CITY OF CARO
REQUEST FOR PROPOSALS
2020 SIDEWALK PROJECT

The City of Caro, MI hereby invites individuals/firms interested in the following work: 2020 SIDEWALK PROJECT, proposed project consists of constructing new sidewalk and related work in two locations and removing and replacing sidewalk in a third location.

Sealed proposals will be received at the City Clerk's Office, 317 S. State Street, Caro, MI 48723 on or before **Wednesday, June 24, 2020 at 10:00 a.m.** and opened at that time. Please mark the sealed envelope as "2020 SIDEWALK REPLACEMENT PROJECT". A complete request for Proposal document may be obtained at:

City of Caro
ATTN: City Clerk
317 S. State Street
Caro, MI 48723
Phone 989-673-7671

PROJECT MANUAL
FOR
2020 SIDEWALK PROJECT
CITY OF CARO

CITY OF CARO
317 S. STATE STREET
CARO, MI 48723

DATE: JUNE 2020

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CITY OF CARO
INVITATION TO BID

2020 SIDEWALK PROJECT

The City of Caro offers this Invitation to Bid for the following work:

2020 SIDEWALK PROJECT, proposed project consists of constructing new sidewalk and related work in two locations and removing and replacing sidewalk in a third location.

All Contractors must be licensed by the State of Michigan and submit proof of liability insurance acceptable to the City of Caro (see Appendix B).

Drawings, Specifications and other Contract documents for submitting a bid must be obtained upon application at the City of Caro Municipal Building, no plan fee required except a $5.00 per set fee if mailed. Plans and specifications will not be mailed until payment is received. City of Caro Municipal Building address is 317 S. State Street, Caro, MI 48723 and the telephone number is 989-673-7671. Bidding documents must be obtained from the City of Caro - Bids submitted on forms obtained elsewhere will not be accepted.

Before submitting a bid, each bidder shall; (1) examine the Bid Documents thoroughly; (2) visit the site to become familiar with local conditions that may in any manner affect cost, progress or performance of the work; and, (3) study and carefully correlate bidder's observations with the Bid Documents.

Modifications proposed by bidders may be considered; however, final determination as to the suitability and compliance with the Technical Specifications will be with the City.

Any bidder may withdraw his / her bid, either personally or by written request, at any time prior to the scheduled closing time for receipt of bids.

Each bid shall be considered binding and in effect for a period of forty-five (45) days after the date of opening set forth in the Invitation to Bid.

An "agreement" between the City and Contractor will be executed only after the required Certificates of Insurance and copies of valid Licenses are submitted.

In accordance with Act No. 453, Public Acts of 1976, the City of Caro does not discriminate against any employee or applicant for employment with respect to hire, tenure, terms, conditions or privileges of employment, or a matter directly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, or a handicap unrelated to an individual's ability to perform the job.

City of Caro, hereinafter called the Owner, reserves the right to reject any or all proposals and to waive any formality or technicality in any Proposal in the interest of the Owner.

Bids must be submitted to City Clerk at City of Caro, 317 S. State Street, Caro, MI 48723 on or before **June 24, 2020 at 10:00 a.m.** Bids will be opened at City Hall at this time and date.

The successful bidder will be required to complete the work by **September 18, 2020**. The City of Caro reserves the right to complete the work at the expense of the Contractor, if the work is not completed by that date.

Present the bid form in a sealed envelope marked **2020 SIDEWALK PROJECT.**

BID FORM

PROJECT IDENTIFICATION: 2020 SIDEWALK PROJECT

THIS BID IS SUBMITTED TO: CITY OF CARO, CITY CLERK

Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

2020 SIDEWALK PROJECT LUMP SUM BID PRICES:

Location #1 – Chippewa Park	$_____
Location #2 – Hooper Street	$_____
Location #3 – W. Bush Street	$_____
Total Lump Sum Bid	$_____

SUBMITTED on _____, 20___.

Company Name (typed or printed):_____

By: _____
(signature)

Name (typed or printed): _____

Address:_____

_____

Phone No:_____ Fax No: _____

CITY OF CARO
WORK AGREEMENT

THIS AGREEMENT, made and entered into this_____ day of _____, _____, by and between the CITY OF CARO, Michigan, a Michigan Municipal Corporation, and _____, hereinafter referred to as the Contractor, for the considerations stated herein, agree as follows:

1. The Contractor agrees to forthwith perform specified services in accordance with the Invitation to Bid, Appendix A, Appendix B, and Drawings and Specifications attached hereto and incorporated herein by reference.

2. The City of Caro shall pay to the Contractor, and the Contractor shall accept as full payment for the performance of this work, subject to any additions or deductions provided for the total LUMP SUM price of:

   _____ ($_____).

   Such payment shall be made when the work has been completed to the City of Caro's satisfaction.

3. The Contractor agrees to complete the project by **September 18, 2020.** Contractor agrees that as Liquidated Damages for delay (but not as a penalty), Contractor shall pay City of Caro **$100.00** for each day that expires after the time specified until the Work is complete.

4. *Waivers of Lien* – Prior to the City of Caro issuing final payment, the Contractor shall provide the City of Caro *Waivers of Lien* for all subcontractors and suppliers.

5. It is understood that the Invitation to Bid, Appendix A, Appendix B, and Drawings and Specifications, and all Addenda prepared for this project are all essential documents of this contract and are incorporated as a part of this agreement by reference.

6. This agreement shall be binding upon the personal representatives, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have executed this document the day and year first above written.

CITY OF CARO
A Municipal Corporation

By:_____

By:_____

_____
(Contractor's Name)

By:_____
(Signature - Authorized Officer)

_____
(Print or Type Name and Title)

APPENDIX A

Indemnification

I, the Contractor, agree to indemnify, hold harmless, and defend the City of Caro or Representative from and against any and all loss, damage, or expense which the City of Caro or Representative may suffer or for which the City of Caro or Representative may be held liable by reason of any injury (including death) or damage to any property arising out of negligence on the part of the Contractor in the execution of the work to be performed under the contract with the City of Caro dated the _____day of_____, _____.

Date:_____ By:_____

(Contractor's Signature)

_____

(Print or Type Name and Title)

_____

(Company Name)

STATE OF MICHIGAN

SS.

COUNTY OF_____

Subscribed and sworn before me this _____ day of_____, _____.

Notary Public: _____

_____ County, Michigan

My Commission expires: _____

City of Caro, Michigan

APPENDIX B

Issued:_____

Subject: Minimum Insurance Requirements for Contractors

Summary Statement

The provision of adequate insurance by persons and businesses working for the City of Caro or on street right-of-way is essential to protect the public from the costs of injury or damage and to protect the City of Caro from unnecessary liability resulting from the acts of persons and businesses working for the City of Caro. Minimum insurance requirements are needed to provide this protection.

Memo

Persons or businesses which provide professional services to the City of Caro under the terms of a written contract or provide labor and/or material to accomplish work for the City of Caro or for others on or over street right-of-way or other City of Caro property shall carry insurance and bonds to protect the public and the City of Caro from exposure to unnecessary financial risks.

Prior to signing of contracts, issuance of purchase orders or permits, or other authorization to begin work, certificates of insurance evidencing the purchase of insurance in amounts not less than required by this Administrative Memo or bid specifications, whichever is greater, shall be filed with the **Clerk** for the City of Caro.

Such certificates shall:

a. Show that the insurance is currently in force and termination date of each policy.

b. State the limits of liability of the policies covered by the certificate.

c. Be issued to the City of Caro as the certificate holder.

d. Provide that the City of Caro will receive not less than ten (10) days written notice of the cancellation of any listed policy.

e. Be issued in the name of an insurance company authorized to conduct business in the State of Michigan.

Insurance shall meet or exceed the following requirements. Exceptions to recognize more or less hazardous operations and financial risks should be considered, and with approval of the City of Caro, may be made in specifications or contract requirements prior to awarding contracts or issuing purchase orders.

INSURANCE REQUIREMENTS

The limits of liability for the insurance required shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

			MINIMUM LIMITS (000's)
1.	WORKERS COMPENSATION		
	a.	Part One: Compensation	Statutory
	b.	Part Two: Employees Liability:	
		accident	$1,000
		disease	$1,000
		aggregate disease	$1,000
2.	GENERAL LIABILITY (1973 form)		
	a.	Combined Single Limit Each Occurrence Limit	$1,000
	b.	Combined Single Limit Aggregate Limit	$2,000
3.	COMPREHENSIVE AUTOMOBILE LIABILITY		
	a.	Combined Single Limit No Fault Statutory	$1,000
4.	UMBRELLA or EXCESS LIABILITY		$2,000

SECTION 01 45 16.01
CONCRETE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes requirements for concrete, concrete submittals, and testing.

1.02 References

A. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field

B. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

C. ASTM C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

D. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete

E. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete

F. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

G. ASTM C595 – Standard Specification for Blended Hydraulic Cements

H. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

I. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

J. ASTM C1293 – Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction

K. ASTM C1567 – Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

L. ASTM E29 – Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

M. Michigan Department of Transportation 2012 Standard Specifications for Construction

N. Michigan Test Methods (MTM)

O. Michigan Department of Transportation Qualified Products List

1.03 Related Work

A. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement

1.04 Submittals

A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.

B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Owner to review.

1.05 Quality Assurance and Quality Control

A. The Owner will be responsible for Quality Control and Quality Assurance Testing.

B. Concrete Testing

1. The temperature of concrete will be determined in accordance with ASTM C1064.
2. Samples of concrete for testing will be obtained in accordance with ASTM C172.
3. The slump of concrete will be determined in accordance with ASTM C143.
4. The air content of concrete will be measured in accordance with ASTM C231.
5. Concrete cylinders for compressive testing will be made in accordance with ASTM C31. Four-inch cylinders are preferred, as allowed by ASTM C31.
6. The compressive strength of concrete will be determined in accordance with ASTM C39.

PART 2 - PRODUCTS

2.01 Submittals

A. Mix Design and Documentation

Design concrete mixtures shall meet the requirements specified in Table 1. The Contractor shall provide the grade of concrete for the section number reference application specified in Table 1, or as specified in the contract. The Contractor shall submit a request variance, in writing, when proposing a mix design that exhibits temperature, slump, or air content other than those specified. This submittal shall include the proposed mix design, Job Mix Formula (JMF), and associated trial batch verification test data. Do not use a grade of concrete with a lower specification limit (LSL) 28-day compressive strength less than what is designated for the application.

Blended cement meeting the requirements of ASTM C595 Type IL is permitted.

Secure prior approval from the Owner to use concrete intended for early opening to traffic to facilitate driveway gaps or other features necessary for required local access.

Unless otherwise specified in the contract, set accelerating admixtures are prohibited.

Unless otherwise specified in the contract, do not exceed 40 percent replacement of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash.

Do not exceed 40 percent total replacement of the Portland cement if both slag cement and fly ash are used in the concrete mixture.

Use the combined weight of all cementitious materials to determine compliance with the maximum water-cementitious ratio and cementitious material content requirements specified in Table 1.

Table 1: Minimum Mix Design Requirements for Concrete				
Mix Design Parameter	**Grade of Concrete**			
	P1	**D**	**T**	**S2**
Lower Specification Limit (28-day compressive, psi)	3,500	4,500	3,500	3,500
Rejection Limit for an Individual Strength Sample Test Result	3,000	4,000	3,000	3,000
Maximum Water/Cementitious Ratio	0.45			
Cementitious Material Content (lb/cyd)	517-611	517-658	517-611	517-611
Air Content (percent)	5.5 – 8.0			
Slump (inch) (Max)	3	See Table Below		

Table 2: Concrete Structure Mixtures						
Concrete Structure Mixtures by Slump						
Concrete Grade (e, h)	**Cement Content per Cubic Yard (b, c)**		**Slump (in)**			
			Type A, D or no Admixture	**Type MR, F, or G Admixtures (g)**		
				Before Admixture	**After Admixture (Type MR)**	**After Admixture (Type F or G)**
	lb	**sack**				
D (a)	658 (d)	7.0	0-3	0-3	0-6	0-7
T	611	6.5	3-7	0-4	3-7	3-8
S2 (a)	564	6.0	0-3	0-3	0-6	0-7
	526 (d)	5.6				

Concrete Structure Mixtures by Strength of Concrete								
Concrete Grade (e, h)	**Cement Content per Cubic Yard (b, c)**		**Minimum Strength of Concrete (f)**					
			Flexural, (psi)			**Compressive, (psi)**		
	lb	**sack**	**7-day**	**14-day**	**28-day**	**7-day**	**14-day**	**28-day**
D (a)	658 (d)	7.0	625	700	725	3,200	4,000	4,500
T	611	6.5	550	600	650	2,600	3,000	3,500
S2 (a)	564	6.0	550	600	650	2,600	3,000	3,500

	526 (d)	5.6						

Notes for Table 2:

(a) Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.

(b) If the local average minimum temperature for the next 10 consecutive days after concrete placement is forecast to be below 40°F, submit a revised quality control plan for the Owner's approval prior to cold weather concrete placement. The revised plan must detail changes in materials, concrete batching and mixing processes, construction methods, curing, and protection of the in situ concrete to ensure that the quality characteristics of the hardened concrete are not compromised by the cold weather. The restriction does not apply to Grade S1 concrete in foundation piling below ground level or Grade T concrete in tremie construction.

(c) Type III cement is not permitted.

(d) Use admixture quantities specified by the Qualified Products Lists to reduce mixing water. Admixture use is required for Grade D, Grade S2, and Grade S3, concrete with a reduced cement content. Use a water-reducing retarding admixture at the required dosage for Grade D concrete to provide the setting retardation required. When the maximum air temperature is not forecast to exceed 60°F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture. Ensure Grade D concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture. For night casting, the Contractor may use a water-reducing admixture in lieu of water-reducing retarding admixture, provided that the concrete can be placed and finished prior to initial set.

(e) The mix design basis for bulk volume (dry, loose) of coarse aggregate per unit volume of concrete is 68% for Grade S1, and 70% for Grade D, Grade S2, Grade T, and Grade S3.

(f) The Contractor may use flexural strength to determine form removal. Use compressive strength for acceptance in other situations.

(g) MR = Mid-range.

(h) The Owner will allow the use of an optimized aggregate gradation meeting the requirements of MTM 130.

B. Alkali-Silica Reactivity

Provide documentation to the Owner that the concrete mixture does not present the potential for excessive expansion caused by alkali-silica reactivity (ASR). Provide current ASR test results (valid for two years from completion of testing), for the fine aggregate that is proposed to be used in the concrete from an independent testing laboratory proficient in ASR testing. The independent testing laboratory must certify, in writing, that all testing was conducted in accordance with the designated standard test procedures described herein. Test results must conform to the specified criterion for one of the following standard test methods. Use the Rounding Method described in ASTM E29 when determining significant digits for reporting expansion test results.

