DIVISION 4 (SHELBY TOWNSHIP) SERVICE CENTER TIMBER SALT STORAGE BUILDING

PROPOSAL SPECIAL PROVISIONS

Construction of a Timber Salt Storage Facility and associated site work including grading, drainage, aggregate base, HMA paving and electrical work in Shelby Township, Macomb County. This is a Macomb County Department of Roads project.

MACOMB COUNTY DEPARTMENT OF ROADS Work Order Number 9048 May 2025

INSTRUCTIONS TO BIDDERS

The Contractor shall complete the work herein described in strict accordance with the plans therefore and in strict conformity with the requirements of the Michigan Department of Transportation's 2012 Standard Specifications for Construction, and such other Special Provisions and Supplemental Specifications as may be a part of this Proposal. For the purpose of this Proposal, Michigan Department of State Highways, Michigan Department of State Highways and Transportation, and Michigan Department of Transportation shall be considered one and the same. The published invitation for Bids or Advertisement for the proposed work is to be considered a part of the "Instructions to Bidders" as fully as if repeated herein.

- a. Preparation-of-Proposal: The proposal must be properly signed and the address of the bidder given. If the bidder is a co-partnership, each member shall sign the Proposal. Department of Roads, at its discretion may require that the co-partnership file in the office of Roads a duly executed certificate of co-partnership. A corporation who shall present the Proposal shall do so by its duly authorized officers in accordance with its articles of incorporation. The Department of Roads at its discretion may require that the corporation file with the office of Roads a certified copy of incorporation and authority for officers' signature. See Article 102.05 of the Standard Specifications.
- **b. Rejection-of-Proposal:** Attention of Bidders is directed to the Standard Specification Article 102.06, relating to Irregular Proposals.
- **c.** Number-of-Copies-of-Contract: Three (3) copies of the contract with the bonds will be required to be executed by the Contractor and the Macomb County Department of Roads.
- **d. Construction Schedule:** The bidder shall complete the Construction Schedule, as provided in the Proposal, by indicating the dates for completion of the major items of work. This Schedule shall become a part of the contract. As the work progresses, the Engineer will check the construction program and, from time to time, order such modifications as may in his opinion be necessary to comply with the completion date and general construction progress. See Article 102.15 of the Standard Specifications.
- e. Contractor Prequalifications: Prospective bidders for the site work must be pre-qualified with the Michigan Department of Transportation and must have the proper classification and numerical rating required for the work on which he proposed to bid. See Article 102.01 of the Standard Specifications. Prospective bidders for the AST Salt Storage Building are not required to be MDOT Prequalified.
- **f. Subcontractor Requirements:** Prior to naming a sub-contractor for any of the designated items or specialty items listed under Subcontract Provisions, the principal Contractor must assure himself that the requirements of Article 108.01 of the Standard Specifications will be met.

To the Macomb County Department of Roads 117 S. Groesbeck Mount Clemens, Michigan 48043

Gentlemen:

The undersigned has examined the plans, specifications and the locations of the work described herein and is fully informed as to the nature of the work and the conditions relating to its performance, and understands that the quantities shown are approximate only, and are subject to either increase or decrease.

The undersigned hereby proposed to furnish all necessary machinery, tools, apparatus and other means of construction; do all the work; furnish all the materials except as otherwise specified herein; and, for the unit prices or lump sums named in the itemized bid, to complete the work herein described in strict accordance with the plans therefore and in strict conformity with the requirements of the Michigan Department of Transportation and such other special provisions and supplemental specifications as may be a part of this proposal.

The undersigned further proposes to do such extra work as may be authorized by the Engineer prices for which are not included in the itemized bid. Compensations shall be made on the basis agreed upon before such extra work is begun. The undersigned encloses a Bid Bond, Certified or Cashier's Check or Bank Money Order, or Certificate of Deposit on an open, solvent bank, in the amount of not less than 5% of the total bid, payable to the Macomb County Department of Roads as a guarantee of good faith. If the undersigned is the successful bidder and fails to enter into a contract or to furnish satisfactory bonds to the Macomb County Department of Roads within 15 days after being furnished with the necessary contract and bid forms, said Bid Deposit shall be forfeited to the Macomb County Department of Roads as a liquidated damages. It is understood that the Bid Deposit of the lowest bidder will not be returned until the contract has been executed and that the proposal guarantees of all except the lowest bidder will be returned promptly.

SIGNED:			
BY:			

ADDRESS:_____

TELEPHONE:

Schedule of Items (Itemized Bid Sheet)

Contract ID:	9048			
Location: Description:	Shelby Township Salt Barn Shelby Township Salt Barn			
Project Number:	9048	Project Engineer:	Adam J. Newton	
Estimate Number:	7	Date Created:	04/26/2024	
Project Type:	Miscellaneous	Fed/State #:		
Location:	Shelby Township Salt Barn	Fed Item:		
		Control Section:		
Description:	Shelby Township Salt Barn			
Instructions to Bidders:	IMPORTANT NOTICE:			
	If the proposal establishes a maximum price for any of the following work items, and if you bid a price than that maximum price, your bid will be considered to have quoted the maximum price and your bid be adjusted to reflect that maximum price. If the proposal provides a specified price for any of the following work items, and if you bid a price high lower than that specified price, your bid will be adjusted to reflect that specified price. If your bid is the lowest accepted bid, and if you refuse to accept the award of the contract due to the what you quoted as a maximum or specified price, you will forfeit your proposal guaranty.			

Letting Date: Thursday, June 05, 2025 11:00 AM

Pay Item	Description	Quantity	Units	Unit Pr	ice	Bid Amo	ount
-		-		Dollars	Cts	Dollars	Cts
1077060	_ Reimbursement of Fees	15,000	Dlr				
1100001	Mobilization, Max \$130,000	1	LSUM				
2030011	Dr Structure, Rem	1	Ea				
2030015	Sewer, Rem, Less than 24 inch	22	Ft				
2050031	Non Haz Contaminated Material Handling and Disposal, LM	50	Cyd				
2050041	Subgrade Undercutting, Type II	150	Cyd				
2057021	_ Subgrade Undercutting, Spec, 21AA	150	Cyd				
2057051	_ Excavation and Embankment - Complete	1	LSUM				
3080010	Geotextile, Stabilization	3,000	Syd				
4020987	Sewer, CI IV, 12 inch, Tr Det B	173	Ft				
4021204	Sewer Tap, 12 inch	2	Ea				
4030005	Dr Structure Cover, Adj, Case 1	1	Ea				
4030010	Dr Structure Cover, Type B	1	Ea				
4030025	Dr Structure Cover, Type D	5	Ea				
4030210	Dr Structure, 48 inch dia	6	Ea				
4030280	Dr Structure, Adj, Add Depth	1	Ft				
8507051	_ 80' x 160' High Gambrel Treated Timber Salt Storage Building	1	LSUM				
8507051	_Aggregate Site Grading - Complete	1	LSUM				
8507051	_ Electrical Service and Equipment - Complete	1	LSUM				
8507051	_ Epoxy Coated Steel Reinforced Concrete Floor - Complete	1	LSUM				
8507051	Pavement Removal and Replacement - Complete	1	LSUM				

Pay Item	Description	Quantity	Units	Unit Pr	ice Cts	Bid Amo	unt Cts
8507051	 _ Site Work - Complete	 1	LSUM			Donars	
	I	+		Total Bid	:		
Contracto	or:						
	(Signature)		(Da	te)			
	(Printed Name of Signer)		(Em	ail)			
	(Mailing Address)		(Phor	ne #)			
	(City, St, Zip)						

SPECIAL PROVISION FOR SUBCONTRACT PROVISIONS

The Contractor may sublet any or all of the "Specialty Items" designated below, plus 60 percent (60%) of the contract amount remaining after subtracting the value of the "Specialty Items". If any subdivision of a contract item is subcontracted, the entire unit may be considered as subcontracted.

The Contractor shall list the name and address of the proposed subcontractor in the space provided for the particular item of work to be sublet. Approval of any subcontractor will not be given unless and until it is determined by the MCDR that it is qualified to bid on the type and magnitude of work proposed, and shall have executed a subcontract in a form acceptable to the MCDR.

The Contractor shall abide by the provisions set forth herein. Any item of work performed by other than the Contractor or approved subcontractors will be considered as unauthorized and shall not be paid for under the provisions of the contract.

NAME-OF-SUBCONTRACTOR-&-ADDRESS		SPECIALTY-ITEMS
NAME-OF-SUBCONTRACTOR-&-ADDRESS	<u>.</u>	OTHER-ITEMS

NOTICE-TO-BIDDERS:

Signatures must comply with Subsection 102.05 of the current Standard Specifications to which attention is particularly directed.

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ADVERTISEMENT FOR Division 4 (Shelby Township) Service Center Timber Salt Storage Building MCDR W.O. # 9048

The Macomb County Department of Roads (MCDR) will receive bids for the following work until 11:00 a.m. EST, Thursday, June 5th, 2025, through Bid Express® at which time all bids will be opened electronically:

PROJECT DESCRIPTION:

This project includes construction of a Timber Salt Storage Facility and associated site work including grading, drainage, aggregate base, HMA paving and electrical work in Shelby Township, Macomb County. This is a Macomb County Department of Roads project.

Plans and Specifications will be on file and will be available on or after Saturday, May 24th, 2025. Plans will be available electronically for no fee. **All downloadable files are available on Bid Express**[®]. Prospective bidders must utilize Bid Express[®] to access the plans and proposal from the website <u>www.bidexpress.com</u>. It will be the bidder's responsibility to submit their bid through Bid Express[®]. **No proposals will be accepted by email, mail or in-person.**

Prior to the award of the contract, the selected bidder must demonstrate that he/she has the necessary labor, equipment, financial resources, bonding capability, and knowhow to construct the building specified. A list of previous clients shall be required. A bidder's failure to provide satisfactory demonstration of the above will be considered grounds for rejection of his/her bid.

A satisfactory Bid Bond, Certified or Cashier's Check, Bank Money Order, or Certificate of Deposit on an open, solvent bank in the amount of not less than 5% of the total bid and made payable to the Macomb Department of Roads shall be submitted with each bid.

The MCDR at its discretion reserves the right to reject any or all bids and to waive any irregularities in the bidding process and to make the award as may appear to be in the best interest of the County of Macomb.

No bid may be withdrawn after the scheduled closing time for receiving bids for at least 45 days. No proposal will be received unless submitted through Bid Express® on or before Thursday, June 5th, 2025, 11:00 a.m. EST.

BID SPECIFICATIONS FOR 80' x 160' TIMBER SALT STORAGE BUILDING 51235 NAPI DRIVE, SHELBY TOWNSHIP, MACOMB COUNTY, MICHIGAN

MCDR: AJN

1 of 2

05-04-2025

SCOPE OF WORK

Provide al labor, equipment and materials necessary to construct an 80' x 160' Hi-Arch Gambrel Treated Timber Salt Storage building on the Macomb County Department of Roads (MCDR) site located at 51235 Napi Drive in Shelby Township, Michigan.

SITE CONDITIONS

The site is part of the MCDR active Shelby Township Service Center Maintenance Facility. Water, power and sanitary facilities are available on site. The Contractor should coordinate his/her activities to avoid interference with the Service Center operations as much as possible.

SITE ACCESS

Site access will through the main entrance to the facility from Napi Drive.

PROGRESS SCHEDULE

A separate Progress Clause is identified within this Project Proposal that identified the project schedule requirements. Note the following:

- The Macomb County Department of Roads (MCDR) would like to complete this building as soon as possible.
- The MCDR is currently working with Shelby Township Building and Engineering Departments for Final Approval in parallel with the advertisement.
- The MCDR anticipates approvals will be obtained prior to the bid due date and "Notice to Proceed" can be issued as soon as the contract documents are completed.
- However, should there be a delay in the final plan approval, the bids shall remain in effect for a period of 45 calendar days after the bids are received.

PERMITS AND BONDS

All permits to date have been obtained and paid. Any permit fees except for fees associated with the proposed electrical work, required during the project will be reimbursed with the pay item "Reimbursement of Fees". Fees that are anticipated during the project include but may not be limited to the following:

- Shelby Township Building Department Inspection Fees
- Shelby Township DPW Inspection Fees

Any permit and/or permit fee associated with the proposed electrical work will be the responsibility of the Contractor.

A bid bond of 5% must accompany the bid.

MCDR: AJN

A two-year maintenance bond in the full amount of the final cost and covering the entire structure shall be submitted prior to final payment for the work. This bond shall cover any problems with the structure due to faulty materials or installation.

SUPPLEMENTAL SPECIFICATIONS

Bollards. There are four (4) bollards shown on the drawings. The Contractor shall provide four (4) additional bollards (Total of 8) in accordance with specifications 2.8 and 3.3. These additional bollards will be located inside the building at locations similar to those on the outside of the building. The cost of these additional bollards is to be included in the total price for "80' x 160' High Gambrel Treated Timber Salt Storage Building".

INSURANCE

The successful bidder shall provide a completed "Insurance Requirement" sheet as part of the final contract documents.

SPECIAL PROVISION FOR SUPPLEMENTAL SPECIFICATIONS

1 of 3

101. TERMS, FORMAT AND DEFINITIONS:

The intent and meaning of terms shall be in accordance with Section 101 of the Standard Specifications, except as herein provided.

101.03 DEFINITIONS:

- 1. Commission:
 - a. The Michigan Department of Transportation of the State of Michigan, when the State is the awarding authority.
 - b. The Macomb County Department of Roads, when the County is the awarding authority.
- 2. County:

The Macomb County Department of Roads.

3. MCDR:

The Macomb County Department of Roads.

102. PROPOSAL SUBMISSION, AWARD AND EXECUTION OF CONTRACT:

These requirements shall be in accordance with Section 102 of the Standard Specifications, except as herein provided.

102.02.E CONTENTS OF PROPOSAL FORM, AMOUNT OF THE PROPOSAL GUARANTY

No proposal will be considered unless accompanied by a Bid Bond, Certified or Cashier's Check or Certificate of Deposit on an open, solvent bank in the amount of not less than 5% of the total bid, payable to the Macomb County Department of Roads as a guarantee that the bidder will enter into contract.

102.15 EXECUTION AND AWARD OF CONTRACT:

These requirements shall be in accordance with Section 102. of the Standard Specifications, except as herein provided.

107.10 INDEMNIFICATION, DAMAGE LIABILITY AND INSURANCE:

The Contractor shall save harmless and indemnify the MCDR and its employees, and each Township, City or Village in which work is done, against all claims for damages to public or private property and for injuries to persons or property directly or indirectly arising either out of, or during the progress or relating to the completion of the work.

SPECIAL PROVISION FOR SUPPLEMENTAL SPECIFICATIONS

2 of 3

Named Insured for (A, C, E) shall include the following: Macomb County Department of Roads and its employees, elected and appointed officials, and all Cities, Townships in Macomb County. The Macomb County Department of Roads coverage shall be <u>primary</u>.

The following insurance coverage shall be provided:

Comprehensive General Liability – including coverage for Contractual Liability Insurance,

- Completed Operations and/or Product Liability, X, C, and U,
- Comprehensive Auto Liability Insurance including coverage for owned hired and nonowned vehicles,
- Owners & Contractors Protective Public Liability & Property Damage Insurance,
- Workmen's Compensation,
- Umbrella or Excess Liability,

The insurance shall not be subject to the usual "X" – explosion, "C" – collapse, or "U" underground property damage exclusions.

The Contractor and Subcontractor (Type A Insurance only) will be required to furnish 3 copies of the Certificate of Insurance on forms furnished by the MCDR, and 3 copies of the Owners & Contractors Protective Policy, Automobile Liability Policy, Workers Compensation said Umbrella or excess Liability Policy prior to execution of the contract. (SEE SAMPLE)

Failure on the part of the Contractor to provide the proper Insurance Policy (Owners and Contractors Protective Policy) within the time limits provided in the insurance binder issued by the insurance carrier will be reason for the Engineer to order all work to stop and the contractor to remove all equipment from the road right-of-way until such time that the proper insurance policy has been received by the MCDR. The Macomb County Department of Roads reserves the right to use any project retainage to pay insurance premiums that are unpaid by the Contractor.

THE OWNERS & CONTRACTORS PROTECTIVE PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE POLICY MUST BE ISSUED BY A COMPANY LICENSED BY THE STATE OF MICHIGAN, AND HAVE A BEST RATING OF A OR BETTER.

In the event of cancellation or reduction in coverage by the Insurance Company, 30 days prior written notice shall be given the Macomb County Department of Roads.

The Subscribing Company and the insured contractor agrees to give 30 day prior written notice to the Macomb County Department of Roads in the event the contractor cancels or reduces the coverage of any insurance certified above.

SPECIAL PROVISION FOR SUPPLEMENTAL SPECIFICATIONS

3 of 3

109.06 PROGRESS AND PARTIAL PAYMENTS:

Article 109.06 of the Standard Specifications shall be revised as follows:

Partial Payments will be made on a monthly basis.

From the total amount earned, the MCDR will deduct and retain ten (I0) percent of the amount earned until fifty (50) percent of the contract work is complete. After fifty (50) percent of the contract is complete, additional retainage will not be withheld unless the contractor is not making satisfactory progress or for other specific cause relating to the contractor's performance under the contract. Should additional retainage be withheld, it will not exceed ten (I0) percent of the amount earned.

For contract having a value of Thirty Thousand (\$30,000.00) Dollars or more, or having four or more partial payments, the Macomb County Department of Roads, at the contractor's formal request, will deposit the retained funds in an interest bearing account in a regulated financial institution in this State, wherein all such retained funds are kept by the MCDR, which shall account for both retainage and interest on each construction account separately.

The retainage and interest earned on retainage will be released to the contractor together with the final progress payment, except as provided in Section 4 (7) and (8) of Act No. 524, Public Acts of 1980.

The bidder and the MCDR, upon entering into a contract, mutually agree to abide by the rules as set forth in the State of Michigan Act No. 524, Public Acts of 1980.

The successful bidder who elects to have the retainage placed in escrow shall contact the MCDR Finance Department (Melissa Williams) at the Department of Roads Administration Building (117 S. Groesbeck Hwy, 3rd Floor, Mt. Clemens, Michigan) to execute an agreement for the escrow account.

CERTIFICATE OF INSURANCE FOR CONSTRUCTION AND RECONSTRUCTION PROJECTS

NOTE: INSURANCE COMPANY MUST BE LICENSED IN THE STATE OF MICHIGAN The subscribing insurance company certifies to the Macomb County Department of Roads that insurance of the kinds and types and for limits of liability covering the work herein designated, has been procured by and furnished on behalf of the insured contractor named in item one (1).

- 1. NAME OF INSURED:
 - ADDRESS OF INSURED: _
- 2. PROJECT NAME:
- 3. TYPE OF INSURANCE (indicate policy amount if other than Minimum Limits shown*)
 - A. Comprehensive General Liability including coverage for Contractual Liability Insurance, Completed Operations and/or Product Liability, X, C, and U
 - B. Comprehensive Auto Liability Insurance including coverage for owned, hired and non-owned vehicles
 - C. Owners & Contractors Protective Public Liability & Property Damage Insurance
 - D. Workmen's Compensation
 - E. Umbrella or Excess Liability'

TYPE	POLICY	EFFECTIVE	EXPIRATION		EACH	
	NUMBER	DATE	DATE	COVERAGE	OCCURANCE	AGGREGATE
А.				B.I. & P.D.	\$1,000,000	\$2,000,000*
В.			Со	mbined Single Lin	nit \$1,000,000*	
C.				B.I. & P.D.	\$1,500,000.*	\$3,000,000*
Named In	sured for "C"	shall include: "N	ACOMB COUNT	Y DEPARTMEN	T OF ROADS ANI	DITS
EMPLOY	EES, ELECT	ED AND APPOI	NTED OFFICIAL	S, AND ALL CIT	IES. TOWNSHIPS	IN MACOMB
COUNTY THIS CE	". SUCH CO RTIFICATE.	VERAGE STAL		F RNSE THR	EE (3) COPIES OF	POLICY WITH
				MI STATUTOI	RY	
D. (Coverage A – C	compensation		\$500,000.*		
(Coverage B – E	mployer's Liabilit	ty	\$500,000./\$500	,00.*/\$500,00.*	
E.			•		\$2,000,000.*	\$2,000,000.*

Certificate holder is scheduled as additional insured with regards to GL coverages.

The coverage herein certified is written in accordance with the company's regular policies and endorsement, subject to the company's applicable manual of rules and rates, except:

- A. the insurance shall not be subject to the usual "X" explosion, "C" collapse, or "U" underground property damage exclusions.
- B. In the event of cancellation or reduction in coverage by the Insurance Company, 30 days prior written notice shall be given the Macomb County Department of Roads.
- C. The Subscribing Company and the insured contractor agree to give 30 day prior written notice to the Macomb County Department of Roads in the event the contractor cancels or reduces the coverage of any insurance certified above.

NAME OF COMPANY

DATE:

BY: _____

Authorized Representative

MACOMB COUNTY BASED PREFERENCE

A local preference percentage credit from the following allowance table will be applied to the bid of any County-based Enterprise. This credit will be subtracted from the bid of the County-based Enterprise. In comparing bids, the bid of the County –based Enterprise after subtraction of the credit shall be considered the official bid. However, if the County-based Enterprise is awarded the Contract, the bid without the equalization percentage credit shall be the Contract price.

Contract Amount	Local Preference Percentage
Up to \$50,000.00	5
\$50,000.00 to \$200,000.00	3
\$200,000.00 and over	1

- 1. No business shall receive these credits unless it has been certified by the Purchasing Manager.
- 2. Any business who claims entitlement to any local preference credit shall disclose the records necessary to establish eligibility to the County.
- 3. After applying any local preference credits as provided above, the Contract shall be awarded to the lowest Responsible Bidder thus evaluated.

IN ORDER TO DETERMINE IF YOUR BUSINESS IS ENTITLED TO RECEIVE A LOCAL PREFERENCE PERCENTAGE CREDIT PLEASE ANSWER THE FOLLOWING QUESTIONS:

- Is your business headquarters physically located within Macomb County, or has it been conducting business at a location with a permanent street address in the County of Macomb on an ongoing basis for not less than one taxable year prior to your bid or response to this Request for Proposal?
- 2. Has your business paid property taxes on real or personal property within the past year on property which is ordinarily needed to perform the proposed contract?
- 3. Are at least 50 percent of your regular full-time employees based at the County location to perform the proposed contract?
 YES _____ NO ____
- 4. Has your business been dealing for at least one year on a regular commercial basis in the kind of goods or services which are the subject of this bid or proposal?

YES _____ NO _____

Drug Screening

To the extent not prohibited by law, all contracts for construction, repair, alteration, or rebuilding of a County building or other property shall include a provision requiring the contractor and any subcontractor providing services under the contract to conduct prehire screening for illegal drug use by their employees who provide services under the contract.

