude Technology Errors & Omissions coverage if the Contractor will have access to any Veolia Systems (including but not limited to any Veolia-owned or managed IT asset (server or application) wherever it is hosted (the public cloud, Veolia's AWS instance, Veolia's data center, etc.)	$2,000,000 each claim $2,000,000 annual aggregate

2. In the event that the state where the Work is to be provided allows an employer to opt out of Workers Compensation coverage, the Contractor shall nevertheless obtain a Workers Compensation policy complying in all respects with this provision.

3. Prior to providing any Work under this Agreement, the Contractor will provide DUWA with an ACORD certificate of insurance evidencing that the above described coverage are in full force and effect. Contractor will include DUWA, its parent companies, subsidiaries, affiliates, and each of their officers, directors, employees, agents, representatives and Client (if applicable), (collectively "DUWA's Additional Insured") as additional insured with respect to coverage (iii), (iv), and (viii), (and (v) if applicable) above. All policies shall be primary and non-contributory, provide a full waiver of the insurer's right of subrogation in favor of DUWA Additional Insured and/or any sub-Contractor with respect to claims that are covered or should have been covered by valid and collectible insurance provided hereunder and said waiver will extend to any deductibles, co-insurance or retentions. Contractor will not permit cancellation or non-renewal of its insurance coverage to be provided hereunder without thirty (30) days' written notice to DUWA.

4. All policies shall be issued on occurrence-based forms, except for coverage (vii) and (viii), which may be issued on a claims-made form. All claims-made policies will at least be retroactive to the earlier of the date of this Agreement or the commencement of the Contractor's services in relation to the Work, and shall be maintained for three (3) years after the expiration or termination of this Agreement.

5. These insurance requirements will not be construed in any matter as waiving, restricting or limiting DUWA's rights or Contractor's obligations under this Agreement. DUWA does not represent that coverage or limits herein will be adequate to protect Contractor. Contractor remains responsible for any liability not paid by insurance including deductibles and retentions.

B. ADDITIONAL INSURANCE

1. **Builders' Risk Insurance.** Contractor shall procure a builders risk insurance policy for the full replacement value of the Work. Contractor shall purchase and maintain during the life of the Work included below at the base insurance against loss to the Work sufficient to replace the Work. Such coverage shall be written on an "all risk" causes of loss builders risk coverage form at replacement cost and without a co-insurance penalty and as follows:

a. Not limited to the following, policy perils shall include: theft, vandalism, malicious mischief, testing and startup, earth movement, terrorism (certified and non-certified), delay in completion or start up, mold, fungus, collapse, earth movement, flood, civil authority, windstorm, building ordinance and demolition.

b. Not limited to the following, the policy shall cover: underground work, foundations, sidewalks and paving, landscaping, falsework, temporary buildings, trailers, laydown areas, supplies, materials, machinery, equipment, fixtures, debris removal, property in transit, property stored offsite, business interruption costs, extra expense costs and soft costs including but not limited to reasonable compensation for professional fees and general conditions.

c. Losses to the Work shall be replaced by the Contractor at no expense to DUWA. Any deductible or sub-limited deductible shall not exceed $50,000.

d. The insurer shall waive all rights of subrogation against DUWA.

e. Coverage including permission for temporary occupancy shall be maintained until final acceptance by DUWA and final payment has been made.

f. The policy shall allow for partial utilization of the Work by DUWA and Veolia.

g. The policy shall be maintained in effect until final payment is made unless otherwise agreed to in writing by DUWA with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

Losses shall be adjusted by and made payable to Contractor as fiduciary for the Builders Risk Insured. Contractor shall pay its subcontractors their just shares of insurance proceeds received by Contractor and shall cause such subcontractors to make payments to their sub-subcontractors in similar manner.

2. Certificates of insurance shall be either emailed in pdf format to: Lambrina.tercala@ohm-advisors.com or mailed to the following postal address:

To DUWA: Gail McLeod, Chair
Downriver Utility Wastewater Authority
25605 Northline Road
Taylor, MI 48180

With copies to:

OHM Advisors
c/o Lambrina Tercala
34000 Plymouth Road
Livonia, MI 48150
Lambrina.tercala@ohm-advisors.com

C. PAYMENT AND PERFORMANCE BONDS

1. The Contractor shall furnish to DUWA and keep in force during the term of the Agreement performance and labor and material payment bonds, guaranteeing that the Contractor will perform its obligations under the Agreement and will pay for all labor and materials furnished for the Work. Such bonds shall be issued in a form and by a Surety reasonably acceptable to DUWA, shall be submitted to DUWA for approval as to form, shall name DUWA as obligee, and shall be in an amount equal to at least 100% of the Contract Price (as the same may be adjusted from time to time pursuant to the Agreement). The Contractor shall deliver the executed, approved bonds to DUWA prior to the execution of the Agreement. Neither the Contractor nor any Sub-Contractor may begin the Work until the required bonds are delivered to DUWA.

2. The costs of all bonds furnished hereunder shall be included in the Contract Price.

3. Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Agreement, the Contractor shall promptly furnish a copy of the bonds to DUWA or shall permit a copy to be made.

4. If any Surety hereunder makes any assignment for the benefit of creditors, or commits any act of bankruptcy, or is declared bankrupt, or files a voluntary petition for bankruptcy or in the reasonable opinion of DUWA is insolvent, the Contractor shall immediately furnish and maintain another Surety satisfactory to DUWA.

D. GENERAL TERMS REGARDING INSURANCE AND BONDS

1. If DUWA is damaged by the failure of the Contractor to purchase or maintain any insurance or bond required by the Agreement then the Contractor shall pay all costs incurred by DUWA, including but not limited to reasonable attorney's fees.

2. Any insured loss under the required policies of property insurance will be adjusted with DUWA and will be made payable to DUWA as trustee for the insured. DUWA shall deposit in a separate account, and shall distribute monies received, based on any agreement that the parties in interest may reach. If no other distribution agreement is reached, the damaged Work shall be replaced or repaired, the monies received shall be used for that purpose and the Work involved and resulting costs shall be covered by Change Order. DUWA as trustee shall have the power to adjust and settle any loss with the insurers unless a party in interest objects in writing within fifteen (15) days following the occurrence of loss to DUWA’s exercise of this power. If an objection is

made, DUWA, as trustee, shall settle with the insurers pursuant to any agreement that the parties in interest may reach.

3. If by the terms of the insurance a mandatory deductible is required, the Contractor shall be responsible for the deductible amount in the event of a paid claim. The Contractor shall also be responsible for any co-insurance penalties.

EXHIBIT A

GENERAL CONDITIONS

TABLE OF CONTENTS

ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

Unless the context expressly requires otherwise, defined terms used in the Contract Documents have the meanings set forth below.

1.1 "Acceptance Testing Plan" means the written testing and commissioning procedures to be developed by the Parties, Kruger, and Veolia in accordance with the Construction Documents, Good Engineering and Construction Practices and Prudent Industry Practices.

1.2 "Applicable Law" means any federal, State, local (or other political subdivision) constitution, statute, law, rule, code, regulation, consent decree, consent order, consent agreement, permit, Governmental Approval, any determination or order entered, promulgated or approved by any Governmental Authority having jurisdiction, any common law or principle of common law applicable to, as the case may be, any of the Work, Project, Parties, activities, requirements or obligations of the Parties under the Agreement.

1.3 "Application for Payment" means the Contractor's certified request for payment for completed portions of the Work and for materials or equipment suitably stored pending their incorporation into the Work .

1.4 "Arbitration Rules" means the Michigan Revised Uniform Arbitration Act, Public Act 371 of 2012, MCL 691.1681 et seq., as amended and Michigan Court Rule 3.602.

1.5 "Authority" means the Downriver Utility Wastewater Authority (DUWA).

1.6 "Business Day" means any day except Saturday, Sunday, and any day on which banking institutions in the State of Michigan generally are authorized or required by law or other governmental actions to close.

1.7 "Change of Law" means any of the following events occurring after the Effective Date:

a. the adoption, modification or repeal, or change in interpretation or application, of any Applicable Law; or

b. the modification, change in interpretation or application, or imposition of any material conditions, restrictions or limitations in any Governmental Approval, which imposes limitations, additional costs or burdens with respect to the Contractor's obligations under this Contract.

1.8 "Change Order" is a mutually agreed upon written instrument that authorizes a change in the Work and an adjustment in the Contract Price or Contract Time or both. All Change Orders will be executed by Contractor and DUWA.

1.9 “Cash Allowance” A sum specified by DUWA included within the Contract Price to reimburse the Contractor for actual purchase/furnished cost of required materials, equipment or other designated items that are to be furnished and incorporated into the Work, as provided in the Contract Documents. Although the scope (i.e., the required quantity) of any portion of the Work covered by a Cash Allowance is sufficiently detailed in the Contract Documents for the equipment and supplemental costs, it is understood that the required materials, equipment or other designated items are either of uncertain purchase cost at the time the Agreement is executed. Any remaining balance of the Cash Allowance upon Final Completion shall be retained by DUWA and not paid to the Contractor.

1.10 “Construction Documents” consist of the detailed plans and specifications, calculations (if required) and other technical documents illustrating the character, nature, detail and scope of the Construction Work to be performed with respect to the Project, based on the approved Proposal, and taking into account the scope of work and relevant design standards, including all paper or electronic plans and specifications prepared by the Contractor and its subcontractors for use in construction, any subsequent modifications, and responses to requests for clarification and information. These documents are complementary and what is required by one such document is required by all such documents.

1.11 “Contract Documents” are those documents set forth in Section 2 of the Agreement and all subsequent contract modifications issued after execution of the Agreement such as Change Orders.

1.12 “Contract Price” means the sum stated in the Agreement that is the total amount payable by DUWA to the Contractor for performance of the Work subject to adjustments through approved Change Order.

1.13 “Contract Time” is the period of time allotted under the Project Schedule set forth in Exhibit E for the Contractor to achieve Substantial Completion.

1.14 “Construction Change Directive” means a written directive issued not to exceed $5,000, or $10,000 in the aggregate, by DUWA’s Representative authorizing the Contractor to proceed with a modification to the scope of Work. The Construction Change Directive is not a Change Order and will only be assembled and issued when there is not adequate time to process a Change Order prior to proceeding with revisions to the scope of the Work or where there is disagreement as to whether an item is included scope. The Contractor is responsible for providing rough order of magnitude pricing to DUWA and OHM for use in assembling the Construction Change Directive.

1.15 “Day” or “day” means calendar day unless specifically described as a work day or Business Day or unless statutorily defined.

1.16 The word “delay” means any and every delay, obstruction, hindrance, interference, loss of productivity, or inefficiency of any kind.

1.17 “Detailed Cost Breakdown” means an itemized breakdown of the Work and Contract Price detailing, for each pay item, quantities and dollar amounts required for cost evaluation. The sum of all pay items in the Detailed Cost Breakdown shall equal the Contract Price

1.18 “DUWA” means the Downriver Utility Wastewater Authority

1.19 “Effective Date” means the date agreed upon by DUWA and the Contractor for the effectiveness of the Agreement, which is set forth in the Agreement.

1.20 “Engineer” means a registered professional engineer in the State of Michigan, employed by the DUWA to design the Work. The Engineer has the rights and authority assigned to the Engineer in the Contract Documents.

1.21 “Environmental Condition” means the presence of any Regulated Substance on or at the Project site or any other location included in the sewage collection system or water delivery system, including the presence in surface water, groundwater, soils, or subsurface strata, or the migration of such a Regulated Substance from the Project site.

1.22 “Equipment” means the biosolids dryer and all ancillary equipment as set forth in Exhibit G to the Agreement.

1.23 “Equipment Supplier” means the entity that will supply the thermal biosolids dryer and dewatering centrifuge to be purchased by Contractor.

1.24 “Final Acceptance Test” means the Performance Test performed within twenty-four (24) months of the Initial Acceptance Test.

1.25 “Final Completion” has the meaning as defined in Paragraph 7.1.4 of these General Conditions.

1.26 “Final Payment” means payment by DUWA to the Contractor of the entire unpaid balance of the Contract Prices as adjusted by Change Orders.

1.27 “Free Float” means the amount of time that a Project Schedule activity can be delayed or extended from its early start date without delaying the early start of its successor activity.

1.28 “Good Engineering and Construction Practices” means those methods, techniques, standards and practices which, at the time they are to be employed and in light of the circumstances known or reasonably believed to exist at such time, are generally recognized and accepted as good design, engineering, equipping, installation, construction, commissioning and testing practices for the design, construction and improvement of capital assets in the municipal wastewater treatment and collection or drinking water distribution industry as practiced in the Western United States and particularly in Michigan for facilities of a similar size and nature and in a similar location and for a similar purpose as the Project. Good Engineering and Construction Practices is not necessarily defined as the optimal methods, techniques, standards or practices to the exclusion of

others, but rather to refer to a range of methods, techniques, standards and practices that are reasonable under the circumstances.

1.29 "Governmental Authority" means any legislative, executive, judicial, or administrative department, board, commission, court, agency or other instrumentality of the Federal, State or local government, including a joint powers agency formed by two (2) or more of the foregoing.

1.30 "Governmental Approval" means any permit, license, approval, consent or other authorization which is required under Applicable Law for the Work or for the performance of any of the obligations under this Contract.

1.31 "Indemnified Party" includes DUWA, OHM, Veolia and their respective officers, agents, directors, partners, members, employees, affiliates, parents and subsidiaries.

1.32 "Initial Acceptance Test" means the Performance Test completed within sixty (60) days of startup and commissioning of the Work and Equipment, and prior to Substantial Completion.

1.33 "Intellectual Property" includes Work Product and means any patents, copyrights, trade secrets, licensed software, proprietary technology or systems, or other intellectual property right owned or licensed in accordance with Applicable Law.

1.34 "Law" or "Laws" means all federal, state and local statutes, laws, ordinances and any regulations, orders and administrative guidelines (by whatever title, and without respect to whether enforceable at law) issued thereunder that are applicable to the performance of the Work under this Contract. To the extent that a Permit is required for Contractor to perform the Work, "Law" includes "Permit."

1.35 "Notice to Proceed" means a written document from DUWA to the Contractor stating the date upon which the Contractor is authorized to begin the Project Work. The date specified in the Notice to Proceed marks the beginning of the performance time of the Agreement.

1.36 "Performance Test" means the 30-day test of the Equipment to determine whether the Equipment meets the performance guarantee provided by Equipment Supplier.

1.37 "Permit" or "Permits" means every permit, license, authorization, certification, permission, or equivalent control document required under any federal, state or local statute, law ordinance, regulation or order.

1.38 "Permitted Delay" means a delay qualifying for an extension of the Contract Time.

1.39 "Person" means any natural person, corporation, limited liability company, partnership, firm, association, Governmental Agency or any other entity whether acting in an individual, fiduciary or other capacity.

1.40 "Progress Payment" means a periodic payment to the Contractor based on DUWA's approval of the Contractor's Application for Payment as required pursuant to the terms of the Agreement.

1.41 "Project" means the Project described in the Exhibit B.

1.42 "Project Schedule" means the schedule included in the Agreement as Exhibit E, as adjusted per the Agreement.

1.43 "Provisionary Allowance" means an amount included in the Contract Price to reimburse the Contractor for the cost to furnish and perform Work that is uncertain, i.e., may not be required, or of indeterminate scope, i.e., design information and quantities, complexity, etc. are neither shown nor detailed in the Contract Documents. Work authorized under any Provisionary Allowance may consist of (a) changes required by actual conditions, as determined by the Contracting Officer, that are incorporated into the Work in accordance with the General Conditions, and (b) any other work authorized and completed under the pertinent provisions of the Contract Documents. Unlike a Cash Allowance, payments under a Provisionary Allowance shall include not only the purchase and finished cost of materials and equipment involved, but also all associated labor, Subcontracts, construction equipment and supplemental costs, provided those costs are substantiated as required by the General Conditions. Any remaining balance upon Final Completion shall be retained by DUWA and not paid to the Contractor.

1.44 "Prudent Industry Practices" means those methods, techniques, standards and practices which, at the time they are employed and in light of the circumstances at the time, are generally accepted as reasonably prudent in the wastewater treatment and collection or drinking water distribution industry or recycled water delivery industry as practiced in the Western United States and particularly in Michigan for water and wastewater facilities of a similar size and used for similar purpose as the Project. Prudent Industry Practices is not necessarily defined as the optimal methods, techniques, standards or practices to the exclusion of others, but rather to refer to a range of methods, techniques, standards and practices that are reasonable under the circumstances.