1. Method 1 – ASTM C1260 Mortar Bar Test

   If the expansion of the mortar bars is less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

2. Method 2 – ASTM C1293 Concrete Prism Test

   a. If the expansion of concrete prisms is not greater than 0.040 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

   b. If the expansion of concrete prisms is greater than 0.040 percent, but not exceeding 0.120 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered moderately deleterious to ASR and mitigation is required, as follows. A low-alkali cement with Na_2O equivalent alkalies (Na_2O + 0.658 × percent K_2O) not exceeding 0.60 percent must be used in the concrete mixture to mitigate the potential for ASR. Slag cement or fly ash may be used in conjunction with the low-alkali cement. The total alkali content for the cementitious materials combination must not exceed 3 pounds per cubic yard of Na_2O equivalent.

3. Method 3 – ASTM C1567 Accelerated Mortar Bar Test

   If no previous test data are available for the fine aggregate that shows it is resistant to ASR using either Method 1 or 2 above, replace 25 percent to 40 percent of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash. A blended cement meeting the requirements of ASTM C595 containing Portland cement and slag cement or fly ash may also be used.

   Demonstrate the ability of the fly ash or slag cement to control the deleterious expansion caused by ASR by molding and testing mortar bars according to the standard test method described in ASTM C1567, using the mix proportions and constituent sources for both the aggregates and the cementitious materials that will be used for the project. Make at least three test specimens for each cementitious materials-aggregate combination. If the average of 3 mortar bars for a given cementitious materials-aggregate combination produces an expansion less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the JMF associated with that combination will be considered non-deleterious to ASR. If the average expansion is 0.10 percent (rounded to the nearest 0.01 percent) or greater, the JMF associated with that combination will be considered not sufficient to control the deleterious expansion caused by ASR and the JMF will be rejected.

   The Owner will not approve the use of the JMF if the expansion exceeds the respective threshold limits for the respective ASTM test method used.

C. Mix Documentation

   Provide mix design and accompanying JMFs using the methods of verification included in this specification. Include sufficient information on constituent materials and admixtures, along with trial batch verified physical properties of the fresh concrete, mix proportions per cubic yard for all constituents, and compressive strength test results necessary to allow the Owner to fully evaluate the expected performance of the concrete mixture.

   Submit mix design and JMF; include accompanying documentation. List the source of materials, bulk density (unit weight) of coarse aggregate (rodding procedure or shoveling procedure), absorption of aggregates, relative density (specific gravity) of aggregates, aggregate correction factors, batch weights, and project specific or historical laboratory test data. Include the recorded air content of fresh concrete using the same admixture and cementitious material sources to be used in the production of the concrete for the project. A JMF will be approved only if all of the minimum mix design requirements specified in the contract have been met. Use of the MDOT Job Mix Formula Concrete Field Communication Form (MDOT Form Number 1976) is encouraged.

   1. Job Mix Formula

      Select proportions for concrete mixtures according to ACI Standard 211.1. The volume (oven-dry-rodded) of coarse aggregate per unit volume of concrete must be 65 percent, minimum.

      Four methods of verification of proposed JMF are acceptable.

      a. Method 1 – Trial Batches

         Verification of JMF is based on trial batches with the same materials and proportions proposed for use on the project. Prepare at least one trial batch for each mix design in sufficient time before starting concrete placement to allow for review, according to subsection 2.01.B of this specification. Provide the results of temperature, slump,

density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples. All samples may be taken from a single trial batch for a mix design, provided the trial batch is at least 4 cubic yards in volume. For JMF trial batch verification purposes only, 7-day compressive strength test results which report at least 70 percent of the specified 28-day lower specification limit will be sufficient documentation, in lieu of 28-day compressive strengths. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

b. Method 2 – Same Mix

Verification of JMF is based on experience with the same mix design, JMF, and the same materials. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples produced within the previous 12 months. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Do not substitute material types or sources, including admixtures or cementitious materials, nor change mix proportions in the JMF. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

c. Method 3 – Similar Mix

Verification of JMF is based on requirements described in Method 2 above. Substitution of coarse aggregate source is permitted if the new source is of the same geologic type as the original aggregate, and conforms to the specification requirements for the application. Substitution of fine aggregate is permitted only if the new source has been tested for ASR. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

Provide the supporting laboratory trial batch documentation and accompanying calculations showing how the mix proportions in the JMF were adjusted, based on the documented differences in relative density (specific gravity), bulk density (unit weight), and absorption of the substituted aggregate sources, to produce a theoretical yield of 100 percent and the required fresh concrete properties.

d. Method 4 – Annual Verification

At the Owner's option, verification may be accepted annually for a concrete plant rather than on a project basis provided the sources and proportions of the constituent materials, including cementitious materials and source and types admixtures, do not change. If the project is the continuation of work in progress during the previous construction season and written certification is submitted to the Owner that materials from the same source and with the same mixture properties are to be used, the Owner may waive the requirement for annual renewal verification of the JMF for the project. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

PART 3 - EXECUTION

3.01 Sampling and Testing

A. The following ASTM test methods will apply.

1. C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
4. C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
5. C172 – Standard Practice for Sampling Freshly Mixed Concrete
6. C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

B. Sampling

Sampling and testing shall be conducted by the Owner at a rate determined by the Owner during placement of the concrete. The Owner shall take a random sample at a rate of approximately once per 50 cubic yards, based on the anticipated total quantity of concrete to be placed and site conditions, with a minimum of 1 sampling for each day of production. The sampling rate may be increased by the Owner if project conditions warrant increased testing. A minimum of 3 cylinders shall be taken for each test (one 7-day break and two 28-day breaks).

Samples will be taken from the concrete at the location as close to its final placement into the forms or on the grade as practical. If sampling from the discharge of the haul unit, the sample will be taken from approximately the middle $^1/_3$ of the load.

Samples for acceptance will not be taken at the concrete production facility (batch plant), nor prior to discharge from a concrete pump (excluding tremie seal placement applications).

3.02 Suspension Limits

If during the pour the concrete is found to be out of the specifications in Table 3, then the pour shall be stopped until concrete can be provided that meets the project specifications. The Owner will not pay for items placed with concrete that does not meet the following specifications.

Table 3	
Quality Characteristic	**Suspension Limits**
Air Content (percent)	<5.0 or >8.5
Air Content Loss (percent)	Greater than 2.0
Concrete Temperature (degrees Fahrenheit)	<45 or >90 at time of placement
Slump	See Table 1

3.03 Acceptance

Concrete items will be accepted based on the criteria in the items specification; concrete was placed within the limits of Table 3 and the average of the corresponding 28-day test cylinders being above the design strength.

END OF SECTION

SECTION 01 45 16.02
DENSITY AND AGGREGATE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes material testing of soil, aggregates, stabilized mixtures, and pulverized pavement mixtures.

1.02 References

A. Michigan Department of Transportation 2012 Standard Specifications for Construction

B. Michigan Department of Transportation Density Testing and Inspection Manual

C. Michigan Test Methods (MTM)

1.03 Related Work

A. Section 31 23 01 – Excavating, Filling, and Grading

B. Section 32 11 23 – Aggregate Base

C. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement

1.04 Quality Assurance and Quality Control

A. Soil and Aggregate Density Testing

1. The Owner is responsible for all onsite density testing on this project. The Owner has the right to determine which materials shall be tested and the frequency of testing.

B. Sand and Aggregate Gradation

The Contractor is to supply sand and aggregates in the Michigan Department of Transportation gradations, as specified by the project specifications.

Contractors are encouraged to use "prequalified" Michigan Department of Transportation aggregate sources. If the Contractor elects to use a non-prequalified source, then the Contractor shall be responsible for supplying the Owner with Sieve Analysis (MTM109) and Loss by Washing (MTM108) at the following rates:

Course Aggregates	1 per 1,000 tons
Dense-Graded Aggregates	1 per 1,000 tons
Open-Graded Aggregates	1 per 1,000 tons
Granular Material Class I	1 per 1,000 tons
Granular Material Class II and IIA	1 per 3,000 cubic yards
Granular Material Class III	1 per 10,000 cubic yards
Fine Aggregate	1 per 1,000 tons

All Sieve Analysis and Loss by Washing reports shall be signed and sealed by a Professional Engineer.

1.05 Job Conditions

A. Access for Testing

The Contractor shall provide the Owner safe access for testing technicians to complete any required testing. Reasonable time for testing shall be allowed by the Contractor.

B. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

PART 2 - PRODUCTS

2.01 Submittals

Not Applicable

PART 3 - EXECUTION

3.01 Minimum Percent of Compaction for Aggregates

The following are a minimum percent compaction for typical items of work. Note: Higher percent compaction may be required for specific items of work, see specifications for those items.

A. Original Ground

Road Embankment Areas	90 percent
Bridges – within the limits as shown on the plans	95 percent

B. Cut Areas

Cuts requiring Sand Subbase	95 percent
Cuts not requiring Sand Subbase	95 percent
Subgrade for HMA Base, Aggregate Base, and Concrete Widening	95 percent

C. Embankments and Backfill

Regular	95 percent
Abutments with Piling	95 percent
Abutments without Piling	100 percent
Foundation Undercut Backfill	100 percent
Backfill for Bridges, Culverts, Utilities, Manholes, Catch Basins, Edge Drains, and Subgrade Undercuts	95 percent
Foundations and Miscellaneous Structures	95 percent

D. Pavement Structure

Subbase	95 percent
Subbase for Slope Paving	90 percent
Aggregate Base under Concrete Pavement	95 percent
Aggregate Base under HMA Pavement	98 percent
Pulverized HMA Aggregate Base	98 percent
Recycled Concrete Aggregate Base – under Concrete Pavement	95 percent
Recycled Concrete Aggregate Base – under HMA Pavement	98 percent
Aggregate Base – Sleeper Slab and Bridge Approach	98 percent
Shoulders – Class I	98 percent
Shoulders – Class II and III	95 percent

3.02 HMA Density

The density control target, "Theoretical Maximum Density" (TMD) for HMA shall be calculated using the Gmm from the Contractors approved HMA mix design. TMD = Gmm X 62.4.

HMA Base Course	92 percent to 98 percent
HMA Leveling Course	92 percent to 98 percent
HMA Top Course	92 percent to 98 percent

The HMA layer must meet the required density target before the succeeding lift or traffic is placed on the pavement.

3.03 Testing Frequency

Each layer must be tested and meet compaction requirements before the succeeding layer is placed. The Owner will test at a rate that is warranted for field conditions and Contractor means and methods. The list of frequencies below are minimums.

Subgrade	1 test per 500 feet per width of 24 feet or less
Embankment	1 test per 300 cubic yards of material
Subbase	1 test per 500 feet per width of 24 feet or less
Backfill	1 test per 300 cubic yards of material
Aggregate Base Course	1 test per 500 feet per width of 24 feet or less
HMA Mixtures	1 test per 500 feet per width of 24 feet or less
Shoulders	1 test per 500 feet each side
Sleeper Slab	1 test per bridge approach
Foundations and Miscellaneous Structures	1 test per 1-foot lift or per 300 cubic yards

3.04 Compaction Efforts

The Contractor shall continue to make compaction efforts to obtain the minimum standards given within this specification upon notification of a failing test. A passing test is required at every location of a failing test prior to starting the next related item of work.

END OF SECTION

SECTION 01 55 26
MAINTAINING TRAFFIC

PART 1 - GENERAL

1.01 Work Included

The Contractor shall execute the work in a manner such that traffic is maintained and access is provided to all residences, businesses, and commercial establishments.

1.02 References

A. Michigan Department of Transportation 2012 Standard Specifications for Construction

B. Michigan Manual on Uniform Traffic Control Devices

PART 2 - PRODUCTS

2.01 Signing

Signing and barricading shall be provided by the Contractor in accordance with the details on the plans, the Michigan Manual on Uniform Traffic Control Devices, the Michigan Department of Transportation Maintaining Traffic Typicals, and the requirements of the road agency. Barricades left in place after dark shall be lighted. The Contractor shall submit a plan of the proposed traffic control to the Owner for review.

PART 3 - EXECUTION

3.01 Maintain Access to all Properties

It shall be the Contractor's responsibility to notify residents or occupants of property along the project of temporary closures of driveways or roads, in writing, a minimum of 24 hours in advance of closure. Sufficient advance warning shall be provided to allow notification of all affected parties. A copy of the written notification shall be provided to the Owner. The duration of any closure shall be limited to the minimum length of time necessary to complete the particular task requiring the closure. In no case shall a closure extend overnight, unless approved by the Owner.

3.02 Protection of Hazardous Areas

Excavation and hazardous areas shall be protected by barricades or snow fence. Barricades left in place at night shall be lighted.

3.03 Corrective Action

If in the Owner's opinion inadequate protection or maintenance of traffic is provided, the Owner will attempt to contact the Contractor and notify them of the deficiency. If the Contractor cannot be notified or fails to make prompt corrections, the Owner may authorize that said deficiencies be corrected by others. The cost of making such corrections will be charged to the Contractor.

END OF SECTION

SECTION 01 71 23.16
CONSTRUCTION STAKING BY CONTRACTOR

PART 1 - GENERAL

1.01 Work Included

The Contractor is responsible to provide all staking and layout necessary for construction of the project.

1.02 Notifications

In the event that it appears there is an error or contradiction between plan grades, construction stakes, and/or actual conditions, the Contractor shall notify the Owner immediately.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Requirements

The Contractor is responsible to provide such layout and control work as may be required for construction of the proposed improvements.

The Contractor shall provide workers competent in the layout and control work necessary. The Contractor shall provide the equipment and materials necessary for establishing the necessary control and layout.

END OF SECTION

SECTION 01 74 50
CLEANUP AND RESTORATION

PART 1 - GENERAL

1.01 Work Included

The Contractor shall restore areas disturbed by construction activities to a condition reasonably close to their condition before the project, unless shown otherwise on the plans. Restoration work should be performed as soon as possible after construction work is completed in a particular area.

Upon the completion of work in an area, all excess materials, debris, equipment, and similar items shall be removed from the project area by the Contractor and disposed of properly.

1.02 Related Work

A. Section 32 92 00 – Turf Establishment

PART 2 - PRODUCTS - Not Applicable

PART 3 - EXECUTION

3.01 Restoration

Unless otherwise provided, aggregate surfaces, HMA pavements, and concrete pavements shall be restored by construction of similar replacement surfaces.

Turf areas shall be restored by re-establishing the turf as described in Section 32 92 00 – Turf Establishment. All areas disturbed by construction that are not to be surfaced with aggregate or pavement shall be restored with turf, unless otherwise directed.

Mailboxes, fences, signs, ornaments, and similar items shall be replaced at the completion of construction. Posts shall be installed plumb. Items that are lost or stolen shall be repaired or replaced at the Contractor's expense. Repairs or replacements shall meet the Owner's approval.