If applicable, is your business compliant with this requirement? YES _____ No____



COUNTY OF MACOMB **VENDOR DISCLOSURE FORM**

The Macomb County ethics ordinance requires vendors of the County to complete and file a disclosure statement, the purpose of which is to disclose any financial relationships or other conflicts of interest that may exist between vendors and employees or elected officials (or their appointees) of the County. Once filed, the disclosure form does not need to be updated unless there is a change in circumstance that would cause the answer to any of the questions to change, at which time an amended disclosure form must be filed. Filing of the disclosure form is considered a condition of payment.

		Vendor Nu	umber (If Kr	nown):
Vendor Name:		Vendor Ph	none Numbe	er:
Street Address:	City:		State:	Zip Code:

1. Does the vendor currently employ a relative of any employee, elected official or appointee of an elected official of Macomb County? Relative is defined as husband or wife, father or mother, son or daughter, brother or sister, uncle or aunt, first cousin, nephew or niece, great uncle or great aunt, grandfather or grandmother, grandson or granddaughter, father-in-law or mother-in-law, sonin-law or daughter-in-law, brother-in-law or sister-in-law, stepfather or stepmother, stepson or stepdaughter, stepbrother or stepsister, half-brother or half-sister, the parents or grandparents of the individual's fiancée. NO

If yes, please answer the following:

Α. Name of County employee or elected official (or appointee):

YES

Β. County Position/Title:

- C. County Department or Agency:
- 2. Does any employee or elected official of Macomb County have an interest in the vendor organization in any capacity, either compensated or non-compensated:

	YES	ΝΟ	
If yes, please answer th	e following:		
		□ partner	
member	employee	□ contractor	□ beneficiary
A. Name of County e	mployee or elected officia	al (or appointee):	
B. County Position/Ti	tle:		
C. County Departmen	nt or Agency:		
D. Position/Title with	Vendor:		

3. Does any current employee or elected official of Macomb County have legal or beneficial ownership of 10% or more of the outstanding stock of the vendor organization?

	lf y	es, please answer the following:
	A.	Name of County employee or elected official (or appointee):
	В.	County Position/Title:
	C.	County Department or Agency:
	D.	% of Ownership of Vendor Organization:
4.	In the of a co or deb	last five calendar years, has the vendor failed to perform or otherwise deliver on the terms ntract or agreement with Macomb County, or any other public entity, including suspensions arments?
	If yes,	please provide further explanation:

I hereby certify that the information included on this form is complete, true and accurate to the best of my knowledge and belief. I understand that either myself or the organization to which this form applies may be subject to sanctions and/or penalties as set forth in the ethics ordinance if any information has been falsified or omitted.

Name (Please Print)

Title

Signature

Date

PLEASE RETURN THE COMPLETED FORM TO:

Macomb County Finance Department **ATTN: Vendor Disclosure** 120 North Main, 2nd Floor Mount Clemens, MI 48043 **PROGRESS CLAUSE:** Submit a Progress Schedule. The Engineer for this project is as follows:

Adam J. Newton, P.E. Macomb County Department of Roads 117 South Groesbeck Highway Mount Clemens, MI 48043 (586) 463-1225 anewton@rcmcweb.org

After receiving Notice of Award, start work on the date approved by the Engineer, within ten (10) days of award. In no case may any work be commenced prior to receipt of formal notice of award by the Department.

The Project shall be completed in its entirety including final site restoration and clean-up as outlined below:

• Final Completion Date on or before: **November 14, 2025**

The entire project will be complete by the Final Completion Date. Failure to have the project complete and all punch list items addressed by the Final Completion Date, will result in liquidated damages in accordance with this proposal.

Failure by the Contractor to meet the final completion date will result in the assessment of liquidated damages in accordance with subsections 108.10.C.1 of the Standard Specifications for Construction. Liquidated damages will be assessed separately and simultaneously for failure to meet the final completion date. Liquidated damages will continue to be assessed for each calendar day that the work associated with the final completion date remains incomplete, even if these days extend into or beyond seasonal suspension, unless approved otherwise by the Engineer.

After award and prior to the start of work, the Contractor must attend a preconstruction meeting with the Engineer. The Engineer will determine the day, time and place for the preconstruction meeting. The meeting will be conducted after project award and may be rescheduled if there are delays in the award of the project. The named subcontractor(s) for, Designated and/or Specialty Items, as shown in the proposal, is(are) recommended to be at the preconstruction meeting if such items materially affect the work schedule.

The Contractor must comply with all local ordinances (noise, etc.) as described in the Special Provision for Maintaining Traffic.

The Contractor may be required to meet with Macomb County Department of Roads representatives for a post-construction review meeting, as directed by the Engineer. The Engineer will schedule the meeting.

Failure on the part of the Contractor to carry out the provisions of this Progress Clause may be considered sufficient cause to prevent bidding future projects.

The starting date, contract time, or completion date for this project may be adjusted by the Department without imposing liquidated damages upon the receipt of satisfactory documented evidence that unforeseen delayed delivery of critical materials will prevent the orderly prosecution of the work.

No unnecessary stoppages in work will be allowed once work has begun at the site. No work will be allowed on Holidays as defined in the 2020 MDOT Standard Specifications for Construction unless approved by the Engineer.

SPECIAL PROVISION FOR MAINTAINING SERVICE CENTER OPERATIONS AND WORK RESTRICTIONS

MCDR: AJN

02-19-2025

a. Description. During the Salt Storage Facility Construction and associated site work, the service center will remain active. The Contractor will coordinate his/her activities to avoid interference with the Service Center operations as much as possible.

b. Work Restrictions. All work will be conducted Monday through Saturday during daytime hours only, unless otherwise stated in the MDOT 2020 Standard Specifications for Construction or approved by the Engineer. Night work will be permitted only at the discretion of the Engineer. Any additional cost for nighttime hours and additional equipment needed for night work will be borne by the Contractor. Shelby Township building restriction hours may be more restrictive and must be adhered to.

- As defined by the MDOT 2020 Standard Specifications for Construction, no work will be performed during holiday periods. Identified Holiday periods are as follows:
 - Memorial Day
 - Start of No Work Period: 3:00 PM, Friday, 05/23/2025
 - End of No Work Period: 6:00 AM, Tuesday, 05/27/2025
 - $\circ \quad \text{Independence Day} \\$
 - Start of No Work Period: 3:00 PM, Thursday, 07/03/2025
 - End of No Work Period: 6:00 AM, Monday, 07/07/2025
 - Labor Day
 - Start of No Work Period: 3:00 PM, Friday, 08/29/2025
 - End of No Work Period: 6:00 AM, Tuesday, 09/02/2025
 - Unless otherwise approved by the Engineer, no work will be allowed on other National Holidays, including Easter, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Eve and Christmas Day, and New Year's Eve and New Year's Day.
- Once work is initiated, that work will be continuous until completed.
- During construction, access to all adjacent residential/commercial drives will be maintained unless otherwise allowed under this Special Provision.

SALT STORAGE FACILITY CONSTRUCTION SPECIFICATIONS

MACOMB COUNTY DEPARTMENT OF ROADS 51235 Napi Drive Shelby Township, Michigan 48315

May 2025

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 GENERAL

- A. Related Documents: All Work under this section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.
- B. Scope of Work: Work under this section shall consist of concrete footings as shown on Drawings.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. ACI-301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI-318, "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
- B. Earth cuts may be used to form concealed vertical surfaces of footings. Earth forms shall be sharp and true to line and dimension.

1.3 SUBMITTALS

- A. Steel reinforcing shop drawings
- B. Concrete mix designs.
- C. Material Certificate: submit certificate from concrete supplier, showing compliance with design requirements for strength.
- D. Product Data: submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, and others as requested by Engineer or Owner's designated representative.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Provide cold weather and/or hot weather protection as recommended in ACI-305 and ACI-306.
- B. Unless adequate protection is provided, concrete shall not be placed during rain, sleet, or snow. Protect concrete from rain water, maintain cement:water ratio, and protect concrete surface.
- C. All concrete shall be adequately protected after pouring to prevent damage from freezing, by the use of suitable covers and adequate heating equipment. Frozen and damaged concrete must be removed and replaced at the Contractor's expense. Do not place concrete on frozen earth.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

- A. Reinforcing bars shall conform to "Specifications for Deformed Billet—Steel Bars for Concrete Reinforcement," ASTM A-615 Grade No. 60, having a minimum yield strength of 60,000 psi.
- B. Tie wire shall be black annealed wire, 16 gauge minimum.
- C. Bar supports shall conform to the "Bar Support Specification" contained in the "Manual of Standard Practice" as published by CRSI and WCRSI. Bar and accessories within 1/2" of the surface of concrete exposed to weather shall be non-corrosive.

2.2 CONCRETE MATERIAL

- A. Cement shall be grey Portland Cement, Type I or II, conforming to ASTM C-150. Use same brand for all exposed work.
- B. Concrete aggregates shall conform to ASTM C-33. Fine and coarse aggregates shall be regarded as separate ingredients, and each shall conform to the appropriate grading requirements of ASTM C-33.
- C. Water shall be potable, clean, and free from impurities affecting the strength of the concrete, in accordance with ACI and ASTM requirements.

2.3 PROPORTIONING AND DESIGN OF MIXES

- A. All concrete shall be of normal weight, consisting of a proportioned mixture of Portland Cement, coarse aggregate, fine aggregate, and water. Concrete proportions shall be selected on the basis of trial mixes conforming to ACI 211.1.
- B. All concrete, unless otherwise noted, shall have a minimum compressive strength of 3,000 psi at 28 days.
 - 1. For fill, 2,000 psi concrete may be used.
- C. Slump for Pumped Concrete: When a water-reducing admixture is not used, maximum slump shall be 4 inches. When a water-reducing admixture is used, maximum slump shall be 6 inches and when a high-range water-reducing admixture (superplasticizers) is used, maximum slump shall be 8 inches.
 - 1. Slump for concrete fill may be 6" maximum.
- Design Air Content: Design air content for concrete shall be according to ACI 318-14 Table 19.3.2.1 "Requirements for concrete by exposure class", and ACI 318-14 Table 19.3.3.1 "Total air content for concrete exposed to cycles of freezing and thawing" with an allowable tolerance of plus or minus 1.5 percent for total air content, except as otherwise specified. Use air-entraining admixture, not air-entrained cement.
- E. Water-Cement Ratio: Cast-in-place concrete shall have a maximum water-cement ratio as Required by ACI 318-14 Table 19.3.2.1"Requirements for concrete by exposure class"
- F. Admixtures to retard or accelerate setting, to reduce water ratio, or to prevent freezing shall not be used without prior approval from the Engineer or the Owner's designated representative. No admixtures containing calcium chloride may be used.
- G. Maximum aggregate size shall conform to the following, and shall not exceed tolerances on oversize as per ASTM C-33.
 - 1. Footings, grade beams, and foundations 3/4"
 - 2. Concrete fill

1/2"

2.4 CONCRETE PRODUCTION

- A. Ready-mixed concrete shall conform to ASTM C-94 and the National Ready Mix Concrete Association. Use of non-agitating trucks is not permitted.
- B. Use of retempered concrete is not permitted.
- C. The addition of water at the job site is permitted providing that only sufficient water is used to provide a workable mix, and that neither the design water:cement ratio nor the maximum slump is exceeded. The addition of cement at the job site to maintain the water:cement ratio is not permitted.

PART 3 – EXECUTION

3.1 PLACING REINFORCEMENT

- A. Comply with CRSI's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement by framework, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Coverage: all reinforcing bars below ground shall have minimum 3" concrete cover.
- E. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so that ends are directed into concrete, and not toward exposed concrete surfaces.
- F. Heating of reinforcement for bending will not be permitted.

3.2 PLACEMENT OF CONCRETE

- A. Consolidate all concrete in accordance with provisions of ACI-309.
- B. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand-spading, rodding, or tamping.
- C. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation of aggregate.

END OF SECTION

SECTION 05500 - MISCELLANEOUS METALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

All Work under this Section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

Work under this section shall include truss bearing plates, truss connector plates, joist hangers, angles, bolts, washers, nails.

1.3 SUBMITTALS

- A. Refer to Section 01300, Submittals.
- B. Truss Bearing Plate Assembly: submit shop drawings for approval.
- C. Structural Steel Fasteners: submit manufacturer's specifications and technical information.

PART 2 - PRODUCTS

2.1 TRUSS BEARING PLATE ASSEMBLY

Truss bearing plate assembly, bolts, and washers shall be AISI Type 304 stainless steel as detailed on Drawings.

2.2 TRUSS CONNECTOR PLATES

A. Truss connector plates shall be galvanized steel, epoxy coated as described in Section 09900.

2.3 JOIST HANGERS

A. Joist hangers shall be JUS26TZ 18 gauge slant nail joist hangers with triple zinc coating by USP Structural Connectors (<u>www.USPconnectors.com</u>, 1-800-328-5934), or equal.

2.4 ANGLES

Angles connecting endwall knee braces to the top and bottom chords of trusses shall be USP Structural Connectors field adjustable framing angles, MP series, JA5-HDG, 14 gauge hot-dip galvanized steel, 2.5 x 2.5 x 5 inches.

2.5 BOLTS AND WASHERS

All bolts (other than those used for the truss bearing plates) and washers shall be made of ASTM A-307 steel, and shall be hot dip galvanized.

2.6 NAILS

A. Materials: All nails, other than roofing nails, shall be ring-shank, double hot dipped, galvanized coated steel.

B. Sizes

	Location	<u>Size</u>	<u>Remarks</u>
	stress skin panel frames and blocking	16d	
	plywood skins to panels	8d	
	interior liner to panels	8d	
	battens to exterior panels	8d	
	fasteners for trusses	5/16"	GRK fasteners (see below)
	upper hip purlins (joist hangers)	8d	
	x-bracing, lateral bracing, lower hip purlins, girts, and jambs	16d	
	angles fastening endwall knee braces to trusses	*	*as per manufacturer
if OD**	overhead door header	5/16″	GRK fasteners (see below)
	exterior siding	6d	do not use power nails
	roofing nails	*	*as per manufacturer
	roof deck	8d	•
LT-opt.	Simpson Strong-Ties	*	*as per manufacturer

2.7 STRUCTURAL STEEL FASTENERS

Structural steel screws shall be 5/16" RSS[™] LTF Timber Frame Fasteners with washer type heads and reinforced shoulders of case-hardened steel with Climatek[™] coating by GRK Fasteners, Thunder Bay, ON, Canada, 800-263-0463, 807-474-4300, <u>grk@grkfasteners.com</u>, or approved equal.

H-Clips shall be used to attach the interior ceiling liner to the 2x4 furring. Clips shall be PC series 20 gauge galvanized steel with G60 galvanizing finish and spacer dimples by United Steel Products Company, or approved equal. Provide H-clips at mid-point of each unsupported span.(No ceiling liner this job)

2.8 BOLLARDS

Bollards (door jamb guard posts) shall consist of minimum 6" OD standard weight steel structural pipe, filled with concrete. Form concrete crown at top of bollard.

PART 3 – EXECUTION

3.1 NAILING

- A. Endwall siding shall be attached to girts with nails 6" on center.
- B. Roof sheathing shall be attached to purlins with galvanized 8d nails 6" on center.
- C. Splice members shall be attached to endwall columns with nails 6" on center, staggered.

3.2 STRUCTURAL STEEL FASTENERS

Size, number, and location shall be as shown on Drawings.

3.3 BOLLARDS

Locations, dimensions, and depth of footings and bollards shall be as shown on Drawings.

SECTION 06100 - CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

All Work under this Section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

- A. This section shall cover the labor and material necessary to furnish and install the following:
 - 1. Wood barrier wall and liner
 - 2. Rough framing and sheathing
 - 3. Prefabricated wood trusses
 - 4. Hi-Arch Gambrel[™] frames
 - 5. Exterior wood siding and wood trim

1.3 QUALITY ASSURANCE

All lumber shall be grade-marked with the Association stamp, showing species, grade, and mill number; lumber shall be kiln-dried and marked as such. For southern pine, the term "Association" refers to the Southern Pine Inspection Bureau.

1.4 SUBMITTALS

- A. Refer to Section 01300, Submittals.
- B. Pressure Treated Members: submit certificate of treatment from lumber supplier, showing sizes of members and treatment for each.
- C. Plywood: American Plywood Association (APA) stamp should be visible on all plywood to verify grade.
- D. Trusses:
 - 1. Submit stamped truss design drawings and design calculations, provided by the truss manufacturer, and stamped by an engineer licensed in the State of New York.
 - 2. Trusses shall be designed for loading requirements as shown on Drawings.
 - 3. The increase in unit stress for short term loading(snow) shall be a maximum of 15%, or in accordance with state and local regulations.
 - 4. Submittals must show the following:
 - a. Space diagram with panel point loading
 - b. Force diagram
 - c. Truss configuration, showing slope and span
 - d. All joint details indicating connector plate size and position
 - e. Size and grade of lumber (to be southern pine)
 - f. Camber to allow for dead load deflection and connector construction.
 - g. Design calculations for truss member sizes. In no case shall members of smaller size than those shown on the drawings be used.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Pressure Treated Components
 - 1. Pressure treatment for components not in ground contact shall be water-borne CCA 0.40 treatment in accordance with AWPA Standard U1 to the requirements of Use Category UC4A. This applies to items such as stress skin panel studs, beams, battens, plywood skins and liner.
 - Pressure treatment for components in ground contact shall be water-borne CCA 0.60 treatment in accordance with AWPA Standard U1 to the requirements of Use Category UC4B. This applies to items such as wood columns and braces, and 6x6 grade beam members at the base of the crib wall.
 - Cut ends of all members greater than 2" nominal thickness which are required to be pressure treated shall be painted with Sherwin Williams WoodScapes® Exterior Polyurethane Semi-transparent Stain, A15T00005, tinted #3535 Foliage, or approved equal. Product is available through Sherwin-Williams, 1-800-424-5837, <u>http://www.sherwin-williams.com</u>.
 - 4. Moisture Content: Any wood components with a nominal thickness of 2" or less shall have a moisture content not to exceed 19% when installed.

2.2 TREATED WOOD BARRIER WALL

A. Description

The barrier wall, as detailed on the Drawings, shall be a composite retaining wall consisting of $4' \times 16'$ (or sized as required) wood stress-skin panels, spanning between wood columns and braces located 8'-0" on center which support the roof trusses. A wood liner shall be applied to the interior surface of the barrier wall.

- B. Materials
 - 1. Wood Columns and Braces shall be pressure-treated kiln-dried #2 or better southern pine.
 - 2. Shop Fabricated Stress Skin Panels
 - a. Exterior (perimeter) panel studs shall be 2x6 pressure treated wood studs, #2 southern pine.
 - b. Interior panel studs shall be 2x6 non-pressure treated wood studs, #2 southern pine, 8" o.c.
 - c. Blocking: 4x6 solid wood blocking at points of attachment to columns, 8' o. c.; see Drawings for details.
 - d. Exterior panel skin: 1/2" pressure treated exterior structural plywood, grade APA-AC or APA-BC, sanded.
 - e. Interior panel skin: 3/4" pressure treated CDX plywood.
 - f. Nails fastening the exterior and interior plywood skins to the panels shall be galvanized 8d nails as indicated in Section 05500, Miscellaneous Metals.
 - g. Adhesive (glue) shall be Titebond GREENchoice heavy duty construction adhesive by Franklin International, Columbus, OH, 1-800-877-4583.
 - h. Bolts fastening the panels to the columns shall be hot dip galvanized lag bolts, recessed as shown on Drawings.
 - 3. Interior Plywood Liner
 - a. Liner shall consist of 3/4" pressure treated CDX plywood.
 - b. Nails fastening the interior liner to the panels shall be galvanized 8d nails, as shown on Drawings.

- 4. Battens
 - a. Battens for application over exterior horizontal panel joints shall be 1x2 pressure treated #2 southern pine. Top edges of battens shall chamfered at a 45-degree angle to provide drainage away from the panel face.
 - b. Nails for battens shall be galvanized 8d nails.

2.3 ROUGH FRAMING AND SHEATHING

- A. Rough framing includes such lumber as door jambs, joists, rafters, studs, plates, furring, backing, copings, fascias, curbs, framing, grounds, sleepers, blocking, etc.
- B. All lumber for rough carpentry shall be construction-grade lumber, with extreme fiber stress of not less than 1,200 psi.
- C. Wood columns installed above the crib wall shall be 6x6 pressure-treated kiln-dried #1 or better southern pine.
- D. Vertical entranceway framing members shall be pressure-treated kiln-dried #2 or better southern pine.

2.4 PREFABRICATED WOOD TRUSSES

- A. Trusses shall be fabricated from lumber as designated by truss manufacturer (grade and size of members).
- B. All load bearing lumber and all components of roof trusses shall have 1,200-psi minimum working stress at 19% maximum moisture content.
- C. Toothed truss connector plates shall be Alpine or approved equal, galvanized steel, treated as specified under Section 09900, Painting.
- D. The net area of connector plate shall not include the area within 1/2" from the edge or end of the connected member.
- E. The plate at the peak must be capable of carrying one half the design stress in the member.
- F. All other plates must carry the full design stress across the joint.

2.5 HI-ARCH GAMBREL[™] FRAMES

- A. The Hi-Arch Gambrel[™] truss frames are to be constructed of prefabricated wood trusses tied together with structural steel fasteners as shown on the drawings.
 - 1. Prefabricated wood trusses are specified in Paragraph 2.3 above.
 - 2. Structural steel fasteners are specified in Section 05500, Miscellaneous Metals.

2.6 EXTERIOR WOOD SIDING AND WOOD TRIM

- A. Furnish and install where shown on Drawings 19/32" exterior grade rough-sawn siding with shiplap vertical edges and grooves 8" o.c., product to be Duratemp by Roseburg Forest Products, Roseburg, OR (800-245-1115, www.roseburg.com), or approved equal.
- B. Panels to be 4' x 8' or 4' x 10' as required.
- C. Wood trim to be 1x6 southern pine as shown on Drawings.

2.7 EAVE SCREENING

Furnish and install 3/4" mesh bird netting where shown on drawings, Bird Net 2000 by Bird B Gone (<u>www.birdbgone.com</u> or 1-800-392-6915), or approved equal.

PART 3 – EXECUTION

3.1 GENERAL

Painting of Cut Ends of Pressure-Treated Members: for number of coats and other application directions, follow recommendations in manufacturer's literature.

3.2 TREATED WOOD BARRIER WALL

- A. Fabrication of Panels
 - 1. Panels, including studs, beams, and plywood skins, shall be shop manufactured.
 - 2. Reinforcement: panels shall be reinforced with solid wood blocking as shown on Drawings.
 - 3. Both the exterior and interior plywood skins shall be glued and nailed to the panel frame as shown on Drawings.
 - 4. A continuous bead of adhesive shall be applied to the entire perimeter frame and to the face of each stud, to which panel skins are to be attached. Spot application is not adequate.

B. Installation

- 1. Stress Skin Panels: The panels shall be fastened to the columns with galvanized lag bolts, recessed as shown on Drawings.
- 2. Interior Liner: The interior liner shall be field applied to the interior surface of the barrier wall and shall be nailed only as shown on Drawings. Carefully follow Drawings for liner layout (staggering panel joints) and for nailing pattern.