1.45 "Regulated Substances" means any pollutant, contaminant, substance, hazardous substance, hazardous material, toxic substance, toxic pollutant, solid waste, municipal waste, industrial waste, or hazardous waste, petroleum or petroleum-derived substance, asbestos, or polychlorinated biphenyls, that is defined as such in, is subject to regulation under, or may form the basis for any requirement for investigation or remediation, under any Applicable Law.

1.46 "Request for Change Order" means a request from the Contractor for an extension of time or additional compensation served on DUWA's Representative in accordance with the General Conditions.

1.47 "Schedule of Values" means an initial submittal of reasonable cost breakdown furnished by the Contractor to be approved by DUWA reflecting the portions of the Contract Price allocated to the various portions of the Work and used as the basis for reviewing progress, to be include with the Contractor's Applications for Payment.

1.48 "Specifications" means a part of the Contract Documents consisting of written requirements for materials, equipment, construction systems, standards and workmanship.

1.49 "Subcontract" means the agreement entered into between Contractor an any Sub-Contractor.

1.50 "Sub-Contractor" is any person or entity retained by Contractor as an independent contractor to perform a portion of the Work and shall include materialmen and Suppliers.

1.51 "Sub-Subcontractor" is any person or entity retained by Sub-Contractor as an independent contractor to perform a portion of the Work and shall include materialmen and suppliers.

1.52 "Substantial Completion" has the meaning as defined in Paragraph 7.1.3 of these General Conditions.

1.53 "Substantial Completion Date" is the date shown in the approved Project Schedule as the milestone for Substantial Completion.

1.54 "Supplier" means any person or entity retained by Contractor or a Sub-Contractor to provide materials, equipment, or other goods for the Project.

1.55 "Surety" means an entity that guarantees the Work via issuance of performance and payment bonds as required pursuant to the terms of the Agreement.

1.56 "Total Float" means the number of days by which the Work or any part of the Work may be delayed, without negatively influencing the Contract Time or any other milestones set forth in the Project Schedule.

1.57 "Work Product" means any and all plans, drawings, specifications, estimates, calculations, reports, models, and other documents and materials prepared by or on behalf of the Contractor or its subcontractors in connection with the Project, whether in electronic or paper form.

1.58 "Work" or "Construction Work" means all labor, materials, services, equipment, supplies, tools, and appurtenances necessary for the proper design and construction services as further described in Exhibit B, and the Contractor's obligations under the Contract Documents.

1.2 EXECUTION, CORRELATION AND INTENT.

1.2.1 By executing the Agreement, the Contractor represents that it is financially solvent; that it is qualified to do business in the State of Michigan, that it has all required licenses and permits necessary in connection with performance by the Contractor hereunder (all such licenses and permits shall be at the Contractor's sole cost and expense); that it has the expertise and authority to perform its obligations under the Agreement; that it has inspected the Project and the Work and familiarized itself with the local conditions (including, both all physical conditions and all applicable local codes, laws and regulations) under which the Work is to be performed; that it

is familiar with all federal, state, municipal and county laws, ordinances and regulations which may, in any way, affect the Work or those employed therein, including, but not limited to, those particularly applicable to the Project; and that the Contract Price is the agreed amount for all the Work, including all risks, hazards, and difficulties in connection therewith assumed by the Contractor under the Agreement. Each Sub-Contractor shall review the foregoing representations and shall be deemed to have made the same representations to DUWA in performing any Work on the Project.

1.2.2 The intention of the Agreement is that all labor, materials, facilities, utilities, equipment, insurance, taxes and all other items necessary for the proper execution and completion of the Work are included in the Contract Price. It is intended that all work required for the construction and administration of the Project shall be supplied including all such work that is in the Contract Documents or is reasonably inferable from the Construction Documents and the Contract Documents. Lists of "Work Included," "Scope" or "Description of Work" are not intended to enumerate each and every item of Work or appurtenances required. Words which have well-known technical or trade meanings are used herein in accordance with such recognized meanings.

1.2.3 The Agreement is intended to constitute a single agreement and every effort shall be made to construe such documents as being consistent and not contradictory. In the event of any conflict among the Contract Documents, the Contract Documents shall be construed according to the priorities set forth in Section 2 of the Agreement:

1.2.4 Where codes, standards, requirements and publications of public and private bodies are referred to in the Contract Documents, references shall be understood to be to the latest revision prior to the date of the Agreement, except where otherwise indicated.

1.2.5 Where no explicit quality or standards for materials or workmanship are established for work, such work is to be of new, high quality for the intended use and workmanship shall be consistent with the best practices of that particular trade, skill and function.

1.2.7 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

1.2.8 The relationship between the Contractor and DUWA shall be that of an independent Contractor. The Agreement shall not be construed to create any third party beneficiaries or to create any rights in any third parties.

1.2.9 If any provision of the Agreement shall be, to any extent, invalid or unenforceable, the remainder of the Agreement shall remain in full force and effect.

ARTICLE 2

DUWA

2.1 INFORMATION AND SERVICES REQUIRED OF DUWA.

Information or services under DUWA's control shall be furnished by DUWA with reasonable promptness after written request to avoid delay in the orderly progress of the Work. The furnishing of such information by DUWA shall not relieve the Contractor from its duties under the Contract Documents, specifically as to inspection of the Project site and the Contract Documents. DUWA makes no representation or warranty with respect to subsurface conditions, or any reports provided by or on behalf of DUWA to the Contractor regarding subsurface conditions.

2.2 DUWA'S RIGHT TO STOP THE WORK.

If the Contractor fails to correct defective Work or fails to carry out the Work or to supply labor, materials and equipment in accordance with the Contract Documents, DUWA may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of DUWA to stop the Work shall not give rise to any duty on the part of DUWA to exercise this right for the benefit of the Contractor or any other person or entity. Should DUWA elect to order the Contractor to stop the Work, the Contractor shall be responsible for whatever measures are necessary to maintain the Project Schedule once the cause for such order has been eliminated and for all costs and expenses associated therewith.

2.3 DUWA'S RIGHT TO CARRY OUT THE WORK.

If the Contractor:

a. Fails to properly respond to notices issued by DUWA pursuant to Section 2.2 hereof; or

b. The Contractor has failed to make undisputed payments properly due to its Sub-Contractors, Sub-Sub-Contractors, laborers or materialmen or for material or labor used in the Work; or

c. Fails to supply the quantity of properly skilled workmen necessary to complete the Work in accordance with the critical path activities as set forth in the Project Schedule; or

d. Fails to supply materials and equipment as necessary to complete the Work in accordance with the Project Schedule; or

e. Fails to maintain any insurance coverage required under the Agreement; or

f. Fails to pay workers' compensation or other employee benefits; or

g. Fails to pay withholding or other taxes; or

h. Fails to perform any other material obligation under the Agreement;

then DUWA may, after seven (7) days written notice to Contractor and without prejudice to any other remedy DUWA may have, make good such deficiencies or otherwise rectify such situations to the satisfaction of DUWA unless Contractor shall have commenced corrective action within said seven (7) day period. In such case, the cost of correcting such deficiencies or otherwise rectifying such situations to the satisfaction of DUWA, including compensation for DUWA's separate Contractors' or consultants' additional services made necessary by such default, neglect or failure, shall be offset against any amounts otherwise due to the Contractor. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to DUWA.

2.4 DUWA'S RIGHT TO WITHHOLD PAYMENT.

DUWA may withhold payment or, because of subsequently discovered evidence or subsequent observations, it may nullify the whole or any part of any payment previously issued, to such extent as it may be necessary in its opinion to protect DUWA from loss because:

2.4.1 The Contractor fails to properly respond to notices issued by DUWA pursuant Section 2.2 hereof; or

2.4.2 The Contractor is in default of any of its material obligations under the Agreement or otherwise is in material default under any of the Contract Documents; or

2.4.3 Any part of such payment is attributable to Work which is defective or not performed in accordance with the Construction Documents, as determined by DUWA; provided, however, such payment shall be made as to the part thereof attributable to Work which is performed in accordance with the Construction Documents and is not defective, reserving, however, such amount as may be reasonably necessary to protect DUWA with respect to defective Work; or

2.4.4 The Contractor has failed to make undisputed payments properly due in accordance with law or the Subcontract documents to Sub-Contractors, Sub-Sub-Contractors, Suppliers, laborers or materialmen or for material or labor used in the Work; or

2.4.5 Any part of such payment is attributable to Work with respect to which any party has filed an un-discharged claim against any payment or performance bonds; or

2.4.6 Third party claims have been filed that trigger Contractor's indemnity obligation under Section 3.13 Indemnification; or

2.4.7 If DUWA reasonably determines that the portion of the Contract Price then remaining unpaid will not be sufficient to complete the Work in accordance with the Contract Documents after meeting with Contractor and giving an opportunity to prove otherwise, no additional payments will be due the Contractor hereunder unless and until the Contractor, at no cost to DUWA, performs, and pays in full for, a sufficient portion of the Work so that such portion

of the Contract Price then remaining unpaid is determined by DUWA to be sufficient to so complete the Work.

ARTICLE 3

Contractor

3.1 REVIEW OF CONTRACT DOCUMENTS.

3.1.1 The Contractor acknowledges that it has reviewed the Contract Documents and that it is familiar with the Contract Documents. The Contractor hereby specifically acknowledges and declares that the Contract Documents are sufficient to enable it to construct the Work outlined therein in accordance with applicable laws, statutes, building codes and regulations, and otherwise to fulfill all of its obligations under the Agreement The Contractor further acknowledges that it has visited the Project site, examined all conditions affecting the Work, is fully familiar with all of the conditions thereon and affecting the same.

3.1.2 Each Sub-Contractor shall review the Contract Documents and shall be deemed to have made the same waiver set forth in Paragraph 3.1.1 above in performing any work on the Project.

3.1.3 Before starting the Work, and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Agreement, General Conditions, Construction Documents, and other Contract Documents and shall at once report to DUWA any error, inconsistency or omission the Contractor may discover. Any necessary change shall be ordered as provided in Article 11, subject to the other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to DUWA, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents the Contractor could have discovered such, the Contractor shall bear all costs arising therefrom.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES.

3.2.1 The Contractor shall provide competent supervision, coordination and related services for construction of, and shall cause to be constructed, the Project. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work. The Contractor shall engage workers who are skilled in performing the Work, and all Work shall be performed with care and skill and in a good workmanlike manner. The Contractor shall be liable for all property damage, including repairs and replacements of the Work and economic losses, which proximately result from the breach of this duty.

3.2.2 The Contractor shall be responsible to DUWA for the acts and omissions of its employees. The Contractor shall be as fully responsible to DUWA for the acts of its Sub-Contractors, Sub-Sub-Contractors, their agents and persons directly or indirectly employed by them, and other persons performing any of the Work as it is for the acts and omissions of persons directly employed by the Contractor.

3.2.3 The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of DUWA in its administration of the Agreement, or by inspections, tests or approvals required or performed by persons other than the Contractor. No inspection performed or failed to be performed by DUWA hereunder shall be a waiver of any of the Contractor's obligations hereunder or be construed as an approval or acceptance of the Work or any part thereof.

3.2.4 The Contractor shall attend meetings scheduled by DUWA to discuss such matters as procedures, progress, problems, scheduling and safety.

3.2.5 At all times the Contractor shall provide a Representative approved by DUWA who (a) will have full responsibility for the prosecution of the Work, (b) will act as agent and be a single point of contact in all matters on behalf of the Contractor, (c) will be present (or its approved designee will be present) at the Project site at all times that the Work is performed and (d) will be available to execute instructions and directions from DUWA.

3.2.6 The Contractor shall maintain daily field reports recording the labor force and equipment employed by the Contractor and Sub-Contractors, materials and equipment received at the Project site or another location, visits by suppliers, significant progress in the Work and completed trade Work within the major Work areas, and other pertinent information. Daily field reports shall be furnished by the Contractor promptly upon request by DUWA. DUWA's review of any daily field report shall not be construed as agreement with any information contained in such report.

3.2.7 The Contractor shall maintain at the Project site a record copy of the Agreement and its Contract Documents in good order and annotated in a neat and legible manner using a contrasting, reproducible color to show (a) all revisions made, (b) dimensions noted during the execution of the Work, (c) all deviations between the as-built installation and the Contract Documents, all approved Submittals and all clarifications and interpretations.

3.2.8 The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times in DUWA. Contractor's right to entry and use thereof arises solely from the permission granted by DUWA under the Contract Documents. Unless otherwise provided in the Contract Documents, all entrances to all buildings and areas of the Project site that are occupied by DUWA shall be provided with safe, secure and convenient access at all times.

3.2.9 If the Work involves modifications to and/or expansion of an existing occupied and/or operating facility, the Contractor acknowledges and agrees that DUWA will continue its operation of the facilities in which the Work is to be performed and that the Contractor will conduct its work so as to cause a minimum of interference with DUWA's operation of the existing facilities. The welfare of DUWA's employees, guests and invitees is to be considered at all times. If the Work involves modifications to and/or expansion of an existing occupied and/or operating facility, all shut downs/outages of building systems, utilities and equipment shall be approved in advance by DUWA. The Contractor shall provide DUWA with reasonable prior notice of any required shutdowns of building systems, utilities and/or equipment, such amount of prior notice to be agreed upon between the Contractor and DUWA. The Contractor will, at the request of DUWA, schedule

any work which otherwise may have an adverse impact upon the health, safety or welfare of DUWA's employees, guests or invitees or the normal facility operations during those times in which said adverse consequences may be minimized.

3.2.10 The Contractor shall retain a competent registered professional engineer or registered land surveyor, acceptable to DUWA, who shall establish the exterior lines and required elevations of all buildings and structures to be erected on the Project site and shall establish sufficient lines and grades for the construction of associated work. The Contractor shall certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries. The Contractor shall establish the building grades, lines, levels, column, wall and partition lines required by the various Sub-Contractors in laying out their work.

3.3 LABOR AND MATERIALS.

3.3.1 Unless otherwise specifically noted in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, insurance, taxes, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The Contractor shall be responsible, at its sole cost and expense, for the cost of hook-up of temporary systems to existing systems, distribution of utilities from existing systems to all areas of the Work, and disconnection of temporary systems at completion of the Work. The Contractor must obtain advance written approval from DUWA for any tie-ins to, and disconnections from, existing DUWA systems.

3.3.2 Prior to specifying any equipment for the Project with a manufacturer's warranty in excess of one (1) year, the Contractor will provide written notice to DUWA specifying the equipment, supplier and proposed terms and conditions of the extended warranty, and DUWA will have the right to review and approve such equipment and extended warranty prior to specification. At DUWA's request, the Contractor will allow Veolia to participate in negotiation of any extended warranty. The Contractor agrees to cooperate with DUWA in obtaining the information requested by DUWA relating to the applicable equipment manufacturer (including credit), the applicable equipment and proposed extended warranties, the operating and maintenance data pertaining to manufacturers' equipment, and information about customary maintenance or repair service, spare parts supply service or personnel support service that the manufacturer of the equipment furnishes.

3.3.3 The Contractor will schedule and coordinate delivery and storage of equipment and materials and the sequencing of its Work with DUWA's current site logistics plan and the most current Project Schedule. The Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the project site or other areas identified in the current site logistics plan for such use, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor will maintain its storage area and will keep its storage areas clean, safe, and secure. Any materials or equipment stored offsite will be insured or stored in an insured or bonded warehouse. The risk of loss will

remain on the Contractor for all materials and equipment stored off-site per Section 3.3 of these General Conditions.

3.3.4 All Construction Work at the Project site, or in preparing or delivering materials or equipment to the Project site, is performed exclusively at the risk of the Contractor until the completed Construction Work is accepted by DUWA. The Contractor's interest in the Construction Work will be insured under the builder's risk policy and, subject to the terms and conditions of that policy, the Contractor may be insured for some or all of the risk of loss under this provision. DUWA makes no representations or warranties regarding the scope or adequacy of the builder's risk coverage. Any damage or loss to the Construction Work will be repaired or replaced promptly by the Contractor.