3.02 Temporary Restoration of Driving Surfaces

Where a pavement or gravel surface is removed as a result of construction activities, a temporary surface shall be provided and maintained by the Contractor until the permanent surface is provided. Unless otherwise directed, the temporary surface shall be 12 inches of aggregate compacted according to Section 01 45 16.02 – Density and Aggregate Testing and graded to meet the adjacent, remaining surfaces. Aggregate shall meet the requirements of Series 23A as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction. Recycled HMA may also be utilized after approval of material by the Owner.

The Contractor shall regrade the temporary surface and add additional aggregate periodically, as necessary, to maintain them in a relatively smooth condition.

END OF SECTION

SECTION 02 41 13.13
PAVEMENT REMOVAL

PART 1 - GENERAL

1.01 Work Included

This work includes removal of an existing pavement, including streets, driveways, sidewalks, curb and/or gutter, and parking areas. For purposes of the work "pavement removal", pavement material may include HMA, concrete, brick, or any combination thereof, including any reinforcement materials.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Limits of Removal

Pavement shall be removed to the limits shown on the plans, or as directed by the Owner in the field. Where pavement is to be removed to allow for the construction of utilities or other improvements, pavement shall be removed to the limits required for their construction.

3.02 Pavement Removal

Pavement shall be removed to an existing joint or to a sawed joint. An existing crack is not suitable for the limit of removal. Sawed joints for pavement removal are to be either parallel or perpendicular to the longitudinal centerline. Sawed joints shall extend substantially through the full thickness of the pavement so that a "clean break" is made and that the adjacent pavement or structures that are to remain are not damaged. If adjacent pavement or structures that are to remain are damaged as a result of the Contractor's removal operations, they shall be replaced to the Owner's satisfaction at the Contractor's expense.

Curb and gutter removal shall be as directed by the Owner. The Contractor shall sawcut existing curb and/or gutter perpendicular to and completely through the existing concrete.

Broken concrete, HMA, brick, and other debris resulting from pavement removal operations shall become the Contractor's property and disposed of properly.

Where pavements are encountered that are composed of more than one material or multiple courses of the same material, the pavement shall be removed in its entirety and all components shall be considered part of the same pavement area.

The Contractor shall provide sufficient barricades and fences to protect pedestrians and vehicles from hazardous areas.

END OF SECTION

SECTION 31 23 01
EXCAVATING, FILLING, AND GRADING

PART 1 - GENERAL

1.01 Work Included

The work of excavating, filling, and grading includes, but is not necessarily limited to:

A. Filling and backfilling to attain indicated grades;

B. Rough and finish grading of the site; and

C. Furnishing and installing granular cushion under concrete slabs on grade.

1.02 References

A. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

B. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

A. Section 01 45 16.02 – Density and Aggregate Testing

B. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Job Conditions

A. Dust Control

Dust caused by the Contractor's operations during performance of the work, or resulting from the condition in which the Contractor leaves the site, shall be controlled by the Contractor. The Contractor shall use all means necessary to control dust on and near the work zone and all off-site borrow areas.

All surfaces shall be thoroughly moistened, as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

B. Protection

The Contractor shall use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain.

In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

C. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

D. Permits

Unless otherwise provided, the Contractor is responsible to obtain and comply with permits required under Parts 31 and 91 of Michigan PA 451 of 1994 (Natural Resources and Environmental Protection Act) and any local ordinances.

PART 2 - PRODUCTS

2.01 Fill Material – General

All fill material shall be subject to the approval of the Owner.

For approval of fill material, notify the Owner at least four working days in advance of intention to import material, designate the proposed borrow area, and permit the Owner to sample, as necessary, from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.02 Fill, Trench, and Structural Backfill Material

Fill material, unless specified otherwise, shall be soil or soil-rock mixture that is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over 6 inches in greatest dimension and not more than 15 percent of the rocks or lumps shall be larger than 2½ inches in greatest dimension.

Fill material obtained from offsite sources shall meet the requirements of the preceding paragraph and additionally, shall be predominantly granular with a maximum particle size of 2 inches and a plasticity index of 12 or less.

2.03 Sand

Sand shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.04 Granular Cushion

Granular cushion under slabs shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.05 Other Materials

All other materials not specifically described, but required for a complete and proper installation, shall be as selected by the Contractor and subject to the approval of the Owner.

PART 3 - EXECUTION

3.01 General

Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section. The Contractor shall not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals. Should any of the work be enclosed or covered up before it has been approved, the Contractor shall uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected, and approved, the Contractor shall make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

3.02 Excavating

Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, the Contractor shall open the depression and remove all debris and soft material as directed by the Owner.

The Contractor shall excavate to the grades shown on the drawings. Where excavation grades are not shown on the drawings, excavation shall be completed, as required, to accommodate the installation.

All over-excavated areas shall be backfilled and compacted at no additional cost to the Owner.

3.03 Preparation of Subgrade

After the site has been cleared, stripped, and excavated to within 6 inches of the specified depths for recompaction, the exposed surface shall be scarified to a minimum depth of 6 inches, thoroughly moisture-conditioned, and compacted to the requirements specified below for fill.

All ruts, hummocks, and other uneven surfaces shall be removed by surface grading prior to placement of fill.

3.04 Excess Water Control

Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. Operations shall not resume until moisture content and fill density are satisfactory to the Owner. Berms or channels shall be provided to prevent flooding of subgrade. All water collecting in depressions shall be promptly removed.

Where soil has been softened or eroded by flooding or placement during unfavorable weather, all damaged areas shall be removed and compacted as specified below for fill and compaction.

The Contractor shall provide suitable means and equipment to maintain excavations and other parts of the work free from water.

Dewatering means and methods shall provide dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.05 Fill and Compaction

After subgrade compaction has been approved by the Owner, the Contractor shall place approved fill material in layers not exceeding 10 inches in uncompacted thickness.

The fill material shall be watered or aerated, as necessary, and thoroughly mixed to obtain a moisture content that will permit proper compaction.

Each soil layer shall be compacted to at least the specified minimum degree. The filling and compaction process shall be repeated until plan grade is attained.

E. Compaction Requirements

Unless otherwise specified on the drawings or in other sections of the specifications, fill and backfill shall be placed in 8-inch lifts and each lift shall be compacted to not less than the

percentages of the maximum density stated in Section 01 45 16.02 – Density and Aggregate Testing.

Compaction by jetting will not be permitted unless specifically authorized by the Owner.

3.06 Grading

Except as otherwise directed by the Owner, the Contractor shall perform all rough and finish grading required to attain the elevations shown on the drawings.

Tolerances For Grading			
Rough Grade		**Finish Grade**	
Building, roads, and parking areas	Plus or minus 0.1 feet	Granular cushion under concrete slabs	Plus or minus 0.05 feet
Landscaped areas	Plus or minus 0.25 feet	Parking areas	Plus or minus 0.03 feet
		Landscaped areas	Plus or minus 0.1 feet

After grading is completed and has been accepted by the Owner, the Contractor shall permit no further excavating, filling, or grading.

The Contractor shall use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.07 Placing Granular Cushion

The Contractor shall carefully place the specified granular cushion in areas to receive concrete slabs on grade, uniformly attaining the thickness indicated on the drawings, and providing all required transition planes.

END OF SECTION

SECTION 31 25 00
SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 Work Included

The Contractor shall provide permanent and/or temporary erosion and sedimentation control as called for on the plans and as required by the county soil erosion agent and permit.

1.02 Definitions

A. Major rainfall event – ¼-inch or more precipitation over a period, delineated by dry periods of at least 24 hours.

1.03 References

A. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

B. ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

C. ASTM D4491 – Standard Test Method for Water Permeability of Geotextiles by Permittivity

D. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles

E. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

F. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile

G. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

H. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.04 Related Work

1.05 Section 32 92 00 – Turf Establishment

1.06 Scheduling

A. Control measures shall be constructed by the Contractor prior to the time construction starts uphill or upstream from the control measure location.

B. The Contractor shall inspect all temporary erosion control measures weekly and within 18 hours of major rainfall events.

C. Maintenance and replacement of erosion control measures shall be completed by the Contractor when necessary, or as directed by the soil erosion control agent or the Owner.

D. Removal and cleanup of temporary control structures shall be provided by the Contractor within one week after the control measure is no longer needed.

1.07 General Soil Erosion and Sedimentation Content Procedures

A. Keep disturbed areas small.

B. Stabilize and protect disturbed areas as soon as possible.

C. Keep storm water runoff velocities low.

D. Protect disturbed areas from runoff.

E. Retain sediment within the construction area.

PART 2 - PRODUCTS

2.01 Materials

A. Geotextiles

Geotextiles for filters shall be non-woven, meeting the requirements of the table below.

Silt fence geotextiles shall meet the requirements of the following table and shall be designed to collect eroded sediment transported in storm water runoff. The fabric shall have at least 70 percent minimum retained strength after 500 hours of U.V. exposure when tested according to ASTM D4355.

	Property/Test Method					
Geotextile Category	**Grab Tensile Strength (min) ASTM D4632 lbs**	**Trapezoid Tear Strength (min) ASTM D4533 lbs**	**Puncture Strength (min) ASTM D4833 lbs**	**Mullen burst strength (min) ASTM D3786 psi (a)**	**Permittivity ASTM D4491 Per second**	**Apparent Opening Size (max) ASTM D4751 (b) Millimeters**
Filters	90	45	45	140	0.5	0.21
Silt Fence	100(c)	45	--	--	0.1	0.60

(a) ASTM D3786. The fluid displacement rate for the Mullen burst test equipment must be 170± 5 ml/minute. Subtract tare strength from the ultimate burst strength as specified by ASTM.
(b) Filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) is permitted as an alternate test method to ASTM D4751 for non-woven geotextiles.
(c) Elongation at the specified grab tensile strength not to exceed 40 percent for silt fence.

B. Stone

Unless otherwise directed, stone shall meet the requirements of Series 6A as specified in Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.02 Mixtures

A. Seed

Seed shall meet the requirements of Section 32 92 00 – Turf Establishment.

2.03 Fabricated Items

A. Silt Fence

Geotextile for silt fences shall meet the requirements of Section 2.01. The geotextile shall be attached to machine pointed No. 2 common grade hardwood posts, using at least 5 staples through wood lath a minimum of $^{3}/_{8}$-inch thick and 2 feet long. Post spacing shall not exceed

$6^1/_2$ feet. Posts must be of sufficient length and cross-section to support the installed silt fence under full sediment load; however, posts shall have cross-sectional area of at least $2^1/_4$ square inches and shall be a minimum of 36 inches in length. Silt fence fabric must be a minimum height of $2^1/_2$ feet. Silt fence shall have at least two permanent markings or affixed labels per assembled roll which positively identifies the fabricator.

B. Mulch Blankets

Mulch blankets shall meet the requirements of Section 32 92 00 – Turf Establishment.

C. Filter Sacks

All materials shall adhere to the requirements of the Michigan Department of Transportation 2012 Standard Specifications for Construction, except fabric drop, which shall consist of a geotextile filter sack inserted into the drainage structure under the cover.

Filter sack shall be as manufactured by "Siltsack", "Catch-All", "Ultra-Urban Filter", "Flogard + Plus", or approved equal. The filter sacks shall be installed and maintained in accordance with the manufacturer's specifications.

PART 3 - EXECUTION

3.01 General Requirements

The Contractor shall perform work on the project in a manner which prevents or reduces erosion and controls sedimentation. The Contractor shall provide controls which keep sedimentation from the project area, within the limits of the project area, and out of any lake, river, stream, wetland, or storm drain.

The Contractor shall install appropriate controls or measures to control or prevent erosion or sedimentation from the project area before beginning any earth disturbance operations. Temporary erosion and sedimentation control measures shall be maintained by the Contractor, until such times as disturbed areas have become permanently stabilized.

During the life of the project, the Contractor shall provide any additional soil erosion or sedimentation control measures necessary to address specific problems which develop in and adjacent to the project area.

3.02 Time Limitations

Grading operations shall be completed as soon as practical. Permanent soil erosion controls for disturbed areas shall be completed within 5 calendar days of the completion of grading, except that permanent measures shall be completed within 24 hours when the disturbed area is within 150 feet of a lake, stream, river, or wetland area.

Temporary soil erosion measures shall be implemented when it is not practical to complete the permanent measures.

3.03 Area Limitations

For linear projects (roads, sewers, water main, etc.), the length of the disturbed area shall be limited to ½-mile, unless otherwise approved by the Owner.

Areas outside the project right-of-way or outside the grading limits shown on the drawings shall not be disturbed, unless otherwise approved by the Owner.

3.04 Construction of Erosion and Sedimentation Controls

The Contractor shall provide all permanent and temporary erosion and sedimentation controls shown on the drawings, required by the permitting agency, or necessary to appropriately control erosion and sedimentation from the project area.

A. Check Dams

Check dams shall be installed and maintained across ditches and watercourses, which might convey surface runoff from disturbed areas within the project area, or where shown on the drawings or required by the Owner or permitting agency.

B. Silt Fence

The Contractor shall furnish, erect, and maintain silt fence around the perimeter of the project area where earth will be disturbed and sediment from the disturbed area could be conveyed.

C. Filters

Fabric or stone filters shall be installed in waterways or in advance of inlets to drainage courses or storm sewers.

D. Sediment Traps and Basins

Sediment traps shall be excavated upstream of check dams and where shown on the drawings or directed by the Owner or permitting agency. Check dams shall be installed downstream of the sediment traps and basins prior to the sediment traps and basins being excavated.

E. Seeding

Earth areas shall be stabilized with turf immediately following the completion of earthwork and grading activities. Where permanent seeding cannot be completed, earth areas shall be stabilized with temporary seeding. Areas which are properly seeded temporarily for stabilization shall be permanently seeded, as shown, as the work can be appropriately completed.

F. Mulch Blankets

Areas susceptible to erosion from moving water, which are not to be paved, shall be seeded and protected with high velocity mulch blankets.

3.05 Maintenance and Erosion and Sedimentation Control

The Contractor shall maintain all temporary erosion and sedimentation controls until such time as the permanent measures have been completed and established.

The Contractor shall inspect all erosion and sedimentation controls weekly and within 18 hours of a major rain event.

Damaged controls or measures shall be replaced or repaired. Sediment shall be cleaned from traps, sumps, basins, filters, and fences periodically. Sediment shall be removed to prevent the accumulation of sediment from exceeding half of the volume of traps, sumps, and basins. Sediment or debris along silt fences shall be removed before the accumulation reaches half the height of the fence.

Sediment and debris removed from soil erosion and sedimentation control devices shall be disposed of properly by the Contractor. Sediment shall not be used for fill or backfill in the project area, except when an area is specifically designated on the plans or by the Owner.

Drainage filters shall be cleaned when an accumulation of silt might reduce flow and result in flooding.