3.3 ROUGH FRAMING AND SHEATHING

A. All framing shall be carefully and accurately laid out, shall be erected and secured in accordance with best building practice, and shall be of size and spacing indicated on the drawings.

3.4 PREFABRICATED WOOD TRUSSES

- A. Trusses to be shop assembled; all wood members shall have full bearing.
- B. Plates shall be positioned as shown on approved shop drawings, and pressed into wood members so that full penetration of the teeth is obtained without crushing surfaces of wood.
- C. All connections shall be made with connectors as required to transmit the stresses fully. Connectors shall conform to Truss Plate Institute "Design Specifications for Light Metal Connected Wood Trusses-TP-166".
- D. Wood members shall be designed in accordance with National Design Specifications for wood construction by the NFPA for stress graded lumber.
- E. Trusses shall be constructed true to line and dimensions within a tolerance of 1/4" for length and 1/8" for height.
- F. All trusses to be stored at the job site in a manner to prevent warping or twisting of trusses.

3.5 RIGID HI-ARCH GAMBREL[™] FRAMES

- A. Designate an area adjacent to the building as a staging area. The truss frames will then be laid out in that area.
- B. Fabricate the trusses into frames as follows:
 - 1. The top truss or trusses (as applicable), having a horizontal bottom chord, are to be sandwiched between two trusses setting diagonally on each side.
 - 2. The trusses are to be bolted into a frame and made rigid by the use of structural steel fasteners, installed where shown on the drawings, in accordance with manufacturer's instructions, and using equipment as recommended or mandated by connector manufacturer. For truss-to-truss connections, bolts alone are not acceptable.
 - 3. Where the side trusses are separated by 1-1/2", 2x4 spacers shall be installed intermittently or continuously. Where the side trusses are separated by 3", two 2x4 spacers shall be installed intermittently or continuously.
 - 4. After Hi-Arch Gambrel truss frames have been assembled, any truss connector plates which remain exposed on the exterior faces of the trusses shall be painted with epoxy coating as specified in Section 09900.
- C. Furnish and install temporary bracing and stiffeners as needed during erection process, in accordance with the most current version of Bracing Wood Trusses published by the Truss Plate Institute.
- D. Trusses shall be erected in locations and at spacings shown on Drawings. Provide complete lateral bracing during erection, and permanent lateral bracing as shown on Drawings, or as required by truss manufacturer.
- E. See Section 05500, Miscellaneous Metals, and Drawings for base plate details.
- F. Any trusses that are damaged during delivery or erection shall be replaced at no extra cost to the Owner.

3.6 EXTERIOR WOOD SIDING AND WOOD TRIM

A. Use 6d galvanized or stainless steel ring shank siding nails for application.

END OF SECTION

SECTION 07610 - METAL ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

All Work under this Section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

The Work under this Section shall include all materials and labor required to install an uninsulated roofing system consisting of metal panels installed upon a plywood deck, attached to the truss frame system specified under Section 06100.

1.3 SUBMITTALS

- A. Refer to Section 01300, Submittals.
- B. Submit manufacturer's warranty certificate for metal roof panels.
- C. Submit manufacturer's specifications and instructions for the following items:
 - 1. Metal roof panels
 - 2. Profiled gasketing
 - 3. Color matched fasteners
 - 4. Ridge vent
 - 5. Fiberglass skylight panels
 - 6. Snow guards/bars (if applicable)
- D. Submit color samples or chips for the following items:
 - 1. Metal roof panels
 - 2. Color matched fasteners
 - 3. Ridge vent

1.4 DELIVERY, STORAGE AND HANDLING OF METAL PANELS

- A. Panels and flashings shall be protected and properly packaged to protect against transportation damage in transit to the jobsite.
- B. Deliver panels and all other components in manufacturer's original and unbroken packaging. Any materials damaged during shipment or delivery shall be rejected and replaced.
- C. Panels and flashings shall be handled during unloading, stacking, moving, storing, and erection so as to prevent twisting, bending, warping, and surface damage.
- D. Stack materials in a safe, dry environment on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering, to prevent water damage and condensation. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage. Panels and flashings with strippable film shall not be stored in direct sunlight.
- E. Upon installation immediately remove strippable film from panels and flashings. Protect panels and flashings from foot traffic and from all other trades.

PART 2 – PRODUCTS

2.1 METAL ROOFING PANELS

Weatheredge³

- A. Roofing shall be Weatherbest panels; a substrate of 29ga sheet steel with AZ50 weight Galvalume® coating, a molten aluminum-zink bath of continuous hot-dip process, by Weatheredge3, division of Engineered Building Solutions LLC (10269 Old Rt 31W, Clyde, NY 14433, 315-902-4229, www.ebsmanufacturing.com/weatheredge.com).
- B. Panels shall be pre-painted with a factory-applied siliconized modified polyester paint finish, WeatherXL by Sherwin Williams coil coating division carrying a 40 year warranty. Color per owners selection from manufacturer's current standard color offering.

2.2 ROOFING UNDERLAYMENT

Roofing underlayment shall be Titanium UDL-30 by InterWrap, Inc. (Roof Products Division, Head Office, 32923 Mission Way, Mission, British Columbia, Canada, V2V 6E4, 640-820-5400, <u>www.interwrap.com/titanium</u>), or approved equal.

2.3 FASTENERS

Screws shall be #14 standard galvanized roofing screws, 1-1/2" and 2" long, with sealing washers colored to match material being fastened and as recommended by the roofing manufacturer.

2.4 FLASHINGS, TRIMS AND ACCESSORIES

- A. Flashings shall be shop fabricated of galvanized sheet metal.
- B. Other trims and accessories such as rake edges and J-channels shall be as provided or recommended by manufacturer for use with specified roofing panels.
- C. Other trims and accessories such as rake edges and J-channels shall be as provided or recommended by manufacturer for use with specified roofing panels.

2.5 SHEATHING

Sheathing shall be 5/8" thick four-ply CDX plywood, or approved equal, where called for on drawings, approved by the American Plywood Association, and fastened with galvanized 8d nails 6" on center.

2.6 RIDGE VENT

Weatherbest

Ridge vent shall be Weatherbest RCR2V ridge cap with vented closure by Weatheredge or approved equal, as manufactured for use with specified roofing panels; color selected by Owner.

2.7 SKYLIGHTS

A. Skylights shall be Marlon CS Longlife polycarbonate rooflights, Profile P1893 nine-inch (9") opal tinted panels, manufactured by Brett Martin Ltd. (distributed by MWI Components, 1015 32nd Avenue West, Spencer, Iowa 51301, tel. 800-360-6467, fax 800-361-3452, email <u>mwicomponents@hotmail.com</u>, <u>www.mwicomponents.com</u>), or approved equal.

Weatherbest

B. At the top edge of the skylight panels, install a galvanized steel J-channel as provided by manufacturer for use with specified roofing panels. Install tightly against upper roof deck.

All

C. At the bottom edge of skylight panels, install a closure strip as per manufacturer's recommendation.

PART 3 – EXECUTION

3.1 GENERAL

All materials shall be installed where shown on Drawings and in complete accordance with manufacturer's instructions, which hereby become a part of this Specification.

3.2 INSTALLATION OF SHEATHING

Roof sheathing shall be attached to purlins with galvanized 8d nails 6" on center.

3.3 INSPECTION OF SUBSTRATE

Contractor shall inspect the structure to insure that the plywood deck is securely anchored and properly aligned to provide a flat plane for the roof panels.

3.4 INSTALLATION OF METAL ROOFING PANELS

A. Fastener selection and installation shall be as recommended by metal roofing manufacturer and in accordance with the manufacturer's fastening schedule.

3.5 GUARANTEE

The Contractor shall guarantee the installation of the roof for a period of two years after substantial completion.

END OF SECTION

STONEfaçadeTM

Beauty That's Set in Stone

SECTION 07466

Manufactured Stone Veneer Siding

CertainTeed STONEfaçade manufactured stone veneer is a cement cast product designed for residential and commercial, exterior and interior use. Mechanically fastened, this product is installed without the use of mortar and lath. It is screwed directly into the exterior sheathing over the water resistive barrier. Molded from natural, hand-picked stone, STONEfaçade blends the rugged beauty of the popular ledgestone style with modern performance features to ensure long lasting beauty. The fully integrated rain screen offers a full 3/8" offset to provide the highest level of moisture management to protect the exterior wall sheathing.

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Manufactured Stone Veneer panels.
- 1.2 REFERENCES Insert
 - A. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - B. ASTM C567 Standard Test Method for Determining Density of Structural Lightweight Concrete
 - C. ASTM C140 Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
 - D. ASTM C348 Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
 - E. ASTM C190 Standard Test Method for Tensile Strength of Hydraulic Cement Mortars
 - F. ASTM C426 Standard Test Method for Linear Drying Shrinkage or Concrete Masonry Units
 - G. ASTM C666 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 - H. ASTM G155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
 - I. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 - J. ASTM D1037 Standard Test Method for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
 - K. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure
- L. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
- M. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
- N. ICC-ES Acceptance Criteria AC51 Acceptance Criteria for Precast Stone Veneer

1.3 SUBMITTALS

- A. Make submittals under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods, including nailing patterns.
 - 4. Applicable model code authority evaluation report (<u>CCRR</u>, ICC, CCMC, etc.)
- A. Panel manufacturer's requirements for water resistive barrier to be installed by others.
- C. Maintenance and periodic inspection recommendations.
- 1.4 DELIVERY, STORAGE, AND HANDLING
 - A. Refer to manufacturer's installation instructions for storage and handling.

1.5 WARRANTY

- A. Provide with a 20 year limited lifetime warranty.
- B. Register manufacturer's warranty, made out in Owner's name, with copy to Owner.

PART 2 PRODUCT

- 2.1 MANUFACTURER
 - CertainTeed Corporation, Siding Products Group, 20 Moores Road, Malvern, Pennsylvania 19355. ASD. Tel: (800) 233-8990 (professional) or (800) 782-8777 (consumer). www.certainteed.com.

2.2 PANELS

- A. STONEfaçade Architectural Stone Cladding System General: CertainTeed STONEfaçade panels consist of lightweight concrete and steel
 - 1. Surface Burning Characteristics: Flame Spread Classification: A, when tested in accordance with ASTM E 84.
 - 2. Noncombustibility: Noncombustible Classification, when tested in accordance with ASTM E136.

- 3. Transverse Load Resistance (Wind-load): Allowable Design Pressure = 47 psf, per Section 4.7 of AC51, when tested in accordance with ASTM E330.
- 4. Water Infiltration Resistance of water penetration into the wall assembly: Passed, when tested in accordance with ASTM E331.
- 5. Water Absorption: Tested in accordance with ASTM C140.
- Freeze / Thaw Resistance: No cracking, checking, crazing, erosion, delamination or other distress, when tested in accordance with Section 4.2 of ICC-ES AC51.
- 7. Accelerated Weathering: No cracking, checking, crazing, erosion, delamination or other distress, when tested in accordance with ASTM G155.
- 8. Compressive Strength: Testing in accordance with ASTM C39
- 9. Flexural Strength: Tested in accordance with Section 4.4 of AC51 (C348).
- 10. Density: Tested in accordance with Section 3.1.1 of AC51 (C567).

11.

- a. Height: 8-inches (203 mm) wide.
- b. Widths: 10-inches (254 mm), 14-inches (355.6 mm), 24-inches (609.6 mm)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to commencing installation, verify governing dimensions of building and condition of substrate.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Examine, clean, and repair as necessary any substrate conditions that would be detrimental to proper installation.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions
 - 1. Read warranty and comply with all terms necessary to maintain warranty coverage.
- B. Over Structural Wood and Wood-Composite Sheathing: STONEfaçade shall be installed over ½" thick plywood or 7/16" OSB. #8 exterior screws are the required fastener and they should be a minimum of 1 ½" inches in length. (Refer to the STONEfaçade Installation Guidelines for specific details)
- C. Over brick, poured concrete or concrete masonry units: (Refer to the STONEfaçade Installation instructions for specific information.)
- D. Do not install siding less than 4 inches (102 mm) from finished grade nor closer than 2 inch (51 mm) to roofs, patios, porches, and other surfaces where water may collect.

3.4 CLEANING

- A. At completion of work, remove debris caused by siding installation from project site.
- B. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09900 – PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

All Work under this Section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

The work covered in this section will include all painting and staining of exterior wood surfaces, painting of bollards and pile height line, and treatment of any truss connector plates that remain exposed after fabrication of 6-ply truss units.

1.3 DEFINITION

For purposes of this specification, the terms "paint" and "painting" refer to the application of any paint or stain materials specified in these documents.

1.4 SUBMITTALS

- A. Refer to Section 01300, Submittals.
- B. Submit manufacturer's specifications and instructions for all paint, stain, and epoxy coating products used.
- C. Submit color samples or chips for paint and stain.

PART 2 – PRODUCTS

2.1 PAINTING OF EXTERIOR WOOD SIDING AND TRIM

- A. Primer shall be exterior grade latex wood primer, Sherwin Williams B42W08041, or approved equal.
- B. Stain shall be exterior grade solid color acrylic latex stain, Sherwin Williams WoodScapes® A15 series, or approved equal; colors to be selected by the Owner. PLEASE NOTE: vinyl acrylic stain or paint may not be used on Duratemp siding.

2.2 PAINTING OF BOLLARDS

All bollards shall be painted with two coats of rust inhibitive paint equal to Sherwin Williams Industrial Enamel, product #B54YZ437, color to be Federal yellow.

2.3 TREATMENT OF INTERIOR METAL SURFACES

All exposed truss connector plates within the **main/salt** storage structure shall be treated with Sherwin Williams Macropoxy® 646 fast-cure epoxy coating, or approved equal.

All truss connector plates within the salt storage area shall be treated with Sherwin Williams Macropoxy® 646 fast-cure epoxy coating, or approved equal.

2.4 PAINTING OF INTERIOR PILE HEIGHT LINE

Interior pile height line shall be painted with exterior grade paint equal to Sherwin Williams Industrial Enamel, product #B54YZ437, color to be Federal yellow.

PART 3 – EXECUTION

3.1 PAINTING OF EXTERIOR WOOD SURFACES

- A. Refer to and follow manufacturer's instructions for surface preparation and application.
- B. All surfaces to be painted shall be dry and clean. Before painting, all surfaces shall be thoroughly cleaned of all dust, dirt, oil, grease, rust, scale, and other foreign matter. The cleaning shall be done with sandpaper, steel scraper, or wire brushes, as necessary.
- C. Follow manufacturer's instructions regarding air, surface and material temperatures, other weather conditions, and time between coats and touchups or recoats.
- D. Apply materials as follows:
 - 1. Primer: one coat.
 - 2. Paint: two coats, or as recommended by the manufacturer.

3.2 PAINTING OF BOLLARDS

3.3 TREATMENT OF INTERIOR METAL SURFACES

- A. For surface preparation, mixing, and application, follow manufacturer's instructions for use on galvanized steel surfaces.
- B. After fabrication of 6-ply truss units, those truss connector plates that remain exposed shall be painted as noted above; damaged surfaces shall be touched up after installation.

3.4 PAINTING OF INTERIOR PILE HEIGHT LINE

A. A 4" wide line will be painted as shown on Drawings around the perimeter of the interior of the crib wall. The line shall be located 2'-0" below the top of the wall. At the entranceway, this line shall extend from the bottom of the door jamb, upward at an angle of 45°, until reaching a height of 10'-0" above finished floor (2' below top of wall).

END OF SECTION

SECTION 16000 – ELECTRICAL WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

All Work under this division shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

The Contractor shall supply and connect power to the building, and shall furnish and install overhead lights within the building, exterior lighting, disconnect panel, switches, outlets, wiring, and conduit, as shown on the Drawings. All electrical work shall be completed in accordance with the requirements of the National Electric Code, Michigan Electrical Code, and Local Electrical Code.

PART 2 – MATERIALS

2.1 ELECTRICAL PANEL

Electrical Panel shall be a 100 amp , 1-phase, 3-wire, 30 circuit panel with main breaker, Square D type QOB or equal. Panel shall be in a NEMA-4X enclosure, exterior mounted adjacent to door as shown on drawings. Contractor shall ground the panel as required by the local utility company.

2.2 LUMINAIRES

- A. Interior Type LED-1: Hubbell Kemlux III Severe Location KSL Series: KSL-36L-U-86-5K- 5M-C-2-GR
 - 1. Vertically finned cast aluminum housing.
 - 2. Separate hinged optical and electrical compartments.
 - 3. One-piece molded silicone gasket for weatherproof seal around each individual LED.
 - 4. Copper-free aluminum housing and cover with powder polyester paint finish.
 - 5. Listed to meet UL 1598 standards for damp location and 45 degree C ambient.
 - 6. Minimum operating temperature of -40 degree C / -40 degree F
 - 7. Furnished with surge protector.
 - 8. Stainless steel mounting accessories for pendant or hook mounting.
 - 9. Corrosion resistant safety chain (stainless steel).
 - 10. Extreme Environment option.

- 11. Suitable for corrosive atmosphere and other extreme environmental locations.
- 12. 120 Vac.
- 13. Cone mounting option and accessories.
- 14. Minimum 8,000 Lumens.
- 15. Switch Interior lights shall be controlled by 2-120 volt switch with dust-tight weatherproof cover. Exact location of switch shall be determined at time of construction by Road Commission (RCMC) personnel.
- B. Exterior Type LED-2: Lithonia Lighting LED Wall Luminaire CSXW LED Series: CSXW LED-30C-700-40K-T4M-MVOLT-PE-DDBXD.
 - 1. Lamp Type: Solid State.
 - 2. Luminaire to operate at 120–277V and connected for operation on 120V circuit, unless otherwise indicated on drawing.
 - 3. Minimum 7,500 Lumens
 - 4. Mounting:
 - a. Wall mounted.
 - b. 20' minimum mounting height.
 - 5. Housing:
 - a. Rugged, die-cast, single piece aluminum.
 - 6. Diffuser: Precision-molded acrylic lenses.
 - 7. Fixture is suitable for operation from -40 degrees C to 40 degrees c ambient conditions.
 - 8. Wet location Listed.
 - 9. IP65
 - 10. LED lamp listed UL 8750
 - 11. This fixture shall also be connected to a single pole, dust-tight, weatherproof photo cell override switch. Exact location of switch shall be determined at time of construction by Road Commission (RCMC) personnel.

2.3 WIRING AND CONDUIT

- A. Power supply
 - 1. Power suppy shall be connected from the pole and proposed electrical panel near the existing salt dome to the electrical service panel on the new salt storage building.
 - 2. See also Electrical Site Plan by others for additional power supply detail, service wire sizing, etc.
 - 3. Wiring shall be run through rigid PVC Schedule 80 conduit at a minimum depth of two feet; use traceable marker tape installed 6" below grade to show location.
 - 4. Above-grade conduit, if any, shall also be Schedule 80 PVC.
 - 5. Expansion coupling to be installed at location of panel, between panel and grade.

B. Salt storage building

- 1. All conduit, boxes, and raceways shall be rated for corrosive atmosphere and wet locations.
- 2. All wiring inside the building shall be type THHN solid copper, no smaller than #12 with #12 grounds.
- 3. Conduit shall be Schedule 80 PVC, with expansion coupling between lights. Provide adequate support for PVC conduit.
- 4. All conduits shall include ground conductors sized in accordance with NEC, Article 250.
- 5. All systems to be "dust tight."

2.4 OVERHEAD AND ROLL-UP DOOR SWITCHES

A. Overhead Door AND Roll-up Door Switches shall be located as directed by Owner.

2.5 OUTLETS

- A. Receptacles shall be 20amp, 125 volt, NEMA 5-15R GFCI duplex receptacles, Leviton exterior GFI 7899-I or approved equal.
- B. Each duplex receptacle shall be operated by a dedicated single pole circuit breaker
- C. Receptacles shall be provided with weatherproof covers.
- D. Locations shall be determined at time of construction by MCDR personnel.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All electrical materials shall be installed in accordance with the National Electrical Code, Michigan Electric Code, and Local Electric Code, with the manufacturers' specifications, and with the Drawings.
- B. Exact locations of light switches and service outlets shall be determined at time of construction by MCDR personnel.

END OF SECTION

SECTION 08300 – DOORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

All Work under this Section shall be performed in accordance with the Drawings and the provisions of the Contract, including General Conditions, Supplementary General Conditions, and Division I—General Requirements of these Specifications.

1.2 SCOPE OF WORK

The Work under this Section shall include all materials and labor required to furnish and install an upward acting sectional door (overhead) and a pass door as shown on Drawings and as called for below.

1.3 SUBMITTALS

- A. Refer to Section 01300, Submittals.
- B. Submit manufacturer's instructions and standard specifications, as predicated by size of door, for:
 - 1. Door
 - 2. Electric operator

Upon approval, such specifications hereby become part of this specification.

1.4 WARRANTY

Overhead door manufacturer shall provide limited door and operator system warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.

PART 2 – PRODUCTS

2.1 SECTIONAL OVERHEAD DOOR

- A. Overhead door shall be a Haas Model CHT-816 insulated sectional steel door by Hass Door Corporation, <u>www.haasddoor.com</u>), or approved equal. Distributed and installed by Fingerlakes Garage Door Co Inc, 315-923-7202.
 - 1. For dimensions, refer to Drawings.

- Doors shall be constructed to meet or exceed standards established under National Association of Garage Door Manufacturers' (NAGDM) specifications and designed for 20-psf minimum wind load.
- 3. Glazing is not required.
- 4. Panels shall be 3" thick galvanized steel, with hot dipped galvanized coating on both interior and exterior surfaces.
- 5. Color shall be selected by Owner from manufacturer's standard colors.
- B. Track and Hardware
 - 1. All tracks shall be 3" heavy gauge galvanized steel, standard lift, with adjustable vertical tracks bracket mounted on wood jambs.
 - 2. Spring counterbalance shall be sized to weight of door with minimum 7 to 1 safety factor, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable; standard cycle spring (10,000 cycles).
 - 3. A hand chain hoist shall be included to provide capability for manual operation of door.
 - 4. Supply and install all wood jamb framing and blocking as called for by door manufacturer.
 - 5. Stop bottom fixture is required.
 - 6. Door closure mechanism shall require constant pressure by operator.
- C. Electric Door Operators
 - 1. Electric door operators shall be model as recommended by door manufacturer for door size and lift condition, with standard hardware operable both from inside and outside of building as shown on Drawings.
 - 2. Door operator to be minimum 1 HP, or as recommended by door manufacturer.

2.2 OVERHEAD COILING DOOR

- PART 1 GENERAL
- 1.1 SECTION INCLUDES
 - A. Overhead coiling service doors; insulated, heavy duty. (Models 6242)
 - B. Electric motor operation for overhead coiling service doors.