3.3.5 DUWA may, in writing, require the Contractor to remove from the Project any employee or Sub-Contractor or employee of a Sub-Contractor that DUWA deems incompetent, careless or uncooperative and may require the Contractor to replace any such employee or Sub-Contractor or employee of a Sub-Contractor with suitable personnel. The Contractor shall at all times enforce strict discipline and good order among its employees and Sub-Contractors and shall not employ on the Project any unfit person or anyone not skilled in the task assigned to him. All services required under the Contract Documents shall be performed in a competent and professional manner. The Contractor shall develop and administer an effective labor relations program for the Project; and the Contractor shall employ, and require its Sub-Contractors and Sub-Sub-Contractors to employ, only compatible labor. In its labor analysis, the Contractor shall take into consideration scheduled work by DUWA with the objective of eliminating strikes, picketing, hand billing and other similar activities which would disrupt the Project.

3.3.6 The Contractor covenants that all Work shall be done in a good and workmanlike manner and that all materials furnished and used in connection therewith shall be new and approved by DUWA, except as otherwise expressly provided for in the Agreement and its Contract Documents. The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. DUWA may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of DUWA, would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor's expense.

3.3.7 Deviations from the Contract Documents shall not be permitted except for substitutions approved by DUWA in accordance with this Paragraph 3.3.7. Substitutions recommended by the Contractor for the purpose of reducing the Contract Price or Contract Time shall be subject to Subparagraph 3.3.7.1 hereof. Substitutions recommended by the Contractor or a Sub-Contractor for the purpose of reducing cost to the Sub-Contractor or Contractor or off-setting delays for which the Contractor or Sub-Contractor is responsible shall be subject to Subparagraph 3.3.7.2. DUWA shall determine whether the procedures of Subparagraph 3.3.7.1 or 3.3.7.2 shall apply to a specific request for a substitution. No other substitutions or variations from the Construction Documents, except that where "or approved equal" is used, the Contractor shall

have the right, after the Agreement has been executed, to request DUWA's approval of a substitute material generally considered to be equal to that named in the Construction Documents. DUWA, however, shall have no obligation to accept any substitute.

3.3.7.1 On-going value engineering recommendations of the Contractor shall be reviewed by DUWA in its sole discretion.

3.3.7.2 Requests from the Contractor or a Sub-Contractor for approval of any substitution for the benefit of the Contractor or such Sub-Contractor, as determined by DUWA, must be submitted in writing to DUWA, together with all necessary supporting data. Requests for approval of any substitute shall be accompanied by an analysis of any changes in the Work of other trades or Sub-Contractors, redesign, other changes in the Contract Documents or additional costs that will result from the proposed substitute or a statement that no such matters will result and the analysis of whether the proposed substitute is inferior, equal or superior to the product specified.

(i) If a substitution recommended by the Contractor requires changes in the work of other trades or Sub-Contractors, redesign, other changes in the Contract Documents or results in any additional costs whatsoever, the Contractor shall be solely responsible for such costs.

(ii) By making a recommendation for a substitution, the Contractor shall be deemed to represent and warrant that:

(a) The Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified;

(b) The Contractor will provide the same warranty for the proposed substitute product as for the specified product; and

(c) The Contractor will waive all claims for additional costs related to the proposed substitute product including any which may subsequently become apparent.

(iii) By making a recommendation for a substitution involving redesign by the Contractor or any Sub-Contractor, the Contractor shall also be deemed to represent and warrant that such redesign:

(a) Will be free from errors and omissions;

(b) Will be fit for the purpose specified and will fully satisfy and perform as represented;

(c) Will properly interface with the design and Construction Documents provided by Contractor and other Sub-Contractors (if any); and

(d) Will comply with all applicable laws, regulations, ordinances and requirements of, and conditions of any approvals,

certifications or permits given by, any and all governmental authorities having jurisdiction over the design, construction, existence or use of the Project.

(iv) Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by DUWA.

3.4 DESIGN STANDARDS.

3.4.1 The Project must be designed to comply with the following design standards, as applicable:

3.4.1.1 To the extent practicable and consistent with Prudent Industry Practices, a minimum design life of 15 years for pumps and mechanical equipment, 30 years for above- ground buildings and structures, and 50 years for underground pipes and lines.

3.4.1.2 Reliability criteria as defined in the United States Environmental Protection Agency document "Design Criteria for Mechanical, Electrical and Fluid System and Component Reliability" published in 1974 for the appropriate reliability class of treatment works, as applicable.

3.4.1.3 Performance standards listed in the latest edition of "Design of Municipal Wastewater Treatment Plants" published jointly by the Water Environment Federation and the American Society of Civil Engineers, as applicable.

The above and foregoing criteria are intended solely as design criteria, and will not be construed as constituting any warranty or guarantee of performance by the Contractor.

3.4.2 Contractor shall comply with National Fire Protection Association ("NFPA") Design Standards including NFPA 820 (Standard for Fire Protection in Wastewater Treatment and Collection Facilities).

3.5 WARRANTIES.

3.5.1 Contractor expressly warrants that the Work (except for design Work, which shall be performed in accordance with the standard of care required by Section 3.2.1) will be of good quality, free from defects in materials and workmanship, in conformance with all applicable specifications, descriptions, samples, and drawings referred to in this Agreement, merchantable and fit for their intended purposes, and conforming to the Contract Documents and Applicable Laws. Contractor's warranty excludes damage due to improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

3.5.2 Contractor warrants that the production, packaging, labeling and transportation of all goods will comply with all applicable national, regional, state and local laws, rules, regulations, ordinances and orders.

3.5.3 Contractor warrants that it has the experience and ability as may be necessary to perform all Work with a high standard of quality and that all Work will be performed in a workmanlike, professional manner and in accordance with the highest standards in the industry.

3.5.4 All warranties will survive inspection, testing and acceptance of the Work and expiration or termination of this Agreement. All warranties are considered independent. Each will be separately construed and interpreted without reference to any other warranty.

3.5.5 All materials furnished or installed, including and without limitation, the dewatering centrifuge, shall be subject to a guaranty of the longer of (a) two (2) years from the date of Substantial Completion or (b) such longer period as may be provided in the Contract Documents. All rights acquired by DUWA through guarantees by the Contractor shall inure to the benefit of DUWA, its successors and assigns. In addition to the foregoing, any equipment warranties and warranties from Sub-Contractors or Suppliers, secured by the Contractor, including those in excess of two (2) years, and any additional bond or guaranty which may be required under the Contract Documents, shall also inure to the benefit of DUWA, its successors and assigns. The Contractor shall require that each Sub-Contractor provide a similar warranty and guaranty for the benefit of the Contractor and DUWA. The Contractor shall acquire, catalog and deliver to DUWA all bonds and guarantees under Subcontracts and from material suppliers. The Contractor shall render assistance and cooperate with DUWA in enforcing those warranties from Sub-Contractors and Suppliers which extend beyond the Contractor's warranties.

3.5.6 The Contractor's express warranty herein shall be in addition to, and not in lieu of, any other warranties, guaranties or remedies DUWA may have under the Agreement and its Contract Documents, at law, or in equity for defective work.

3.5.7 For a period of two (2) years commencing from Substantial Completion or the date of a warranty repair, whichever is later, and for longer periods specified in the Contract Documents for certain equipment manufacturers or suppliers, Contractor will provide all labor, materials, and equipment necessary to promptly repair or replace any and all deficient, defective or non-conforming Work, provided that the Work was properly maintained and used, together with any other Work that is damaged during repair or replacement, without expense to DUWA (including any additional re-inspection fees). If operations of the Facility are impaired by the defective or deficient Work or its correction, Contractor shall use such overtime labor and time saving procedures as DUWA may require at Contractor’s expense. Establishment of the two (2) year period for correction of Work relates only to the Contractor’s express warranty on workmanship and specific obligation to correct defective or non-conforming Work, and has no relationship to statute of limitations periods for legal claims arising from this Agreement.

3.5.8 Contractor shall provide on-site troubleshooting services within five (5) days after receipt of notice in writing from DUWA of a problem with its Work. DUWA is hereby authorized to repair any defective or non-conforming Work, and Contractor and its Surety (if any) shall be liable for the cost thereof, if 10 days after giving of such notice to Contractor, the Contractor has failed to make or undertake the repairs with due diligence. In case of emergency, where, in the opinion of DUWA, delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor, the expense in connection therewith shall be charged to the Contractor, and its Surety (if any) shall be liable for the cost thereof.

3.5.9 As part of the close-out documentation for Substantial Completion, the Contractor shall execute and submit a completed "Warranty Form" in the format included in Exhibit D to the Agreement, for the Work, and any portion of the Work possessed. The Warranty Form shall be submitted prior to Substantial Completion or within five (5) days of the occupancy or use of a portion of the Project, whichever is applicable.

3.6 TAXES.

The Contractor shall pay all consumer, use, sales and other similar taxes on supplies, materials, machinery, tools, utilities and other equipment and services used or incorporated in the construction of the Project which are required by law to be paid at the time the Agreement is executed, whether or not yet effective.

3.7 PERMITS, FEES AND NOTICES.

3.7.1 The Contractor shall secure and pay for all Permits, and pay all fees necessary for the proper execution and completion of the Work which are legally required at the time the Agreement is executed. If any of the Work is required to be inspected or approved by any Government Authority other than DUWA, the Contractor shall, at its sole cost and expense, cause such inspection or approval to be sought and obtained.

3.7.2 The Contractor shall give all notices and comply with all Applicable Laws, ordinances, rules, regulations and lawful orders of any Government Authority bearing on the performance of the Work.

3.7.3 The Contractor shall comply with all Applicable Laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. The Williams-Steiger Occupational Safety Act of 1970, administered by the United States Department of Labor, is specifically applicable. The Contractor shall erect and maintain, as required by existing conditions and the progress of the Work, all reasonable safeguards for safety and protection, including barriers and the posting of danger signs and other warnings against hazards, promulgate safety regulations and notify owners and users of adjacent utilities.

3.7.4 If the Contractor performs, or allows any Sub-Contractor to perform, any of the Work knowing such Work to be subject to an error, inconsistency or omission in the Contract Documents, or contrary to Applicable Laws, ordinances, rules, regulations, codes or orders of any public authority, and fails to give DUWA notice thereof prior to performance thereof, the Contractor shall bear all costs arising therefrom.

3.8 SUBMITTALS SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

3.8.1. The Contractor will provide DUWA with a submittal schedule that indicates when submittals will be issued and when approval is required, including review periods by DUWA which provide at least 14 days for standard submittals and 30 days for major equipment or electrical submittals (submittals requiring a 30 day review period will be identified by DUWA).

3.8.2. The Contractor will submit to DUWA for review all shop drawings, product data, samples and other submittals required by the Contract Documents in accordance with the submittal schedule and in all cases with reasonable promptness and in such sequence as to avoid delays in the Work or in the activities of the Contractor. The Contractor will not submit any submittal that is merely a tracing or copy of any of the Construction Documents. Each submittal will be prepared by Contractor, its tier subcontractor, or supplier and will be submitted according to the Contract Documents.

3.8.3. As Contractor is a Contractor, the submittals must be prepared by, or under the responsible charge of, a professional engineer or architect registered or licensed in Michigan who will sign and seal all design-build submittals indicating that the design professional is the engineer or architect of record for that scope. Contractor will remain liable and responsible for all design-build submittals notwithstanding any review by DUWA, OHM, Veolia or Contractor's contractors.

3.8.4. Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared for the Work by the Contractor or any Sub-Contractor, manufacturer, supplier or distributor to illustrate some portion of the Work. Shop Drawings are not Contract Documents.

3.8.5. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor or any Sub-Contractor, manufacturer, Supplier or distributor to illustrate a material, product or system for some portion of the Work. Product Data are not Contract Documents.

3.8.6. Samples are physical examples furnished by the Contractor or any Sub-Contractor, manufacturer, supplier or distributor which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged. Samples are not Contract Documents.

3.8.7. The Contractor shall review, utilizing personnel who are qualified, knowledgeable and experienced in the area of expertise required, approve and only then submit, with reasonable promptness, in orderly sequence so as to cause no delay in the Work or in the work of DUWA or any separate Contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents or subsequently required by DUWA.

3.8.8. Shop Drawings, Product Data and Samples shall be properly identified as specified, or as DUWA may require.

3.8.9. At the time of submission, the Contractor shall clearly inform DUWA in writing of any deviation in the Shop Drawings, Product Data or Samples from the requirements of the Contract Documents.

3.8.10. Shop Drawings and other submittals which are not approved by the Contractor will be returned un-reviewed.

3.8.11. Shop Drawings and other submittals may not be submitted with disclaimers or other exculpatory language inasmuch as it is the responsibility of the Sub-Contractor or Supplier

originating such submission to properly prepare the submittal and the responsibility of the Contractor to verify that the submittal has been properly prepared. Shop Drawings and other Submittals containing disclaimers or other exculpatory language will be returned un-reviewed.

3.8.12. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor thereby represents that it has (i) determined and verified all materials, field measurements, field construction criteria, catalog numbers and similar data; (ii) checked and coordinated such Shop Drawing, Product Data and Samples with the requirements of the Work and of the Contract Documents; and (iii) clarified any discovered design ambiguity with DUWA in writing.

3.8.13. DUWA will review and approve or take other appropriate action upon designated Shop Drawings, Product Data and Samples with reasonable promptness so as to cause no delay.

3.8.13.1 The Contractor shall provide all submittals as required by the Project Schedule. The Contractor shall allow for a maximum period of fourteen (14) days for DUWA's review and approval of any submittal not covered by the Project Schedule

3.8.13.2 DUWA's approval of a separate item shall not indicate approval of an assembly in which the item functions.

3.8.13.3 DUWA's review and approval of Shop Drawings and other Submittals that deviate from the requirements of the Contract Documents shall not constitute approval of deviations unless the same are clearly called out as required by the Project.

3.8.13.4 The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by DUWA's approval thereof.

3.8.14 The Contractor shall, at its sole cost and expense, correct any errors identified by DUWA and shall resubmit the required number of corrected copies of Shop Drawings, Product Data or new Samples until approved.

3.8.14.1 The Contractor shall direct specific attention in writing on resubmitted Shop Drawings, Product Data or Samples to revisions other than the corrections requested by DUWA on previous submissions and DUWA's review and approval of resubmitted submissions will not constitute approval of any changes other than those specifically noted.

3.8.14.2 The fees and expenses of DUWA in reviewing and approving more than one re-submittal of a submission shall be charged to the Contractor and off-set against amounts otherwise due and payable to the Contractor if resubmission is required because the original submittal and first re-submittal were not correct and complete. All time consumed by the resubmissions and re-reviews of a particular Submittal shall constitute time required to furnish the particular item, or delays not meeting the requirements for increases to Contract Time or Contract Price, or both.

3.8.14.3 The Contractor shall submit to DUWA final Shop Drawings, as used for construction, marked as such for DUWA's records.

3.8.15 DUWA's review of the Shop Drawings, Product Data or Samples shall not relieve the Contractor of responsibility for a deviation from the requirements of the Contract Documents unless Contractor has informed DUWA in writing of such deviation at the time of submission and DUWA has given written approval to the specific deviation, nor shall DUWA's review relieve the Contractor from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples.

3.8.16 Except as specifically authorized by DUWA in writing, no portion of the Work requiring a Shop Drawing, Product Data or Sample submission shall be commenced until the submission has been reviewed and approved by DUWA. All such portions of the Work shall be in accordance with such reviewed and approved Shop Drawings, Product Data and Samples.

3.9 USE OF SITE.

The Contractor shall confine operations at the Project site to areas permitted by law, ordinances, permits, the Contract Documents and directions of DUWA or Veolia and shall not unreasonably encumber the Project site with any materials or equipment. The Contractor shall abide by and enforce DUWA's or Veolia's instructions, if any, regarding signs, traffic circulation and patterns, advertisements, fires and smoking at the Project site. The Contractor may utilize only such access routes as may be designated by DUWA or Veolia from time to time.

3.10 CUTTING AND PATCHING OF WORK.

3.10.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly and, to the extent required by the Contract Documents, for all cutting, fitting, or patching required in connection with work done by DUWA or DUWA's separate Contractors. DUWA shall not be responsible for any costs arising out of cutting, fitting and patching the work of the various Sub-Contractors and no claims on account thereof will be considered.