Any sediment from the construction area which enters storm sewers or drainage ditches shall be removed by the Contractor. Since sediment can be carried great distances within storm sewers, it may be necessary for many segments of downstream storm sewer segments to be televised, jetted, and vacuumed. If the Owner believes that the Contractor has allowed or provided the potential for sediment to enter storm sewers or drainage courses, the Contractor will be responsible for the costs of inspection and removing sediment from downstream drains, whether it can be conclusively proven that the sediment was the result of the Contractor's actions (or inaction).

3.06 Removal of Erosion and Sedimentation Control Devices

Temporary soil erosion and sedimentation control devices shall be removed or obliterated by the Contractor when the permanent measures are in place and established. Any areas damaged by the removal of the temporary devices shall be corrected by the Contractor.

Mulch used for temporary erosion control may either be removed or worked into the soil before the permanent topsoil and seeding is completed.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE

PART 1 -GENERAL

1.01 Work Included

This specification describes the requirements for constructing an aggregate base under a proposed pavement surface.

1.02 References

A. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

A. Section 01 45 16.02 – Density and Aggregate Testing

B. Section 31 23 01 – Excavating, Filling, And Grading

PART 2 - PRODUCTS

2.01 Materials

A. Aggregate shall meet the requirements of Series 21AA aggregate, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction, unless otherwise noted on the plans, proposal, or specifications.

PART 3 - EXECUTION

3.01 Subgrade Preparation

Aggregate shall not be placed until the subgrade is properly prepared. The subgrade shall be graded to the required elevations and shape for placement of the specified aggregate thickness. The subgrade shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft or yielding spots shall be excavated and replaced with sound material.

3.02 Placement

Aggregate shall be placed in a manner that provides a uniform cross section of the specified thickness and the required surface grades. The edges of the area of aggregate surface shall be straight and uniform.

Aggregate shall be placed in lifts not exceeding 8 inches (loose measure) and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

END OF SECTION

SECTION 32 13 00
CONCRETE CURB AND GUTTER, SIDEWALK,
AND MISCELLANEOUS PAVEMENT

PART 1 - GENERAL

1.01 Work Included

This work includes all preparation, forming, concrete production and placement, finishing, jointing, reinforcing, curing, protection, and restoration for the construction of concrete curb and gutter, sidewalk, and miscellaneous pavement.

1.02 References

A. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

B. ASTM C94 – Standard Specification for Ready-Mixed Concrete

C. ASTM C150 – Standard Specification for Portland Cement

D. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

E. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

F. Michigan Department of Transportation 2012 Standard Specifications for Construction

G. Michigan Department of Transportation Standard Plan

1.03 Related Work

A. Section 01 45 16.01 – Concrete Testing

B. Section 01 45 16.02 – Density and Aggregate Testing

PART 2 - PRODUCTS

2.01 Materials

A. Portland cement shall meet the requirements of ASTM C150.

B. Coarse aggregate shall meet the requirements of Class 6A aggregate, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

C. Reinforcing steel fabric shall meet the requirements of ASTM A1064.

D. White membrane curing compound shall conform to ASTM C309, Type 2. Curing compound shall be agitated to provide a uniform consistency prior to transfer between containers or before application.

E. Fiber joint filler shall meet the requirements of ASTM D1751.

F. Sand for base shall meet the requirements of Granular Material Class II, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

G. The detectable warning surface shall contrast visually with adjacent walking surfaces. The Contractor shall submit the detectable warning product information to the Owner for approval.

2.02 Mixtures

Concrete shall be transit mixed concrete in accordance with ASTM C94.

Air content, slump, and compressive strength shall be according to Section 01 45 16.01 – Concrete Testing. Concrete shall contain at least six sacks of cement per cubic yard of concrete. Modifications and the use of admixtures may be submitted and shall be approved by the Owner.

2.03 Submittals

A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.

B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Owner to review.

2.04 Cross Sections

A. Sidewalk

Unless indicated otherwise on the plans, sidewalk shall have a minimum thickness of 4 inches. Sidewalk through residential driveways shall have a minimum thickness of 6 inches. Sidewalk through commercial driveways shall have a minimum thickness of 8 inches.

PART 3 - EXECUTION

3.01 Coordination of Traffic

Hazardous areas shall be barricaded to protect pedestrian and vehicular traffic.

Work shall be scheduled so that access is maintained to driveways and entrances through the project area to the extent possible. Where a driveway or entrance must be closed for a period, the property owner or occupant shall be notified in advance of the closing.

3.02 Preparation

The base shall be excavated, filled, and shaped, as required, to construct pavement of the required thickness at the proposed grades and alignment. The base shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft and yielding soils shall be excavated and replaced with suitable soils.

Concrete may be placed by slipforming, unless indicated otherwise.

Where forms are used, the forms shall extend the full depth of the concrete. Forms shall be of sufficient strength and staked to prevent springing or yielding after placement of concrete. Flexible forms capable of making a smooth arc shall be used for curved sections. Face forms for the exposed face of curb are not required.

Where steel reinforcement is used, it shall be spliced and held in place in a manner approved by the Owner. Splices shall be overlapped by 10 inches.

3.03 Required Grades

A. Sidewalks shall be constructed with a maximum transverse slope of 2 percent. Transverse slopes shall be at least 1 percent, unless longitudinal drainage is provided. The longitudinal slope of sidewalk shall not exceed the general grade established for the adjacent street or highway. Where adjacent street or highway general grades are less than 5 percent, the longitudinal slope of sidewalk may exceed the general road grade to a maximum of 5 percent.

B. Gutter grades shall not be constructed flatter than 0.4 percent, or less than the grades shown on the plans, whichever is less.

3.04 ADA Requirements

A. Sidewalks and sidewalk ramps shall meet ADA requirements and shall follow the Michigan Department of Transportation Standard Road Plan R-28-series.

B. ADA sidewalk ramps shall include polymer, cast in, detectable warning surfaces. ADA ramps shall be constructed per Michigan Department of Transportation and ADA specifications.

3.05 Placement of Concrete

Concrete shall not be placed until the forms (or grade, if the concrete will be slipformed) have been inspected by the Owner. The base shall be moistened just prior to placement of the concrete.

Concrete shall have a temperature between 45 degrees Fahrenheit and 90 degrees Fahrenheit at the time of placement.

Concrete shall be deposited to the proper depth and spaded or vibrated to ensure proper consolidation. Concrete shall be placed and finished in a continuous operation.

Any material required to fill low spots shall be obtained from the mixture used in the work. Exposed surfaces of the concrete slab shall be finished smooth and even by means of a moistened wood float. Sidewalk and pavement slabs shall be lightly brushed perpendicular to the normal direction of traffic. Water shall not be added to the concrete surface as an aid to finishing. The top edges of the slab and all transverse joints shall be rounded with a finishing tool having a radius of ¼-inch. Surfaces shall not vary more than $^{3}/_{8}$-inch from the alignment and typical cross section.

Joints shall be constructed in accordance with the Michigan Department of Transportation Standard Road Plan R-29 and R-30 Series.

Expansion joint filler shall extend the full depth of the concrete, with the top of the filler material just below the finished concrete surface.

Exposed concrete surfaces shall be cured using white membrane curing compound, applied uniformly at a rate of 200 square yards per gallon. Curing compound shall be applied regardless of temperature or humidity conditions.

3.06 Protection

Concrete shall not be placed if the air temperature is not at least 25 degrees Fahrenheit and rising, or more than 90 degrees Fahrenheit. Concrete shall be protected from damage caused by freezing or rain.

The Contractor shall provide sufficient barricading and security to protect fresh concrete from accidental damage or vandalism. Damaged concrete shall be removed to a joint and replaced at the Contractor's expense.

3.07 Cleanup

After the concrete has attained sufficient strength, the forms shall be removed.

Where adjacent areas are turf, the area next to the pavement shall be backfilled with sound earth, topsoil, and graded so the surface is about 1-inch below the pavement or as necessary to provide proper drainage.

END OF SECTION

SECTION 32 92 00
TURF ESTABLISHMENT

PART 1 - GENERAL

1.01 Work Included

This work includes soil preparation, seeding, fertilizing, and mulching on those areas designated for turf establishment.

1.02 References

A. Michigan Department of Transportation Qualified Products List

1.03 Related Work

A. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Performance Requirements for Guaranteed Growth and Smooth Ground Surface

The Contractor is responsible to provide turf, substantially free of bare spots and free of weeds. The ground in turf areas shall be smooth, graded to provide positive drainage, and graded to provide a smooth transition to adjacent areas. The Owner will determine when the requirements of guaranteed growth and smooth ground surface have been met.

Materials, requirements, and methods described in this specification are provided to establish minimum levels. Where the Contractor believes that other materials or methods are appropriate for the specific site conditions or better suited to the Contractor's schedule, the Contractor shall submit details of the alternative materials and/or methods to the Owner for approval.

The Contractor shall provide re-seeding, watering, and herbicides, as necessary, to achieve the desired results.

There will be no adjustment in project cost for re-seeding, watering, application of herbicides, or using alternative methods of turf establishment.

1.05 Areas Designated for Turf Establishment

All areas disturbed by the Contractor's activities or as a result of the project, which are not to be restored with a pavement or aggregate surface, are to be restored with turf, unless specifically directed otherwise.

Turf shall be established on borrow areas and areas where excess soil is stockpiled.

PART 2 - PRODUCTS

2.01 Materials

A. Topsoil

Topsoil shall be a humus-bearing, natural mineral soil of loam, sandy loam, silty loam, or clay loam classification. Topsoil shall neither be excessively acidic or alkaline.

Topsoil shall be screened and free of stones, roots, debris, and other foreign matter. Topsoil which is stripped from the project area shall be removed, transported, and stockpiled in a manner which prevents it from becoming mixed with sub-soils.

B. Fertilizer

Fertilizers shall be standard, commercial packaged or bulk products in granular or liquid form. Each container of packaged fertilizer shall be marked by the manufacturer with the following information: manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight. Bulk fertilizer shall be accompanied with an invoice indicating the manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight or volume.

Fertilizer for seeding and sodding shall be comprised of both a water insoluble component and a water soluble component. The water insoluble nitrogen must be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

Fertilizer shall provide 33 pounds of actual water insoluble nitrogen per acre. The water soluble component of the fertilizer shall provide 65 pounds of actual nitrogen, phosphorus, and potassium nutrient per acre, in equal proportions. The water soluble component of the fertilizer shall include urea, diammonium phosphate, and potassium chloride.

C. Mulch

1. Loose Mulch

Mulch shall be straw or marsh hay, in an air-dried condition. Mulch material must be clean, undamaged, and rot-free. It must be substantially free of weed seed and other objectionable foreign matter.

2. Turf Mulch Blankets

Mulch blankets shall be manufactured by a company currently listed on the Michigan Department of Transportation's Qualified Products List.

Mulch blankets shall have a net covering on both sides of the blanket and shall be manufactured from either excelsior or straw. Excelsior blankets shall be manufactured from a uniform layer of interlocking excelsior fibers cut from sound, green timber, with an average dry weight of 12 ounces per square yard. Straw blankets shall be made of a uniform layer of clean wheat straw, free of weeds and weed seed, with the straw and net covering securely stitched together to form a uniform mat having an average dry weight of 8 ounces per square yard.

3. Mulch Anchoring

Mulching anchoring shall be manufactured by a company currently listed on the Michigan Department of Transportation's Qualified Products List.

Latex-based anchoring shall have a composition, by weight, of 48 percent styrene, 50 percent butadiene, and 2 percent additive, 42 percent to 46 percent solids, and a pH of 8.5 to 10.

Recycled newsprint mulch shall be comprised of specifically prepared, biodegradable, shredded newspaper particles consisting of recycled newsprint fibers. The recycled newsprint must contain a wetting agent, defoaming agent, and nontoxic dyestuff that will impart a bright green or blue color. The dyestuff must adhere tightly to the fiber. Recycled newsprint shall meet the following minimum requirements:

Moisture content (total weight)	12 percent maximum
Shredded high-grade newsprint (oven dry)	96 percent minimum
Tackifier, by weight	1½ percent to 3 percent
Water holding capacity (water per 3½ ounces of fiber)	32 ounces minimum

Wood fiber shall be specially prepared, biodegradable, air-dried virgin wood fibers manufactured from 100 percent whole wood chips. The wood fiber must be manufactured with a tackifier. Recycled materials are not acceptable. The fibers must be dyed with a green or blue biodegradable dye to aid in visual metering during construction. The process and materials must not contain growth or germination inhibiting materials. The wood fiber must conform to the following specifications:

Moisture content (total weight)	12 percent maximum
Organic wood fiber (oven dry)	95 percent minimum
Tackifier, by weight	3 percent to 5 percent
Water holding capacity (water per 3½ ounces of fiber)	35 ounces minimum

Guar gum tackifiers shall contain a minimum of 95 percent guar gum by weight. The remaining components shall be dispersing and crosslinking additives.

Other tackifiers may include water soluble natural vegetable gums, or guar gums blended with gelling and hardening agents, or a water soluble blend of hydrophilic polymers, viscosifiers, sticking aids, and other gums.

4. Mulch Netting

Netting shall have a mesh size not larger than 1½ inches by 2 inches and not smaller than ½-inch by ½-inch. The netting shall be fabricated from a plastic formulated from or treated with a chemical which will promote the breakdown of the net within the first growing season after its placement. The net shall have sufficient strength to hold the mulch in place and still deteriorate rapidly upon exposure to sunlight. Steel staples or pins shall not be used for anchoring of netting.

D. Weed Control

Herbicides must be approved for use by the Michigan Department of Agriculture and the U.S. Environmental Protection Agency.

2.02 Seeding Mixtures

Seed shall be furnished in durable bags, each with a tag indicating the seed supplier, lot number, date, mixture proportions, purity, germination, and net weight.

Seed mixtures shall meet the requirements of one or more of the following mixtures, or other mixtures that are approved in advance by the Owner. Where the Contractor believes that another mixture is appropriate for areas within the limit of the project, the Contractor shall request that the Owner review and approve the substituted mixture(s). Requests for substitutions shall include the name of the seed supplier, the mixture proportions, the purity, and the germination.

Species	**Purity, Minimum (percent)**	**Germination (percent)**	**Seed Mixture**						
			Mixture Proportions (percent by weight)						
			TDS	**THV**	**TUF**	**TGM**	**THM**	**CR**	**TSM**
Kentucky Blue Grass	98	85	5	15	10	10	30		
Perennial Ryegrass	96	85	25	30	20	20	20		50
Hard Fescue	97	85	25		20	30			
Creeping Red Fescue	97	85	45	45	40	40	50		
Fults Salt Grass	98	85		10	10				
Cereal Rye	85	85						100	
Spring Oats	85	85							50

PART 3 - EXECUTION

3.01 Preparation for Turf Establishment

A. Topsoil Stripping

Prior to performing any excavation, filling, grading, or other earthwork, the Contractor shall strip and stockpile topsoil for later use on the project. Excess topsoil shall not be removed from the project site unless specifically provided elsewhere in the contract documents.