PART 2 PRODUCTS

- 2.1 MANUFACTURERS
 - A. Acceptable Manufacturer: C.H.I. Overhead Doors, which is located at: 1485 Sunrise Dr.; Arthur, IL 61911; Toll Free Tel: 800-677-2650; Fax: 217-543-4454; Email:aia@chiohd.com; Web: <u>http://www.chiohd.com</u>
 - B. Substitutions: Not permitted.
 - C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 Product Requirements.
- 2.2 OVERHEAD COILING SERVICE DOORS; INSULATED, HEAVY DUTY

- A. Performance Requirements:
 - 1. Wind Loads: Door assembly to withstand 20 psf (958 Pa) per ASTM E330 using a 1.0 factor of safety. Certified windload also available.
 - 2. Seismic Performance: Evaluated to withstand earthquake motions determined per ASCE/SEI 7.
 - 1. Operation: 20,000 cycles for door assembly including operator. (Standard)
- B. Model 6242 as manufactured by C.H.I. Overhead Doors:
 - 1. Openings up to (WxH) 24 ft-4 inches x 16 ft-4 inches (7417 x 4978 mm).
 - 2. Curtain: Flat faced, full width, interlocking roll formed slats with backer. Individual slat profile is 2-3/4 x 13/16 inch (70 x 21 mm).
 - a. Exterior Slat Material: 24-gauge, 0.022 inch (0.57 mm) polyester painted (G90 coating) galvanized steel.
 - 1) Finish: White
 - b. Interior Slat Material: 24-gauge, 0.022 inch (0.57 mm) polyester painted (G90
 - 1) Finish: White
 - c. Insulation: CFC free foamed-in-place polyurethane insulation. Comply with maximum flame spread and smoke developed indexes of 75 and 450 respectively, per ASTM E84 or UL 723.
 - d. U-factor: 1.09 per ANSI/DASMA 105
 - e. R-Value: 7.2.
 - f. Air Infiltration: 0.68 per ANSI/DASMA 105, ASTM E283.
 - g. STC Rating: 23.
 - h. End locks: Galvanized malleable iron, attached to every other slat to act as wearing surface and prevent lateral movement. Riveted in place.
 - i. Wind locks: Per design and wind load requirements.
 - j. Bottom Bar: Two steel angles, bolted back-to-back. Minimum 11-gauge,
 - 0.114 inch (2.90 mm).
 - 1) Finish: Primed Black
 - 2) Powder coat to match curtain.
 - k. Vision Lites NONE.
 - 3. Guides: Three, minimum 3/16 inch (4.76 mm) structural angles bolted together to form guide and mounting surface. Removable 24 inch (610 mm) service panel for easy access to slats and bottom bar.
 - a. Finish: Primed Black
 - b. Finish: Hot dipped galvanized
 - c. Finish: Powder Coat to match curtain
 - 4. Head Plate: Minimum 1/4 inch (6.34 mm) rectangular steel plate. Precision sealed ball bearings supporting drive side axle.
 - 5. Barrel Assembly:
 - a. Barrel: Steel pipe sized for maximum deflection under full load to not exceed 0.03 inch (0.76 mm) per 1 ft (305 mm) of span. Welded rings or threaded lugs to barrel assembly for curtain attachment.
 - b. Springs: Tension assembly supported in barrel by precision ball bearings. Curtain weight counterbalanced by oil tempered, helically wound torsion springs, grease packed and mounted on steel torsion shafts with cast spring plug.
 - 6. Hood: Half-hexagonal hood for structural rigidity and aesthetic appeal. Fits within head plates with intermediate supports as required.
 - a. Material: 24-gauge, 0.022 inch (0.57 mm) polyester painted (G90 coating) galvanized steel
 - 1) Finish: To match curtain interior.
 - 7 Weather Seal:
 - a. Bottom astragal (standard)
 - b. Vinyl guide seal (standard)

- c. Rubber hood baffle (standard)
- 8. Locking Mechanism:
 - a. Two plated steel slide bolt locks. Padlock provisions.
- 9. Interlock Switches: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
- 10. Mounting:
 - a. Face of wall and above lintel.
 - b. Face of wall and under lintel.
- 11. Jamb Construction:
 - a. Wood Jambs: Provide wood lag bolts.
- 12. Operation:
 - a. Electric: See article "Electric Motor Operation for Overhead Coiling Service Doors."
- 2.3 ELECTRIC MOTOR OPERATION FOR OVERHEAD COILING SERVICE DOORS1. Electric Motor Operator: UL listed and labeled. Sized by manufacturer.

2.3 PASS DOOR

- A. Furnish and install one 3'-6" x 7'-0" exterior grade fiberglass swing-out pass door with jambs, Plyco Series 98 FG or approved equal, as shown on Drawings.
- B. Supply lockset hardware and two sets of keys for each door.

PART 3 – EXECUTION

3.1 GENERAL

All materials shall be installed in complete accordance with manufacturer's recommendations and instructions, which hereby become a part of this Specification.

3.2 ELECTRIC DOOR OPERATORS

Where headroom permits, operators shall be center mounted; otherwise they shall be side mounted.

3.3 GUARANTEE

Installer shall guarantee installation of the door for one (1) year.

END OF SECTION

REFERENCE LIST

Bidder shall submit information on this sheet indicating construction experience on similar work. Failure to complete this sheet may be cause for rejection of bid.

1.	Type of Structure	
	Year Constructed	
	Owner	
	Location (City, State)	
	Owner's Contact Person	
	Owner's Telephone No.	
2.	Type of Structure	
	Year Constructed	
	Owner	
	Location (City, State)	
	Owner's Contact Person	
	Owner's Telephone No.	
3.	Type of Structure	
	Year Constructed	
	Owner	
	Location (City, State)	
	Owner's Contact Person	
	Owner's Telephone No.	
4.	Type of Structure	
	Year Constructed	
	Owner	
	Location (City, State)	
	Owner's Contact Person	
	Owner's Telephone No.	- <u> </u>
5	Type of Structure	
0.	Year Constructed	
	Owner	
	Location (City, State)	
	Owner's Contact Person	-
	Owner's Telephone No	

MACOMB COUNTY DEPARTMENT OF ROADS

LOG OF PROJECT

MCDR: AJN

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05-24-2025

OUTLINE OF WORK

The work under this Contract will consist of, but will not necessarily be limited to the following:

- Construction of a new one-story salt storage building.
- Construction of an 8-inch-thick reinforced concrete floor on 16 inches of 21AA limestone. After the floor is cured it will be sawcut 1/8" x 3" deep into 12' by 12' panels. The joints will be cleaned and sealed according to the manufacturer's directions with Dow Corning 888 silicone joint sealant or approved equivalent. The surface will then be cleaned and sealed with Enviroseal 40 manufactured by Hydrozo according to the manufacturer's directions or approved equal.
- Installation of HMA site paving using 7 inches HMA on 8 inches of 21AA limestone.
- Subgrade undercutting and/or geotextile stabilization as determined to be necessary and directed by the Engineer.
- Proposed electrical service panel at DTE Meter, proposed underground electrical and proposed electrical panel at salt storage facility.

Reimbursement of Fees: Shelby Township Department of Public Works (DPW) and Building Department require inspection fees to be paid. These fees will be paid by the Contractor and reimbursed accordingly. Coordination of all required inspections are the responsibility of the Contractor. See Special Provision.

Pay Item	Pay Unit
Reimbursement of Fees	Dollar

Mobilization, Max: A maximum bid amount has been determined by the Department for Mobilization.

Pay Item	Pay Unit
Mobilization, Max	Lump Sum

Non-Hazardous Contaminated Material Handling and Disposal: An estimated quantity has been included in this contract for any excavated material discovered that is determined to require disposal in a Type II landfill. See Special Provision.

Pay Item	Pay Unit
Non-Haz Contaminated Material Handling and Disposal, LM	Cubic Yard

Excavation and Embankment: Silt Fence will be installed around the building footprint and proposed sitework prior to the start of work. Existing catch basins and proposed catch basins when installed will have silt sacks and sediment traps installed. See SESC Plan on Sheet 9 of plans for locations. The Contractor will strip the existing 23A Limestone Aggregate within the limits of construction and stockpile for use as aggregate base material and aggregate surface course for the finished aggregate surface area. The anticipated quantity of salvaged 23A Limestone Aggregate is 1620 Cyd or 2620 Ton, assuming a

compacted unit weight of 120 lbs/cft. The Contractor will excavate to the elevations necessary to install the building footings per plan, concrete pavement/aggregate base, asphalt pavement/aggregate base and aggregate surface course per plan. The excavated material below the stripped 23A Limestone Aggregate is estimated to be approximately 2900 Cyd (Measured in Place) and will be removed from the site by the Contractor. Estimated quantities are not guaranteed and no attempt will be made by the MCDR to confirm.

Pay Item	Pay Unit
Excavation and Embankment - Com	plete Cubic Yard

Storm Sewer Work: These items cover installation of proposed storm sewer and taping the existing storm system as indicated on the plans or as directed by the Engineer. Reference the Michigan Department of Transportation Standard Specifications for Construction.

Pay Item	Pay Unit
Dr Structure, Rem	Each
Sewer, Rem, Less than 24 inch	Feet
Sewer, Cl IV, 12 inch, Tr Det B	Feet
Sewer Tap, 12 inch	Each
Dr Structure Cover, Adj, Case 1	Each
Dr Structure Cover, Type B	Each
Dr Structure Cover, Type D	Each
Dr Structure, 48 inch dia	Each
Dr Structure, Adj, Add Depth	Feet

80' x 160' High Gambrel Treated Timber Salt Storage Building: Construction of a new one-story salt storage building as shown on the plans (Sheets 12-19) (Building Plans A-1 through A-8). There are four bollards shown on the drawings. The Contractor will provide four (4) additional bollards (Total of Eight (8)) in accordance with the specifications. The additional bollards will be located inside the building at locations similar to those on the outside of the building as indicated on the plans. The cost of these additional bollards is to be included in the total price.

Pay Item	Pay Unit
80' x 160' High Gambrel Treated Timber Salt Storage Building	Lump Sum

Epoxy Coated Steel Reinforcement Concrete Floor: Construction of an 8-inch-thick reinforced concrete floor over 16 inches of aggregate base. The aggregate base will be 21AA limestone. The steel reinforcement will be epoxy coated No. 4 bars spaced at 1 foot centers in both the longitudinal and transverse directions and be placed in the center of the slab thickness. After the floor is cured it will be sawcut 1/8" x 3" deep into 12' by 12' panels. The joints will be cleaned and sealed according to the manufacturer's directions with Dow Corning 888 silicone joint sealant or approved equivalent. The surface will then be cleaned and sealed with Enviroseal 40 manufactured by Hydrozo according to the manufacturer's directions or approved equal.

Pay Item	Pay Unit
Epoxy Coated Steel Reinforced Concrete Floor - Complete	_ump Sum

Subgrade Undercutting, Type II: If determined to be necessary, to be completed below the aggregate base within the limits of the proposed reinforced concrete floor as directed by the Engineer. Reference the Michigan Department of Transportation Standard Specifications for Construction.

Pay Item	Pay Unit
Subgrade Undercutting, Type II	Cyd

Electrical Service and Equipment: Install buried electrical power drop from the existing pole to the proposed panel located near the northwest corner of the proposed salt storage building. Install proposed electrical service panel at the existing pole and at the proposed salt storage facility as indicated on the plans. Includes all required coordination with Shelby Township and/or DTE for permits and/or inspections. All proposed electrical work to be completed by a licensed electrician in the State of Michigan and in accordance with the requirements of the National Electrical Code, Michigan Electrical Code, and Local Electrical Code.

Pay Item	Pay Unit
Electrical Service and Equipment - (Complete Lump Sum

Pavement Removal and Replacement: The Contractor will sawcut, remove and dispose of the existing pavement edges where abutting with the proposed asphalt including the pavement necessary to be removed to install Catch Basin 3-2 / 4-3 as shown on the plans. When the salt storage building is complete, the Contractor will excavate the proposed pavement areas to a depth of 15 inches below the final grades as indicated on the plans or as directed by the Engineer and place 8 inches of aggregate base. The aggregate base will be 21AA limestone material. The pavement will be 7 inches of HMA over the aggregate base. See HMA Application Estimate for specific requirements. The pavement area includes asphalt and base material being installed between each of the supports for the salt storage barn up to the outside wall and restoration of the pavement if the electrical service and equipment is installed by direct bury method. This item includes the 8-inch non-reinforced concrete pavement around each drainage structure as identified on Shelby Township's Storm Sewer Detail Sheet.

Pay Item	Pay Unit
Pavement Removal and Replacement - Complete	Lump Sum

Subgrade Undercutting, Spec, 21AA: If determined to be necessary, to be completed below the aggregate base within the limits of the proposed HMA pavement area as directed by the Engineer. See Special Provision.

Pay Item	Pay Unit
Subgrade Undercutting, Spec, 21AA	Cyd

Geotextile, Stabilization: If determined to be necessary, to be completed below the aggregate base within the limits of the proposed HMA pavement and/or the proposed reinforced concrete floor as directed by the Engineer. Reference the Michigan Department of Transportation Standard Specifications for Construction.

Pay Item	Pay Unit
Geotextile, Stabilization	Syd

Aggregate Site Grading - Complete: When the salt storage building is complete, the Contractor will excavate the proposed aggregate area to a depth of 24 inches below the final grades as indicated on the plans or as directed by the Engineer and place 24 inches of aggregate surface course. The aggregate surface course will be 23A limestone material salvaged and stockpiled from the site.

Pay Item	Pay Unit
Aggregate Site Grading - Complete	Lump Sum

Site Work: This item covers all miscellaneous costs to restore the site for Department of Roads use.

Pay Item	Pay Unit
Site Work - Complete	Lump Sum

MACOMB COUNTY DEPARTMENT OF ROADS

SPECIAL PROVISION FOR REIMBURSEMENT OF FEES

MCDR: AJN

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02-18-2025

a. Description. This special provision describes the way reimbursement, for permit and inspection fees as stated in section 107.02 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, will be paid. This work consists of obtaining local permits including but not limited to the following:

- Shelby Township Building Department Inspection Fees
- Shelby Township Department of Public Works (DPW) Inspection Fees

b. Materials. None specified.

c. Construction. None specified.

d. Measurement and Payment. The costs for the permits will be reimbursed as per subsection 107.02 in the MDOT Standard Specifications for Construction using the following pay item:

Pay Item	Pay Unit
Reimbursement of Fees	Dollar

Reimbursement of Fees includes the reimbursement for the eligible permit and/or inspection fees with supporting receipts or other proof of payment documentation from the Contractor.

MICHIGAN DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION FOR NON-HAZARDOUS CONTAMINATED MATERIAL HANDLING AND DISPOSAL

1 of 2	APPR:DMG:DBP:02-26-20
	FHWA:APPR:03-02-20

a. Description. This work consists of handling, transporting, disposing of non-hazardous contaminated material, including all laboratory testing required for the proper disposal of the material and site restoration of temporary storage locations. Ensure this special provision is not employed without authorization by the Engineer. The laboratory testing will be used to solicit landfill approval and is not intended to determine whether or not the material is contaminated. Soil delineated on the plans and classified as non-hazardous contaminated cannot be used elsewhere on the project regardless of the laboratory test results unless otherwise directed by the Engineer.

b. Materials. None specified.

ENV:JCW

c. Construction. Complete this work in accordance with sections 204 and 205 of the Standard Specifications for Construction, except as modified herein or as directed by the Engineer.

1. Excavation of Non-hazardous Contaminated Material. Excavate non-hazardous contaminated material as shown on the plans or as directed by the Engineer.

2. Temporary Storage of Non-hazardous Contaminated Material. Place excavated nonhazardous contaminated material which is to be temporarily stockpiled on plastic sheeting or tarps having a minimum thickness of 6 mils or in trucks, roll off boxes, or other containers, such that no liquid may escape from the containment. Cover the non-hazardous contaminated material securely with plastic sheeting of 6 mils thickness or greater at the end of each work day.

Dispose of excavated non-hazardous contaminated material as soon as approval is received from the disposal site. This material cannot be stockpiled for longer than 30 days prior to disposal.

Restore temporary storage locations to the condition prior to conducting the work.

3. Sampling and Analysis of Non-hazardous Contaminated Material. Sample and analyze non-hazardous contaminated material prior to disposal. The analysis required is dictated by the Type II disposal facility to be utilized for disposal. Should the results of the analysis show the material to be hazardous waste, as defined by the 1994 PA 451, Part 111, of the Natural Resources and Environmental Protection Act, notify the Engineer immediately. The material must then be disposed of as directed by the Engineer.

4. Disposal of Non-hazardous Contaminated Material. Dispose of non-hazardous contaminated material at a licensed Type II sanitary landfill. Submit at the preconstruction

meeting the name of the Type II landfill to be used for disposal, the sampling and analysis requirements of that landfill, and verification that use of the proposed landfill will meet the requirements of the county solid waste plan.

Ensure the proposed landfill is acceptable to the Department and approval is obtained from the Engineer prior to commencing disposal operations. Provide a copy of the laboratory analysis to the Engineer as a requirement of approval for disposal. Following disposal and prior to approval for payment provide to the Engineer landfill receipts for all non-hazardous contaminated material disposed of.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item

Pay Unit

Non Haz Contaminated Material Handling and Disposal, LM...... Cubic Yard

Non Haz Contaminated Material Handling and Disposal, LM will be measured by volume in cubic yards, LM. Provide to the Engineer receipts from the disposal facility for the number of cubic yards disposed of at that facility prior to payment. Payment will include all costs for materials, labor and equipment needed for storage, loading, transportation, testing, restoration of temporary storage locations and disposal of the non-hazardous contaminated material. Disposal costs will include all documentation required by the landfill.

Payment for excavation of non-hazardous contaminated material will be included with the related items of work.

Delays in testing and disposal of non-hazardous contaminated material that are not the fault of the Contractor may be considered valid reasons for extension of time. However, these delays and the resultant extensions of time will not be considered valid reasons for additional payment.

Should the analysis of the material document that it is hazardous waste, then payment for disposal of hazardous waste will be measured and paid for as extra work. Disposal includes hauling by a licensed hazardous waste hauler and disposal at an appropriate licensed disposal facility. Prequalification is waived.

MACOMB COUNTY DEPARTMENT OF ROADS

SPECIAL PROVISION FOR SUBGRADE UNDERCUTTING, SPECIAL, 21AA

MCDR: AJN

1 of 1

11-09-2024

a. Description. Perform subgrade undercutting in conformance with section 205 of the Standard Specifications except as modified herein.

b. Materials. Use 100 percent limestone materials.

• Subgrade Undercutting, Spec, 21AA: 21AA dense-graded limestone aggregate.

c. Construction. Conform to subsection 205.03.E of the Standard Specifications

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
Subgrade Undercutting, Spec, 21AA	Cubic Yard

Subgrade Undercutting, Spec, 21AA will be paid for as detailed in subsection 205.04.E of the Standard Specifications.

MACOMB COUNTY DEPARTMENT OF ROADS

SPECIAL PROVISION FOR HMA APPLICATION ESTIMATE

MCDR: AJN

1 of 2

02-18-2025

a. Description. This work consists of furnishing and placing hot mix asphalt (HMA) on the surface in accordance with the details shown on the plans or proposal and as specified in Section 501 of the Standard Specifications for Construction.

b. Materials.

Site Paving:

- The HMA, 5EML used for the paving top course will have a yield of 220 pounds per square yard.
- The HMA, 4EML used for the paving leveling course will have a yield of 220 pounds per square yard.
- The HMA, 3EML used for the paving base course will have a yield of 330 pounds per square yard.

All Site Paving areas will be paid with the Lump Sum item "Pavement Removal and Replacement".

The Recycled Asphalt Material (RAP) is limited to a maximum of 15 percent binder by weight of the total binder in the mixture. The use of shingles or tires as RAP is not acceptable.

The Aggregate Wear Index (AWI) number required for the aggregates in the production of the top course is 260, minimum.

The asphalt binder for the HMA, 5EML; HMA, 4EML and HMA, 3EML shall be PG 64-22 performance grade. The asphalt binder PG 64-22 will not be paid for separately, but payment will be considered as having been included in the Contract Items.

c. Construction. Construction must conform to section 501 of the Standard Specifications for Construction except as described herein.

Pavement density will be measured by the Macomb County Department of Roads at the time of placement using a nuclear density gauge with the maximum theoretical specific gravity (G_{mm}) from the job mix formula (JMF) being used as the field control. 92% minimum of the theoretical maximum density (TMD) is required for acceptance.

When preparing a foundation and constructing thereon a hot mixture asphalt (HMA) pavement, the following HMA material shall be used: HMA bond coat SS-1H, asphalt cement performance grade PG 64-22. The HMA Bond Coat SS-1H and Asphalt Cement Performance grade PG 64-22 will not be paid for separately, but payment will be considered as having been included in HMA Contract Items.

d. Acceptance of Superpave HMA Mixtures.

Table 1: Uniformity Tolerance Limits for Superpave HMA Mixtures

	Superpave HMA Mixtures
Percent Binder Content	+ / - 0.50
Air Voids	+ / - 1.00% (% @ Ndes)
Voids in Mineral Aggregate (VMA)	+ / - 1.00%
Maximum Specific Gravity (GMM)	+ / - 0.019

If for any one mixture, two consecutive samples have shown that the results for Binder Content, Air Voids, Voids in Mineral Aggregate (VMA), or Maximum Specific Gravity (GMM) tests, have exceeded the tolerances in Table 1, the contractor will incur 50% Penalty.

MACOMB COUNTY DEPARTMENT OF ROADS SPECIAL PROVISION FOR ACCEPTANCE OF HOT MIXED ASPHALT

MCDR/DESIGN: RB

PAGE 1 OF 5

ORG:05-27-2021 FHWA:10-26-2021

a. Description

This special provision applies to all Hot Mix Asphalt (HMA) acceptance testing for all Macomb County Department of Roads (MCDR). The HMA mixture shall be provided to meet the requirements of the current *Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction* except where modified herein.

b. Materials

Aggregates, mineral filler (if required), and asphalt binder shall be combined as necessary to produce a mixture of the type(s) specified on plans.

Superpave Hot Mix Asphalt Mixtures shall be proportioned within the limits set by the *MDOT* 2020 Standard Specifications for Construction.

No topsoil, clay, loam, tires or shingles shall be present with aggregates that are to be used in plant mixed HMA mixtures.

For mixtures meeting the definition of top or leveling course, field regress air void content to 3.5 percent with HMA binder unless specified otherwise on HMA application estimate. For mixtures meeting the definition of base course, field regress air void content to 3.0 percent with liquid HMA binder unless specified otherwise on HMA application estimate.

c. Construction

After the job-mix-formula is established and approved by the Engineer, the aggregate gradation and the binder content of the HMA mixture furnished for the work shall be maintained within Range 1 uniformity tolerance limits permitted for the job-mix-formula specified in Table 1. When mixtures are tested for Air Voids, Voids in Mineral Aggregate (VMA), Maximum Specific Gravity (GMM), and Binder Content, the mixtures shall also meet specifications listed in Table 2. However, if deviations are predominantly either below or above the job-mix-formula, even if within Range 1, the Engineer may order the Contractor to make alterations to bring the mixture to the job-mix-formula. If two consecutive Aggregate Gradations on one sieve, or Binder Content, as determined by the field tests are outside Range 1, but within Range 2 tolerance limits, Table 1, or if two consecutive tests are out of tolerance limits for Air Voids, Voids in Mineral Aggregate (VMA), Maximum Specific Gravity (GMM), or Binder Content using calculated value, Table 2, the Contractor shall suspend all operations. Contract time will continue during these times when the plant is not producing material. Before resuming any production, the contractor shall propose, for the Engineer's approval, all necessary alterations to the materials or plant so that the job-mix-formula can be maintained. The Engineer, after evaluating for effects on AWI and mix design properties, will approve or disapprove such alterations.