3.10.2 The Contractor shall not, and shall not permit any Sub-Contractor to, damage or endanger any portion of the Work or the work of DUWA or any separate Contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of DUWA or any separate Contractor except with the written consent of DUWA and of such separate Contractor. The Contractor shall not unreasonably withhold from DUWA or any separate Contractor its consent to cutting or otherwise altering the Work.

3.11 CLEANING UP.

3.11.1 The Contractor, at all times, shall keep the Project site free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work, it shall (i) remove all its waste materials and rubbish from and about the Project, as well as all tools, construction equipment, machinery, surplus materials and temporary installations and facilities; (ii) shall clean and protect all finished surfaces and areas in accordance with the Specifications.

3.11.2 If the Contractor fails to clean up after request from DUWA, DUWA may do so and the cost thereof shall be charged to the Contractor.

3.12 ROYALTIES AND PATENTS.

The Contractor shall pay all royalties and license fees. The Contractor shall indemnify and defend, with counsel reasonably acceptable to DUWA, all suits or claims for infringement of any patent rights or copyrights and shall defend, indemnify and save DUWA harmless from all loss, cost or expense (including attorney's fees) on account thereof. Notwithstanding the foregoing, the Contractor shall not be responsible for infringement of patent rights where a particular design process or product of a particular manufacturer is specified by DUWA and the Contractor has no reason to believe that such design process or product specified is an infringement of a patent.

3.13 INDEMNIFICATION.

3.13.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless Indemnified Parties from and against claims, damages, losses, and expenses (including but not limited to attorney fees) to the extent arising out of or resulting from performance of the Work, Contractor's breach of this Agreement, or failure to perform in accordance with the Contract Documents, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. The Contractor shall not be required to defend or indemnify DUWA for damages to the extent caused by the negligence of DUWA. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.13.1.

3.13.2 To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless the Indemnified Parties from all liabilities, claims, demands, actions, suits and costs (including, without limitation, reasonable attorneys' fees) if caused by reason of or as result of a notice of lien, claim for lien, lien, or suit to foreclose a lien filed, given, made or maintained by subcontractor, sub-subcontractor or supplier of Contractor provided that the Contractor has received payment pursuant to the terms of this Agreement.

3.13.3 In any and all claims against DUWA or any of its directors, officers, agents or employees by any employee of the Contractor, any Sub-Contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 3.13.3 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Sub-Contractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

3.13.4 The obligations of the Contractor under this Section 3.13 shall survive the termination of the Agreement.

ARTICLE 4

SUB-CONTRACTORS

4.1 THIRD PARTY BENEFICIARY.

Nothing contained in the Agreement or the Contract Documents shall create any contractual relation between DUWA or any Sub-Contractor or Sub-Sub-Contractor.

4.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK.

4.2.1 Prior to executing any Subcontracts or utilizing any Sub-Contractors for the Work, the Contractor shall provide DUWA with a list of proposed Sub-Contractors for DUWA's prior review and approval (the "Sub-Contractor List"). DUWA may object, for any reason, to any proposed Sub-Contractor within a reasonable time after its receipt of the Sub-Contractor List. The Contractor shall not award any portion of the Work to a Sub-Contractor that was not nominated before execution of the Agreement, without first obtaining DUWA's written consent. If DUWA objects to any Sub-Contractor without cause, and such objection causes an increase in the Contract Price, DUWA shall, pursuant to Article 11, order any adjustments in the Contract Price required to make up the difference in cost between the proposed Sub-Contractor and the Sub-Contractor approved by DUWA, or the Contractor's cost to self-perform, that part of the Work involved, whichever is applicable. The Contractor shall make no substitution for any Sub-Contractor, person or entity previously approved by DUWA without first obtaining DUWA's written consent.

4.2.2 The Contractor shall promptly deliver to DUWA a complete executed copy of each Subcontract awarded.

4.2.3 Upon award of a Subcontract, the Sub-Contractor shall identify its job-site staff and agree that such job-site staff may not be changed or reassigned (except where an individual leaves the employ of the Sub-Contractor or any affiliate) without the prior written consent of the Contractor. The Contractor shall consult with DUWA prior to giving consent to any proposed substitution.

4.3 SUBCONTRACTUAL RELATIONS.

4.3.1 By an appropriate written agreement, the Contractor shall require each Sub-Contractor, to the extent of the portion of the Work to be performed by the Sub-Contractor, to be bound to the Contractor by the terms of the Agreement and the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Agreement and the Contract Documents, assumes toward DUWA. Where appropriate, the Contractor shall require each Sub-Contractor to enter into similar agreements with its Sub-Sub-Contractors. The Contractor shall make available to each proposed Sub-Contractor, prior to the execution of the Subcontract, copies of the Agreement and its Contract Documents to which the Sub-Contractor will be bound by this Section 4.3, and identify to the Sub-Contractor any terms and conditions of the proposed Subcontract which may be at variance with the Agreement and its Contract Documents. Each Sub-Contractor shall similarly make copies of the Agreement and its Contract Documents available to its Sub-Sub-Contractors.

4.3.2 The Contractor shall cause all Sub-Contractors, Suppliers, laborers and vendors to agree to indemnify DUWA and hold it harmless from all claims that may arise from such Sub-Contractor's operations to the same extent as the Contractor has indemnified DUWA pursuant to Section 3.13 hereof. Such provisions shall be in a form reasonably satisfactory to DUWA.

4.3.3 The agreement between the Contractor and the Sub-Contractors (and, where appropriate, between Sub-Contractors and Sub-Sub-Contractors) shall include, without limitation:

4.3.3.1 Preserve and protect the right of DUWA under the Contract with respect to the Work to be performed under the Subcontract so that the subcontracting thereof will not prejudice such rights;

4.3.3.2 Require that such Work be performed in accordance with the requirements of the Contract Documents;

4.3.3.3 Require submission to the Contractor of sworn statements and waivers of claim under each Subcontract and Sub-subcontract, in reasonable time to enable the Contractor to comply with the Agreement, all such documents to be in the form approved by DUWA and in compliance with all requirements of applicable law;

4.3.3.4 Require that all claims for additional costs or extensions of time with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Sub-Contractor or Sub-Sub-Contractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided, if any, in the Agreement for a like claim by the Contractor upon DUWA. To the extent the Contractor is liable to any Sub-Contractor, any such pass-through claim raised by the Contractor against DUWA shall first be liquidated between the Contractor and Sub-Contractor pursuant to the terms of a liquidation agreement under which (i) the Contractor acknowledges its liability to the Sub-Contractor and remains unchanged to pay the Sub-Contractor regardless of the outcome of the Contractor's claim against DUWA, (ii) the Contractor's liability is liquidated to the extent of its recovery, if any, against DUWA; and (iii) the Contractor agrees to pass its recovery, if any, to the Sub-Contractor. The Contractor shall deliver the executed liquidation agreement to DUWA as a pre-requisite to pursuing any claims on behalf of the Sub-Contractor or Sub-Sub-Contractor;

4.3.3.5 Waive all rights the contracting parties may have against one another and against DUWA for damages caused by fire or other perils covered by the property insurance required under the Agreement; and

4.3.3.6 Obligate each Sub-Contractor specifically to consent to the provisions of this Section 4.3.

4.3.4 The Contractor shall bear the risk of any inconsistencies between the terms and conditions of the Agreement and its Contract Documents and the terms and conditions of its Subcontract, purchase orders and similar documentation.

4.3.5 The Contractor shall coordinate and supervise the work performed by Sub-Contractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. The Contractor and all Sub-Contractors shall at all times afford each trade, any separate Contractor, or DUWA, every reasonable opportunity for the installation of work and the storage of materials.

4.4 COMMUNICATIONS WITH SUB-CONTRACTORS.

4.4.1 The Contractor shall be responsible for the communication of information between the Sub-Contractors or Suppliers and DUWA and shall ensure that all communications from the Sub-Contractors and Suppliers are properly routed to the Contractor.

4.4.2 Where, for purposes of clarity, direct communications between DUWA and Sub-Contractors or Suppliers are necessary, the Contractor shall have a representative present.

ARTICLE 5

WORK BY DUWA OR BY SEPARATE ContractorS

5.1 DUWA'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS.

5.1.1 This is not an exclusive services contract. DUWA reserves the right to (i) perform work related to the Project with his own forces; and (ii) to award separate contracts in connection with other portions of the Project or other work on the Project.

5.1.2 The Contractor will provide for the coordination of the work of DUWA's forces and of each separate Contractor with the Work of the Contractor, who shall cooperate therewith as provided in Section 5.2 hereof.

5.2 MUTUAL RESPONSIBILITY.

5.2.1 The Contractor shall afford DUWA and DUWA's separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work related to the Project, and shall properly connect and coordinate its Work with theirs as required by the Contract Documents.

5.2.2 If any part of the Work depends on proper execution or results upon the work of DUWA or any separate Contractor, the Contractor shall, prior to proceeding with such portion of the Work, inspect and promptly report to DUWA any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report shall constitute an acceptance of DUWA's or DUWA's separate Contractors' work as fit and proper to receive its work, except as to defects which may develop or become apparent in DUWA's or separate Contractor's work after the execution of the Work.

5.2.3 Should the Contractor cause damage to the work or property of DUWA, or to other work on the Project site, the Contractor shall promptly remedy such damage as provided in Article 9 hereof.

5.2.4 Should the Contractor cause damage to the work or property of any separate Contractor, the Contractor shall upon due notice promptly settle with such other Contractor by agreement, if it will so settle. If such separate Contractor sues or initiates an arbitration proceeding against DUWA on account of any damage alleged to have been caused by the Contractor, DUWA shall notify the Contractor who shall defend such proceedings at the Contractor's expense, and if any judgment or award against DUWA arises therefrom, the Contractor shall pay or satisfy it and shall reimburse DUWA for all reasonable attorneys' fees and court or arbitration costs which DUWA has incurred.

5.3 DUWA'S RIGHT TO CLEAN UP.

If a dispute arises between the Contractor and DUWA as to the Contractor's responsibility for cleaning up as required by Section 3.11 hereof, DUWA may clean up and charge the cost thereof to the Contractor upon 48 hours written notice if the Contractor does not commence reasonable action.

ARTICLE 6

MISCELLANEOUS PROVISIONS

6.1 TESTS.

6.1.1 The Contractor shall, at its sole cost and expense, provide and pay for testing and inspections required by the Contract Documents or laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Work. The Contractor shall give DUWA timely notice of its readiness and the date arranged so they may observe such inspection, testing or approval.

6.1.2 If DUWA determines that any Work requires special inspection, testing, or approval which Paragraph 6.1.1 hereof does not include, DUWA will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Paragraph 6.1.1 hereof. If such special inspection or testing reveals a failure of the Work to comply with (i) the requirements of the Contract Documents; or (ii) Applicable Laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof; otherwise DUWA shall bear such costs, and an appropriate Change Order shall be issued.

6.1.3 Certificates of inspection, testing or approval required to be obtained by the Contractor or Sub-Contractors in connection with construction permits, shall be secured by the Contractor, cataloged, indexed, bound (in removable form) and promptly delivered by it to DUWA.

6.2 OTHER PROJECTS.

Nothing set forth in the Contract Documents shall constitute an agreement between DUWA and the Contractor with respect to services other than those included in the Contract Documents.

6.3 NONDISCRIMINATION.

The Contractor shall comply with Titles VI and VII of the Civil Rights Act of 1964 (Public Law 88-352, 78 STAT.266), U.S. Department of Justice Regulations (28 CFR Part 42), the Michigan Civil Rights Act (Public Act No. 453 of 1976), the Michigan Handicappers Civil Rights Act (Public Act No. 220 of 1976) and all other fair employment practices and equal laws. The Contractor shall furnish and file compliance reports within the times and in form prescribed by DUWA. Compliance reports may also elicit information as to the practices, policies, programs, and employment statistics of the Contractor and Sub-Contractors. The Contractor will permit access to Contractor's records and accounts by DUWA and/or its agent for purposes of investigation to ascertain compliance with the Agreement and its Contract Documents. The Contractor agrees that it will not discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions or privileges of employment because of religion, race, color, national origin, age, sex, height, weight, marital status, or handicap that is unrelated to the individual's ability to perform the duties of a particular assignment or position. The Contractor hereby recognizes the right of the United States, the State of Michigan and DUWA to seek judicial enforcement of the foregoing covenants against discrimination, against itself or its Sub-Contractors connected directly or indirectly with the performance of the Agreement.

6.4 MUTUAL WAIVER OF CONSEQUENTIAL DAMAGES.

Notwithstanding any other provision of this Agreement to the contrary, neither party including their officers, agents, servants and employee shall be liable to the other for lost profits or any special, indirect, incidental, or consequential damages in any way arising out of this Agreement however caused under a claim of any type or nature based on any theory of liability (including but not limited to: contract, tort, or warranty) even if the possibility of such damages has been communicated. Penalties or fines assessed by permitting parties for violations of DUWA's NPDES Permit effluent maximum loads or concentrations for the Project as a result of defects in design or construction by Contractor are hereby expressly excluded from this provision 6.4 and shall not be considered a consequential, special, indirect, or incidental damage.

6.5 MISCELLANEOUS PROVISIONS.

Remedies Cumulative: All rights and remedies provided in this Agreement are cumulative and not exclusive of any other rights or remedies that may be available to the parties, whether provided by law, equity, statute, in any other agreement between the parties or otherwise. Notwithstanding the foregoing, DUWA's exclusive remedies for breach of the Project Schedule milestones specified in the Agreement shall be the remedies specified in Section 4.6 of the Agreement.

ARTICLE 7

TIME

7.1 DEFINITIONS.

7.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Final Completion of the Work as defined in Paragraph 7.1.4 hereof, including authorized adjustments thereto.

7.1.2 The date of commencement of the Work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Agreement or such other date as may be established therein.

7.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date upon which DUWA shall have certified that construction is sufficiently complete, in accordance with the Agreement and its Contract Documents, so DUWA can utilize the Work or designated portion thereof for the use for which it is intended and shall include (i) completion of all specified training, (ii) receipt by DUWA of acceptable, specified O & M manuals (i.e., 90% O & M manuals in the case of Substantial Completion of the entire Work), (iii) all systems have been successfully tested and demonstrated by the Contractor for their intended use, (iv) Equipment Supplier's Equipment having successfully passed the Initial Acceptance Test, and (iv) DUWA having received all required certifications and/or approvals from the State of Michigan and any other political bodies having jurisdiction over the Work.

7.1.4 The date of Final Completion of the Work is the date on which the Work shall be fully, completely and finally completed in accordance with the Agreement and its Contract Documents and:

7.1.4.1 The Contractor has completed all Punch List items to the satisfaction of DUWA, including providing DUWA with the results of any and all tests that may be required;

7.1.4.2 The Contractor has delivered to DUWA:

7.1.4.2.1 All 100% complete maintenance and operating manuals; if any;

7.1.4.2.2 Marked sets of working Drawings reflecting "as built" conditions and upon which the Contractor shall have transferred all changes in the location of any concealed utilities, mechanical or electrical systems and components;

7.1.4.2.3 Any special guarantees or warranties required by the Contract Documents;

7.1.4.2.4 An assignment and/or transfer of all guarantees and warranties from Sub-Contractors, vendors, Suppliers and manufacturers;

7.1.4.2.5 A list of the names, addresses and phone numbers of all Sub-Contractors and other persons providing guarantees or warranties;

7.1.4.2.6 The Sub-Contractor close-out logs; and

7.1.4.2.7 All required sworn statements and waivers of claim and other documentation required by the Contract Documents.

7.1.4.3 The Contractor has otherwise complied with all close-out requirements of the Contract Documents.

7.2 <u>PROGRESS AND COMPLETION</u>.

7.2.1 All time limits stated in the Contract Documents are of the essence of the Agreement. The construction and completion of the Project shall be undertaken and completed in accordance with the Project Schedule described in the Contract Documents. The parties shall use the Project Schedule for planning and monitoring the progress of the Work.

7.2.2 The Contractor shall begin the Work on the date of commencement as defined in Paragraph 7.1.2 hereof. It shall carry the Work forward expeditiously with adequate forces, shall at all times adhere to the Project Schedule and shall achieve Substantial Completion and Final Completion within the time limits set forth in the Project Schedule.