B. Finish Grading

The areas that are to be seeded shall be properly graded, sloped, and shaped with an allowance for the thickness of the topsoil layer. The earth bed upon which topsoil will be placed shall be friable to a depth of at least 4 inches. Earth beds not in a friable condition shall be harrowed with a disk, spring tooth drag, or similar equipment.

C. Placement and Preparation of Topsoil

Topsoil shall be spread on the prepared areas to a depth of 4 inches (in place, after rolling or compaction), unless otherwise shown on the plans or proposal. After spreading, any large clods or lumps shall be broken and all stones larger than 1-inch diameter, rocks, roots, litter, and other foreign debris shall be raked up and disposed of by the Contractor. After spreading and raking, the topsoil surface shall be in a friable condition and the surface shall be reasonably close to the proposed grades and cross section.

The topsoil surface shall be shaped to provide proper drainage. Where proposed grades are not shown on the plans, the topsoil surface shall be graded to provide a smooth transition between the new construction and the existing, adjacent ground.

Excess topsoil shall be stockpiled in a location acceptable to the Owner and neatly trimmed to

present a neat appearance.

3.02 Turf Establishment

A. Permanent Seeding and Fertilizing

Disturbed areas shall be seeded upon completion of earthwork and grading operations. Disturbed areas shall be stabilized with temporary seeding if permanent seeding cannot be completed.

Seed mixtures for permanent seeding shall be appropriate for the soil type and location, as indicated in the following table. The Contractor may propose and submit alternative mixtures to the Owner for review and approval. It is the Contractor's responsibility to provide turf areas which are substantially free of bare spots and generally weed-free.

Mixture Designation	Soil Type	Location
TDS	Dry Sandy to Sand Loam	Rural or Urban
THV	Heavy	Rural
TUF	All Types	City Streets
TGM	Medium to Heavy	All
THM	Loamy to Heavy	Residential / Commercial

Fertilizer and seed shall be applied uniformly on areas prepared for seeding. Seed shall be applied at a rate of 220 pounds per acre. Seed and fertilizer may be applied by drilling, broadcasting, or hydraulically. Seed and fertilizer shall be applied before applying mulch. Seed and fertilizer shall be lightly raked or rolled into the prepared topsoil surface.

Neither broadcast seeding nor hydraulic seeding shall be performed during windy weather.

There shall be provisions for mixing or agitating the seed – fertilizer mixture used for hydraulic seeding to keep it evenly distributed in suspension. Mixtures shall be applied within an hour of mixing the seed with water; unused portions shall be discarded.

B. Temporary Seeding

Temporary seeding shall be completed when the permanent seeding cannot be completed because of seasonal conditions. Temporary seeding shall be applied at a rate of 100 pounds per acre, and shall be of the following designation.

Mixture Designation	Soil Type	Location
CR	All Types	Temporary, less than 6 months
TSM	All Types	Temporary, more than 6 months

Before completion of the contract, the Contractor shall complete permanent seeding of all areas which are temporary seeded.

C. Dormant Seeding

Dormant seeding should be used only when necessary to complete a project when seasonal conditions are not conducive to permanent seeding. Dormant seeding shall not be completed on frozen ground. Dormant seeding shall be completed, as required, for permanent seeding.

The Contractor is responsible to establish turf which is substantially free of bare spots and

generally free of weeds.

3.03 Mulching

A. Mulch Placement

Immediately after the seed has been set into the topsoil surface by light raking or rolling, the Contractor shall spread mulch and anchor it as appropriate. Mulching shall not be performed during windy conditions.

Loose mulch shall be placed thick enough to shade the ground, conserve moisture, and resist erosion, but open enough to allow sunlight to penetrate and air to circulate.

The Contractor shall maintain mulched areas and repair any areas where damage from erosion, wind, traffic, fire, or other causes occur.

Mulch shall be applied at a uniform rate of 2 tons per acre, except that a rate of 3 tons per acre is required with dormant seeding.

B. Mulch Anchoring

Mulch anchoring (tackifiers) shall be sprayed immediately after the mulch is placed. Spraying shall not be performed when wind might prevent the proper placement of the adhesive. The Contractor shall provide protection measures, as necessary, to protect traffic, signs, structures, and other objects from being marked or disfigured by tackifier materials.

Latex based adhesive shall be mixed at a rate of at least 15 gallons of adhesive with a minimum of 250 pounds of recycled newsprint and 375 gallons of water.

Recycled newsprint shall be mixed at a minimum rate of 750 pounds of newsprint with 1,500 gallons of water.

Wood fiber shall be mixed at a minimum rate of 750 pounds of wood fiber with 1,500 gallons of water.

Guar gum shall be mixed at a minimum rate of 100 pounds of dry adhesive and a minimum of 250 pounds of recycled newsprint and 1,300 gallons of water.

Other tackifiers shall be mixed at a minimum rate of 100 pounds of dry adhesive with a minimum of 250 pounds of recycled newsprint with 1,300 gallons of water.

C. Mulching Netting

When netting is used to secure mulch, it shall be secured with anchors, staples, or pins. The net shall be spread over the mulch so that a worker can walk between adjacent widths of the net. The edges of adjacent widths of net shall be pulled together and held in place with net anchors. Net anchors shall be spaced not more than 30 inches apart along the edges, joints, and centerline. The net shall not be installed in direct contact with the ground. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

D. Mulch Blankets

Mulch blankets shall be installed within one day of seeding. The side edges of blankets shall be overlapped by 2 inches. Blanket ends shall be shingle lapped 6 inches. Non-metallic

staples or pegs shall be placed along all joint edges and along blanket centerlines at a maximum spacing of 2 feet. Blankets in waterways shall be shingle lapped 12 inches on the downslope edge. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

High velocity blankets shall be installed on slopes of 1:2, or steeper, on ditch bottoms, on ditch side slopes (to an elevation 1 foot above the ditch bottom), and where specifically shown on the drawings or directed by the Owner.

3.04 Weed Control

Weed control shall be provided by the Contractor, as necessary, to develop turf areas which are relatively free of weeds. Herbicides shall be applied in accordance with federal, state, and local regulations. Herbicides shall be applied in accordance with manufacturer's instructions. Herbicides shall be applied by commercial applicators, licensed in the State of Michigan and certified by the Michigan Department of Agriculture in the appropriate category(ies).

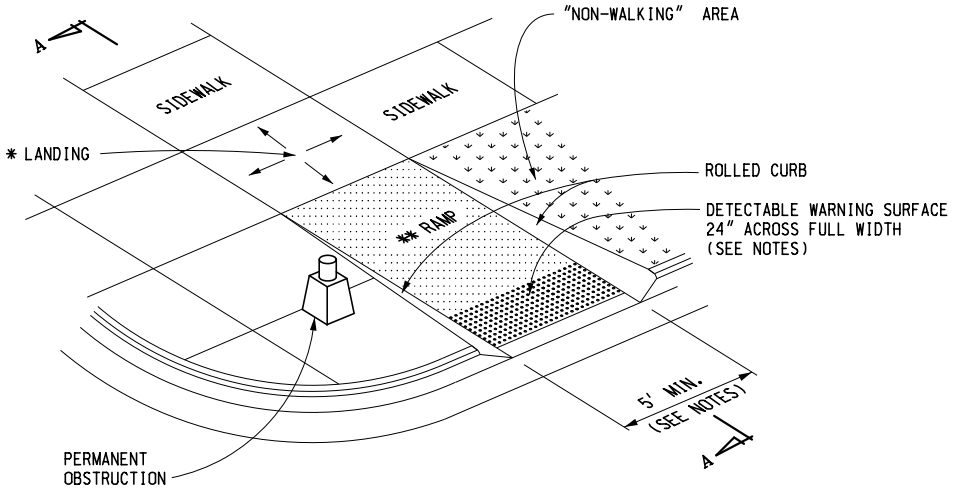
Target weeds shall be sprayed in the newly seeded turf when the new turf grass is sufficiently established to withstand the application of herbicide. Herbicide application shall be repeated if the first application failed to control target weeds.

The Contractor shall take appropriate measures to preserve and protect adjacent property from damages resulting from the application of herbicides. Herbicides shall not be applied when wind may carry it to adjacent areas.

END OF SECTION

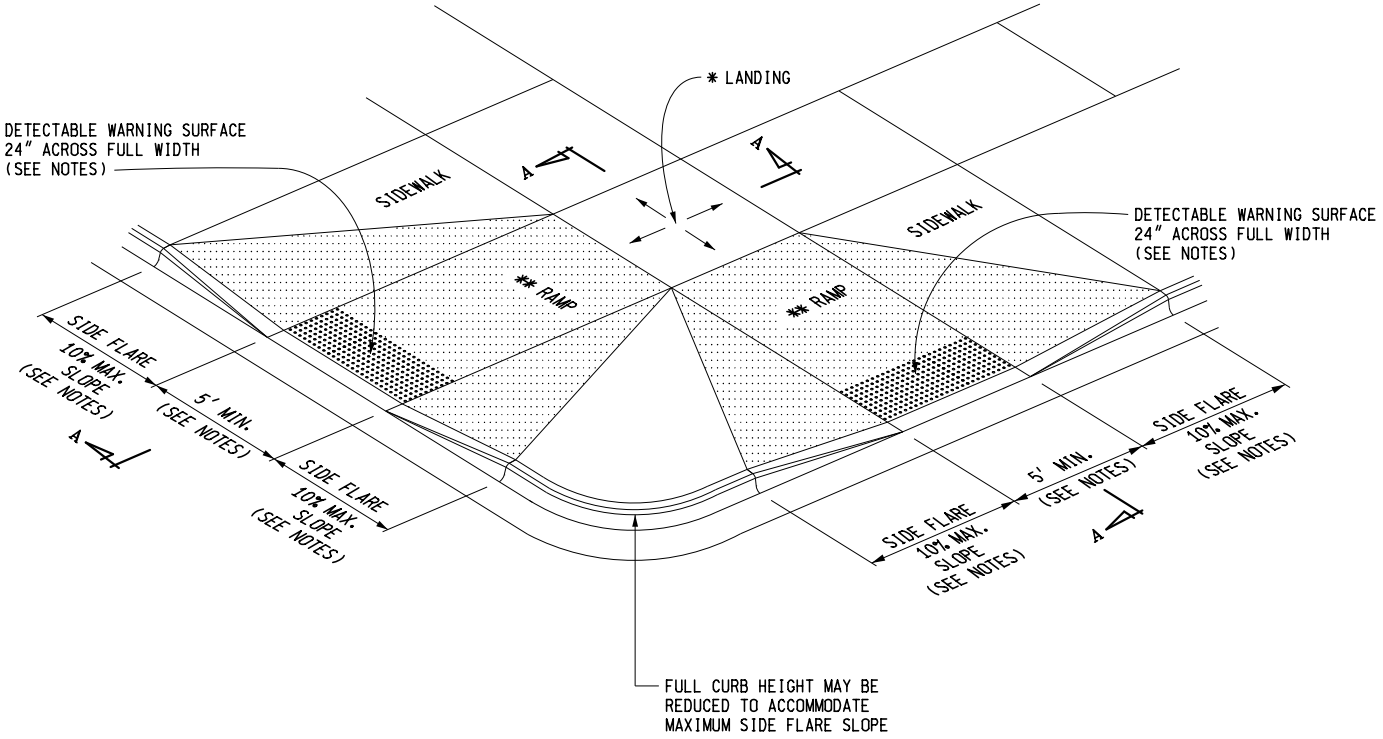
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R

(ROLLED SIDES)



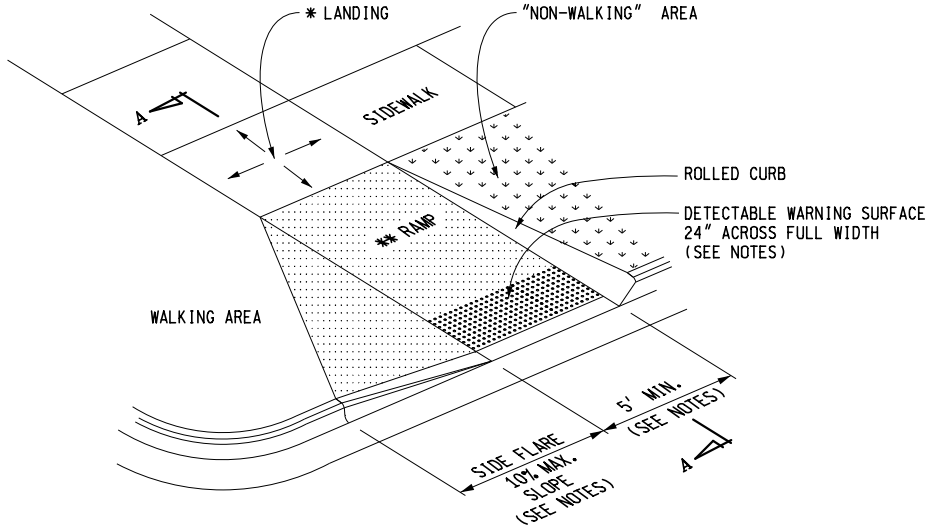
SIDEWALK RAMP TYPE F

(FLARED SIDES, TWO RAMPS SHOWN)

MDOT Michigan Department of Transportation PREPARED BY DESIGN DIVISION DRAWN BY: B.L.T. CHECKED BY: W.K.P.	DEPARTMENT DIRECTOR Kirk T. Steudle APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR SIDEWALK RAMP AND DETECTABLE WARNING DETAILS			
		F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 1 OF 7

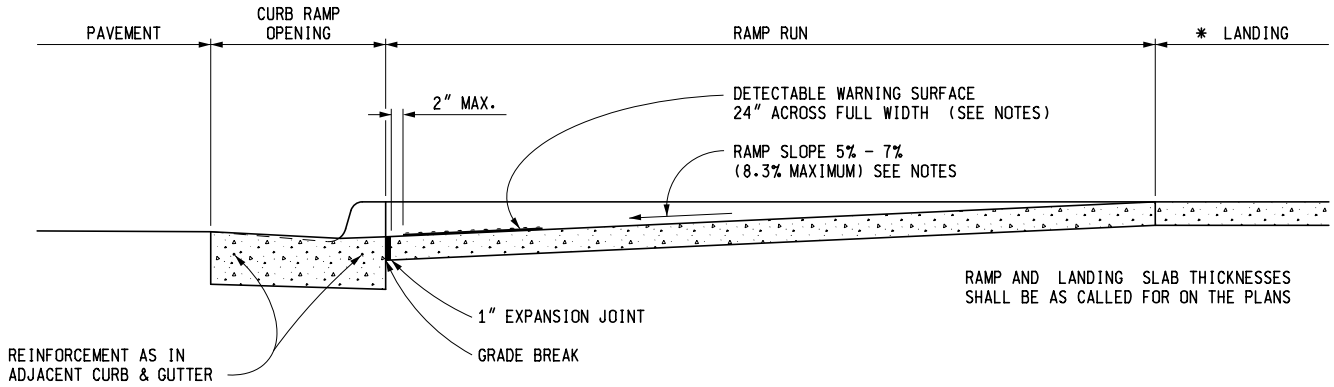
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE RF