Acceptance sampling and testing will be performed by MCDR using the sampling method and testing options selected by the Engineer. Sampling will be done in accordance with MTM 313 (Sampling HMA Paving Mixtures), or MTM 324 (Sampling HMA Paving Mixtures behind the Paver), or sampling from haul units at the HMA plant. Each day of production, MCDR will determine the number of samples to be taken for each mix type. Acceptance testing will be performed at minimum frequency of once per 1000 tons. Quality Control measures to ensure job control are the responsibility of the Contractor. All persons performing QC and QA HMA field sampling must be Local Agency HMA Sampling Qualified.

All persons performing HMA testing must be at a minimum Hot Mix Asphalt Level One certified and maintain certification through an approved program. The MDOT HMA certification program administered by Ferris State University is an approved program.

All labs performing Acceptance testing or Quality Control testing shall be qualified labs per the MDOT HMA Production Manual and participate in the MDOT round robin process, or as a minimum be "AASHTO Re Source" accredited for AASHTO T 30 or T 27, and AASHTO T 164 or T 308.

If ignition method is chosen for acceptance of asphalt binder content, the correlation procedure for ignition oven will be established as follows. Asphalt binder content based on ignition method. Gradation (ASTM D5444) and Crushed particle content (MTM 117) based on aggregate from MTM 319. The Contractor will provide MCDR laboratory mixture samples to establish the correction factor for each mix. Ensure this sample is provided to the Engineer a minimum of 14 calendar days prior to production.

Pavement density will be measured for acceptance by MCDR with a Nuclear Density Gauge using the Maximum Theoretical Specific Gravity (GMM) from the job-mix-formula (JMF) for acceptance. The minimum required in place density shall be **92.0** percent. The Contractor shall be responsible for establishing a rolling pattern that will achieve the required in-place density. Any time minimum in place density is not being achieved, the Contractor shall immediately notify the Engineer. The Engineer may suspend placement operations until the Contractor can establish a rolling pattern that will achieve the required in place density. Contract time will continue, and the Contractor will not be compensated for down time.

At the sole discretion of the Engineer, HMA density/compaction for residential driveways and low traffic volume commercial driveways, as determined by the Engineer, will be accepted by visual inspection by the Engineer, based upon number of roller passes and roller pattern acceptable to the Engineer, in lieu of **92.0** percent density/compaction specified elsewhere for other HMA pavements.

PARAMETERS	TOP & LEVELING COURSE		BASE COURSI	BASE COURSE	
	Range 1 (a)	Range 2	Range 1 (a)	Range 2	
Binder Content Ignition Oven, Vacuum or Centrifuge Extraction Method	-0.30 to+0.40	+/- 0.50	-0.30 to +0.40	+/- 0.50	
% Passing # 8 and Larger Sieves	+/- 5.0	+/- 8.0	+/- 7.0	+/- 9.0	
% Passing #30 Sieve	+/- 4.0	+/- 6.0	+/- 6.0	+/- 9.0	
% Passing #200 Sieve	+/- 1.0	+/- 2.0	+/- 2.0	+/- 3.0	
Crush Particle Content	-10%	-15%	-10%	-15%	
a. This range allows for normal as closely as possible to the	mixture and testing e Job-Mix-Formula	variations. The r	nixture shall be prop	portioned to tes	

Table 1: Uniformity Tolerance Limits for HMA Mixtures

MCDR will test for Uniformity Tolerances in Table 2 at least once per Job Mix Formula. MCDR reserves the right to vary the testing frequency for volumetric specifications at the Engineer's discretion depending on the daily production. The Contractor will still be required to meet stated tolerances in Table 2.

Binder Content	+/- 0.5%
Air Voids	+/-1.0% (% @ Ndes)
Voids in Mineral Aggregate (VMA)	+/- 1.0%
Maximum Specific Gravity (GMM)	+/- 0.019

Table 2: Uniformity Tolerance Limits for HMA Mixtures

1. Rejected Mixtures

If for any one mixture, two consecutive aggregate gradations on one sieve, crushed particle content or binder content, as determined by field tests, exceed the uniformity tolerance of Range 2 under Table 1, the mixture will be rejected. This will include removal, at Contractors Sole Expense if already in place. If for any one mixture, two consecutive samples have shown that the results for Binder Content, Air Voids, Voids in Mineral Aggregate (VMA), or Maximum Specific Gravity (GMM) tests, have exceeded the tolerances in Table 2, the mixture will be rejected. This will include removal, at Contractors Sole expense if already in place.

If such mixtures are in place in pavement and Contractor does not agree with results, the Contractor can within four days after being notified that material did not meet specification, request in writing that the remaining portions of the field sample(s) (split sample) be sent to an Independent Testing Laboratory (MDOT Approved) to confirm the field test results. For the request to be considered, Contractor must include Quality Control test results along with the written request for Independent Testing. Quality Control results must have been performed from samples that were taken the same day that Quality Assurance samples were taken. If the Engineer agrees, the sample(s) (split sample) will be sent out for testing within seven days after Engineer approves Contractors request. If the Laboratory's results do not confirm the field test results and there are no price adjustments required due to test failures on the asphalt binder, then no price adjustments will be made for the mixture involved. If the Laboratory's results confirm the test results, and if in the Engineer's judgment the defective mixture can remain in place, and there are no price adjustments required due to test failures on the asphalt binder, the contract base price for the defective mixture involved, as determined from field tests, will be decreased on the following basis:

The contract base price for material outside of Range 2 (Table 1) or with crushed particle content below that specified in Table 1, will be decreased 25 percent.

The contract base price for material outside of tolerances (Table 2) for Air Voids, Voids in Mineral Aggregate (VMA) or Maximum Specific Gravity (GMM) will be decreased 50 percent.

The contract base price for material outside of tolerances (Table 2) for Binder Content using MTM 319 (Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method) or MTM 325 (Quantitative Extraction of Bitumen from HMA Paving Mixtures) will be decreased 25 percent. Back calculation will not be allowed for determining asphalt content.

If three consecutive aggregate gradations on one sieve, crushed particle content or binder contents as determined by field tests are outside Range 1, but within Range 2 tolerance limits (Table 1), the mixture produced from the time the third sample was taken until the gradation, crushed particle content, or binder content is corrected back into Range 1 will be decreased in contract base price by 10 percent. Field tests indicating that mixtures are subject to the 10 percent penalty will be confirmed in the same manner as mixtures subject to the 25 percent penalty as described herein.

Any delays for additional Independent Laboratory Testing shall not be considered grounds for any extension of time to the contract.

2. Pavement Density

For HMA Mixtures that fall below the required 92.0 percent in place density, based on the Maximum Theoretical Specific Gravity (GMM), the Contract Unit Price will be adjusted, calculated from a Contract Base Price adjustment, as follows:

Contract Base Price Adjustment = Contract Base Price * ((92.0%-average Density%) 10/100 for average HMA densities between and including 90.0% and 91.9%.

Contract Base Price Adjustment = Contract Base Price * 0.25 for average HMA densities between and including 90.0% and 90.9%.

Adjusted Contract Unit Price = Contact Unit Price - Contract Base Price Adjustment

If the density is below 90.0 percent, the material placed shall be removed and replaced at the sole expense of the Contractor.

If the Contractor disputes MCDR's density testing results, the Contractor can request to take cores to verify the original density results within seven days after they are notified that the material did not meet specifications. If the Engineer approves, the Engineer will establish the limits of the area, or separate discrete areas, to be represented by the cores and the core locations. Not more than one core for every 100 linear feet of any discrete area in question will be taken. The Contractor shall notify the Engineer 24 hours in advance of coring to ensure that MCDR has a representative to witness the coring operation and to take immediate possession of the cores. After the cores are taken, the core holes shall be filled with hot mixture asphalt, and thoroughly compacted as part of the coring operation.

After the Engineer takes possession of the cores, MCDR will complete the density testing of the cores. The density of the cores shall supersede the nuclear density tests. The resulting core density for any areas, discrete, or total, established by the Engineer, shall be applied to the above contract Base Price adjustments or if required the HMA shall be removed and replaced. After completion of the core testing the Engineer will notify the Contractor of the results.

All costs associated with this additional testing, will be borne by the Contractor. Delays for this additional testing shall not be considered grounds for any extension of time to the contract.

d. Measurement and Payment

The above items will not be paid for separately and are considered included in the contract unit price for the standard HMA pay items shown on plan.

1. Base Price

Price established by the Department to be used in calculating incentives and adjustments to pay items and shown in the contract.

MACOMB COUNTY DEPARTMENT OF ROADS SPECIAL PROVISION FOR RECYCLED HOT MIX ASPHALT MIXTURE

MCDR/DESIGN: RB

1 of 1

ORG:10-15-2021 FHWA:10-26-2021

a. Description.

This work shall be done in accordance with section 501 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as modified herein.

b. Materials.

Subsection 501.02.A.2 of the MDOT 2020 Standard Specifications for Construction is hereby supplemented with the following: Reclaimed Asphalt Pavement (RAP) content shall be limited to a maximum of 15 percent binder by weight of the total binder contained in the mixture for all HMA Mixtures.

c. Construction

All work must be in accordance with the contract documents

d. Measurement and Payment

The above items will not be paid for separately and are considered included in the contract unit price for the standard HMA pay items shown on the plans

MACOMB COUNTY DEPARTMENT OF ROADS

SPECIAL PROVISION FOR UTILITY COORDINATION

MCDR: AJN

1 of 3

05-04-2025

The contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in Section 104.08 of the 2020 MDOT Standard Specifications for Construction. In addition, for the protection of underground utilities, the contractor shall follow the requirements in Section 107.12 of the 2020 MDOT Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon Section 108.09 of the 2020 MDOT Standard Specifications for Construction.

For protection of underground utilities and in conformance with Public Act 53, the Contractor shall dial 1-800-482-7171 or 811 a minimum of three full working days, excluding Saturdays, Sundays, and holidays prior to beginning each excavation in areas where public utilities have not been previously located. Members will thus be routinely notified. This does not relieve the Contractor of the responsibility of notifying utility owners who may not be a part of the "Miss Dig" alert system.

The following utilities have facilities located within the property. There is proposed utility relocation work to be completed as part of this contract. The Contractor will be required to coordinate work to accommodate concurrent utility work as described below. This list is provided as a courtesy and may not be all-inclusive. Coordinate all work with any other agencies or contractors working within the project construction influence area.

ELECTRIC: DTE

• Electrical Service and Equipment: Install buried electrical power drop from the existing pole to the proposed panel located near the northwest corner of the proposed salt storage building. Install proposed electrical panel at the existing pole and at the proposed salt storage facility as indicated on the plans. Includes all required coordination with Shelby Township and/or DTE for permits and/or inspections. All proposed electrical work to be completed by a licensed electrician in the State of Michigan.

Owners of public utilities will not be required by the County to move any poles or structures to facilitate the operation of construction equipment unless it is determined by the Project Engineer that such poles or structures constitute a hazard to the public or are extraordinarily dangerous to the Contractor's operations.

The Contractor shall protect and support all utilities that are encountered. All costs for utility location verification, support and protection, and any additional measures required to work around the underground service lines or utility poles shall be included in the proposed pay item conflicting with that utility.

The relocation of utilities may be ongoing and occurring during construction of the project. The Contractor is expected to progress with the work and coordinate their operations with all ongoing utility relocation efforts. The Contractor shall not cease operations due to ongoing or unfinished utility relocation efforts.

MICHIGAN DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION FOR ERRATA TO THE 2020 STANDARD SPECIFICATIONS

1 of 11

04-30-24

Page	Subsection	Errata
1-06	101.02	Delete the second abbreviation of the list on this page reading: "IESIlluminating Engineering Society
1-06	101.02	Add the abbreviation to the list on this page reading: "IESNA Illuminating Engineering Society of North America
1-07	101.02	Change the first abbreviation of the list on this page to read: MMUTCDMichigan Manual on Uniform Traffic Control Devices
1-83	108.05.A.2	In the first paragraph of this subsection change the language "MDOT Form 1130" to read "MDOT Form 1130A".
1-88	108.08.D	Move the last paragraph of this subsection to the left one indent to align with the first paragraph of the subsection and not with the subsection 108.08.D.3.
2-29	205.03.P.1	Delete the first sentence of this subsection and replace with the following: "Do not dispose of material, temporarily or permanently, beyond the normal plan fill slope across wetlands or floodplains."
2-30	205.03.P.2	Delete the first sentence of this subsection and replace with the following: "Do not dispose of material, temporarily or permanently, in wetlands or floodplains."
2-30	205.03.P.3	Delete the second paragraph of this subsection and replace with the following: "Contact the appropriate regulatory agencies to determine whether an area is a regulated wetland or floodplain before disposing of surplus or unsuitable material in areas outside the right-of-way and not shown on the plans as disposal sites."
2-30	205.03.P.3	Delete the first sentence of the third paragraph of this subsection and replace with the following: "Immediately move to an upland site any surplus or unsuitable material that was disposed of in portions of wetlands or floodplains not shown on the plans as disposal sites, at no additional cost to the Department."

2-30	205.03.P.4	Delete the first sentence of this subsection and replace with the following: "The Department will notify the applicable regulatory agencies if the Department becomes aware that the Contractor disposed of surplus or unsuitable material in portions of a wetland or floodplain not shown on the plans."
3-31	308.04.D	Change the subsection title from "D. General." to read "A. General."
4-7	401.03.E	Delete the third sentence of the second paragraph of this subsection and replace with the following: "Use precast or cast-in-place footings for precast end sections as required."
4-8	401.03.E	Delete the first sentence of the fourth paragraph on this page of this subsection and replace with the following: "When discharging stormwater directly to waters of the state, permanently label all end sections or other piped points of stormwater entry with "MDOT" or the local agency's name in a conspicuous location that will remain visible after construction."
4-11	401.04	Change the eighth pay item from the bottom of the list on this page to read as follows: Culv End Sect inch, GrateEach
4-12	401.04.C.4	Change this subsection to read: "The Engineer will measure Culv End Sect <u>inch</u> , Grate by each as shown on the plans for the size of grate required."
4-21	402.03	Add a new subsection to the end of subsection 402.03 on this page reading as follows: "K. Outfall Labeling. Label all stormwater outfalls directly discharging to waters of the state in accordance with subsection 401.03.E.
4-39	406.02	Change the third line in the list of materials to read: Coarse Aggregate 6A, 6AA, 17A902
4-41	406.03.A.3	Delete the third paragraph of this subsection and replace with the following: "Design joints between adjacent box culvert sections in accordance with Section 9 of ASTM C1577 and to accommodate the joint sealing material in accordance with section 914 as applicable."
4-50	406.03.G.3	Change the first sentence of the first paragraph to read: "Unless otherwise shown on the plans, construct culvert bedding for box culverts by placing a 9-inch-thick layer of 46G aggregate, covered with a 3-inch-thick layer of 34G, 34R aggregate, or approved equal."

4-51	406.03.G.3	Add the following sentence to the end of the second paragraph of this subsection: "The cold applied joint sealer must completely cover the external rubber gasket with the placement limits matching the width of the geotextile blanket."
4-52	406.04.B	In the second paragraph of this subsection delete the first sentence and replace with the following: "The Department will pay separately for cast-in-place concrete, other than for culvert segments, headwalls, wingwalls, aprons, and curtain walls."
5-26	502.02	Delete the first sentence of the subsection and the listed materials in this subsection.
5-26	502.02.A	Add the following to the end of the first sentence in this subsection: "(914.04A)"
5-26	502.02.B	Add the following to the end of the first sentence in this subsection: "(502.02B)"
5-35	503.04	Change the first paragraph to read: "The unit price for Paver-Placed Surface Seal , of the type required, includes the cost of preparing the surface, and placing a membrane and paver placed surface seal course for full-width coverage, except that the Department will pay separately for removing pavement markings in accordance with subsection 812.04"
5-46	504.04.A	Change the first paragraph to read: "A. General . The unit prices for Micro-Surface , regardless of the type required, include cleaning existing pavement, applying a bond coat, stationing, corrective action, and traffic control to complete corrective action."
6-20	602.04	Delete the fifteenth pay item of the list on this page reading: "Shoulder, Reinf ConcSquare Yard
6-20	602.04	Change the sixteenth thru the eighteenth pay items on this page to read as follows: Shld, Nonreinf ConcSquare Yard Shld, Nonreinf Conc, High PerformanceSquare Yard Shld, FreewaySquare Yard
6-21	602.04.B.1	Delete this subsection and replace with the following: "Shld, Nonreinf Conc; and Shld, Nonreinf Conc, High Performance. The Engineer will measure, and the Department will pay for, Shld, Nonreinf Conc; and Shld, Nonreinf Conc, High Performance by area, based on plan quantities in accordance with subsection 109.01."
6-21	602.04.B.2	Delete this subsection and replace with the following:

3 of 11

		4 of 11 20SS-001A-10 04-30-24	6 4
		"Shid, Freeway. The Engineer will measure, and the Departmer will pay for, Shid, Freeway based on plan quantities in accordance with subsection 109.01. If the Contractor uses concrete for the shoulder, the unit price for Shid, Freeway includes the cost of the transverse joints in the shoulder and the external longitudina pavement joints."	ıt e e al
6-23	602.04.F	Add the following sentence to the end of the first paragraph of thi subsection: Temporary concrete pavement, pavement within 4 feet of a obstruction, pavement areas less than 300 square yards, c pavement less than 3 feet wide will not be cored.	s n >r
6-23	602.04.F	Delete the following language from this subsection on this page: "The Engineer will not core the following:	
		1. Temporary concrete pavement;	
		2. Pavement within 4 feet of an obstruction;	
		3. Pavement areas less than 300 square yards; or	
		4. Pavement less than 3 feet wide."	
6-24	602.04	Rename the following subsections as follows:	
6-24	602.04	2. Additional Cores.	
6-24 6-25	602.04 602.04	 Price Adjustment for Thickness. Price Adjustments for Steel Locations within the Pavement 	
6-26	602.04	5. Remove and Replace."	
6-29	603.02	Change the first sentence in the last paragraph in this subsection to read: "Provide coarse aggregate with no greater than 2.5% absorption in accordance with AASHTO T85."	n n
7-11	705.02	Change the second sentence in the last paragraph in thi subsection to read: "Provide natural aggregate and with no greater than 2.50% absorption as specified in AASHTO T85 for structure concrete."	s ⁄₀
7-29	706.02	Change the first sentence in the seventh paragraph in thi subsection to read: "Provide natural aggregate and with no greater than 2.50% absorption as specified in AASHTO T85 for structure concrete."	s ⁄₀
7-107	709.04	Change the Pay Unit on the second pay item from the top of the lis on this page to read as follows:	st

Thousand Board Foot

7-115	711.02	Change the first sentence in the last paragraph in this subsection to read: "Provide natural aggregate with a maximum absorption of 2.50% in accordance with AASHTO T85."
7-120	712.02	Change the first sentence in the sixth paragraph in this subsection to read: "Provide concrete containing natural aggregate with a maximum absorption of 2.50% in accordance with AASHTO T85."
7-185	718.02	Change the first sentence in the last paragraph in this subsection to read: "Provide concrete with natural aggregate with a maximum absorption of 2.50% in accordance with AASHTO T85."
8-12	804.03.B.2	Change the first sentence in this subsection to read: "Cast in place light standard and sign support foundations using fixed forms in accordance with the <i>MDOT Standard Plan R-50</i> <i>series.</i> "
8-27		Change the last pay item at the bottom of this page to read as follows: Guardrail Anch, Bridge, Det, CurvedEach
8-44	810.03.J.9	Add a period to the end of the third sentence in this subsection.
8-53	810.03.V	Add a period to the end of the second sentence of the first paragraph of this subsection.
8-53	810.04	Change the fourth pay item from the top of the list on this page to read as follows: Post, Steel, poundFoot
8-53	810.04	Change the last four pay items at the bottom of this page to read as follows: Fdn, Truss Sign Structure Type, inch dia, CasedFoot Fdn, Truss Sign Structure Type, inch dia, UncasedFoot Fdn, Cantilever Sign Structure Type, inch dia, CasedFoot Fdn, Cantilever Sign Structure Type, inch dia, Uncased.Foot
8-55	810.04.B.1	Delete the second paragraph of this subsection and replace with the following: "The unit prices for Fdn, Truss Sign Structure Type, inch dia, Cased and Fdn, Cantilever Sign Structure Type, inch dia, Cased include the cost of concrete, slurry, steel reinforcement, permanent casings, anchor bolts, excavation, and disposal of excavated material."
8-55	810.04.B.2	Delete this subsection and replace with the following: "Foundation, Truss Sign Structure, Uncased and Foundation, Cantilever Sign Structure, Uncased. The unit prices for Fdn,
		Truss Sign Structure Type, inch dia, Uncased and Fdn, Cantilever Sign Structure Type, inch dia, Uncased include the cost of concrete, slurry, steel reinforcement, temporary casings, anchor bolts, excavation, and disposal of excavated material."
-------	--------------	--
8-57	810.04.I	Delete the first paragraph of this subsection and replace with the following: "The unit price for Sign, Rem of the type required includes the cost of removing signs from supports and stacking by shape and size."
8-57	810.04.I	Delete the second paragraph of this subsection and replace with the following: "The unit prices for Ground Mtd Sign Supports, Rem ; Cantilever, Rem and Truss, Rem include the cost of removing ground mounted sign supports, cantilever or truss supports."
8-57	810.04.L	Change this subsection to read: "The unit price for Sign, Erect, Salv of the type required includes erecting the salvaged sign on a new sign support or existing sign support, as shown on the plans, and attaching devices, and hardware, including brackets."
8-110	812.04	Change the fifth and sixth pay item from the top of the list on this page to read as follows: Sign, Type B, Temp, Prismatic, Spec, Furn
8-141	815.04.C.1.b	Delete this subsection in its entirety.
8-141	815.04.C.1.c	Rename and change this subsection as follows: "b. Removal and disposal of unacceptable plants including the root ball.
8-141	815.04.C.1.d	Delete this subsection in its entirety.
8-142	815.04.C.2.d	Change this subsection to read: "During the first watering of the second growing season, remove and dispose of the guying material, identification tags, and inspection tags."
8-144	816.03.A	Change the third sentence in this subsection to read: "Use topsoil from within the project limits; or from off-site sources meeting the requirements in subsection 917.06."
8-167	818.04	Add the pay item to the bottom of the list on this page as follows: Power Company (Estimated Cost to Contractor)
8-170	818.04.G	Delete this subsection in its entirety.
8-170	818.04	Rename the following subsections as follows: "G. Handholes (Hh).