7.2.3 The Contractor shall be responsible to maintain daily records that will enable the Contractor to accurately update the Project Schedule as required in Paragraph 7.2.4 hereof.

7.2.4 At the end of the first month following issuance of the approved Project Schedule and every month thereafter (or at such lesser intervals if deemed necessary by DUWA), the Contractor shall prepare an updated Project Schedule showing the actual status of the Project as of the date of the updated Project Schedule. The updated Project Schedule shall be related to the original Project Schedule to facilitate identification of variances therefrom (activity descriptions shall not be redefined on such updated Project Schedule).

7.2.5 Extensions of the Contract Time shall not be granted except as expressly provided for in this Article 7.

7.2.6 In the event (i) Construction Change Directives or Change Orders are issued by DUWA; (ii) the Contractor receives a notice of a change in the Agreement or extra work to be performed; or (iii) the Contractor becomes aware of any conditions which are likely to cause or are actually causing delays, the Contractor shall notify DUWA in writing of the effect, if any, within any specific time limits set forth in the Agreement (and if no specific time limits are set forth, within fifteen (15) days) and shall state in what respects, if any, the Project Schedule should be revised with the reasons therefor. If the Contractor shall fail to provide DUWA with written notice within the specified time period that an adjustment to the Project Schedule is necessary, then any claims by the Contractor for an extension of the Contract Time shall be waived.

7.2.7 If the Contractor shall fail to adhere to the Project Schedule, as revised pursuant to the Agreement, it must promptly work such additional time over regular hours, including Saturdays, Sundays and holidays and/or supply such additional workmen as may be required to bring the Work on schedule, without additional cost or expense to DUWA, including claims for inefficiency due to the use of overtime.

7.3 SUSPENSION BY DUWA.

7.3.1 DUWA may order the Contractor in writing to suspend, delay or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of DUWA.

7.3.2 If the performance of all or any part of the Work on the Project is suspended, delayed or interrupted at the direction of DUWA, if such act causes delays in the critical path activity, then the Project Schedule shall be adjusted as mutually agreed.

7.3.3 Any claims for extension of time pursuant to paragraph 7.3.2 hereof shall be made in writing to DUWA no more than five (5) days after the commencement of the delay; otherwise they shall be waived. In the case of a continuing cause of delay, only one claim is necessary. Any delay of less than twenty-four (24) hours duration shall not be justification for adjusting the Project Schedule or Contract Price.

7.3.4 To the extent practical, the Contractor shall reduce the size of its Project staff upon notice from DUWA of any DUWA caused delay or interruption which is likely to exceed thirty (30) days to reduce costs and expenses to DUWA. Upon the termination of the delay or as otherwise directed by DUWA, the Contractor shall restore the Project staff to its former size.

7.3.5 No adjustments to the Contract Price or Contract Time shall be made under this Section 7.3 for any suspension, delay or interruption (i) to the extent that performance would have been so suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor; or (ii) for which an equitable adjustment is provided or excluded under any other provision of the Agreement. DUWA's exercise of any of its rights under the Agreement, or DUWA's requirement of correction or re-execution of any defective Work shall not, under any circumstances, be construed as interference with the Contractor's performance of the Work.

7.3.6 NOTWITHSTANDING ANYTHING CONTAINED HEREIN TO THE CONTRARY. CONTRACTOR ACKNOWLEDGES THAT NO EXTENSIONS OF THE CONTRACT TIME OR INCREASE TO THE CONTRACT PRICE SHALL BE PERMITTED EXCEPT AS APPROVED IN ADVANCE BY DUWA.

7.3.7 Each Sub-Contractor shall be bound by the foregoing provisions.

7.4 DELAYS AND EXTENSIONS OF TIME.

7.4.1 If the Contractor shall be delayed by: (1) the combined action of workmen (either those employed on the Work or in any industry essential to the conduct of the Work) in no way caused by or resulting from default or collusion on the part of the Contractor; (2) by strikes, lockouts, embargoes, fire, unavoidable casualties, unusual delays in transportation, national emergency, unusually severe and adverse weather conditions not reasonably anticipatable; or (3) by any other causes which the Contractor could not reasonably control or circumvent, and if such delay affects the critical path activity, then the Project Schedule shall be adjusted as necessary to compensate for such delay (but the total extension of all critical path activities may not exceed the length of the delay).

7.4.2 To the extent delays are caused by DUWA, Contractor shall be entitled to an equitable adjustment of the Contract Price and extension of the Contract Time. An extension of the Contract Time shall be the Contractor's sole remedy for any other delays under Paragraph 7.4.1. In no event shall the Contractor be entitled to any compensation or recovery of any damages in

connection with any delay under 7.4.1, including, without limitation, consequential damages, lost opportunity costs, impact damages or other similar remuneration.

7.4.3 All claims for extension of time pursuant to Paragraph 7.4.1 hereof shall be made in writing to DUWA no more than ten (10) days after the commencement of the delay, except in connection with weather delays which shall be made on a monthly basis within five (5) days from the end of each month; otherwise they shall be waived. In the case of a continuing cause of delay only one claim is necessary. Any delay of less than twenty-four (24) hours duration shall not be justification for adjusting the Project Schedule.

7.4.4 No adjustments shall be made under this Section 7.4 for any suspension, delay or interruption (i) to the extent that performance would have been so suspended, delayed or interrupted by any other cause including due to the fault or negligence of the Contractor; or (ii) for which an equitable adjustment is provided under any other provision of the Agreement. DUWA's exercise of any of its rights under the Agreement, or DUWA's requirement of correction or re-execution of any defective Work shall not, under any circumstances, be construed as interference with the Contractor's performance of the Work.

7.4.5 Each Sub-Contractor shall be bound by the foregoing provisions.

7.5 ACCELERATION OF PERFORMANCE.

7.5.1 If DUWA shall desire the Work of the Contractor hereunder to be performed with greater speed than is herein contracted for, the Contractor shall, without affecting or abridging the rights of DUWA under the Agreement, upon receipt of a written order from DUWA, specifically setting forth a request pursuant to this Section 7.5, employ overtime work as so ordered. Only the premium cost of such overtime work, as shown on the time slips checked and approved each day by DUWA shall be paid by DUWA to the Contractor as additional compensation, and no overhead, profits, costs, commissions, claims for inefficiencies or otherwise, or other costs or claims shall be charged or due with respect to use of overtime work or the acceleration of performance. This provision shall not apply to acceleration of performance caused by the Contractor's default, the cost of which shall be borne solely by the Contractor.

7.5.2 Each Sub-Contractor shall be bound by the foregoing provisions.

7.6 PREREQUISITES FOR START OF CONSTRUCTION.

7.6.1 The Contractor shall not commence construction (or recommence construction following any suspension) of any portion of the Work prior to occurrence of all the following events except with the prior written consent of DUWA in his/her sole discretion, and the Contractor shall promptly commence such construction promptly following the occurrence of such events:

7.6.1.1 DUWA shall have delivered to the Contractor a Notice to Proceed for the relevant phase of the Work; and

7.6.1.2 DUWA has reviewed and approved the Project Schedule; and

7.6.1.3 DUWA has convened and conducted a kick-off meeting.

7.7 USE OF FLOAT.

7.7.1 Total Float and Free Float, whether disclosed or implied by the use of float suppression techniques, are not for the exclusive benefit of the Contractor or DUWA, and shall be available to the Contractor and DUWA.

ARTICLE 8

PAYMENT AND COMPLETION

8.1 CONTRACT PRICE.

The Contract Price is the total amount payable by DUWA to the Contractor for the performance of the Work, including all risks, hazards and difficulties therewith assumed by the Contractor under the Agreement.

8.2 SCHEDULE OF VALUES; DETAILED COST BREAKDOWN.

The Contractor shall prepare, and submit to DUWA for approval, a Schedule of Values and Detailed Cost Breakdown showing the allocation of the Contract Price among the various components of the Work and in sufficient detail as DUWA may require. The Contractor shall revise the Schedule of Values as required by DUWA. The Schedule of Values, and Detailed Cost Breakdown when approved by DUWA, shall be used as a basis for Applications for Payment and Progress Payments to the Contractor. The Contractor represents and warrants to DUWA that the final Schedule of Values and Detailed Cost Breakdown is an accurate and correct allocation of the Contract Price.

8.3 APPLICATIONS FOR PAYMENT.

8.3.1 The issuance of an Application for Payment will constitute a representation by the Contractor to DUWA that the Work has progressed to the point indicated; that the quality of the Work is in accordance with the Contract Documents; that all as-built drawings are accurate and up-to-date; and that Contractor is entitled to payment in the amount certified.

8.3.2 Payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the Project or at some other location, only with the prior written approval of DUWA. Payment for materials stored off-site shall be conditioned upon submission by the Contractor of the following: (1) the notarized bill of sale to DUWA executed by an officer of the selling corporation; (2) a certificate of insurance covering the material for fire, theft and vandalism naming DUWA as the insured party; (3) an affidavit from an officer of the selling corporation stating that he is an officer and giving the complete address of the specific location where the material is stored; (4) a certification authorizing inspection by DUWA or its representative at the storage location; and (5) such other evidence as DUWA may reasonably require demonstrating that it is the owner of such material free and clear of all rights in others. Except to the extent covered by the insurance required under the Agreement, the Contractor shall have full responsibility for all stored materials and shall bear the risk of all loss, damage or theft thereof or thereto.

8.3.3 The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to DUWA upon the receipt of payment by the Contractor, free and clear of all liens, claims, security interests, encumbrances or rights in others, hereinafter referred to in this Article 8 as "liens"; and that no portion of the Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials or equipment for the Project, subject to a choate or inchoate lien or an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

8.3.4 At a minimum, each Application for Payment shall (i) be accompanied by the Contractor's sworn statements and waivers of claim, which sworn statement and waiver shall cover all work, labor and materials, including equipment and fixtures of all kinds done, performed or furnished as of the date of the request for payment; (ii) be accompanied by properly completed sworn statements and waivers of claim from each Sub-Contractor, Sub-Sub-Contractor, laborer and materialmen, which sworn statements shall cover all work, labor and materials, including equipment and fixtures of all kinds done, performed or furnished as of the date of the previous request for payment, and which waivers shall cover all work, labor and materials, including equipment and fixtures of all kinds, done, performed or furnished as of the previous request for which payment has been received; and (iii) such other evidence necessary to satisfy DUWA that the Work for which payment is requested has been completed in conformance with the Agreement, and that all amounts which have previously been paid for Work have been properly distributed to the various Sub-Contractors, Sub-Sub-Contractors, laborers and materialmen. In the event of any discrepancy, the Contractor shall furnish a written explanation to DUWA.

8.3.5 DUWA will, with reasonable promptness, either approve payment in the amount DUWA determines is properly due, or notify the Contractor in writing of its reasons for withholding payment.

8.4 PROGRESS PAYMENTS.

8.4.1 DUWA shall make payment upon, and only upon DUWA's receipt and approval of an Application for Payment which complies with all requirements of the Agreement.

8.4.2 DUWA may, on request and at his/her discretion, furnish to any Sub-Contractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by DUWA on account of Work done by such Sub-Contractor.

8.4.3 DUWA shall have no obligation to pay or to see to the payment of any moneys to any Sub-Contractor.

8.4.4 No Application for Payment, or any Progress Payment, or any approval of either by DUWA, or any partial or entire use of the Project by DUWA, shall constitute an acceptance of any Work not in accordance with the Contract Documents. Nor shall any prior estimate of completed units made by DUWA in connection with a Progress Payment constitute a certification

or acceptance of the amount of actual quantities which shall be determined by DUWA upon Final Completion which determination shall be final and binding.

8.5 PAYMENTS WITHHELD.

8.5.1 In addition to and not in limitation of the rights granted to DUWA under Section 2.4 hereof, DUWA may withhold payment because of subsequently discovered evidence or subsequent observations, or it may nullify the whole or any part of any payment previously issued, to such extent as may be necessary in its opinion to protect DUWA from loss because of any of the causes listed in Subparagraphs 8.5.1.1 through 8.5.1.6 below.

8.5.1.1 An Application for Payment is incorrectly completed or is not accompanied by properly completed supporting documentation; or

8.5.1.2 The Contractor is in default of any of its material obligations under the Agreement or any of the Contract Documents; or

8.5.1.3 Any part of such payment is attributable to Work which is defective or not performed in accordance with the Construction Documents, as determined by DUWA; provided, however, such payment shall be made as to the part thereof attributable to Work which is performed in accordance with the Construction Documents and is not defective, reserving, however, such amount as DUWA shall determine reasonably necessary to protect DUWA with respect to defective Work; or

8.5.1.4 The Contractor has failed to make payments promptly to Sub-Contractors, Sub-Sub-Contractors, laborers or materialmen or for material or labor used in the Work in accordance with the Subcontract documents; or

8.5.1.5 Any part of such payment is attributable to Work with respect to which DUWA has been notified of a claim or dispute or has received reasonable evidence indicating the existence of such a claim or dispute, provided DUWA has paid the Contractor in accordance with the Agreement and its Contract Documents; or

8.5.1.6 If DUWA reasonably determines that the portion of the Contract Price then remaining unpaid will not be sufficient to complete the Work in accordance with the Contract Documents after meeting with the Contractor and giving an opportunity to prove otherwise, no additional payments will be due the Contractor hereunder unless and until the Contractor, at no cost to DUWA, performs, and pays in full for, a sufficient portion of the Work so that such portion of the Contract Price then remaining unpaid is determined by DUWA to be sufficient to so complete the Work.

8.5.2 Until the Work is fifty percent (50%) completed as determined by DUWA, DUWA shall hold ten percent (10%) of each Progress Payment as retainage. After the Work is fifty percent (50%) completed, further retainage shall not be withheld, unless the Contractor is not in compliance with the terms of the Contract Documents.

8.5.3 All retainage shall be held in an interest bearing account with a regulated financial institution in the State of Michigan. The interest shall belong to the Contractor. The retainage plus

interest shall be paid to the Contractor with the Final Payment and upon fulfillment of the conditions set forth in Section 8.8.2 below.

8.6 FAILURE OF PAYMENT.

8.6.1 Unless otherwise directed by DUWA, the Contractor shall continue with the Work and maintain its progress during the existence of any disputes and DUWA shall continue to make payments to the Contractor over which there is no good faith dispute.

8.6.2 Each Sub-Contractor shall be bound by the foregoing provision.

8.7 SUBSTANTIAL COMPLETION.

When the Contractor considers that the Work, or a designated portion thereof which is acceptable to DUWA, is substantially complete as defined in Paragraph 7.1.3 hereof, the Contractor shall prepare for submission to DUWA a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When DUWA, on the basis of an inspection, determines that the Work or designated portion thereof is substantially complete, it will then prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall state the responsibilities of DUWA and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein.

8.8 FINAL COMPLETION, FINAL PAYMENT AND RELEASE OF RETENTION.

8.8.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, DUWA will promptly make such inspection and, when DUWA finds the Work acceptable under the Contract Documents, all items on DUWA's Punch List completed to DUWA's satisfaction and the Agreement fully performed, DUWA will promptly issue a final Certificate for Payment, which shall set forth a final determination of the actual quantities and measurements of the completed work and that the entire balance found to be due the Contractor, and noted in said final Certificate of Payment, is due and payable.

8.8.2 Neither the Final Payment nor the retained percentage shall become due until the Contractor submits to DUWA (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which DUWA or its property might in any way be responsible, have been paid or otherwise satisfied; (2) consent of surety, if any, to final payment and release of retention; and (3) final, unconditional general releases and final sworn statements and waivers of claim from Contractor and all Sub-Contractors, Sub-Sub-Contractors, laborers and material suppliers in the forms required by DUWA. Notwithstanding the foregoing, the Contractor's final waiver and unconditional release is not required to be submitted in advance of Final Payment but may be exchanged for Final Payment.

ARTICLE 9

PROTECTION OF PERSONS AND PROPERTY

9.1 SAFETY PRECAUTIONS AND PROGRAMS.

The Contractor shall develop a comprehensive project safety program and require each separate Sub-Contractor to adhere to such program. The Contractor shall appoint a safety officer who shall be responsible for administering the comprehensive safety program. This person shall be the Contractor's Project Manager unless otherwise designated by the Contractor in writing to DUWA. The person designated shall not be changed unless notice is given to DUWA. The Contractor shall assume responsibility for full and violation free compliance with all applicable laws, rules and regulations pertaining to job and project safety.