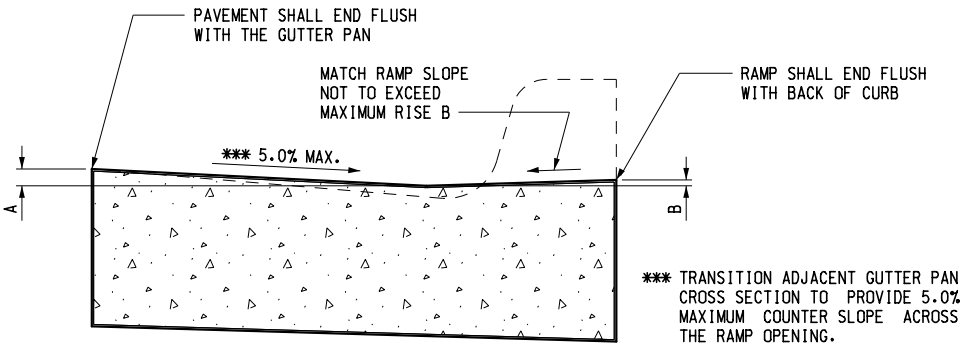
(ROLLED / FLARED SIDES)



SECTION A-A

CURB TYPE	MAXIMUM RISE (INCHES)	
	A	B
B1	3/4	1
B2	3/4	1
B3	3/4	1
D1	3/4	1
D2	3/4	1
D3	3/4	1
C1	1/2	1/2
C2	1/2	1/2
C3	3/4	1/2
C4	3/4	1/2
C5	1	1/2
C6	1	1/2
F1	1/2	1/2
F2	1/2	1/2
F3	3/4	1/2
F4	3/4	1/2
F5	1	1/2
F6	1	1/2

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES



SECTION THROUGH CURB RAMP OPENING

(TYPICAL ALL RAMP TYPES)

MICHIGAN DEPARTMENT OF TRANSPORTATION

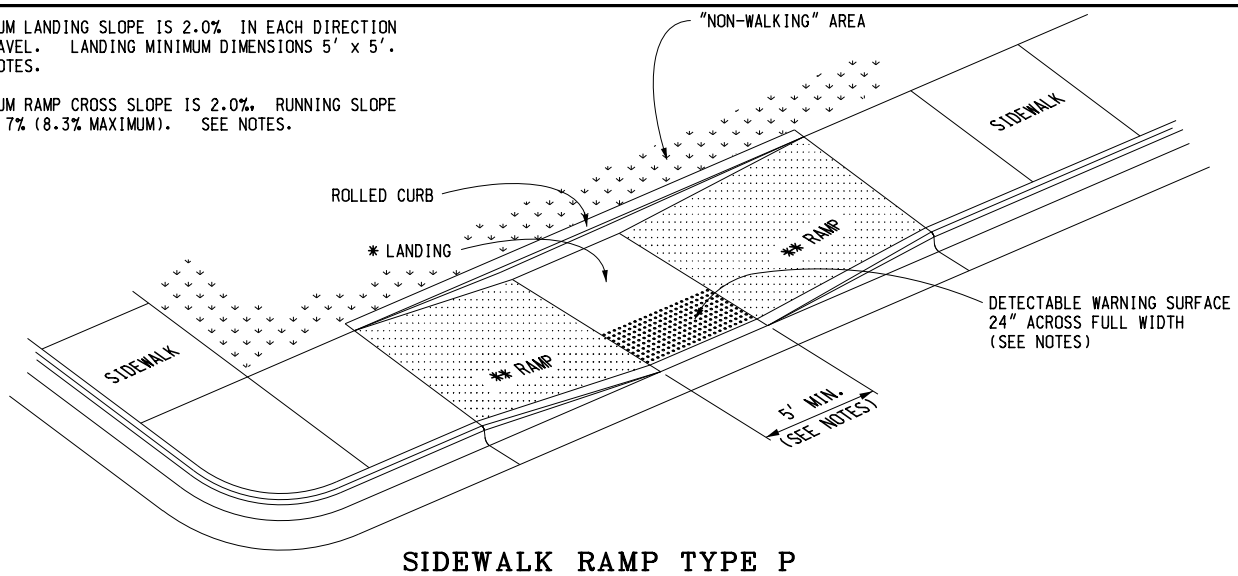
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 2 OF 7

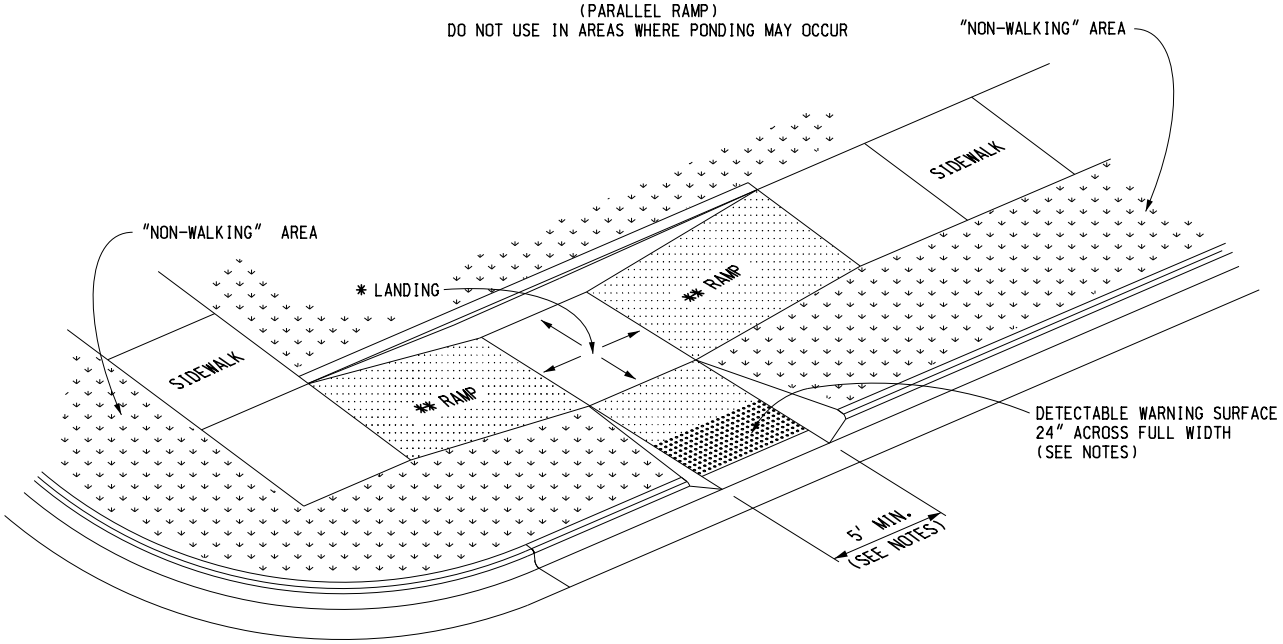
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



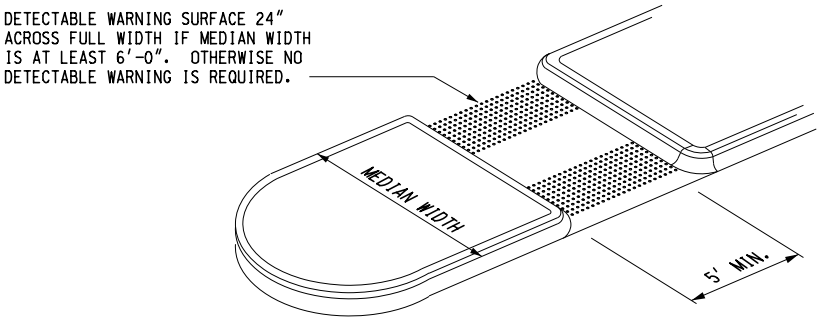
SIDEWALK RAMP TYPE P

(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C

(COMBINATION RAMP)



SIDEWALK RAMP TYPE M

(MEDIAN ISLAND)

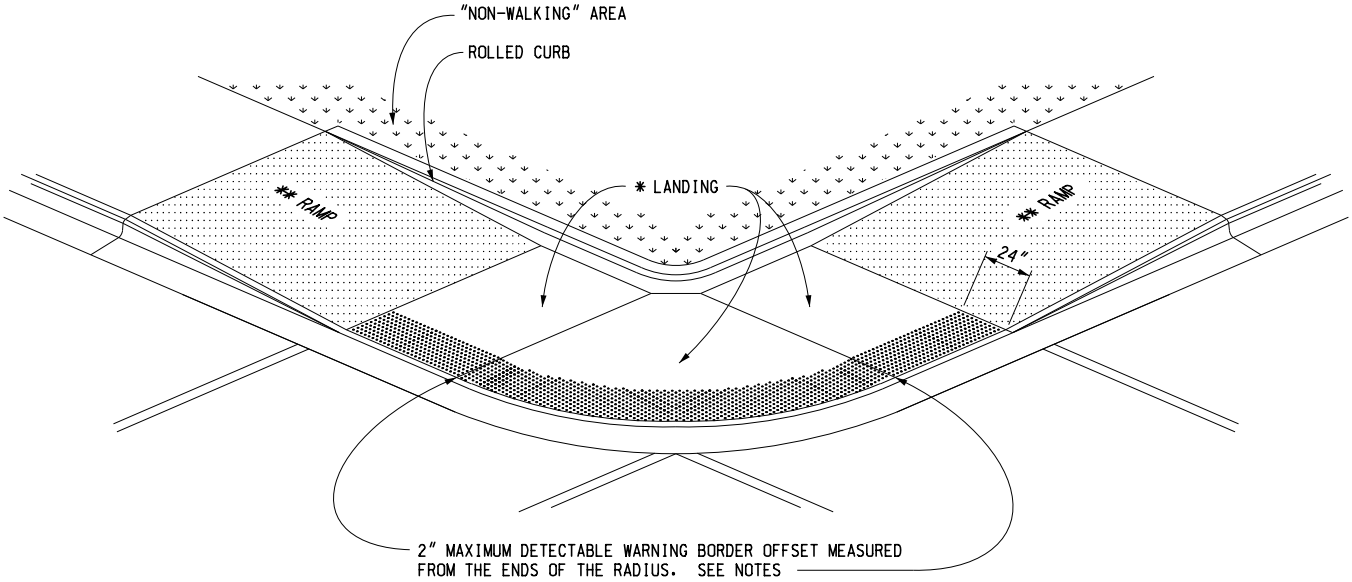
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

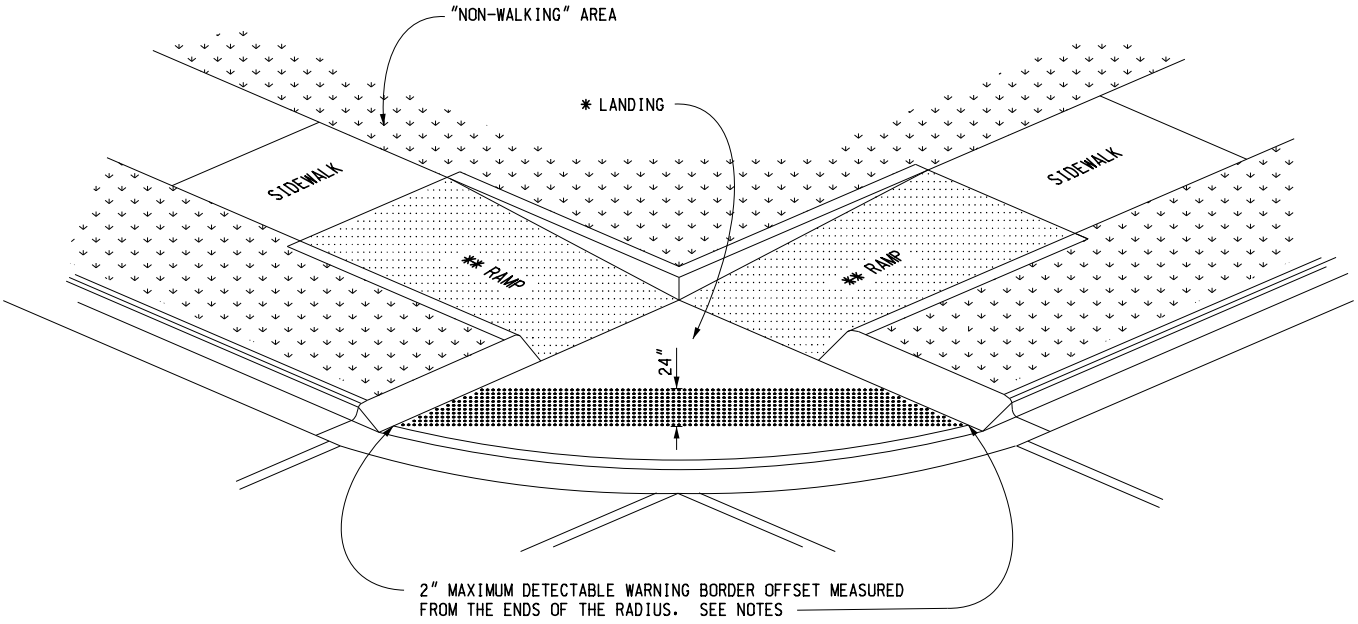
F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 3 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)



(TANGENT DETECTABLE WARNING SHOWN)

SIDEWALK RAMP TYPE D

(DEPRESSED CORNER)

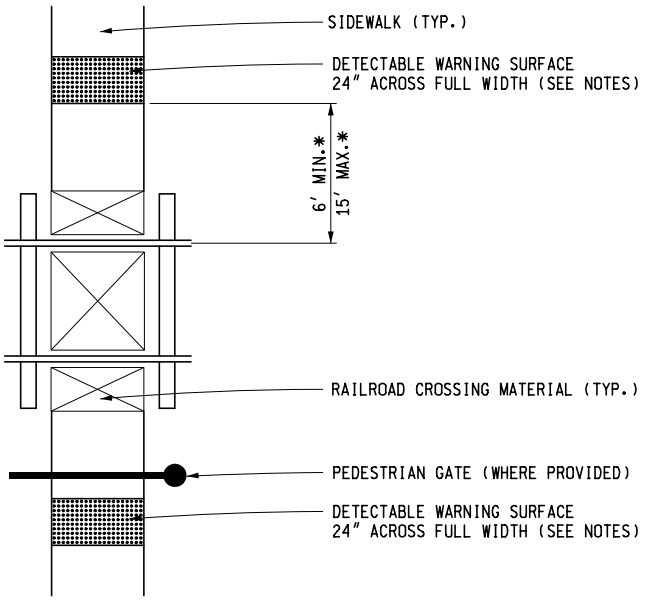
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