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8-171 8-171 8-171 8-172 8-172 8-172 8-172	818.04 818.04 818.04 818.04 818.04 818.04 818.04	 H. Service Disconnect. I. Metered Service. J. Unmetered Service. K. Wood Pole. L. Concrete Pole, Fit Up. M. Steel Pole, Fit Up. N. Bracket Arm."
8-171	818.04.J	Delete the second paragraph of this subsection and replace with the following: "The pay item, Power Company (Estimated Cost to Contractor) , establishes a budgeted amount in the contract to cover the cost of reimbursing the Contractor for payments made to the power company for providing electrical power at the locations shown on the plans. The Department will estimate the reimbursement costs to the Contractor and establish a budgeted amount as shown on the plans. The Department will pay the Contractor for power company invoices paid, as submitted to the Engineer."
8-176	819.03.B.5.b	In the second paragraph of this subsection delete the first sentence and replace with the following: "Tighten bolts connecting the pole to the frangible base to a snug tight condition in accordance with subsection 707.03.E.6.c."
8-185	820.01.B	Add a period to the end of the first sentence of this subsection.
8-187	820.02	Change the first line in the list of materials on this page to read: Conduit Material918
8-196	820.03.O	In the fourth paragraph of this subsection delete the last sentence and replace with the following: "Use smooth wall, Schedule 80, rigid PVC conduit, or coilable, Schedule 80 PE conduit in accordance with section 818."
8-199	820.04	Add the pay item to the list on this page: TS, (number) Way (type) Mtd (LED) Optic
8-200	820.04	Change the second pay item from the top of the list on this page to read as follows: TS Head, TempEach
8-200	820.04	Change the eleventh pay item from the top of the list on this page to read as follows: TS, Lens, Pedestrian Sym (LED)Each
8-200	820.04	Delete the following pay items from the list: Strain Pole, Steel, 6 bolt, footEach Mast Arm Pole, CatEach Mast Arm,Foot, CatEach

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8-200	820.04	Change the eleventh pay item from the bottom of the list on this page to read as follows:
		Mast Arm, RemEach
8-201	820.04	Delete the following pay item from the list: Power Co. (Est Cost to Contractor)Dollar
8-202	820.04	Add the following pay item to the list: Bracket, Truss, SalvEach
8-204	820.04.C	Delete the last paragraph of this subsection in its entirety.
8-204	820.04.D	Delete the first paragraph of this subsection in its entirety.
9-5	902.02	Delete the first line under the Material list and relace with the following: "Wire Cloth and Sieves
9-9	902.03.C.1.b	Delete the first sentence in this subsection and replace with the following: "The physical requirements for the coarse aggregate are as specified in Table 902-2 and as follows:"
9-14	Table 902-1	In the row that includes the information on the 34G material, under the column titled Item of Work by Section Number (Sequential) delete the reference to the section 404.
9-15	Table 902-2	Add the superscript (n) in the first row in the Dense-graded aggregates section of the table under the column titled Crushed Material, % min. (MTM 117).
9-16	Table 902-2	Add the superscript (n) in the first row in the Open-graded aggregates section of the table under the column titled Crushed Material, % min. (MTM 117).
9-16	Table 902-2	Delete the superscript footnote in the first through fourth rows under the header row that reads "(m)" in the column Loss, % max, LA Abrasion (MTM 102).
9-16	Table 902-2	Add the following row after the third row in the Open-gradedaggregates section reading:46R45
9-16	Table 902-2	Add the superscript footnote in the header row that reads "(m)" in the column Loss, % max, LA Abrasion (MTM 102).
9-15	Table 902-2	Delete the footnote (d) in one location in the table.
9-17	Table 902-2	Delete the footnote (d) in one location in the table.

9-17	Table 902-2	Add the following footnote below the existing footnotes in this table. "(n) For recycled crushed concrete, if the source concrete uses primarily rounded river gravel aggregates, the minimum crushed particle content can be reduced to 90% ."
9-21	Table 902-6	Delete the footnote (b) in two locations in the table.
9-21	Table 902-6	Change the footnote (c) to read (b) in two locations in the table.
9-21	Table 902-6	Change the footnote (d) to read (c) in two locations in the table.
9-25	903.04	Delete the second sentence of the second paragraph of this subsection.
9-70	909.07.A	Delete the second sentence of this subsection.
9-70	909.05.D	Change the first sentence in this subsection to read: "Provide steel pipe for jacking in place meeting the requirements of ASTM A53/A53M for Type E or Type S, Grade B, or ASTM A139/A139M for Grade B."
9-71	909.08.A	Change the first sentence in this subsection to read: "Provide bridge deck downspouts of PE pipe meeting the requirements of ASTM F714, PE 4710, DR 26 or Schedule 80 PVC.
9-94	Table 910-01	Change the value in the fifth row under the header row in the Permittivity (min) (per second) column from 0.5 to read: "0.05"
9-94	Table 910-01	Change the value in the seveth row under the header row in the Permittivity (min.) (per second) column from 0.5 to read: "0.05"
9-95	Table 910-2	Change the second row under the Ultimate strength section to read: "CMD ^(c) 1950 lb/ft"
9-119	913.06	Change this subsection to read: Circular precast concrete units with circular reinforcement for adjusting rings, tops, risers, and sump bases for manholes, catch basins, and inlets must meet the requirements of AASHTO M199 and the following additions and exceptions:
9-133	917.03	Rename the four subsections following the first paragraph on this page as follows:D. Deciduous Shade Trees.E. Small Trees, Ornamentals, and Shrubs.F. Evergreen Trees.G. Vines, Ground Cover, and Herbaceous Ornamental Plants.
9-149	918.08	In the first paragraph of this subsection delete the second sentence and replace with the following:

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		"Provide light standards designed in accordance with AAS LRFD Specifications for Structural Supports for Highway Luminaires, and Traffic Signals."	HTO's Signs,
9-150	918.10	In the first paragraph of this subsection delete the first sentence replace with the following: "Provide tower lighting units designed in accordance AASHTO's LRFD Specifications for Structural Suppor Highway Signs, Luminaires, and Traffic Signals."	ce and with ts for
9-164	919.04.B	In the first paragraph of this subsection delete the first sentent replace with the following: "Provide square tubular steel sign supports meeting the che mechanical, and geometric properties of material used in the tests referenced in AASHTO's LRFD Specifications for Stru Supports for Highway Signs, Luminaires, and Traffic Signals	ce and emical, e crash uctural ."
9-170	920.02.C	Change the reference to Table 920-2 to read Table 920-3 locations.	in two
9-222	922.10.A.3	Delete this subsection and replace with the following: "Conform to the wind load requirements specified by AAS LRFD Specifications for Structural Supports for Highway Luminaires, and Traffic Signals with all equipment mounted w the need for additional ballast;"	HTO's Signs, vithout
10-23	1003.03.B	Delete the last sentence of this subsection and replace w following: "Aggregate sampling for concrete will be performed by an N certified Aggregate Technician Level II."	ith the ⁄ICAT-
10-42	Table 1006-01	Change footnote (a) to read: "(a) Ensure that the coarse aggregate's absorption doe exceed 2.5% in accordance with AASHTO T85."	es not
10-43	Table 1006-02	Replace Table 1006-02 with the Table 1006-02 below.	
1A - 20A	Pay Item Index	Replace the Pay Item Index in its entirety.	

Table 1006-2: Overlay Mixtures

					Mixture Proportions lb/yd ³ , dry weight					
Mixture Type	Aggregate	Slump (inch)	Air Content	Admixture Required	Cement ^(a)	Dry Densified Silica Fume ^(b)	Net Mix Water	Fine Agg	Coarse Agg	Latex Admixture
SFMC	2NS and 26A ^(c)	4–6	6.5 ±1.5%	(d),(e),(f)	618	40	273 ^(g)	1273	1601	_
LMC	2NS and 26A ^(c)	(h)	4.5 ±1.5%	_	658	—	(h)	1490 ^{(i),(j)}	1300 ^{(i),(j)}	206

(a) Use only Type I Portland cement.

(b) For SFMC mixtures, the Contractor may use a blended silica fume Portland cement. However, if the silica fume content of the blended material is greater than 8% of the total cementitious material, submit to the Engineer modified mix proportions with Type I Portland cement added to the blended material to achieve the equivalent individual cementitious material mixture proportions.

(c) Provide coarse aggregate, 95% minimum crushed materials in accordance with Michigan Test Method (MTM) 117, with an absorption no greater than 2.5%, in accordance with AASHTO T85.

(d) Water-reducing high-range admixture or water-reducing high-range and retarding admixture.

(e) Virgin polypropylene collated fibers at 2 lb/yd³.

(f) Air-entraining admixture.

(g) Provide a net water to cementitious material ratio of 0.41 (cementitious material includes cement and silica fume).

(h) Add water in addition to water in the latex admixture to control slump to within 3 to 5 inches. Measure slump from 4 to 5 minutes after discharge from the mixer. During the waiting period, deposit concrete on the deck and do not disturb. If placing mixtures on sections within superelevated curves, the Contractor may need to use the lower allowable range of the slump requirement, as determined by the Engineer. Do not exceed water-cement ratio, by weight, of 0.30 including water contained in the latex emulsion.

 Aggregate proportions are approximate; due to gradation changes, the Contractor may increase proportions by no greater than 5% by weight of total aggregate if reducing coarse aggregate by an equivalent volume.

(j) Aggregate weights specified in the table are based on a dry bulk specific gravity of 2.65 for gravel and stone. Adjust the weights if the specific gravity of the materials used varies by more than 0.02 from the specified values.

MACOMB COUNTY DEPARTMENT OF ROADS

NOTICE TO BIDDERS

All inquiries concerning the plans and proposal for this project are to be directed to:

Adam J. Newton, PE Name Project Engineer

Title

(586) 463-8682 Fax Number

anewton@rcmcweb.org

Email

(586) 463-8671 Extension 1226 Phone

The above contact person is available Monday through Friday, 8:00 a.m. to 12:00 noon / 1:00 p.m. to 4:00 p.m. All inquiries must be made by Fax or E-mail. Telephone inquiries will not be answered. To be able to process and distribute an addendum, if required, all inquiries shall be made at least **ten calendar days** before the letting. Inquiries made after this date will be considered by Macomb County Department of Roads, but will not require a response.

Inquiries made by Fax or E-mail must include the following information:

Proposal Item Number Contract ID Name of Inquiring Person Company Name Phone#, Fax #, and /or E-mail address Detailed question(s) with reference to proposal page and plan sheet number

Other employees of Macomb County Department of Roads have been instructed to direct all inquiries to the person mentioned above.

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED SALT BARN SHELBY TOWNSHIP, MACOMB COUNTY, MICHIGAN MCDR PROJECT NO. 9048

MSG PROJECT NO. 401.2300893-TASK 2

AUGUST 28, 2024

PREPARED FOR: MACOMB COUNTY DEPARTMENT OF RODS

117 SOUTH GROESBECK HIGHWAY MOUNT CLEMENS, MI 48043

PREPARED BY: THE MANNIK & SMITH GROUP, INC.

607 Shelby Street, Suite 300 Detroit, Michigan 48226





August 28, 2024

Mr. Adam Newton, PE Project Engineer Macomb County Department of Roads 117 South Groesbeck Highway Mount Clemens, Michigan 48043

Re: Geotechnical Investigation Report Proposed Salt Barn Shelby Township, Macomb County, Michigan MCDR Job No. 9048 MSG Project Number: 401.2300893-Task 2

Dear Mr. Newton:

This report presents the results of our geotechnical field investigation, field and laboratory testing results, geotechnical analyses, and geotechnical recommendations and construction considerations for the proposed salt barn in Shelby Township, Macomb County, Michigan. Our investigation was completed in accordance with our Original Proposal No. 401.2400053 dated January 17, 2024.

We trust that this report addresses your project needs. We appreciate the opportunity to work with you on this very important project. Please contact us if you have any questions or if we can be of further assistance.

Sincerely, The Mannik & Smith Group, Inc.

Zana Abudtaish

Lana AbuQtaish, PhD, PE Geotechnical Engineer

Dr. Brahim Benhamida, PE VP/Chief Geotechnical Engineer



401.2300893.MCDR Task 2.Shelby Twp Salt Barn.Geo.Rpt_2024.08.28.docx



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1.0 INTRODUCTION

1.1 General

The Mannik & Smith Group, Inc., (MSG) was retained by Macomb County Department of Roads (MCDR) to conduct a geotechnical investigation and to provide geotechnical engineering services to assist with the design and construction of the proposed Salt Barn in Shelby Township, Macomb County, Michigan. The site location is depicted in Figure 1-Site Location Map in Appendix A. This geotechnical investigation was performed in general accordance with MSG Original Proposal 401.2400053 dated January 17, 2024.

1.2 **Project Information**

As we understand, the overall proposed project consists of the design and construction of a Salt Barn Structure with a footprint area of 160 feet by 80 feet with no basement. The approximate interior height of the Salt Barn Building is 35 feet. Based on the current design concept provided to us via email on August 12, 2024, the proposed exterior walls are supported on 12 feet by 3 feet shallow foundation spaced at approximately 8 feet.

1.3 Site Conditions

The site of the proposed project is located at approximately 900 feet north of the intersection of Napi Drive and 23 Mile Road in Shelby Township, Macomb County. The site area consists of undeveloped open unpaved ground surface that is located south of an existing salt barn structure. Based on a recent Survey Data provided to us by MCDR, the site of the proposed structure is relatively flat with surface elevation ranging from approximately 634.0 to 636.0 feet.

2.0 SUBSURFACE INVESTIGATION

2.1 Field Exploration

The subsurface investigation consisted of performing seven (7) soil borings as indicated below in Table 2.1.1

Proposed Structure: Salt Barn Building	Soil Boring Number	Soil Boring Depth (ft)	Comments
Periphery Soil Borings	4	25	Or to refusal before 25 ft.
Central Soil Borings	3	35	Or to refusal before 35 ft.
Total Drilling Footage		205	

Table 2.1.1: Summary of Drilled Soil Borings

The approximate locations of the proposed soil borings were selected by MSG in coordination with MCDR's Project Manager based on Design concept of the Project's Structural Engineer. The boring locations were field marked by MSG personnel and surveyed by MCDR's Surveyor. These borings had to be field-adjusted away from existing underground utilities and overhead lines. The approximate as-drilled soil boring locations are shown in Figure 2 in Appendix A. Soil boring elevations were estimated from MCDR's recent survey data.

The drilling operations for this investigation were performed over 3 days on April 8, 9, and 1, 2024. Soil borings were advanced using a track-mounted Geoprobe 3230 DT and using 3¹/₄-inch inner diameter hollow stem augers. Upon completion, the boreholes were backfilled to the surface with bentonite mixed with auger cuttings.



During drilling operations, Standard Penetration Test (SPT) was conducted in accordance with ASTM D1586 procedures and was completed at 2.5 feet intervals within the upper 10 feet, then every other 5 feet until depth termination. During the SPT testing, soil samples were obtained with a 2-inch outer diameter split spoon sampler driven 18 inches into the soil with blows of a 140-pound hammer falling 30 inches. The sampler is generally driven in three successive 6-inch increments with the blows for each 6-inch increment being recorded. The number of blows required to advance the sampler through 12 inches after an initial penetration of 6 inches is termed as the Standard Penetration Test resistance (N-value) and is presented graphically on individual Soil Boring Logs.

SPT sampling was conducted in accordance with ASTM D1586 and was completed at 2.5 feet intervals for the upper 10 feet and at 5 feet intervals thereafter. No rock coring was performed as part of the current geotechnical investigation.

Additionally, MSG collected thinned walled Shelby tubes from borings SB-05 and SB-07 at different depths in accordance with ASTM D1587.

Collected soil samples were labeled with the soil boring designation and a unique sample number. Split-spoon samples are designated as SS and Shelby tube samples are designated as ST. The soil samples were sealed in glass jars and in Shelby tubes in the field to protect the soil and maintain the soil's natural moisture content. All samples were transferred to MSG's laboratory for further analysis and testing.

Whenever possible, groundwater level observations were made during the drilling operations and are shown on the Soil Boring Logs. In addition, prior to backfilling, each open borehole was observed again for groundwater. During drilling, the depth at which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. It should be noted that seasonal variations and recent rainfall conditions may influence the groundwater table significantly.

2.2 Laboratory Testing

Each split-spoon recovered from the borings was examined and visually classified. This examination was performed to verify conditions identified within field boring logs, to select samples for further laboratory evaluation, and to perform visual-manual classification of samples not subject to further laboratory testing. During the examination process, the geotechnical engineer finalized the soil boring logs.

Representative soil samples were subjected to laboratory tests consisting of pocket penetrometer, Dry Unit Weight (ASTM D7263), Natural Moisture Content (ASTM D2216), Atterberg's Limits (ASTM D4318), One-Dimensional Consolidation (ASTM 2435), and Unconfined Compression Strength (ASTM D2166). A brief description of each test is provided in Laboratory Test Procedures in Appendix C.

All soil samples were classified in general accordance with the Unified Soil Classification System (USCS). The USCS group symbol determined from the visual-manual classification is shown in parentheses at the end of the sample description for each layer shown on the Soil Boring Logs.

The results of the soil classification and the laboratory test results are included on the soil boring logs and soil laboratory test data, which are presented in Appendices B and C, respectively.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Classification

The following sections describe the subsurface conditions in terms of major soil strata for the purposes of geotechnical exploration. The soil boundaries indicated are inferred from non-continuous sampling and observations of the drilling



operations and/or sampling resistance. The subsurface conditions discussed in the following sections and those shown on the boring logs represent an evaluation of the subsurface conditions based on interpretation of the field and laboratory data using normally accepted geotechnical engineering judgement and common engineering practice standards. The subsurface conditions described herein may vary beyond the boring locations and at different times of the year. A generalized soil profile of the subsurface conditions encountered across the site of the proposed development, beginning at the ground surface and extended downward is as follows:

Stratum 1 – Native Granular Soils (SP, SM, ML)

Native brown and gray granular soils were encountered at the ground surface at all soil borings. This stratum extended to depths ranging between approximately 6 feet to 13.5 feet below existing grades (EI. 629.0 to EI. 622.0). The density of this Stratum was very dense to medium dense.

Stratum 2 – Gray Silty Clay (CL)

Native gray silty clay was encountered underneath Stratum at all the soil. This cohesive layer extended to the explored planned depths at all drilled deep soil borings (El. 61104 to El. 605.0). The consistency of this stratum ranged from soft to hard.

3.2 Groundwater Observations

No groundwater was observed at any of the soil borings drilled during the current investigation. Water levels reported are accurate only for the time and date the borings were drilled. The borings were backfilled and sealed the same day that they were completed. Long term monitoring of the boreholes was not included as part of the scope of this subsurface investigation.

4.0 ANALYSES AND RECOMMENDATIONS

The following evaluations and recommendations are based on interpretations of field and laboratory data obtained during the geotechnical investigation, our geotechnical analyses, and MSG's experience with similar subsurface conditions and projects. Where comments are made on construction or regarding the proposed development, they are provided in order to highlight aspects of construction that could potentially affect the design of the project. Contractors bidding on or undertaking the work should make their own interpretations of the factual results of the investigation as it affects their construction methods, equipment capabilities, costs, schedule, sequencing and similar issues.

This report and evaluation reflects only the geotechnical aspects of the subsurface conditions at the site. Review and evaluation of environmental aspects of subsurface conditions is beyond the scope of this report

4.1 Structure Information

Based on the Geotechnical Investigation Specifications prepared by Advanced Storage Technology, Inc. (AST) provided to us by MCDR on August 12, 2024, we understand the following structural information for the proposed structure salt barn building:

- The footprint area of 160 feet by 80 feet with no basement.
- The approximate interior height of the Salt Barn Building is 35 feet.
- The current design concept calls for the proposed exterior walls be supported on 12 feet by 3 feet shallow foundation spaced at approximately 8 feet.

4.2 Foundation Recommendations for the proposed Structure

Based upon our review of the existing soil conditions in the planned foundation areas of the salt barn building, it is recommended that the shallow foundations bearing on **native granular soils overlying the native**



cohesive soils as described in Section 3.1 above be designed for an allowable soil bearing capacity of 2,000 psf.

If during the construction operations, the upper layers consist of random backfill soils and not suitable to support the shallow foundation system, we recommend all the fill soils be removed and replaced with a well-compacted engineered fill.

It is highly recommended that **shallow foundations do not bear directly on random backfill soils and on high plasticity clays.** Removal of random backfill soils and/or high plasticity clay and replacement with a suitable material within 3 feet of the bearing elevation is recommended in all areas where these unsuitable soils are encountered. Replacement with lean concrete or suitable cohesive soil fill is preferred to limit water from accumulating in undercut areas. If granular fill material is used in undercuts, an underdrain system should be installed at the bottom of the undercut to limit water accumulation. We recommend MSG be retained to evaluate the foundation subgrades to determine the undercut locations and depths and perform the compaction testing of the engineered fill.

4.3 Settlement Analyses

As part of the current investigation, detailed settlement analyses were performed within the proposed shallow foundation areas using the geotechnical analysis/design parameters obtained from the laboratory consolidation testing conducted at our MSG's laboratory. The consolidation testing was performed on the relatively undisturbed Shelby tube soil samples collected during the field investigation. The consolidation testing results consisting of the compression index (Cc), recompression index (Cr), pre-consolidation pressure, and initial void ratio (e_0) are included in Appendix C – Soil Laboratory Testing Results.

Settlement generally consists of three separate components, immediate settlement, consolidation, and secondary settlement (or creep). In general, all soils will exhibit settlement as a result of a load applied on the soils. The magnitude of soil settlement depends on several factors, including soil type, structure, past loading history of the soil deposit, and moisture content. The predominant soil type encountered below the proposed shallow foundation areas consisted of granular soils (Stratum 1) underlain by cohesive clay soils (Stratum 2). Settlement of granular soils, if any, occurs rapidly, often during construction activities. For cohesive soils, consolidation settlement is the predominant mechanism of settlement. Consolidation settlement of clay is of greater concern than immediate settlement due to the potential magnitude and time dependent nature of consolidation.

The obtained consolidation parameters and coefficients were compared and verified with empirical relationships based on index properties. The empirical equations used in the estimation of Cc and Cr are based on our laboratory testing results of the natural moisture content and the Atterberg's limits and based on historical geotechnical data and our experience with Southeastern Michigan clay soils.

The compression index (Cc), recompression index (Cr), pre-consolidation pressure and initial void ratio (e_0) are used to assess the amount of consolidation settlement and the coefficient of consolidation is used to evaluate the time duration of the consolidation settlement.

Table 4.3.1 below summarizes the estimated soil parameters used in the settlement analyses for the proposed salt barn shallow foundations:



Soil Description	Depth (feet)	Unit Weight (psf)	Initial Void Ratio e₀	Recompression Index, C _R	Compression Index, C _C	Pre-consolidation Pressure (ksf)
Medium Dense Sand (Stratum 1	1 to 6	130	-	01	01	-
Soft to hard Clay (Stratum 2)	6 to 30	125	0.823	0.058	0.333	3.5

Table 4.3.1 Summary of Soil Settlement Parameters

1. Settlement of granular layers is assumed to be immediate with no long term settlement.

The results of the settlement analyses indicate consolidation settlement of the native underlying clay strata associated with an applied load of 2,000 psf will be on the order of 1 inch.