9.2 SAFETY OF PERSONS AND PROPERTY.

9.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

9.2.1.1 All employees on the Work and all other persons who may be affected thereby;

9.2.1.2 All of the Work and all materials and equipment to be incorporated therein, whether in storage on or off the Project site, under the care, custody or control of the Contractor or any of its Sub-Contractors or Sub-Sub-Contractors or others;

9.2.1.3 Other property at the Project site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and

9.2.1.4 DUWA's equipment and employees, directors, officers, agents and separate Contractors; provided that DUWA's equipment and employees, directors, officers, agents and separate Contractors comply with applicable state and federal safety regulations and the Contractor's written safety program.

9.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss, including without limitation the Confined Space Entry policy promulgated by DUWA. The Williams-Steiger Occupational Safety Act of 1970, as amended, administered by the United States Department of Labor, is specifically applicable as are parallel state statutes.

9.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including barriers and of danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

9.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

9.2.5 All damage or loss to any property referred to in Subparagraphs 9.2.1.2, 9.2.1.3, and 9.2.1.4 hereof caused in whole or in part by the Contractor, any Sub-Contractor, any Sub-Sub-Contractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss to the extent attributable to the acts or omissions of DUWA or anyone employed by DUWA or for whose acts DUWA may be liable; provided that such loss is not otherwise covered by insurance as required of any party (other than Contractor) pursuant to the terms of the Agreement.

9.2.6 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

9.2.7 The Contractor shall at all times protect excavations, trenches, buildings and materials, from rain water, ground water, back-up or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

9.2.8 The Contractor shall remove snow and ice which might result in damage or delay.

9.2.9 The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of DUWA, whether or not forming part of the Work, located within those areas of the Project to which the Contractor has access. The Contractor shall have full responsibility for the security of such property of DUWA located in such areas and shall reimburse DUWA for any such loss, damage or injury, except such as may be directly caused by directors, officers, agents or employees of DUWA.

9.3 EMERGENCIES.

In any emergency affecting the safety of persons or property, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work, not occasioned in whole or in part by Contractor's acts or omissions or by other causes which are Contractor's responsibility or indemnity obligation hereunder, shall be determined as provided in Article 11 hereof.

9.4 ENVIRONMENTAL.

9.4.1 The Contractor shall not, at any time, cause or permit any Hazardous Materials to be brought upon, stored, manufactured, blended, handled, or used in, on, or about the Work or the Project site for any purpose, except any Hazardous Materials as may be specifically called for in the Contract Documents and except as specifically identified in writing by the Contractor. Any material change and/or addition to the Hazardous Materials or uses so identified must be approved in writing in advance by DUWA, which approval shall not be unreasonably withheld.

9.4.2 The Contractor shall at all times be in material compliance with all applicable state, federal, and local environmental and health and safety laws and regulations; shall, at its sole cost and expense, obtain and maintain all permits, licenses, and authorizations required for the Contractor's business, equipment, and operations on and in connection with the Work; shall

comply with all material terms and conditions of such permits, licenses, and authorizations, and shall comply with all material and applicable requirements, orders, and directives of Government Authorities, including, without limitation, the Resource Conservation and Recovery Act (42 U.S.C. §§ 6901 et seq.), the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. §§ 9601 et seq.), the Occupational Health and Safety Act, all applicable fire and municipal building codes, and any amendments thereto and any applicable guidelines or regulations promulgated thereunder.

9.4.3 The Contractor shall certify with each Application for Payment, that (i) the Contractor, its agents, employees, Sub-Contractors, Sub-Sub-Contractors and their agents and employees, are in material compliance with the requirements of all Applicable Laws; (ii) to the Contractor's best knowledge, no disposal of Hazardous Materials has occurred on, in, under, or about the Work or the Project site; (iii) to the Contractor's best knowledge, no release of Hazardous Materials (except as otherwise reported to DUWA pursuant to Paragraph 9.4.6) has occurred on, in, under, or about the Work or the Project site; (iv) to the Contractor's best knowledge, no soil or surface or ground water contamination of the Work or the Project site has occurred; and (v) no Hazardous Materials have been used on the Work or the Project site except as provided under Paragraph 9.4.1 hereof.

9.4.4 The Contractor shall indemnify, defend, and hold DUWA, and its partners, officers, agents and employees harmless from and against any and all claims, judgments, damages, penalties, fines, liabilities, losses, and costs and expenses (including reasonable attorney's fees. and court costs) which arise at any time during or after the completion of the Work as a result of or in connection with (i) the Contractor's breach of any prohibition or requirement set forth in this Section 9.4; and (ii) any Hazardous Materials present or occurring in the soil or surface or ground water in, on, under, or about the Work, the property or other properties proximately caused by the Contractor's, its agents', employees', Sub-Contractors', Sub-Sub-Contractors' and their agents and employees', activities on or in connection with the Work. This obligation by the Contractor to indemnify, defend, and hold harmless includes, without limitation, costs incurred in connection with any investigation of site conditions or any cleanup, remedial, removal, or restoration work required by DUWA or any federal, state, or local governmental agency or political subdivision because of any Hazardous Materials occurring or present in the soil or surface or ground water in, on, under, or about the Work or the Project site, diminution in value of the Work or the Project site, damages for the loss or restriction on use of rentable or usable space or of any amenity of the Work or the Project site, and sums paid in settlement of claims, penalties, attorney's fees, court costs, consultant and laboratory fees, and expert's fees as a result of the Contractor's, its agents', employees', Sub-Contractors', and their agents and employees' activities on or in connection with the Work or the Project site. Without limiting the foregoing, if any Hazardous Materials attributable to the Contractor, its agents, employees, Sub-Contractors, or their agents or employees, or the activities of any of them, are found in the soil or surface or ground water in, on, under, or about the Work or the Project site, Contractor shall promptly take all actions, at its sole expense, necessary to return the Work or the Project site (as the case may be) to the condition existing prior to the introduction of Hazardous Materials to the Work or the Project site in accordance with Applicable Laws: provided (i) that, except in emergency situations (in which case notice shall be

given to DUWA as soon as practicable), DUWA's written approval of such actions shall first be obtained, which approval shall not be unreasonably withheld; and (ii) if it is impossible to return the Work or the Project site to such condition, as determined by DUWA, then the Contractor may substitute an alternative action which will achieve and maintain the safe condition of the Work or the Project site, if such alternative is acceptable to DUWA in DUWA's sole discretion. Notwithstanding anything to the contrary set forth in the Contract Documents, the Contractor shall not be liable for any damages or costs suffered or incurred by DUWA as a result of encountering Hazardous Materials which were present at the Project site prior to commencement of the Work (except Hazardous Materials encountered in the removal and disposal of the Hazardous Materials included in the scope of the Work under the Agreement) even if the Contractor's activities contributed or caused the Hazardous Materials to be disturbed or discharged unless the Contractor had actual knowledge of the presence of the Hazardous Materials and nevertheless proceeded to cause such Hazardous Materials to be disturbed or discharged. The Contractor shall not under any circumstances be liable to DUWA for any consequential damages as a result of discovery of or disturbing any Hazardous Materials which were present at the Project site prior to the Contractor's commencement of the Work. For the avoidance of doubt, DUWA acknowledges and agrees that the Contractor shall not be considered the generator of preexisting Hazardous Materials.

9.4.5 DUWA may conduct any testing, sampling, borings, and analyses it deems necessary. The Contractor, upon request, shall be given split samples of such test samples or borings; such testing shall be at the Contractor's expense if the Contractor, its agents, employees, Sub-Contractors or their agents and employees have caused Hazardous Materials to be on the Work or the Project site. In addition to any other right granted by law or the Agreement, if the Contractor is in material noncompliance with any Applicable Law, DUWA may make a reasonable demand for action upon the Contractor. If the Contractor does not respond within seven (7) days (unless an emergency is involved, in which case Contractor shall respond as soon as is practicable), DUWA may, at its option, take whatever action it deems necessary and appropriate at the Contractor's sole expense, which sums shall be immediately due and payable to DUWA. Upon termination of the Agreement, or abandonment of the Work by the Contractor for any reason, the Contractor shall remove all of its equipment, materials, and other items which may cause, contribute to, or result in contamination and investigate, remedy, and clean up any contamination caused by the Contractor, its agents, employees, Sub-Contractors, Sub-Sub-Contractors or their agents or employees, in compliance with all Applicable Laws. At all times during the performance of the Work, the Contractor shall if required by DUWA, or any governmental agency, promptly take whatever steps are necessary to stop any and all equipment, materials, and other items which may cause, contribute to, or result in contamination from causing, contributing to, or resulting in such contamination, and shall investigate, remedy, and clean up any contamination caused by the Contractor, its agents, employees, Sub-Contractors, or their agents or employees.

9.4.6 The Contractor shall promptly notify DUWA in writing of any release of Hazardous Materials on the Project site, specifying the nature and quantity of the release, the location of the release, and the measures taken to contain and clean up the release and ensure that future releases do not occur.

9.4.7 As used herein, the term "Hazardous Materials" means any hazardous, toxic, flammable, or explosive substance, material, or waste which is or becomes regulated by any local governmental authority, the State of Michigan, or the United States Government. The Contractor shall be given a reasonable period of time within which to come into compliance with future-enacted laws or regulations. The term "Hazardous Material" includes, without limitation, any material or substance which is (i) designated as a "hazardous substance" pursuant to Section 311 of the Federal Water Pollution Control Act (33 U.S.C. § 1317); (ii) defined as a "hazardous waste" pursuant to Section 1004 of the Federal Resource Conservation and Recovery Act, (42 U.S.C. §§ 6901 et seq.); (iii) defined as a "hazardous substance" pursuant to Section 101 of the Comprehensive Environmental Response, Compensation and Liability Act, (42 U.S.C. §§ 9601 et seq.); (iv) defined as a "hazardous" or "toxic" substance in any law similar to or in any amendment of any of the foregoing laws; or (v) petroleum or petroleum by-products. Any vehicles/waste shipment containers leaving an exclusion zone shall be decontaminated prior to leaving the Project site. The Contractor shall inspect all waste shipment containers prior to leaving the Project site to ensure that the least possible amount of soil adheres to wheels and undercarriages.

9.4.8 The Contractor shall not deliver site materials to any facility other than the approved disposal facility listed on the shipping manifest.

9.4.9 The Contractor shall prepare and submit for approval by DUWA through Veolia, a route selection report containing results of any inspections of the proposed access routes to determine road conditions, overhead clearance, weight restrictions, and required traffic control measures.

9.4.10 The Contractor shall ensure that waste shipment containers are protected against contamination by properly covering and lining them with compatible materials or by decontaminating them prior to any use other than hauling contaminated materials.

9.4.11 Prior to leaving the Project site, a load inspection of all shipments shall be conducted by a designated responsible party approved by DUWA's Representative. The load inspection report shall be submitted to DUWA through Veolia, which shall verify and provide written documentation of the following:

a. A complete and accurate manifest.

b. Utilization of the proper United States Department of Transportation ("DOT") approved shipping container in accordance with Chapter 49 of the Code of Federal Regulations .

c. Labeling in accordance with Department of Transportation regulations specified in 49 CFR.

d. A bill of lading traceable to the manifest.

e. Validations that all waste shipment containers are in good condition and are not leaking.

f. A statement that the driver is physically fit to perform his duties.

g. Validation that the driver has written documentation in his possession of completion of the required DOT safety training and health monitoring.

h. A statement that the driver's logbook is current.

i. Validation that a certificate of insurance is in force.

ARTICLE 10

WAIVER OF SUBROGATION

10.1 SUBROGATION.

DUWA and the Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance required under the Agreement or any other insurance actually carried by DUWA or the Contractor, respectively. The Contractor shall require similar waivers by Sub-Contractors and Sub-Sub-Contractors in accordance with Article 4 hereof. All insurance policies required hereunder shall permit and recognize such waivers of subrogation.

ARTICLE 11

CHANGES IN THE WORK

11.1 GENERAL.

11.1.1 The Contractor acknowledges that (i) that DUWA may, without invalidating the Agreement, order changes in the Work (including extra Work, less Work or alterations) at any time and (ii) that changes in the Work, regardless of their scope or number, are within the contemplation of the parties. Changes in the Work may be ordered only by Change Order or Construction Change Directive. Changes in the Work may be made without notice to any Sureties, and absence of such notice shall not relieve such Sureties of any of their obligations to DUWA.

11.1.2 A Change Order shall be based upon agreement among DUWA and the Contractor. A Change Order may result from a Construction Change Directive. Agreement on any Change Order shall constitute a final settlement of and waiver of and permanent bar to all claims relating to the change in the Work which is the subject of the Change Order, including all direct and indirect costs associated with such change and any and all adjustments to the Contract Price and Contract Time. The Contractor shall include the Work covered by such Change Orders in its Applications for Payment as if such Work were originally part of the Contract Documents.

11.1.3 A Construction Change Directive may be issued by DUWA and may or may not be agreed to by the Contractor.

11.1.3.1 The Contract Time and Contract Price shall be adjusted appropriately when changes in the Work are ordered via a Construction Change Directive. However, the Contract Time shall be adjusted only if the Contractor demonstrates to DUWA that the changes in the Work required by the Construction Change Directive adversely affect the critical path of the Work.

11.1.3.2 A Construction Change Directive may be used in absence of total agreement on the terms of a Change Order.

11.1.3.3 If the Construction Change Directive provides for an adjustment to the Contract Price, it shall state the method that shall be used for the adjustment. The decision of DUWA with respect to the determination of the method for adjustment to the Contract Price shall final and binding on the Contractor.

11.1.3.4 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement with all of its terms, including adjustment in the Contract Price and the Contract Time or the method for determining them. Such agreement shall be effective immediately and shall have the same legal effect of and be recorded as a Change Order.

11.1.4 Changes in the Work shall be performed under the applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order or Construction Change Directive. Any change in the Contract Price or Contract Time must result from the provisions of this Section 11.1. Accordingly, no oral instructions, course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that DUWA has been unjustly enriched by an alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall in the absence of a written Change Order or Construction Change Directive be the basis for any claim to an increase in any amounts due under the Contract Documents or a change in the time period provided for in the Contract Documents. All such claims are hereby waived by the Contractor and are forever barred. Notwithstanding the foregoing, when time does not permit the processing of a Change Order in advance of commencing the change in the Work, upon receipt of a Construction Change Directive from DUWA, the Contractor shall proceed with a change in the Work, and the parties shall concurrently proceed with the preparation and submission of a proposed Change Order.

11.1.5 Without invalidating this Agreement and without notice to any surety, DUWA may, by Change Order approved by DUWA and, if necessary, the Board of Directors, or Construction Change Directive signed by DUWA (a) order changes in the Work consisting of additions, deletions or other revisions (within the general scope of the Work) in the requirements of the Contract Documents and (b) unilaterally make or provide the basis for making an adjustment in Contract Price or Contract Time. Upon receipt of any such unilateral order, the Contractor shall promptly proceed or continue with the Work involved unless Contractor submits a written objection within four (4) working days. Any such adjustment made by Change Order or authorized by Construction Change Directive to which the Contractor has submitted no objection shall be final and binding on the Contractor.

11.2 PROCESSING DUWA-INITIATED CHANGES IN THE WORK.

11.2.1 Notwithstanding anything contained herein to the contrary, DUWA may negotiate changes in the Work with the Contractor by submitting a Request for Proposal to the Contractor describing the change being considered and requesting that the Contractor submit its proposal for the corresponding adjustment in Contract Price or Contract Time, if any.

11.2.2 If a change in the Work is required, DUWA may issue a Construction Change Directive. Even though the Contractor shall cause the changes in the Work therein described to be performed immediately, it shall, while the changed Work is being performed, also develop pricing for the change as required in Section 11.2.3 below.

11.2.3 Within fifteen (15) days of its receipt of a Request for Proposal or Construction Change Directive, the Contractor shall provide DUWA with the amount of any change to the Contract Price or Contract Time and including an itemization of all costs of material and labor with extensions listing quantities and total costs, and a substantiation of any claim for an extension to the Contract Time by preparing a detailed schedule depicting the change's impact upon the Work's critical path. If DUWA wishes to proceed with the changes in the Work based upon the pricing quotation, DUWA shall submit a proposed Change Order to the Contractor, together with the revised Construction Documents that will become part of the Contract Documents setting forth the exact amount of any adjustment in the Contract Price or the Contract Time.