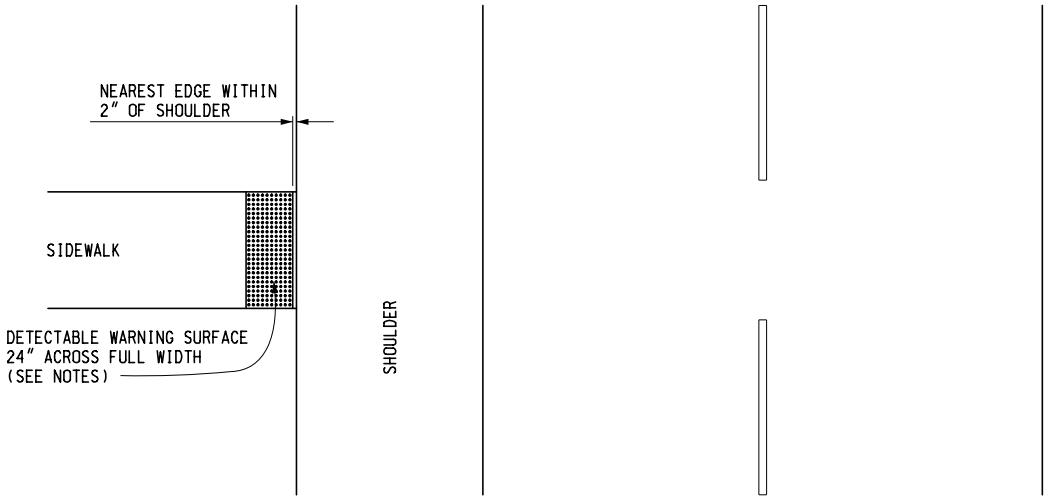
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 4 OF 7

* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6′ MINIMUM AND 15′ MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING

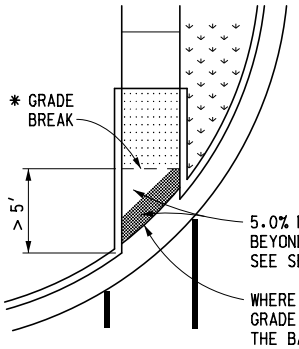


DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

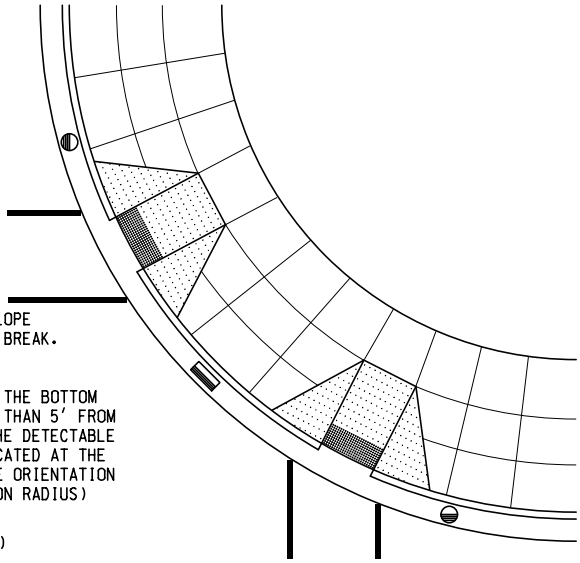
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 5 OF 7



SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET GREATER THAN 5')

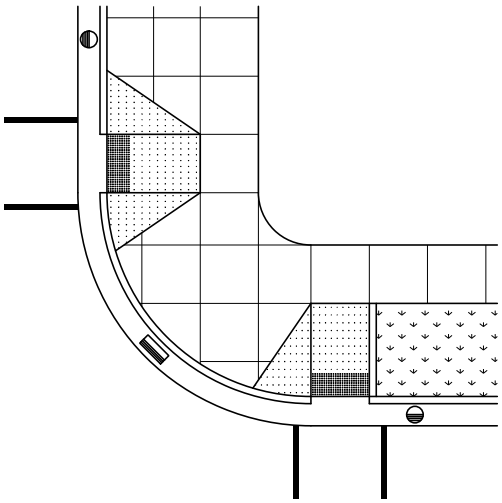


SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)

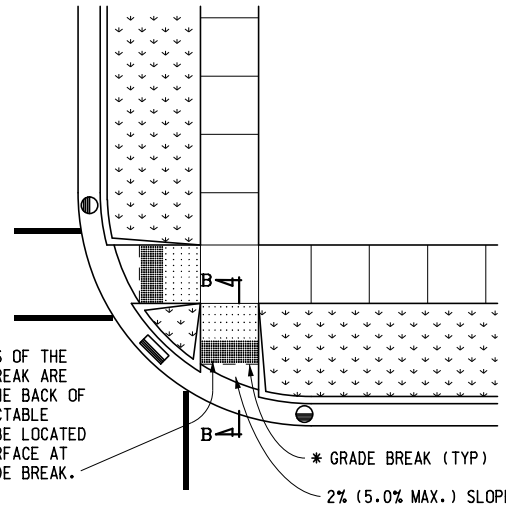
(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)

LEGEND

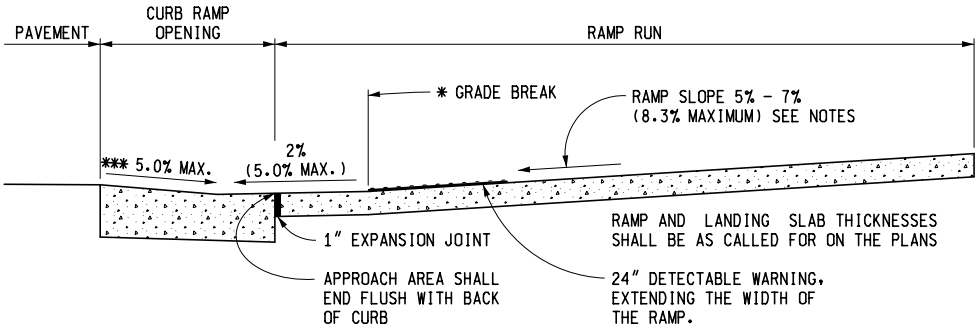
- SLOPED SURFACE
- DETECTABLE WARNING
- "NON-WALKING" AREA
- CROSSWALK MARKING
- PREFERRED LOCATION OF DRAINAGE INLET (TYP.)
- ALTERNATE LOCATION OF DRAINAGE INLET (TYP.)



SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)



SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET LESS THAN 5')



* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

SEE SHEET 2 FOR CURB RAMP OPENING DETAILS.

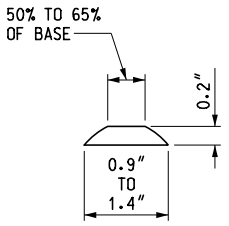
SECTION B-B

SIDEWALK RAMP ORIENTATION

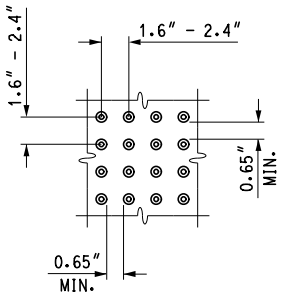
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

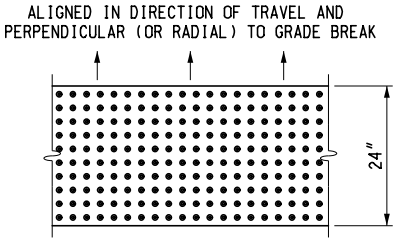
F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 6 OF 7



DOME SECTION



DOME SPACING



DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5′ MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4′ AND LANDINGS TO NOT LESS THAN 4′ x 4′.

CURB RAMPS WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24″ MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2″ MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½″. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

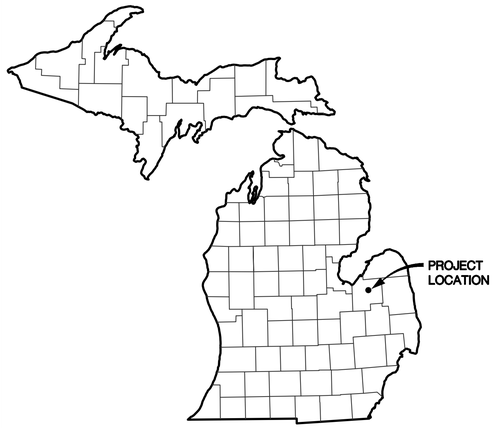
F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 7 OF 7

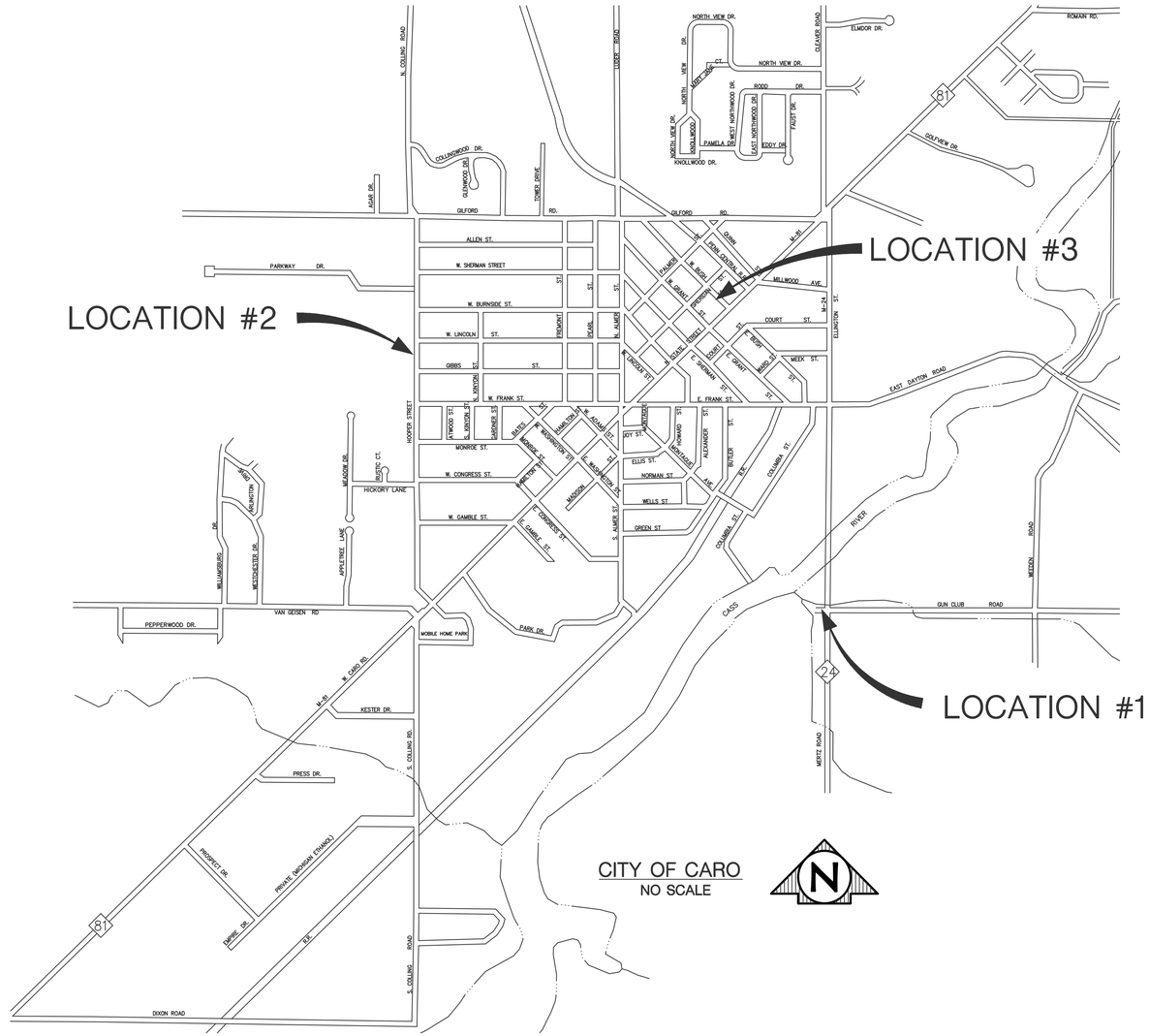
CONSTRUCTION PLAN FOR

CITY OF CARO

CARO, MICHIGAN

2020 SIDEWALK PROJECT





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5	LOCATION #3 – W. BUSH STREET PLAN SHEET

PROJECT SCOPE

LOCATION #1:
CONCRETE ADA RAMP CONSTRUCTION FOR FUTURE HMA TRAILWAY PROJECT AT CHIPPEWA PARK.

LOCATION #2:
REMOVE AND REPLACE EXISTING CONCRETE SIDEWALK ALONG HOOPER STREET IN FRONT OF CARO SCHOOLS

LOCATION #3:
REMOVE AND REPLACE EXISTING CURB AND GUTTER AND CONSTRUCTION OF A NEW DRIVEWAY ALONG W. BUSH STREET INTO A VACANT LOT TO BE USED FOR ATWOOD PARK PARKING. ALSO INCLUDED IS NEW SIDEWALK ALONG THE STREET.

PROJECT CONTACT

MATTHEW LANE, CITY MANAGER
CITY OF CARO
317 S STATE STREET
CARO MI 48723
989-673-7671

UTILITIES

THE EXISTING UTILITIES LISTED BELOW AND SHOWN ON THESE PLANS REPRESENT THE BEST INFORMATION AVAILABLE. THIS INFORMATION DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO BE SATISFIED AS TO IT'S ACCURACY AND THE LOCATION OF EXISTING UTILITIES.

NAME OF OWNER	CONTACT	TYPE OF UTILITY
DTE ENERGY 4100 DOERR ROAD CASS CITY, MI 48726	LISA GREMEL (989) 872-6188	ELECTRIC
CONSUMERS ENERGY 2400 WEISS ST. SAGINAW, MI 48602	JOE RODEA (989) 213-3044	GAS
CENTURY LINK 100 W SECOND STREET PINCONNING, MI 48650 PO BOX 389	BILL MARCHAND (989) 879-8709	TELEPHONE
CHARTER COMMUNICATION 1480 VALLEY CENTER DR. BAY CITY, MI 48706	MARK KELLY (989) 233-9404	CABLE
CITY OF CARO DPW 317 S. STATE STREET CARO, MI 48723	JEFF GRAHAM (989) 928-9198	WATER AND SEWERS

Know what's **below.**
Call before you dig.