The differential settlement is expected to be ³/₄ of the total settlement.

The aforementioned recommended soil bearing capacity and the associated settlement evaluation are based on salt barn footing elevations with regards to existing and proposed preliminary site elevations. The required footing sizes are dependent on the anticipated applied loads in comparison to the above recommended allowable bearing capacity of the bearing soil. Exterior footing bottoms and footings in unheated areas should be no less than 42 inches below final exterior grade for protection against possible frost damage. This is the typical frost depth for Southeast Michigan; however, local building codes may vary and will govern the footing depth. Interior footings, which should not be subject to frost action, may bear at shallower depths, provided they are supported on native compact soil or engineered fill capable of supporting the design load.

Prior to the placement of reinforcing steel and concrete, an MSG geotechnical engineer or his/her designated representative should evaluate foundation excavations to verify that an adequate bearing material is present and that all debris, mud, loose, frozen or water-softened soils, and unsuitable soils are removed. All footings should bear in the undisturbed natural soils or in well-compacted engineered fill. In addition, MSG recommends that a DCP test or Housel Penetrometer Test, or similar field testing, be performed by the geotechnical engineer representative to assure a suitable bearing capacity for all foundations prior to concrete placement.

Where foundation subgrade undercutting and replacement is required, the undercuts should extend laterally at a slope of 1(Horizontal):2(Vertical) from the edge of the footing.

Foundations should be constructed as soon as is practical after foundation excavation activities. If the foundation excavations will be left open for an extended period of time, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation. Foundation concrete should not be placed on frozen or flooded subgrade.

The final grade adjacent to the structure exterior should be sloped at a minimum 2 percent grade away from the structure's foundations and structure's roof drains, if any, should be routed away from the foundation soils. Shallow groundwater was not encountered at the site. However, foundation drains will assist in ensuring the foundation subgrade soils are not adversely impacted by moisture changes that could result in differential settlement of the foundations. To prevent moisture against the exterior footings, a perforated matted edge drain may be used around the perimeter of the footings and placed at the base of the footings. The underdrain



should be backfilled with free draining material. A waterproofing membrane with a protection layer should extend from the top to the base of the footings along the exterior edge where the concrete is in direct contact with the natural or backfilled material.

If a two-pour system is used for footings and slab, the cold joint at the interface of the exterior footings and slab on grade should be located at least 4 inches above the adjacent finish exterior grade. As an alternative, the use of a water stop between the two pours will minimize the moisture penetration through the cold joint and migration of water under the slab. A monolithic pour will eliminate the need of a water stop.

4.4 Slab-on-Grade

This section presents our geotechnical recommendations and construction considerations for a Slab-on-Grade foundation system if considered at the interior of the proposed salt barn structure.

Based on the existing subsurface conditions, it is recommended that soils be removed within 1 feet of the slab subgrade and replaced with engineered fill. The modulus for subgrade reaction for the native soils at the site is 150 pci and for a subgrade composed of well-compacted granular engineered fill is 200 pci. The final design thickness of the slab, the joint spacing and slab reinforcement should be determined by the structural engineer based on the above recommended subgrade modulus, the slab loading conditions and local building code requirements.

The subgrade of the slab-on-grade areas should be inspected and tested to assure proper preparation. The remediated slab subgrade shall be proof rolled as described in Section 4.5 to verify the effectiveness of the remediation measures. The subgrade soils should be protected against frost action if construction takes place during the winter. Frozen soils should be thawed, moisture conditioned and re-compacted or undercut and replaced prior to commencement of slab-on-grade construction. We recommend that the slabs-on-grade bear directly on a minimum of 6 inches of capillary resistant granular engineered fill (well graded granular material or engineered approved equivalent) compacted to 98 percent of Standard Proctor or 95 percent of the Modified Proctor maximum dry density within 2 percent of the optimum moisture content.

A waterproof membrane (vapor retarder) should be placed directly beneath the concrete building slab to minimize infiltration of water and delamination of the concrete floor slab. The moisture condition of the floor slab should be tested prior to placement of floor coverings to verify they are within tolerable limits for the floor coverings. Precautionary measures such as concrete mixture with low water-cement ratio of no more than 0.50 should be implemented to reduce the residual moisture in the slab. The vapor retarder should be sealed at all seams and pipe penetrations and connected to all footings. Water reducing admixtures may be used to obtain workability of the concrete. Sufficient time should be provided to moist cure the slabs for a minimum of 3 days or use other equivalent curing methods identified by the structural engineer.

In order to minimize the potential impacts caused by differential settlement, the slab-on-grade should be kept structurally separate from walls and columns and saw cut control joints should be provided at suitable intervals. A minimum of 6 inches of engineered fill should be placed between the slab bottom and the top of the footings below.

4.5 Site Preparation

The following are recommendations for the site soil preparation based on the geotechnical investigation performed for this project. These recommendations should be incorporated into the project specifications.



Before proceeding with construction, surface soils, vegetation, topsoil, root systems, refuse, asphalt, concrete including any existing abandoned buried foundations, and other deleterious materials should be stripped from the proposed construction areas. Depending on the time of year of construction and the Contractor's Means and Methods at controlling surface water, it may be possible that portions of the upper layers of site material including the surface soils and/or random backfill soils will be considered unsuitable and/or unstable and will be required to be stripped during site preparation activities.

The on-site soils are moisture sensitive and could become unstable if proper site water controls are not implemented and/or if they are subject to construction traffic. Every effort should be taken to minimize disturbance during compaction or over excavation and where possible, free standing water should be diverted away from the construction perimeter or pumped out using a sump to accommodate the proper compaction techniques.

Generally, areas exposed by stripping operations on which subgrade preparations are to be performed should be compacted in place to 98 percent of Standard Proctor or 95 percent of Modified Proctor within 2 percent of the optimum moisture content. If there are areas where the building floor slab will be located partially on a fill area and partially on a cut area, it is recommended that the depth of subgrade compaction in the cut area be increased to 18 inches, to provide uniform support of the rigid slab.

It is recommended that the prepared subgrade for pavement and slab-on-grade areas be proof rolled to detect any unstable areas. Proof rolling should be accomplished by making a minimum of two complete passes in each of two perpendicular directions with a fully-loaded tandem-axle dump truck, or other approved pneumatic-tired vehicle, with a minimum weight of 20 tons. If proof rolling reveals the presence of unstable areas within the subgrade, certain remedial measures will be required to stabilize the subgrade. Depending on the severity of distress encountered during proof rolling, undercutting of 12 to 18 inches below subgrade and backfilling with engineered fill as outlined in Section 4.6 may be performed. If an undercut and replacement of the top 12 to 18 inches fails to stabilize the subgrade, use of granular backfill with geogrid stabilization may be required.

The actual undercut depths and/or subgrade remediation measures required should be determined by the on-site Geotechnical Engineer or his/her designated representative.

During construction, if utilities are encountered within the project site, these should be removed and relocated or abandoned in place. If abandoned in place, it is recommended that the utility pipe be filled with cement grout to avoid potential collapse in the future. Should the utility lines be removed from the site, the resultant trench excavations should be backfilled with well-compacted granular material, placed and compacted in accordance with the recommendations of Section 4.6.

4.6 Fill Placement and Engineered Fill Requirements

All new fill should consist of inorganic soil that is free from all deleterious materials and construction debris. Fill materials should not be placed in a frozen condition or upon frozen subgrades. Proper drainage should be maintained during and after fill placement to prevent water from impacting compaction efforts or long-term fill integrity. Most on-site native granular and cohesive soils are suitable materials and they can be re-used as engineered fill.

Coarse crushed granular material is preferred as fill for replacement of undercut areas. For undercut areas, the coarse crushed granular material may consist of natural aggregate materials or geotechnical engineer approved equivalent. Typical lift thickness utilized for this material is 8 inches. The soil should be compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor maximum dry density within 2 percent of the optimum moisture content. If coarse crushed granular material is used for fill in undercut areas, then underdrains shall be installed to limit water accumulation in the undercuts. As an alternative to imported granular fill, excavated soil material may be re-compacted



back in place so long as the excavated soil material is determined to be suitable according to the project Geotechnical Engineer or his/her designated on-site representative. Undercuts backfilled with cohesive engineered fill material will not require an underdrain.

Coarse crushed granular material is recommended as fill for utility trench backfill and as aggregate base material for pavement and slab-on-grade areas. The granular material shall consist of natural aggregate materials. Typical lift thickness used for this material is 8 inches. In utility trenches, granular backfill material should extend at least two pipe diameters above the pipe's crown. Clay (on-site material determined to be suitable or import material) compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor within 2 percent of the optimum moisture content can be used as a backfill for the balance of the trench excavation.

If a working platform for the new structure construction is needed, and prior to footing excavation, it is recommended that at least 6 inches of granular base material be placed and compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor maximum dry density within 2 percent of the optimum moisture content.

The actual lift thickness suitable for fill placement is dependent upon the soil type, compaction equipment, and the compaction specification. In general, fill should be placed in 9-inch loose thickness lifts (8-inch compacted); assuming appropriately weighted and ballasted compaction equipment is used. In confined areas where hand operated compaction equipment is required, 4-inch and 6-inch loose thickness lifts should be used for hand operated vibratory plate compactors and hand operated vibratory drum rollers weighing at least 1,000 pounds, respectively. Sand fills should be compacted using smooth vibratory rollers. Clay fills should be compacted using a sheep foot compactor. The geotechnical engineer, as part of the construction monitoring, should review the equipment utilized for compaction to confirm suitability relative to the specified loose lift thickness. If necessary, the geotechnical engineer will recommend a revised lift thickness suitable to the equipment performing compaction.

A qualified geotechnical consultant should be retained to monitor all fill placement in order to assure that materials are placed according to their suitability and compaction requirements are achieved. In-place soil moisture/density testing should be performed during fill placement activities to assure proper fill compaction. A commonly used testing criterion is one test per 2,500 square feet per lift in areas to support proposed structures and one test per 5,000 square feet in parking lots, driveways, exterior slabs, etc., with a minimum of three tests per lift. Areas that do not achieve compaction requirements after initial placement should be re-compacted to meet project requirements.

4.7 Excavation and Slope

Familiarity with applicable local, state and federal safety regulations, including current OSHA excavation and trench safety is vital. Therefore, it should be a requisite for both the Owner and Contractor with the Contractor by and large being responsible for the safety of the site. Activities at the site, such as utilities or building demolition and site preparation, may require excavations at significant depths below the ground surface. Slope height, slope inclination, and excavation depth (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety (OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 Subpart P) regulations. Such regulations are strictly enforced and, if not followed, the Owner, Contractor, or earthwork or utility Subcontractors could be liable for substantial penalties.

The overburden soils encountered during our investigation were generally composed of dense to medium dense granular soil and soft to hard silty clay. Based upon the data obtained, we anticipate OSHA will classify site soils as **Type C Soil**, which will require a maximum temporary excavation slopes of 1(H):1(V). Flatter slopes will be required if seepage conditions occur during construction or if subsurface sand lenses are encountered. For permanent excavations and slopes, the grades should be no steeper than 3(H):1(V) without further geotechnical review of the finalized grading plan. If any excavation, including a utility trench, is extended to a depth of more than 20 feet, OSHA



requires that a Professional Engineer design the side slopes of such excavations. However, we recommend that any excavation extending to a depth of more than 5 feet below existing grade be done under the supervision of a qualified engineer.

4.8 Site Seismic Classification

According to ASCE 7-10 Table 20.3-1, the proposed site is designated as "Site Class DE" based on medium stiff clay soil profile and expected shear wave velocity for the upper 30 feet of soil (the maximum depth the borings were advanced for this investigation) and assumed subsurface conditions to a depth of 100 feet.

4.9 Lateral Earth Pressure

Lateral earth pressures (horizontal stresses) are developed during soil displacements (strains). Lateral earth pressure for design is determined utilizing an earth pressure coefficient to relate horizontal stress to vertical stress. Three separate earth pressure coefficients are utilized to determine lateral earth pressure: at-rest; active; and passive. Active earth pressure addresses displacement of a vertical soil face away from the retained soil. Passive earth pressure addresses displacement against the retained soil. At-rest earth pressure addresses a negligible displacement scenario. Structures (retaining walls) that are restrained at the top and bottom such that negligible movement is allowed to occur should be designed using at-rest earth pressures. Structures (retaining walls) that are allowed to move laterally (at least 0.001 times the total height of the wall) such as retaining walls in loading docks, receiving areas or other unrestrained retaining walls necessary to accommodate site grade modifications should be designed using active earth pressures.

Applied horizontal stress can be determined by multiplying the appropriate earth pressure coefficient by the applied vertical stress. Earth pressure coefficients are a direct function of the internal friction of a soil. Laboratory testing to determine internal friction angles for soil was not performed. However, index laboratory and field data obtained can be utilized to approximate earth pressure coefficients based upon empirical relationships.

To minimize lateral earth pressures, MSG recommends the zone adjacent to any walls be backfilled with granular fill. To provide effective drainage, a zone of free-draining gravel (similar to AASHTO No. 57 stone) should be used directly adjacent to the walls with a minimum thickness of 18 inches. This granular zone should drain to weep holes or a pipe drainage system to prevent hydrostatic pressures from developing against the walls.

The type of backfill beyond the free-draining granular zone will govern the magnitude of the pressure to be used for structural design. Clean granular soil is recommended as the backfill material against retaining structures to minimize lateral earth pressures. Lateral earth pressure coefficients for granular and clay are provided in Table 4.8.1. The equivalent fluid pressure can be determined by multiplying the total unit weight by the appropriate pressure coefficient.



Seil Devemetere	Material			
Son Parameters	Clean Granular Soil	Clay Soil		
Total Unit Weight (pcf)	125	125		
Internal Friction Angle (°)	32	23		
At-rest Pressure Coefficient, Ko	0.47	0.61		
Active Pressure Coefficient, Ka	0.31	0.44		
Passive Coefficient, Kp	3.25	2.28		
Concrete/Soil Friction Coefficient	0.50	0.30		

Table 4.8.1 Recommended Lateral Earth Parameters

The coefficients of friction between concrete and soil subgrade were also provided in the table above. These friction coefficients can be used for evaluating the factor of safety against sliding of foundations. The recommended minimum safety factor against sliding is 1.5. Passive pressure resistance of the top 3.5 feet below final grade should generally be neglected in designing the retaining walls to resist sliding failure due to the freeze-thaw cycle that can significantly weaken soils and the potential for the material to be removed at a future date for installation of utilities or other construction-related activities.

Any additional lateral earth pressure due to surcharge loading conditions including, but not limited to, floor loads, column loads, sloping backfill, traffic loading, and construction loads, should be incorporated into the wall design.

MSG should be retained to perform other geotechnical evaluations for retaining walls, as necessary, including but not limited to bearing capacity, settlement, and global stability. A geotechnical evaluation of retaining walls is beyond the scope of this report.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Groundwater Control

The location of the level of groundwater is of importance in shallow foundations for a number of reasons. Most importantly, the bearing capacity of the soil is affected by the presence of a high water table, decreasing the bearing capacity. The project civil engineer is also responsible for designing the surface drainage improvements.

As discussed in Section 3.2 groundwater was not encountered in the borings drilled during the current geotechnical investigation. Typically, the groundwater elevation fluctuates and is higher during the winter and spring and lower in summer and early fall.

The amount and type of dewatering required during construction will depend on the weather, groundwater levels at the time of construction, and the effectiveness of the Contractor's techniques in preventing surface water runoff from entering open excavations and lowering the groundwater table. Given the nature of the soils encountered on-site, the Contractor should be prepared to address general water infiltration (i.e. pumping water from prepared sumps). The use of perimeter drains and/or sub-drains may be necessary on approval of the site civil design engineer.



6.0 GENERAL QUALIFICATIONS AND LIMITATIONS

The evaluations, conclusions and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the geotechnical investigation, results of our geotechnical analyses, our understanding of the project and our experience during previous work, with similar sites and subsurface conditions. Data used during this exploration included:

- Seven (7) exploratory borings performed during this investigation;
- Observations of the project site by our staff;
- Published historic soil and geologic data for the project area;
- Results of laboratory soil testing;
- Our discussion with the Project's Structural Engineer, and
- Results of the geotechnical analyses.

The subsurface conditions discussed in this report and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. MSG is not responsible for independent conclusions, opinions or recommendations made by others based upon information presented in this report.

We strongly recommend the final project plans and specifications be reviewed by MSG's geotechnical engineer to confirm that the geotechnical aspects are generally consistent with the recommendations of this report. In particular, the specifications for excavation and foundation construction should be prepared and/or reviewed by MSG's Geotechnical Engineer of Record. In addition, we recommend site subgrade preparation, fill compaction activities, and foundation installation activities should be monitored by MSG's geotechnical engineer or his/her representative.

This report and evaluation reflects only the geotechnical aspects of the subsurface conditions at the site. Review and evaluation of environmental aspects of subsurface conditions are beyond the scope of this report.









Figure 2: Soil Boring Location Map Shelby Township, Salt Barn, Macomb County MSG Project Number: 401.2300893.000

No Scale Map Adapted from Google Earth 2024 ®







GENERAL SOIL SAMPLE NOTES

Unless noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D653.

Standard Penetration Test (ASTM D1586): A 2.0-inch outside-diameter (O.D.), 1-3/8-inch inside-diameter (I.D.) split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

	COHESIVE SOILS	COHESIONLESS SOILS		
Consistency	Approximate Range of N	Unconfined Compressive Strength (psf)	Density Classification	Approximate Range of N
Very Soft	0 – 1	Below 500	Very Loose	0 – 4
Soft	2 – 4	500 - 1,000	Loose	5 – 10
Medium Stiff	5 – 8	1,000 – 2,000	Medium Dense	11 – 30
Stiff	9 – 15	2,000 - 4,000	Dense	31 – 50
Very Stiff	16 – 30	4,000 - 8,000	Very Dense	Over 50
Hard	31 – 50	8,000 - 16,000		
Very Hard	Over 50	Over 16,000		

CLASSIFICATION

The major soil constituent is the silt, gravel. The second major minor constituents are reported	e principal noun, i.e. sand, soil constituent and other as follows:	Boulders Cobbles Gravel:	Coarse	 Greater than 12 inches (305 mm) 3 inches (76.2 mm) to 12 inches (305 mm) 3/4 inches (19.05 mm) to 3 inches (76.2 mm) 				
Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)	Sand:	Fine Coarse Medium	- No.4 (4.75 mm) to ³ / ₄ inches (19.05 mm) - No. 10 (2.00 mm) to No. 4 (4.75 mm) - No. 40 (0.425 mm) to No. 10 (2.00 mm)				
Trace – 1% to 11%	Trace – 1% to 11%	Silt	Fine	- No. 200 (0.074 mm) to No. 40 (0.425 mm) - 0.005 mm to 0.074 mm				
Adjective – 12% to 35% (clayey, silty, etc.)	Little – 12% to 22%	Clay		- Less than 0.005 mm				
	Some – 23% to 33%							

PARTICLE SIZES

And – Over 35%

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier: i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils: i.e., silty clay, trace sand, little gravel.

If sand particle size is greater than 11% by weight of the total sample weight, the adjective (i.e., fine, medium or coarse) is added to the soil description for the sand portion of the sample, provided sand is the major or second major constituent.

	SAMPLE DESIGNATIONS											
AS	Auger Sample - directly from auger flight	ST	Shelby Tube Sample - 3-inch diameter unless otherwise noted									
BS	Miscellaneous Samples - Bottle or Bag	PS	Piston Sample - 3-inch diameter unless otherwise noted									
MC	Macro-Core Sample - 2.25-inch O.D., 1.75-inch I.D., 5 feet long polyethylene liner	RC	Rock Core - NX core unless otherwise noted									
LB	Large-Bore (Micro-Core) Sample - 1-inch diameter, 2 feet long polyethylene liner	CS	CME Continuous Sample - 5 feet long, 3-inch diameter unless otherwise noted									
SS	Split Spoon Sample - 1-inch or 2-inch O.D.	HA	Hand Auger									
LS	Split Spoon (SS) Sampler with 3 feet long liner insert	DP	Drive Point									
NR	No Recovery	СМ	Coring Machine									

		MAJOR DIVI	SIONS			TYPICAL NAMES						
			CLEAN GRAVELS	GW		WELL-GRADED GRAVELS WITH OR WITHOUT SAND						
	SIEVE	GRAVELS MORE THAN HAI F	15% FINES	GP		POORLY-GRADED GRAVELS WITH OR WITHOUT SAND						
	ILS N NO. 200	COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	GRAVELS WITH	GM		SILTY GRAVELS WITH OR WITHOUT SAND						
	AINED SO RSER THA		15% OR MORE FINES	GC		CLAYEY GRAVELS WITH OR WITHOUT SAND						
	ARSE-GR		CLEAN SANDS	SW		WELL-GRADED SANDS WITH OR WITHOUT GRAVEL						
	CO. CO	SANDS MORE THAN HALF	15% FINES	SP		POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL						
	MORE	COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	SANDS WITH 15%	SM		SILTY SANDS WITH OR WITHOUT GRAVEL						
			OR MORE FINES	SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL						
	SIEVE			ML		INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL						
	-S V NO. 200	SILTS AN	CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL							
	INED SOIL VER THAN			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL						
	FINE-GRA			МН		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL						
	L E THAN F	SILTS AN	D CLAYS EATER THAN 50%	СН		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL						
	MOR			он		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL						
		HIGHLY ORGANI	CSOILS	PT		PEAT AND OTHER HIGHLY ORGANIC SOILS						
		SYMBOLS KEY				OTHER MATERIAL SYMBOLS						
SAMPLE TYPES Split Spoon sample Image: Split Spoon sample Image: Shelby Tube samp Image: Shelby Tube samp	e, 1 inch or 2 r. Ie - 3 inch herwise		WELL SYMBOLS Portland Cement Blank Casing Bentonite Pellets First Encountered Groundw Static Groundwater Filter Pack Screened Casing	rater		Topsoil Well Graded Gravel Poorly Graded Sand Well Graded Gravel with Clay Well Graded Gravel Clayey Sand Well Graded Gravelly Sand Sandy Silt Shale Gravelly Silt Shaly Dolomite Poorly Graded Gravelly Sand Himestone						
	The Mannik & Smith Group, Inc. 2365 Haggerty Road South, Canton, MI 48188 ph: (734) 397-3100 fax: (734) 397-3131 www.manniksmithgroup.com											



GEOTECH STANDARD LOG - GINT STD US LAB. GDT - 8/9/24 14:49 - W.PROJECTS/2023/800-999/2300893/ADMIN/02 SALT BARN/04 SOIL BORING LOGS & LOG PLAN SHEETS/401.2300893.GP.