11.2.4 Upon the Contractor's acceptance of a proposed Change Order, it shall be executed by DUWA and the Contractor, and the Contract Price or the Contract Time or both shall be adjusted to the extent provided in the Change Order.

11.2.5 Nothing contained herein shall limit the right of DUWA to order changes in the Work. No payments will be made in respect of changed Work unless and until a Change Order has been signed by DUWA and the Contractor. In the case of disagreement as to the amount to be adjusted, credited, or paid for changed Work, the Contractor shall nevertheless promptly comply with the Construction Change Directive or Change Order, as the case may be, and payment or credit shall be made in accordance with the Agreement payment provisions up to the reasonable estimated value of the change as determined by DUWA.

11.2.6 Where any changed Work is ordered by DUWA on a time and materials or cost plus fee basis, the Contractor shall, for such purposes, permit DUWA to audit its books as they relate to the Project and shall require all Sub-Contractors to permit DUWA and the Contractor to audit their books as they relate to the Project. The Contractor shall produce, and shall cause any Sub-Contractors to produce, any and all data which DUWA may reasonably request for the purpose of determining the correctness of the charges. The Contractor shall keep, and shall cause all Sub-Contractors to keep, such full and detailed accounts as may be necessary to reflect its operations with respect to such charges and extras, and the system adopted shall be such as is satisfactory to DUWA. DUWA, its directors, officers, agents and employees, shall be afforded access at all reasonable times to the Contractor's books, correspondence, instructions, receipts, vouchers, memoranda and records of all kinds, relating to all changed Work under the Agreement as well as to such charges and extras. In regard to the foregoing and generally, the Contractor hereby authorizes DUWA, and shall require all Sub-Contractors to authorize the Contractor and DUWA, to check directly with its suppliers of labor and materials the charges for such labor, material and other items appearing in the Contractor's bills rendered to DUWA, to confirm balances due and obtain sworn statements and waivers of claim.

11.3 PRICING FOR CHANGED WORK.

11.3.1 DUWA shall, at all times, have the right to order changes in the Work to be performed on the basis of (i) a lump sum proposal as provided in Section 11.3.3; (ii) a Unit Price Basis as provided in Section 11.3.4 below; or (iii) Actual Cost of the Changes, plus a fee to the Contractor for overhead and profit, as provided in Section 11.3.5 below. The Contractor warrants that all costs in proposals and claims for adjustments in Contract Price shall not exceed those allowed under the Contract Documents, and that proposals and claims for adjustments to Contract Price shall grant prices, terms and warranties comparable to or better than prices, terms and warranties offered to others for similar work.

11.3.2 Credits for deductions from the Work shall be determined on the same basis as charges for additions to the Work except that a reasonable amount shall be deducted for overhead and profit in the case of deletions from the Work and the affected Sub-Contractor shall be allowed any restocking or material and equipment cancellation charges payable to suppliers and vendors for the purpose of computing the credit resulting from deductions from the Work.

11.3.3 Lump Sum Proposal: Should DUWA elect to have changed Work performed on a lump sum proposal, it will so indicate in the Construction Change Directive or request for proposal and the Contractor will, with reasonable promptness but in any event within the time periods set forth in Paragraph 11.2.3 hereof, transmit its lump sum proposal detailing the proposed adjustment to the Contract Price (and the various components thereof). The lump sum proposal shall be based solely upon the affected Sub-Contractors' estimated net cost for labor (including union fringe benefits, insurance, employment insurance, Social Security and taxes paid on labor) and materials and excluding increased bond premiums, plus the percentages for overhead and profit as hereinafter set forth. The lump sum proposal shall be itemized and segregated by labor and material for the various components of the changed Work and no aggregate figures for labor and material will be acceptable. The Contractor shall furnish, with its lump sum proposal, supporting data consisting of Contractor (self-performing), Sub-Contractor, Sub-Sub-Contractor and vendor executed proposals. The Contractor (self-performing), Sub-Contractor or Sub-Sub-Contractor actually performing the changed Work shall be permitted to include in the estimate not more than fifteen (15%) percent for overhead and profit; The Contractor and Sub-Contractors of a higher tier shall be permitted to include in the estimate a handling charge of five (5%) percent on changes to the contract for the value of up to a ten (10%) total aggregate change in initial contract value. After the ten (10%) of contract value is exceeded, Contractor will be allowed a seven (7%) percent handling charge. The Sub-Contractors may include in their labor proposal only those workmen directly involved in the changed Work. All other supervision is included in the percentages for overhead and profit allowed the Sub-Contractors, unless (i) additional foremen are required in connection with the changed Work who were not otherwise on the Project site; or (ii) the total Contract Time is extended as a result of the changed Work, in which event an equitable amount shall be allowed for supervision during the extended period. Sub-Contractor's material costs will include invoiced costs, transportation and applicable sales or use taxes. Use of small tools is included in the overhead and profit. Equipment rental may be included only if the equipment will be required on the Project site for a longer duration solely because of the changed Work. Overhead and profit, as outlined above, includes all other costs whatsoever beyond those enumerated. If any of the changed Work included in the lump sum proposal is covered by unit prices, DUWA may

elect to use these unit prices within the lump sum proposal. Unit prices shall include overhead and profit. Also, the overhead and profit of the Contractor, Sub-Contractor, Sub-Sub-Contractor shall always be calculated on the cost of performing the work.

11.3.4 Unit Prices: Should DUWA elect to have changed Work performed on a unit price basis, the Contractor will submit, with reasonable promptness but in any event within the time periods set forth in Paragraph 11.2.3 hereof, a written proposal itemizing the quantities of each item of changed Work for which there is an applicable unit price contained in the Agreement, Contract Documents or applicable Subcontracts. The quantities must be itemized in relation to each specific item in the Contract Documents. The unit prices will also be applied to net increases in quantities of the same item. The unit prices will also be applied to net decreases in quantities of the same item. There shall be no adjustment (equitable or otherwise) to unit prices established in Subcontracts. Unit prices, if any, shall be established through the bidding process and strictly adhered to thereafter, even if a change in quantity is made.

11.3.5 Time and Material: Should DUWA elect to have any changed Work performed on an Actual Cost of the Changes basis, the affected Sub-Contractors shall perform such changed Work at "actual cost of the changes" as defined in Paragraph 11.3.6 hereof, plus the percentages for overhead and profit set forth in Paragraph 11.3.3 hereof. The Contractor will submit to DUWA daily time and material tickets for all changed Work, including changed Work performed by Sub-Contractors. These tickets will include the identification number assigned to this Work, the location and description of the changed Work, the classification of labor employed including the applicable Sub-Contractor, workers' names and social security numbers, the materials used, the equipment rented (not tools) and any other information ordered by DUWA.

11.3.6 The term "Actual Cost of the Changes" means the sum of all costs necessarily incurred and paid by the Contractor in the proper performance of the changed Work. All such costs shall be in amounts no higher than those prevailing in the locality of the Work. The following costs shall constitute recoverable Actual Cost of the Changes to which the Contractor is entitled when performing extra or change Work, or making any other claim for an adjustment to the Contract Price. These costs will also form the basis for the Contractor's recoverable costs which are associated with extensions of the Contract Time caused by extra or changed Work, or other cause solely within the control of DUWA, and which are further substantiated by the Contractor in accordance with the requirements of Subparagraph 11.3.6.7 below:

11.3.6.1 Payroll costs for employees of the Contractor directly employed in the physical performance of the Work. Payroll costs for employees not directly employed in the physical performance of the Work, such as superintendents and foremen, are recoverable only to the extent that additional supervision or staffing is specifically required to be added for the proper execution of the Work. Percentage add-ons, or other costs, for employees not directly employed in the physical performance of the Work shall not be allowed unless the Contractor establishes to DUWA's satisfaction that such employees are or were required for the proper execution of the Work and further that such employees were actually added to the Contractor's staff, or their time on the Work was extended as a result of the extra or changed Work. Payroll costs shall include salaries or wages paid plus

the cost of itemized fringe benefits, including social security contributions, unemployment and workers' compensation insurance, and vehicle parking costs. The payroll costs associated with premiums paid for performing the Work after regular hours, on weekends or holidays shall be allowed only to the extent that these costs have been approved in writing by DUWA.

11.3.6.2 Overtime, when specifically authorized in writing by DUWA for reasons other than the failure of the Contractor to perform the Work in accordance with the Project Schedule or otherwise in conformity with the Contract Documents shall be paid for by DUWA solely on the basis of the overtime rates established in the Contract Documents.

11.3.6.3 Costs of all materials and equipment furnished and incorporated into the Work by the Contractor, including costs of transportation, and storage where applicable. All trade discounts, rebates, refunds and all returns from sales of surplus materials and equipment shall accrue to the benefit of DUWA. Use of small tools is included in the overhead and profit. Equipment rental may be included only if the equipment will be required on the Project site for a longer duration solely because of the changed Work.

11.3.6.4 Payments made by the Contractor to Sub-Contractors for Work performed. All Sub-Contractor recoverable costs shall be determined in the same manner as the Contractor's recoverable costs. If requested by DUWA, the Contractor shall obtain competitive bids from the Sub-Contractors who are acceptable to DUWA, and the Contractor will contract with those accepted by DUWA.

11.3.6.5 Sales, consumer, use or similar taxes related to the Work, and for which the Contractor is liable, or are otherwise imposed by laws and regulations.

11.3.6.6 Construction equipment costs of the Contractor's equipment or rental costs from others; hourly, daily, weekly or monthly rates will be applied where appropriate.

11.3.6.7 Other supplemental costs which are substantiated by the Contractor as specifically being required for the proper execution of the extra or changed Work, unless specifically prohibited by Section 11.3.7 below.

11.3.6.8 The Contractor's recoverable Actual Cost of the Changes shall not include any of the following costs when performing extra or changed Work, or in making any other claim for an increase to the Contract Price or extension of the Contract Time:

11.3.6.8.1 Payroll costs and other compensation of the Contractor's officers, executives, principals, general managers, project managers, construction managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing or contracting agents, expediters, clerks, or any other employees or agents who are not specifically employed full-time on the Work. Those or agents not employed on the Work are to be considered administrative costs which are covered by the Contract Price. Exceptions to this requirement will only be made on a case-by-case basis, each of which shall require prior written authorization and approval by DUWA.

11.3.6.8.2 Expenses of the Contractor's principal and branch offices other than the Contractor's office located at the Project site.

11.3.6.8.3 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work and charges against the Contractor for delinquent payments.

11.3.6.8.4 Costs associated with the Work arising from one year correction of the Work period, warranties, or guarantees which are required by the Contract Documents.

11.3.6.8.5 Additional vehicle parking costs which exceed the parking reimbursement allowable within the payroll cost as provided in Paragraph 11.3.6 above.

11.3.6.8.6 Any other supplemental costs which are not substantiated by the Contractor as specifically being required for the proper execution of the extra or changed Work.

11.3.7 Unless and until DUWA shall elect either the Lump Sum Proposal, the Unit Price Basis or the Time and Material Basis, the Contractor shall maintain and submit daily records of labor, material and equipment used in the changed Work which have been acknowledged thereon daily by DUWA. In any event, DUWA shall have the right to order such changes in the Work to proceed promptly prior to the submission of a Lump Sum Proposal and/or DUWA's election of the method by which the cost of the changed Work shall be determined. The Contractor shall certify all time and records and invoices and keep and present in such form as DUWA may direct, an itemized accounting, together with supporting date and vouchers, of all actual costs associated with the extra or changed Work.

11.3.8 Any Cash Allowances and Provisionary Allowances shall not be subject to change in connection with Change Orders.

11.4 CONCEALED CONDITIONS.

11.4.1 The Contractor shall promptly notify DUWA in writing, if it discovers that (a) actual subsurface conditions or latent physical conditions encountered at the Project site differ materially from those shown or indicated in the Contract Documents, (b) unknown physical conditions are encountered at the Project site, of an unusual nature, differ materially from those ordinarily encountered and recognized as inherent in work similar in character to the Work, or (c) any reference points need correction to enable the Contractor to proceed with the Work.

11.4.2 If the Contractor wishes to make a claim for an increase in the Contract Price or extension of the Contract Time pursuant to this Section 11.4, it shall give DUWA written notice thereof prior to the end of the fifth (5th) Business Day after discovery of the conditions. This notice shall be given by the Contractor before proceeding to execute further Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Section 10.3. No such claim shall be valid for any work performed prior to delivery of written

notice to DUWA. In the case of a tunnel or subsurface boring collapse, Contractor shall endeavor to protect its equipment and the completed Work without endangering the safety of any person.

11.4.3 No proposal or claim by Contractor due to differing site conditions shall be allowed (a) if the Contractor knew of the existence of those conditions before proceeding with the Work, or (b) if those conditions could have been discovered by the types of reasonable explorations and examinations for which the Contractor was made responsible under the Contract Documents.

11.5 MINOR CHANGES IN THE WORK.

DUWA shall have the authority to order minor changes in the Work provided that such changes will not (i) involve an adjustment to the Contract Price or extension of the Contract Time, or (ii) render the Construction Documents, as so revised, not in material conformance with the Work as set forth in the Construction Documents prior to such change. Such changes shall be effected by written order by DUWA and shall be binding on the Contractor. The Contractor shall carry out such orders promptly.

11.6 REQUESTS FOR CHANGE ORDERS.

11.6.1 Subject to the other terms of the Agreement, if the Contractor believes that any act, error, or omission of DUWA constitutes a change in the Work entitling it to additional compensation, it shall within twenty (20) days after the date on which the Contractor discovers, or should with the exercise of appropriate diligence have discovered, the pertinent act, error or omission of DUWA (provided that the necessity of extra cost and/or time is already determinable, even if such extra cost and/or time has not yet been incurred), submit a Request for Change Order to DUWA stating the amount of the additional compensation or additional time to which it is entitled and justifying the request. DUWA shall evaluate the Request for Change Order within a reasonable period of time and advise the Contractor whether DUWA will grant, grant in part, or deny the Request for Change Order. Any additional compensation granted shall be recorded in the form of a Change Order. Failure of the Contractor to timely submit a Request for Change Order in accordance with the requirements of this Section 11.6.1 shall constitute a waiver of recovery arising out of the pertinent act, error or omission of DUWA, if DUWA was materially prejudiced thereby.

11.6.2 No proposal or claim by the Contractor on account of changes to the Work shall be allowed for any costs or delay incurred more than twenty (20) days before the Contractor gives written notice as required.

11.7 CHANGE ORDER PROCEDURE.

11.7.1 NO CHANGE IN THE WORK, WHETHER BY WAY OF ALTERATION OR ADDITION TO THE WORK, SHALL BE THE BASIS OF AN ADDITION TO THE CONTRACT SUM OR A CHANGE IN THE CONTRACT TIME UNLESS AND UNTIL SUCH ALTERATION OR ADDITION HAS BEEN AUTHORIZED BY A CHANGE ORDER EXECUTED AND ISSUED IN ACCORDANCE WITH AND IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

11.7.2 ANY CLAIM FOR INCREASED COST FOR DELAY SHALL BE ASSERTED IN ACCORDANCE WITH THE PROVISIONS OF THE AGREEMENT UNLESS THE TIME IS EXTENDED IN WRITING BY DUWA. THIS REQUIREMENT IS OF THE ESSENCE OF THE CONTRACT DOCUMENTS. ACCORDINGLY, NO COURSE OF CONDUCT OR DEALINGS BETWEEN THE PARTIES, NOR EXPRESS OR IMPLIED ACCEPTANCE OF ALTERATIONS OR ADDITIONS TO THE WORK SHALL BE THE BASIS FOR ANY CLAIM TO AN INCREASE IN THE CONTRACT PRICE OR CHANGE IN THE CONTRACT TIME.

11.7.3 CONTRACT PRICE AND CONTRACT TIME SHALL BE CHANGED ONLY BY CHANGE ORDER APPROVED IN ADVANCE BY DUWA'S BOARD OF DIRECTORS.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK.