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COMPLETED 4/10/24

HAMMER TYPE Automatic

BORING ID: SB-04

PAGE 1 OF 1

CLIENT Macomb County Department of Roads

DRILLING METHOD 3.25" Hollow Stem Auger

PROJECT NUMBER 401.2300893.000

DATE STARTED 4/10/24

PROJECT NAME Shelby Township Salt Barn

PROJECT LOCATION Shelby Township, Macomb County

BORING COORDINATES 430275.5 N;13488735.8 E FT

GROUND ELEVATION 634.7 FT BACKFILL Soil Cuttings & Bentonite

CHECKED BY BBH

DRILLING CONTRACTOR MSG

TOTAL DEPTH 25.0 FT LOGGED BY RD

DRILLER RS

DRILL RIG 3230DT

REMARKS N/A

101.2300893.GPJ	ELE VATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	o DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP STRENGTH (PSF	MOISTURE CONTENT (%)	▲ 1 ◇ U STF 20	SPT N VA 0 20 3 JNCONF. RENGTH 00400060	0 40 COMP. (PSF) ↔ 00 8000	ATTE PI 20 □ [100	A0 6 40 6 (PCF) 110 1	G LIMITS LL 0 80 NSITY 20 130
IEETS/4			Very dense to dense, brown, poorly graded SAND with gravel, trace silt,			= 0		100									
LAN SH			damp (SP)			50+		100									
LOG P					-												
ING LOGS &				 5	SS 2	15-17-22	39	56						*			
	628.7		Medium dense, gray, silty SAND, trace	+ -	M 88									Í			
N04_SO			gravel, damp (SM)		∭ <u>3</u>	9-12-14	26	67						•			
T BARN	626.2		Loose, gray, sandy SILT, trace clay,														
02_SAL	624.7		trace gravel, damp (ML)	10		2-3-5	8	50									
			Soft to medium stiff, gray, silty CLAY, trace sand, trace gravel, damp (CL)		-									•			
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ELE (F	GR		0	SAMF NL	ВО	SPT	RECO	DRY)	UNCO	OM CON	◇ UNCONF. COMP. STRENGTH (PSF) < 2000 4000 6000 8000	DRY DENSITY (PCF) [] 100 110 120 130
		Dense to medium dense, brown, poorly graded SAND with gravel, trace silt, damp (SP)		SS 1	10-20-25	45	56					
000.4				SS 2	5-10-13	23	67					
629.1		Soft to medium stiff to stiff, gray, silty CLAY, trace sand, trace gravel, moist (CL)	+ - 	SS 3	7-4-4	8	44		2000 ^P	-		
			 10	ST 1			88	106	800	22	•	•□
			 15 	SS 4	2-3-2	5	44		1500 [₽]	24	▲ ◆	H O
										-		
			20		0-0-4	4	39		2000 ^P	-		
				$\left \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	1-2-5	7	67		1500 ^P			
	<u>ND:</u>		25	VN					1	1	1 : 🗙 : : : :	
≚w≉	ATER I	EVEL AT TIME OF DRILLING N/A					D = U	CS TE	ST PERI	FORM	ED ON DISTURBED	SAMPLE
¥₩≉	ATER I	EVEL AT END OF DRILLING N/A					P = P(OCKET	F PENET	ROME	ETER TEST	AR
I T M∕	ATER I	EVEL AFTER DRILLING N/A				_	T = TC	ORVAN	NE SHEA	AR TES	ST	AASHTO R18

(Continued Next Page)



	1	2										BORIN	IG ID: SB-06
	Mc	The Manni 2365 Hage	ik & Smith Group,	Inc. Canton	MI 4818	8							PAGE 1 OF 2
		GROUP ph: (734) 3 www.man	397-3100 fax: (734 hiksmithgroup.com) 397-3	3131	0							
CLIE	NT Ma	acomb County Department	of Roads			PROJE	СТІ	NAME	Shel	by Town	ship S	alt Barn	
PRO	JECT N	UMBER 401.2300893.00	0			PROJE	СТІ	OCA		Shelby -	Towns	hip, Macomb County	
DAT	E STAR	TED <u>4/8/24</u>		4/8/24		BORIN	G C	OORD	NATE	S _4303	54.1 N	13488769.2 E FT	
DRIL	LING N	ETHOD 3.25" Hollow Ste	m Auger			GROU	ND E	LEVA	TION_	635.6 F	Т		
DRIL	LING C	ONTRACTOR MSG					DE	РТН <u>2</u>	9.9 FT	-	B	ACKFILL Soil Cuttin	ngs & Bentonite
DRIL	l Rig	3230DT	HAMMER TYPE	Auto	matic	LOGGED BY RD CHECKED BY BBH							
DRIL		RS				REMA	RKS	N/A					
3.GPJ /ATION EET)	APHIC	MATERIAL DESC	CRIPTION	EPTH EET)	LE TYPE MBER	LOW UNTS	VALUE	VERY % (QD)	DENSITY PCF)	VF. COMP. GTH (PSF)	STURE 'ENT (%)	▲ SPT N VALUE ▲	ATTERBERG LIMITS PL MC LL 20 40 60 80
401.230089: ELEV (F	GR			о В Ш	SAMP NUI	COB	SPTN	RECO (F	DRY I (F	UNCON	CONT	♦ UNCONF. COMP. STRENGTH (PSF) ♦ 2000 4000 6000 8000	□ DRY DENSITY (PCF) □ 100 110 120 130
ETS		Very dense to medium poorly graded SAND w	dense, brown, ith gravel, trace										
JG PLAN SHE		clay, trace silt, damp (s	SP)		ss 1	42-30-25	55	67				>>	
S& LO													
RING LOGS				5	X SS 2	9-13-14	27	56				/ /	
V/04_SOIL BC		Medium dense to loose SILT, damp (ML)	e, gray, sandy		$\begin{cases} ss \\ 3 \end{cases}$	7-9-10	19	67					
2_SALT BARI				10	SS 4	2-3-4	7	50					
00893/ADMIN/0													
027/666-008\x		Medium stiff, gray, silty	/ CLAY, trace	 - 	V ss	1-3-3	6	72		2000 ^P	23		
JECTS/2023		graver, trace sand, dan	ih (CC)		5	1-3-3		12		2000	23		
50 - W:\PRO													
8/9/24 14::				20	SS 6	0-2-3	5	78		2000 ^P	32	≜ ≎	•
JS LAB.GDT													
GINT STD L													
-00-				F -	X SS	0-2-4	6	56	103	1000	24		
	<u> //////</u>			25	V V '								
≧ <u>LEG</u>										OT			
티즈…			LING <u>N/A</u>					ט = U(US TE	ST PER	ORM		SAMPLE
El ¥ ₩			ING <u>N/A</u>					P = P(CKE1	PENET	ROME	TER TEST	AR
ଧୁ ≭ พ	ATER	LEVEL AFTER DRILLING	N/A					T = TC	ORVAN	NE SHEA	AR TES	ST	AASHTO R18

(Continued Next Page)

	Mc	group	The Mannik & Smith Group 2365 Haggerty Road South ph: (734) 397-3100 fax: (73	, Inc. , Canton 34) 397-3	, MI 4818 3131	8						BORIN	IG ID: SB-06 PAGE 2 OF 2			
CLIEN	IT M	acomb Countv D	epartment of Roads	m		PROJE	сті	NAME	Shel	bv Town	ship Sa	alt Barn				
PROJ		UMBER 401.23	300893.000			PROJE	СТІ			Shelbv ⁻	Townsh	hip. Macomb County				
DATE	STAF	RTED 4/8/24	COMPLETED	4/8/24		BORIN	G CO	OORD		S 4303	54.1 N;	13488769.2 E FT				
DRILL	ING N	IETHOD 3.25"	Hollow Stem Auger			GROU	ND E	LEVA	TION	635.6 F	т					
DRILL	ING C	ONTRACTOR	MSG			TOTAL	DE	PTH 2	9.9 FT	-	B	ACKFILL Soil Cuttir	ngs & Bentonite			
DRILL	RIG	- 3230DT	HAMMER TYP	E Auto	matic	LOGGE	ED E	BY RE)		CI	HECKED BY BBH	-			
DRILL	ER F	RS				REMA	REMARKS N/A									
ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION		DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	JNCONF. COMP. TRENGTH (PSF)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 10 20 30 40 ◇ UNCONF. COMP. STRENGTH (PSF) ◇	ATTERBERG LIMITS PL MC LL 20 40 60 80 DRY DENSITY (PCF) 100 400 400			
607.1		Medium stiff gravel, trace (continued)	f, gray, silty CLAY, trace sand, damp (CL)	 						<u>~`</u> ∞		2000 4000 6000 8000	100 110 120 130			
		No recovery			V ss	20-26-50+	76	0								
605.6		R	efusal at 29.9 feet. of borehole at 29.9 feet.		8	20-26-50+	76	0				>>				
<u>LEGE</u> ∑w/	ND: ATER I	LEVEL AT TIME	OF DRILLING N/A					D = U	CS TE	ST PERI	FORM	ED ON DISTURBED S	SAMPLE			
⊻ w∕	TER	LEVEL AT END	OF DRILLING _N/A					P = P(CKET		ROME	TER TEST				
▼ w⁄	TER	LEVEL AFTER [DRILLING N/A				_	т = тс	ORVAN	NE SHEA	AR TES	ST	AASHTO R18			

GEOTECH STANDARD LOG - GINT STD US LAB.GDT - 8/9/24 14:50 - W:/PROJECTS/2023(800-999/2300893/ADMIN/02_SALT BARN/04_SOIL BORING LOGS & LOG PLAN SHEETS/401.2300893.GPJ

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	Mc	The Mannik & Smith Group,	Inc.								BORIN	GID: SB-07 PAGE 1 OF 2
	S	GROUP 2365 Haggerty Road South, ph: (734) 397-3100 fax: (734)	Cantor I) 397-	n, MI 4818 3131	8							
CLIEN	IT Ma	www.manniksmitngroup.com acomb County Department of Roads	1		PROJE	сті	NAME	Shell	by Town	ship S	alt Barn	
PROJ	ECT N	UMBER 401.2300893.000			PROJE	сті			Shelby -	Towns	hip, Macomb County	
DATE	STAR	TED _4/9/24 COMPLETED _	4/9/24		BORIN	G C	DORDI	NATE	S _43038	56.2 N	;13488813.1 E FT	
DRILL	ING M	ETHOD 3.25" Hollow Stem Auger			GROU	ND E	LEVA	TION_	636.0 F	Т		
DRILL	ING C					DE	PTH <u>2</u>	9.0 FT	•	B.	ACKFILL Soil Cuttin	igs & Bentonite
	RIG_	3230D1 HAMMER TYPE	Auto	omatic	_ LOGGI	ED E	N/A)		c	HECKED BY BBH	
						th3	<u>IN/A</u>					
NOI (P		II.	ГҮРЕ ER	LS <	VLUE	۲۲ %)	SITY (COMP H (PSF	IRE T (%)	▲ SPT N VALUE ▲	
EVAT	ZAPH	MATERIAL DESCRIPTION	JEPT FEET	PLE -	NUO BLOV	N VA	OVEI (RQD	PCF	NF. (VGTF	ITEN		
	5			SAM NI	-0	SPT	REC	DRY	UNCC	MONON	STRENGTH (PSF) 2000 4000 6000 8000	(PCF)□ 100 110 120 130
		Very dense to medium dense, brown,										
		clay, trace silt, damp (SP)		V ss	35 28 25	53	11					
					00-20-20	00						
			5		9-12-15	27	56				▲	
630.0											/	
		Medium dense to loose, gray, silty SAND, trace gravel, damp (SM)		SS 3	7-10-11	21	56				j j . 	
1												
			L -	M ss	4.0.0	_	70					
1			10	Λ 4	1-2-3	5	10					
				-								
622.5				-								
		Soft to medium stiff, gray, silty CLAY, trace sand, trace gravel, damp (CL)		SS 5	1-1-1	2	67		800 ^T	22		H A
			15									
				ST								
			20	1			75					
			25	$\left \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	1-4-4	8	72	122	1500	15		• □
LEGE	<u>ND:</u>		1 20	¥ 1							· · · · ·	<u> </u>
∑ w/	ATER I	LEVEL AT TIME OF DRILLING N/A					D = U0	CS TES	ST PERI	FORM	ED ON DISTURBED \$	SAMPLE
¥w/ ▼…	ATER L	EVEL AT END OF DRILLING N/A					P = PC	OCKET		ROME	ETER TEST	AR
– W/	ATER L	LEVEL AFTER DRILLING N/A					T = TC	RVAN	NE SHEA	AR TES	S T	AASHTO R18

GEOTECH STANDARD LOG - GINT STD US LAB.GDT - 8/9/24 14:50 - W:/PROJECTS/2023/800-999/2300893/ADMIN/02_SALT BARN/04_SOIL BORING LOGS & LOG PLAN SHEETS/401.2300893.GPJ

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LABORATORY TEST PROCEDURES

A brief description of the most common laboratory tests performed at the Geotechnical Engineering Laboratory at the Mannik Smith Group is provided in the following sections.

DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D2488)

The visual classification of soil samples are performed in accordance with ASTM D2488 standard. Our engineers use this test method to describe each soil sample using visual examination and simple manual tests. Visual classification helps grouping similar soil samples so that only a minimum number of laboratory tests are required for positive soil classification.

POCKET PENETROMETER

In the pocket penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small, calibrated spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square foot.

NATURAL MOISTURE CONTENT (ASTM D2216)

Natural moisture content represents the ratio of the weight of water in a given amount of soil to the weight of solid particles. Natural moisture content is expressed as a percentage (%). In this test method the water content is measured in the laboratory by noting the weight loss after drying the soil at specific temperature for 24 hours.

ATTERBERG LIMITS (ASTM D4318)

The Atterberg Limits test is performed in accordance with ASTM D4318. Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) of the soil sample are determined using this test method. The Liquid Limit is the moisture content at which the soil begins to behave as a liquid material and starts to flow. The Plastic Limit is the moisture content at which the soil changes from plastic to semi-solid stage. The Plasticity Index (PI = LL - PL) is the range of moisture content at which the soil is in a plastic stage. Typically, a soil's potential for volume change increases with increase of plasticity indices.

PARTICLE SIZE ANALYSIS (ASTM D421, D422 and D1140)

These tests are performed to determine the partial soil particle size distribution. The soil sample is prepared according to ASTM D421 test method. The amount of material finer than the openings on the No. 200 sieve (0.075 mm) is determined by wash sieve method according to ASTM D1140. The hydrometer test is used to determine particle size distribution of material finer than 0.075 mm according to ASTM D422 test method.

STANDARD PROCTOR COMPACTION TEST (ASTM D698)

The Standard Proctor compaction test is used to determine maximum dry density and optimum moisture content of the soil sample. In this test, the soil is compacted in the Proctor mold in three lifts of equal volume using a standard effort by the free falling of a 5.5 lb rammer from 12 inches above soil surface. The test procedure is repeated on samples at several different moisture contents and a parabolic graph showing the relationship between moisture content and dry density of the soil is established. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

MODIFIED PROCTOR COMPACTION TEST (ASTM D1557)

Modified Proctor compaction is similar to the Standard Proctor test. In this test, the soil is compacted in the Proctor mold in five lifts of equal volume using a standard effort by the free falling of a 10 lb rammer from 18 inches above the soil surface. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

LABORATORY CALIFORNIA BEARING RATIO (ASTM D1883)

The CBR value is the ratio of forces required for 0.1-inch penetration of a 2-inch diameter circular plunger at the rate of 0.05 inch/min into a compacted soil sample compared to the same penetration in a certain standard crushed stone.

LOSS ON IGNITION TEST (LOI) (ASTM D2974)

LOI tests are performed on peat or suspected organic soils. An oven-dried sample is ignited in a furnace at 440°C (Method C) or 750°C (Method D). The ash content of the soil sample is determined as a percentage of the weight of the oven-dried sample. The organic content is the loss of weight due to ignition and reported as a percentage of the weight of the oven-dried sample.

ONE-DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)

The consolidation test data is used to estimate the magnitude and rate of both differential and total settlement of a structure. A one-dimensional consolidation test is performed in a consolidation ring that does not allow lateral displacement of the sample. The sample is subjected to various vertical loading and unloading cycles. The deformation of the sample due to loading and unloading is recorded and used for the plotting a void ratio-applied pressure graph. The pre-consolidation pressure for the soil can also be determined from this test.



UNCONFINED COMPRESSION TEST ON ROCK SAMPLES (ASTM D7012)

In the unconfined compression test, the unconfined compressive strength (q_u) of a rock sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of approximately 2) to reach the failure condition.

UNCONFINED COMPRESSION TEST ON SOIL SAMPLES (ASTM D2166)

In the unconfined compression test, the unconfined compressive strength (q_u) of a cohesive soil sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of 2 to 2.5) to reach the failure condition or 15 percent (%) of axial deformation, whichever is secured first.

UNCONSOLIDATED-UNDRAINED (UU) TRIAXIAL COMPRESSION TEST (ASTM D2850)

Triaxial Shear tests are used to determine the shear strength of soil samples under various loading conditions. The test is performed on a relatively undisturbed sample extruded from a Shelby tube. In this test method, fluid flow is not permitted into or out of the soil specimen as the load is applied (undrained condition), therefore pore pressure builds up in the sample. The compressive strength of a soil is determined in terms of the total stress. The various confining pressures help determining the shear strength of the soil at different depths.

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL COMPRESSION TEST (ASTM D4767)

The shear characteristics of cohesive samples (collected from relatively undisturbed sample extruded from a Shelby tube) are measured in this test under undrained conditions. This test represents field conditions where fully consolidated soils under one set of stresses are subjected to a sudden change in stress without sufficient time for further consolidation (undrained condition). The data from this test is used to analyze the shear strength parameters of the soil at different depths. The compressive strength of a soil is reported in terms of the effective stress.

WATER SOLUBLE SULFATE, RESISTIVITY AND PH

To evaluate the corrosion potential of the site, MSG performs sulfates (Ohio DOT Supplement 1122), resistivity (ASTM G187), and pH tests (ASTM D4972) on select soil samples.

SPECIFIC GRAVITY (ASTM D854)

Specific gravity is defined as the ratio of the unit weight of soil solids only to unit weight of water at a specific temperature. MSG performs specific gravity tests for soils according to ASTM D854 test procedure.

PERMEABILITY (ASTM D2434 and ASTM D5084)

This test method covers laboratory measurements of the hydraulic conductivity (the coefficient of permeability) of water-saturated granular and cohesive materials. MSG performs multiple methods for permeability tests according to ASTM D2434 and ASTM D5084.

DIRECT SHEAR TEST (ASTM D3080)

The direct shear tests are performed to determine the maximum and residual shear strength. A horizontal load is applied at a constant rate of strain. The soil sample is placed in a box where the lower half of the box is mounted on rollers and is pushed forward at a uniform rate by a motorized apparatus. The upper half of the box bears against a steel proving ring, the deformation of which is shown on a dial gauge indicating the shear force. The various information that can be obtained from the results includes the maximum (peak) shear strength and the ultimate (residual) shear strength.



SUMMARY OF LABORATORY RESULTS



PAGE 1 OF 1

CLIENT Macomb County Department of Roads					PROJECT NAME Shelby Township Salt Barn						
PROJECT NUMBER _401.2300893.000						PROJECT LOCATION Shelby Township, Macomb County					
Boring No. / Sample No.	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class- ification	Water Content (%)	Bulk Density (pcf)	Satur- ation (%)	Specific Gravity
SB-01 / SS-1	1.0				19	0	SP				
SB-01 / SS-4	8.5							20.6			
SB-01 / SS-6	18.5							23.8	130.8		
SB-02 / SS-5	13.5							34.2			
SB-03 / SS-6	18.5							36.5			
SB-04 / SS-5	13.5							34.0	118.2		
SB-04 / SS-7	23.5							15.9			
SB-05 / ST-1	8.0							22.2	129.5		
g SB-05 / SS-4	13.5	23	16	7				24.5			
SB-06 / SS-2	3.5				9.525	0	SP				
SB-06 / SS-5	13.5	20	18	2				22.7			
SB-06 / SS-6	18.5							32.0			
SB-06 / SS-7	23.5							24.2	127.3		
SB-07 / SS-5	13.5	24	16	8				21.8			
SB-07 / ST-1	18.0	44	21	23							
SB-07 / SS-6	23.5							14.8	140.0		
SB-07 / SS-7	28.5							13.5			



SOIL BORING LOGS & LOG PLAN SHEETS\401.2300893.GPJ







CLIENT Macomb County Department of Roads

PROJECT NUMBER _401.2300893.000

PROJECT NAME Shelby Township Salt Barn

PROJECT LOCATION Shelby Township, Macomb County



Specimen Identification		fication	Classification	UCS (psf)	Ŷd	MC%
•	SB-01 / SS-6	18.5		1835	106	24





PROJECT NAME Shelby Township Salt Barn

PROJECT NUMBER _401.2300893.000

CLIENT Macomb County Department of Roads

PROJECT LOCATION _ Shelby Township, Macomb County



STRAIN, %

	Specimen Identification		ecimen Identification Classification		$\gamma_{\rm d}$	MC%
•	SB-04 / SS-5 13.5			878	88	34

UNCONFINED - GINT STD US LAB.GDT - 4/29/24 12:43 - W:PROJECTS/2023/800-999/2300893ADMINI/02_SALT BARN104_SOIL BORING LOGS & LOG PLAN SHEETS/401.2300893.GPJ STRESS, psf





CLIENT Macomb County Department of Roads

PROJECT NUMBER 401.2300893.000

Mannik

GROUP

PROJECT NAME ______ Shelby Township Salt Barn

PROJECT LOCATION Shelby Township, Macomb County



STRAIN, %

:	Specimen Identification		Classification	UCS (psf)	γ _a	MC%
ullet	SB-05 / ST-1 8.0			833	106	22

UNCONFINED - GINT STD US LAB.GDT - 4/29/24 12:42 - W:PROJECTS/2023/800-999/2300893/ADMIN/02_SALT BARM/04_SOIL BORING LOGS & LOG PLAN SHEETS/401.2300893.GPJ





CLIENT Macomb County Department of Roads

PROJECT NUMBER _401.2300893.000

Mannik

GROUP

PROJECT NAME Shelby Township Salt Barn

PROJECT LOCATION Shelby Township, Macomb County



Specimen Identification		fication	Classification	UCS (psf)	γ _d	MC%
•	SB-06 / SS-7 23.5			1009	103	24



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The Mannik & Smith Group, Inc. 2365 Haggerty Road South, Canton, MI 48188 ph: (734) 397-3100 fax: (734) 397-3131 www.manniksmithgroup.com

PROJECT NAME Shelby Township Salt Barn

PROJECT NUMBER _401.2300893.000

CLIENT Macomb County Department of Roads

PROJECT LOCATION Shelby Township, Macomb County



Specimen Identification		fication	Classification	UCS (psf)	$\gamma_{\rm d}$	MC%
•	• SB-07 / SS-6 23.5			1521	122	15



Checked By: Michael Gerdeman