12.1.1 If any portion of the Work should be covered contrary to the request of DUWA or to requirements specifically expressed in the Contract Documents, it must, if required by either, promptly be uncovered for observation and shall be replaced at the Contractor's sole cost and expense. In such event, the Contractor shall not be entitled to any increase to the Contract Price or extension of the Contract Time.

12.1.2 If any other portion of the Work has been covered which DUWA specifically requested to observe prior to being covered, DUWA may request to see such Work and it shall be promptly uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Construction Change Directive or Change Order, be charged to DUWA. If such Work be found not in accordance with the Contract Documents, the Contractor shall correct the Work at its sole cost and expense and maintain the Project Schedule.

12.2 CORRECTION OF WORK.

12.2.1 The Contractor shall correct all Work rejected by DUWA as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion or Final Completion and whether or not fabricated, installed or completed. Such correction shall be accomplished within seven (7) days after notice from DUWA unless such work cannot be accomplished within such period, in which case the Contractor shall commence the correction and submit its Drawings therefor within seven (7) days. The Contractor shall bear all costs of correcting such rejected Work and maintaining the Project Schedule. Correction shall be accomplished without affecting the Final Completion date or the Project Schedule. Nothing set forth in this Paragraph shall be construed as extending any statute of limitations or statute of repose for any defects in materials and workmanship whether patent or latent.

12.2.2 If, within one (1) year after Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor agrees to make any and all repairs or replacements and further agrees to commence such repair or replacement and the replacement of any and all damage caused thereby at any time or times during the guarantee period, within seven (7) days from receipt of written notice from DUWA and to faithfully and diligently prosecute the same to conclusion, without cost to, and to the satisfaction of, DUWA. This obligation shall survive termination of the Agreement. DUWA shall give such notice promptly after discovery of the condition.

12.2.3 The Contractor shall remove from the Project site all portions of the Work which are defective or non-conforming and which have not been corrected under Paragraph 12.2.1 hereof, unless removal is waived in writing by DUWA and the Work shall be corrected to comply with the Contract Documents without cost to DUWA.

12.2.4 If the Contractor fails to correct defective or nonconforming Work, DUWA may correct it in accordance with Section 2.3 hereof.

12.2.5 If the Contractor does not remove defective or nonconforming Work within a reasonable time fixed by written notice from DUWA, DUWA may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days (10) thereafter, DUWA may sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to DUWA.

12.2.6 The Contractor shall bear the cost of making good all of the Work, the work of DUWA or separate Contractors and any other facilities destroyed or damaged by such deficiencies and their removal or correction.

12.2.7 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents. The establishment of the time period of one year after Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any special warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 <u>ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK</u>.

If DUWA prefers to accept defective or nonconforming Work, it may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a

reduction in the Contract Price, or, if the amount is determined after Final Payment, it shall be paid by the Contractor.

ARTICLE 13

TERMINATION OF THE AGREEMENT

13.1 TERMINATION FOR CAUSE.

13.1.1 DUWA shall have the right, without prejudice to any other right or remedy it may have to terminate the Agreement and take possession of the Project site and of all materials, tools and appliances thereon and finish the Project by whatever method DUWA may deem expedient upon five (5) Business Days prior written notice to the Contractor upon the occurrence of any of the following events of default:

13.1.1.1 The Contractor breaches a material term of the Agreement; or

13.1.1.2 The Contractor shall make an assignment for the benefit of creditors; or make an admission in writing of its inability to pay its debts generally as they become due; or

13.1.1.3 The Contractor shall voluntarily make any unauthorized changes in the personnel previously approved by DUWA; or

13.1.1.4 The filing of claims with DUWA by third parties alleging failure to pay any amount due (except disputed claims).

13.1.2 In such case, the Contractor shall not be entitled to receive any further payment until the Project is finished. If the unpaid balance of the Contract Price shall exceed the expense of finishing the Project, including compensation for DUWA's additional services, such excess shall be paid to the Contractor but only to the extent of the costs incurred by the Contractor prior to the termination of the Agreement. If the expense of finishing the Project shall exceed the unpaid balance of the Contract Price, the Contractor shall pay such excess to DUWA.

13.2 TERMINATION FOR CONVENIENCE.

DUWA may also terminate the Agreement for its convenience at any time upon five (5) calendar days' written notice of termination to the Contractor. In such case, the Contractor shall be entitled to receive, as total compensation for all services performed hereunder, (i) payment for all Work properly performed prior to the effective date of termination, including payment of the appropriate retainage, plus (ii) any restocking or material and equipment cancellation charges payable to Suppliers and vendors (unless the Contractor shall have assigned to DUWA, at the request of DUWA, the agreements pursuant to which such material and equipment was ordered and DUWA shall have indemnified the Contractor in connection therewith); plus (iii) the Contractor's reasonable demobilization costs. Payment of such compensation is the sole and exclusive remedy of the Contractor for a termination of the Agreement by DUWA without cause and the Contractor shall not be entitled to, and hereby waives, claims for lost profits and all other damages and expenses. The Contractor shall execute a waiver and general release of claim as a

condition of payment. At DUWA's option, the Contractor shall assign to DUWA all approved Subcontracts and DUWA shall indemnity and defend the Contractor against all claims for payment thereunder in respect of work performed after the date of termination. On the date that the Contractor receives the written notice of termination, the Contractor shall not order any additional products, materials or equipment and shall immediately cancel any previously submitted orders for products, materials and equipment.

ARTICLE 14

AUDIT

14.1 DUWA'S ACCESS TO Contractor'S RECORDS.

14.1.1 The Contractor agrees that DUWA or any of its duly authorized representatives shall, until the expiration of three (3) years after Final Payment under the Agreement, have access to and the right to examine and audit any directly pertinent books, documents, papers and records of the Contractor involving transactions related to the Agreement.

14.1.2 The Contractor shall include in the Subcontracts a provision to the effect that the Sub-Contractor agrees that DUWA or any of his duly authorized representatives shall, until the expiration of three (3) years after final payment under the Agreement, have access to and the right to examine any directly pertinent books, documents, papers and records of such Sub-Contractor, involving transactions related to the Agreement. The term "Subcontracts," as used in this paragraph 14.1.2 only, excludes (1) purchase orders not exceeding Two Thousand Five Hundred ($2,500.00) Dollars and (2) subcontracts or purchase orders, for public utility services at rates established for uniform applicability to the general public.

14.1.3 The periods of access and examination described in this Section 14.1 for records which relate to (1) under the "Claims" clause of the Agreement, (2) litigation or the settlement of claims arising out of the performance of the Agreement, or (3) costs and expenses of the Agreement as to which exception has been taken by DUWA or any of its duly authorized representatives, shall continue until such appeal, litigation, claim or exception has been disposed of.

ARTICLE 15

CONFLICT OF INTEREST

15.1 The Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of the Work. The Contractor further covenants that, in the performance of the Agreement, no person having any such interest shall be employed. The Contractor further covenants that no officer, member or employee of DUWA and no other public official who exercises any functions or responsibilities in the review or approval of the undertaking or carrying out of the Agreement has any personal or financial interest, direct or indirect, in the Agreement or in the proceeds thereof.

15.2 The Contractor also hereby warrants that it has not and will not employ any person to solicit or secure the Agreement upon any agreement or arrangement for payment of a

commission, percentage, brokerage, or contingent fee, either directly or indirectly. The Contractor further agrees that if this warranty is breached, DUWA may, at its option, terminate the Agreement without penalty, liability or obligation, or may at its election, deduct from any amounts owed to the Contractor hereunder any amounts of such commission, percentage, brokerage, or contingent fee.

15.3 The Contractor agrees that neither it nor its employees will endeavor to influence DUWA's employees to seek employment with the Contractor within the duration of the Agreement and shall not for a period of one (1) year thereafter employ any of DUWA's employees without prior written approval from DUWA. Proof of such activity as determined by DUWA may cause immediate termination of the Agreement.

15.4 The Contractor shall include the provisions of this Article 15 in any Subcontract it enters into pursuant to the Agreement.

ARTICLE 16

CONFIDENTIAL INFORMATION

16.1 In order that the Contractor may effectively fulfill its covenants and obligations under the Agreement, it may be necessary or desirable for DUWA to disclose confidential and proprietary information to the employees pertaining to DUWA's past, present and future activities. Since it is difficult to separate confidential and proprietary information from that which is not, the Contractor shall instruct its employees and all Sub-Contractors to regard all information gained by each such person as a result of the Work to be performed hereunder as information which is proprietary to DUWA and not to be disclosed to any organization or individual without the prior consent of DUWA.

16.2 The Contractor agrees to take appropriate action with respect to its employees, Sub-Contractors and agents to insure that the obligations of non-use and non-disclosure of confidential information of the Agreement can be fully satisfied.

ARTICLE 17

CLAIMS

17.1 CLAIMS.

17.1.1 A "Claim" is a demand or assertion by the Contractor seeking adjustment or interpretation of contract terms, payment of money, extension of time or other relief with respect to the terms of the Agreement or any of the Contract Documents that the procedure for resolution of which is not specifically provided for in the Agreement. The term "Claim" also includes all other disputes, controversies and matters in question between or among DUWA and the Contractor arising out of or in any way relating to the Agreement, the Project or the Work. Claims must be made by written notice to DUWA containing as much detail as reasonably possible. The burden for substantiating any Claim shall rest with the Contractor.

17.1.2 Except as otherwise specifically provided in this Agreement, Claims by the Contractor must be made promptly and within not more than twenty (20) days, unless a longer period is granted by writing, after the Contractor first recognizes the condition giving rise to the Claim, whether or not any impact in money or time has been determined. **In no event shall this provision be deemed to extend the period of time for the Contractor to make claims for an extension of the Contract Time or adjustment to the Contract Price as provided in the other provisions of the Agreement, which provisions and time periods are to be strictly adhered to by the Contractor.**

17.1.3 Pending final resolution of a Claim, the Work shall continue unabated, the Contractor shall proceed diligently with performance of the Work, and DUWA shall continue to make payment in accordance with the Contract Documents, except as to amounts in good faith dispute.

17.2 CLAIMS FOR ADDITIONAL COST.

Subject to the limitations and other time limits contained herein, if the Contractor wishes to make a Claim for an increase in the Contract Price, to the extent the Claim is reasonably discoverable, written notice of it shall be given to DUWA before the Contractor proceeds to execute the Work for which the Claim is made. Prior notice is not required for Claims relating to bona fide emergencies endangering life or property. All Claims for adjustment to the Contract Price shall be supported by such documentation as DUWA shall require.

17.3 INJURY OR DAMAGE TO PERSON OR PROPERTY.

If the Contractor suffers injury or damage to person or property because of an act or omission of DUWA, or its employees or agents, or others for whose acts DUWA is legally liable, prompt notice of such injury or damage shall thereafter be given within a reasonable time and not exceeding twenty-four (24) hours in the case of serious personal injury or damage or seventy-two (72) hours in all other cases after first observance. The notice shall provide sufficient detail to enable DUWA to investigate the matter.

17.4 SUBMITTAL OF CLAIMS: DISPUTE RESOLUTION.

17.4.1 All Claims shall be submitted to DUWA. Any mutual agreement reached shall be final and binding upon the parties.

17.4.2 In the event of any dispute between the parties arising out of or in connection with the Agreement or the services or work contemplated herein; the parties agree to first make a good faith effort to resolve the dispute informally. Negotiations shall take place between the designated principals of each party. If the parties are unable to resolve the dispute through negotiation within forty-five (45) days, then either party may give written notice within ten (10) days thereafter that it elects to proceed with mediation pursuant to the commercial mediation rules of the American Arbitration Association. In the event that mediation is unsuccessful in resolving the dispute, then either party may submit the controversy to a court of competent jurisdiction. The foregoing is a condition precedent to the filing of any action other than an action for injunctive relief or if a statute of limitations may expire.

17.4.3 Each party shall be responsible for its own costs and expenses including attorneys' fees and court costs incurred in the course of any dispute, mediation, or legal proceeding. The fees of the mediator and any filing fees shall be shared equally by the parties.

17.4.4 All Claims which are not asserted and pursued in accordance with the provisions of this Article 17 shall be deemed to have been waived.

17.4.5 The resolution of all Claims under this Article 17 resulting in a change in the Contract Price or Contract Time shall be memorialized by a Change Order. The provisions of this Article 17 shall survive the completion of the Work and termination of the Agreement.

ARTICLE 18

MISCELLANEOUS REQUIREMENTS

18.1 **GOVERNING LAW**.

This Agreement will be governed and construed in accordance with the laws of the State of Michigan without regard to the principles of the conflict of laws. Both Parties agree that any enforcement of a judgment or alternative dispute award will be filed with the appropriate court of law in Wayne County, Michigan.

18.2 **LICENSING**.

Contractor represents that it is authorized to do business in the State of Michigan and is properly licensed by all necessary Governmental Authority having jurisdiction over the Project for performance of the Work. Contractor will cause all professional services to be performed by appropriately licensed professionals qualified for its Project duties.

18.3 **ANTI-CORRUPTION COMPLIANCE**.

18.3.1 In carrying out the terms of this Agreement, Contractor hereby undertakes to strictly comply with applicable laws prohibiting the bribery of public officials and private persons, influence peddling, money laundering that may in particular entail a public contract debarment, including:

(a) the 1977 Foreign Corrupt Practices Act of the United States,
(b) the 1999 Canadian Corruption of Foreign Public Officials Act,
(c) the 2010 UK Bribery Act,
(d) the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions of December 17, 1997.

18.3.2 Contractor undertakes to put in place and implement all necessary and reasonable policies and measures to prevent corruption.

18.3.3 Contractor declares that to its knowledge, its legal representatives, directors,

employees, agents, and anyone performing services for or on behalf of DUWA pursuant to this Agreement do not and will not directly or indirectly offer, give, agree to give, authorize, solicit, or accept the giving of money or anything else of value or grant any advantage or gift to any person, company or undertaking whatsoever including any government official or employee, political party official, candidate for political office, person holding a legislative, administrative or judicial position of any kind for or on behalf of any country, public agency or state owned company, official of a public international organization, for the purpose of corruptly influencing such person in their official capacity, or for the purpose of rewarding or inducing the improper performance of a relevant function or activity by any person in order to obtain or retain any business for DUWA or to gain any advantage in the conduct of business for DUWA.

18.3.4 Contractor further undertakes to ensure that neither the Contractor nor any of its legal representatives, directors, employees, agents, sub-contractors and anyone performing services for or on behalf of DUWA under this Agreement, has been, or is listed by any government agency as being debarred, suspended, proposed for suspension or debarment, or otherwise ineligible for participation in government procurement programs and/or bidding following invitations to bid advertised by the World Bank or any other international development bank.

18.3.5 Contractor agrees to notify DUWA of any breach of any term of this Article 18 within a reasonable time.

18.3.6 If DUWA notifies Contractor that it have reasonable grounds to believe that Contractor has breached any term of this Article:

a. DUWA is entitled to suspend performance of this Agreement without notice for as long as DUWA considers necessary to investigate the relevant conduct without incurring any liability or obligation to the Contractor for such suspension;

b. Contractor is obliged to take all reasonable steps to prevent the loss or destruction of any documentary evidence in relation to the relevant conduct.

18.3.7 If Contractor breaches any term of this clause:

a. DUWA may immediately terminate this Agreement without notice and without incurring any liability.

b. Contractor must undertake to indemnify DUWA, to the maximum extent permitted by law, for any loss, damages, or expenses incurred or suffered by DUWA arising out of such breach.

18.4 **DUWA POLICIES**.

Contractor shall not discriminate against any employee or applicant for employment or applicant for employment because of race, color, national origin, religion, sex, age or for any reason prohibited by law. To the extent applicable to the Work on this Project, Contractor shall comply with Executive Order 11246 or any amendment, replacement or counterpart thereof.

18.5 **PATENTS AND COPYRIGHTS**.

If Contractor or its personnel make any inventions or prepare copyrightable material as a result of the performance of this Agreement, Contractor promptly shall disclose such inventions or materials to DUWA. Contractor agrees to grant, and hereby grants, to DUWA the entire right, title, and interest in and to such inventions and copyrightable materials, and Contractor shall cooperate with DUWA and execute all documents necessary to perfect DUWA's rights in the inventions or materials and to allow DUWA to prosecute and obtain patents and copyrights thereon.