PLAN SUBMITTALS AND CHANGES

BIDDING DOCUMENTS

DATE	DESCRIPTION
6-8-2020	ISSUED FOR BIDS

PLAN DATE: JUNE 2020
PROJECT MGR: MCC
REVIEWER: DPS
SCALE: NO SCALE

ROWE PROFESSIONAL SERVICES COMPANY
O: (810) 664-9411
F: (810) 664-3451
www.rowepsc.com
128 N. Saginaw Street
Lapeer, MI 48446

PREPARED FOR
CITY OF CARO
2020 SIDEWALK PROJECT
PROPOSED SIDEWALK AND SIDEWALK REPAIRS
COVER SHEET

REV:

SHT# 1 OF 5

JOB No: 16L0004

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GENERAL CONSTRUCTION NOTES

EMERGENCY CONTACTS
BEFORE BEGINNING WORK ON THE PROJECT, THE CONTRACTOR SHALL PROVIDE THE OWNER WITH THE NAMES AND TELEPHONE NUMBERS OF EMERGENCY CONTACTS. AT LEAST ONE PERSON REPRESENTING THE CONTRACTOR SHALL BE AVAILABLE TO RESPOND TO EMERGENCIES THROUGHOUT THE LIFE OF THE PROJECT, 24 HOURS A DAY, 7 DAYS A WEEK.

UNDERGROUND UTILITY IDENTIFICATION AND LOCATION
THE CONTRACTOR SHALL CALL MISS DIG (1-800-482-7171) A MINIMUM OF THREE WORK DAYS IN ADVANCE OF BEGINNING EXCAVATION. THE CONTRACTOR IS RESPONSIBLE TO IDENTIFY AND NOTIFY UTILITY AGENCIES WITHIN THE PROJECT AREA WHICH DO NOT PARTICIPATE IN THE MISS DIG NOTIFICATION PROGRAM. THE CONTRACTOR SHALL EXCAVATE AND LOCATE ALL EXISTING UTILITIES IN THE PROJECT AREA IN ADVANCE OF CONSTRUCTION TO VERIFY THEIR ACTUAL LOCATION.

PUBLIC UTILITIES
EXISTING UTILITIES ARE SHOWN BASED UPON RECORDS AND LOCATIONS PROVIDED BY UTILITY AGENCIES. THE INFORMATION SHOWN IS CONSIDERED APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR. UNLESS THE PLANS SPECIFICALLY SHOW THAT EXISTING UTILITIES ARE TO BE MOVED, THE CONTRACTOR IS RESPONSIBLE TO PROTECT AND MAINTAIN EXISTING UTILITIES. POTENTIAL CONFLICTS SHALL BE REPORTED TO THE OWNER. THE CONTRACTOR SHALL MAKE SUCH CHANGES TO GRADE AND ALIGNMENT OF PROPOSED WORK AS DIRECTED BY THE OWNER TO AVOID CONFLICTS, AT NO INCREASE IN COST TO THE OWNER.

MAINTAINING TRAFFIC
LOCAL AND EMERGENCY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES WITHIN THE PROJECT AREA.

WHEN EXCAVATION, FRESH CONCRETE, OR OTHER CONSTRUCTION WORK WILL RESULT IN THE CLOSURE OF A STREET OR DRIVEWAY FOR A PERIOD OF TIME, THE CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL AFFECTED RESIDENTS AND BUSINESSES IN ADVANCE.

THE CONTRACTOR SHALL NOTIFY EMERGENCY RESPONSE AGENCIES IN ADVANCE OF ROAD CLOSURES OR THE ESTABLISHMENT OF DETOURS.

CONSTRUCTION SIGNING AND BARRICADING
THE CONTRACTOR SHALL PROTECT HAZARDOUS AREAS WITH BARRICADES. BARRICADES LEFT IN PLACE AFTER SUNSET SHALL BE LIGHTED.

THE CONTRACTOR SHALL PROVIDE SUITABLE SANDBAGS OR OTHER SUITABLE MEASURES FOR ANCHORING OF TEMPORARY SIGNS AND BARRICADES, TO PREVENT THEIR TIPPING OR DISPLACEMENT BY WIND OR AIR FLOW FROM VEHICLES.

THE CONTRACTOR SHALL PROVIDE SIGNING, BARRICADES, FLAGGERS, CONES, AND OTHER TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCY HAVING JURISDICTION OVER STREETS OR ROADS IN THE PROJECT AREA, THE CURRENT MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND THE PLANS AND SPECIFICATIONS.

THE CONTRACTOR SHALL COVER OR REMOVE TEMPORARY SIGNS DURING PERIODS WHEN THEY ARE NOT APPROPRIATE.

PROTECTION OF TREES, SHRUBS, AND LANDSCAPING
ALL TREES, SHRUBS, AND LANDSCAPING WITHIN THE CONSTRUCTION AREA WHICH ARE NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. DAMAGED TREES, SHRUBS, AND LANDSCAPING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

TURF ESTABLISHMENT
ALL DISTURBED AREAS SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE, TOP SOILED WITH SCREENED TOPSOIL, SEEDED AND MULCHED. SEED AND MULCH ITEM SHALL CONSIST OF 4" OF TOPSOIL, 220# PER ACRE OF SEED MIX, 240# PER ACRE OF CHEMICAL FERTILIZER NUTRIENTS, IN EQUAL PROPORTIONS OF NITROGEN, PHOSPHORIC ACID AND POTASH. MULCH SHALL BE PLACED AT THE RATE OF 2 TONS PER ACRE.

THE CONTRACTOR IS RESPONSIBLE TO ESTABLISH TURF WHICH IS SUBSTANTIALLY FREE OF BARE SPOTS AND FREE OF WEEDS. THE GROUND SURFACE IN TURF AREAS SHALL BE SMOOTH AND PROVIDE A NATURAL TRANSITION TO ADJACENT, UNDISTURBED AREAS. WATERING, WEEDING, RESEEDING, MOWING, AND REWORKING SHALL BE PROVIDED AS NECESSARY TO ESTABLISH TURF AREAS TO THE REQUIRED STANDARD.

MULCH BLANKETS SHALL BE UTILIZED ON ALL SLOPES THAT EXCEED 3:1 GRADE. CONTRACTOR SHALL REMOVE NETTING ONCE TURF HAS BEEN ESTABLISHED.

ADA COMPLIANCE
ALL PROPOSED CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT (ADA), AND APPLICABLE GUIDELINES OR STANDARDS. WHERE EXISTING CONDITIONS AND/OR THE REQUIREMENTS OF THE PLANS WILL RESULT IN FINISHED CONDITIONS THAT DO NOT MEET THE ADA REQUIREMENTS, GUIDELINES, OR STANDARDS; THE CONTRACTOR SHALL NOTIFY THE OWNER BEFORE PROCEEDING WITH CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO REMOVE AND REPLACE WORK DETERMINED TO BE NOT IN ACCORDANCE WITH APPLICABLE REQUIREMENTS, GUIDELINES, OR STANDARDS.

EARTHWORK
THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF THE EARTHWORK QUANTITIES, AND BASE THEIR BID ON THEIR OWN DETERMINATION OF THE QUANTITIES OF WORK REQUIRED. IF ADDITIONAL FILL MATERIAL MUST BE PROVIDED TO ATTAIN THE FINISH GRADES SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE THE REQUIRED FILL MATERIAL. EXCESS SOILS RESULTING FROM EXCAVATION AND EARTHWORK SHALL BECOME THE CONTRACTOR'S PROPERTY AND DISPOSED OF PROPERLY.

BACKFILL AND EMBANKMENT
BACKFILL OF AN EXCAVATION UNDER OR WITHIN THE ONE ON ONE INFLUENCE OF AN EXISTING OR PROPOSED ROAD, SIDEWALK, DRIVEWAY, PAVEMENT, OR AGGREGATE SURFACE, SHALL BE SAND, MEETING THE REQUIREMENTS OF GRANULAR MATERIAL CLASS II AS DESCRIBED IN THE 2012 MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION. THE SAND BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT. BACKFILL OF AN EXCAVATION WHICH IS NOT UNDER OR WITHIN THE ONE ON ONE INFLUENCE OF AN EXISTING OR PROPOSED ROAD, SIDEWALK, DRIVEWAY, PAVEMENT, OR AGGREGATE SURFACE MAY BE SUITABLE EXCAVATED MATERIAL OR OTHER SOIL, WHICH IS FREE OF ORGANIC MATTER, STONES AND ROCKS, ROOTS, BROKEN CONCRETE, FROZEN MATERIAL, OR DEBRIS. THE BACKFILL SHALL BE COMPACTED TO AT LEAST 90% OF ITS MAXIMUM UNIT WEIGHT.

THE CONTRACTOR SHALL INDICATE THE SOURCE OF SAND USED FOR BACKFILL TO THE OWNER, AND PROVIDE THE OWNER WITH THE RESULTS OF A GRADATION TEST PERFORMED ON A SAMPLE OF THE SAND. THE CONTRACTOR SHALL NOTIFY THE OWNER IN ADVANCE OF USING SAND FROM OTHER SOURCES.

EMBANKMENT USED TO BUILD THE SUBGRADE TO REQUIRED ELEVATION SHALL BE SUITABLE SOIL EXCAVATED FROM THE PROJECT SITE, OR FURNISHED BY THE CONTRACTOR FROM OTHER SOURCES. SUITABLE SOIL IS FREE FROM ORGANIC MATTER, ROCKS AND STONES, FROZEN MATERIAL, BROKEN CONCRETE, AND DEBRIS. EMBANKMENT CONSTRUCTED OF GRANULAR SOILS SHALL BE COMPACTED IN LIFTS NOT EXCEEDING 12 INCHES TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT. EMBANKMENT CONSTRUCTED OF COHESIVE SOILS SHALL BE COMPACTED IN LIFTS NOT EXCEEDING 10 INCHES TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

CONTRACTOR SHALL REMOVE ALL UNSUITABLE SOIL INCLUDING MUCK, PEAT, AND MARL, AS WELL AS BRUSH, TREES, TREE STUMPS AND ROOTS, AND SIMILAR MATERIALS. THESE AREAS SHALL THEN BE BACKFILLED WITH GRANULAR MATERIAL TO PROVIDE A STABLE SUBGRADE. IF ANY UNSTABLE GRADE IS ENCOUNTERED, THE CONTRACTOR SHALL USE CONSTRUCTION METHODS WHICH WILL CAUSE THE LEAST AMOUNT OF BASE DAMAGE. BASE CORRECTIONS WILL BE MADE AT THE DIRECTION OF THE OWNER AND ADDITIONAL COSTS TO BE AGREED ON IN ADVANCE.

THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN THE MOISTURE CONTENT OF SUBGRADE SOILS WITHIN A SUITABLE RANGE TO ALLOW FOR COMPACTION TO THE REQUIRED DENSITY. WHEN THE SOIL IS TOO DRY, THE CONTRACTOR SHALL ADD WATER. WHEN THE SOIL IS TOO WET, THE CONTRACTOR SHALL PROVIDE DRAINAGE OR AERATE THE SOIL. THE SURFACE OF THE SUBGRADE SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT, PRIOR TO CONSTRUCTING FILLS, SUBBASE, OR PAVEMENTS.

DRAINAGE
THE CONTRACTOR SHALL MAINTAIN DRAINAGE OF THE PROJECT AREA AND ADJACENT AREAS. WHERE EXISTING DRAINAGE FACILITIES ARE DISTURBED OR BLOCKED BY CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY PROVISIONS FOR DRAINAGE.

WHERE CONSTRUCTION HAS DISTURBED EXISTING DITCHES, SWALES, OR OTHER DRAINAGE FACILITIES; THE CONTRACTOR SHALL RESTORE THEM TO THEIR GRADES AND DIMENSIONS WHICH EXISTED PRIOR TO THE BEGINNING OF CONSTRUCTION, UNLESS DIRECTED OTHERWISE.

DRAINAGE SHALL NOT BE REROUTED ONTO ADJACENT PROPERTIES NOR ALLOWED TO DRAIN ONTO ADJACENT PROPERTIES AT AN INCREASED RATE, AS A RESULT OF THE CONTRACTOR'S WORK.

PAVEMENTS
ALL EDGES OF EXISTING PAVEMENT AND SIDEWALK TO BE MATCHED SHALL BE NEATLY SAW CUT, TRIMMED, AND THOROUGHLY CLEANED PRIOR TO PLACEMENT OF NEW PAVEMENT.

THE PAVEMENT SUBGRADE AND SIDEWALK SUBGRADE SHALL BE COMPACTED TO A MINIMUM OF 95% OF MAXIMUM DENSITY.

SIDEWALK CONSTRUCTION
SIDEWALKS SHALL BE CONSTRUCTED TO PROVIDE POSITIVE DRAINAGE OF THE SIDEWALK AND ADJACENT SURFACES.

EXCEPT WHERE NECESSARY TO PROVIDE POSITIVE DRAINAGE OR MEET EXISTING SURFACES, SIDEWALK SHALL BE CONSTRUCTED WITH A CROSS SLOPE SLOPED TOWARD THE STREET. SLOPES SHALL NOT EXCEED 2%

IN TURF AREAS, THE SURFACE OF THE SIDEWALK SHALL BE ABOUT 1/4 INCH HIGHER THAN THE ADJACENT GROUND SURFACES, EXCEPT WHERE NECESSARY TO PROVIDE POSITIVE DRAINAGE OR MEET EXISTING SIDEWALKS, CURBS, OR PAVEMENTS.

SIDEWALK SHALL BE CONSTRUCTED ON A SAND BASE, COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

THE CONTRACTOR SHALL NOTIFY THE OWNER WHEN SIDEWALK FORMS HAVE BEEN SET AND THE SAND BASE PREPARED. CONCRETE SHALL NOT BE PLACED UNTIL THE OWNER HAS OBSERVED THE FORMS. CONCRETE DELIVERY SHALL BE SCHEDULED TO ALLOW SUFFICIENT TIME FOR ADJUSTMENT OF THE FORMS, IN THE EVENT THAT ADJUSTMENT IS NECESSARY.

THE CONTRACTOR SHALL PROTECT FRESH CONCRETE FROM DAMAGE BY THE WEATHER, TRAFFIC, OR VANDALISM. DAMAGED CONCRETE SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

PERMITS
ALL WORK SHOWN ON THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND ISSUED PERMITS FROM THE PERMITTING AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PERMIT FEES.

MISCELLANEOUS
MIOSHA SAFETY REQUIREMENTS – ALL WORK, WORK PRACTICE, AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE STATE AND FEDERAL SAFETY, OCCUPATIONAL, HEALTH AND ENVIRONMENTAL REGULATIONS AND ALSO NFPA AND ANSI CODES AS APPLICABLE. ALL WORK INSIDE A CONFINED SPACE SUCH AS MANHOLES OR OTHER UNDERGROUND STRUCTURES SHALL BE COORDINATED WITH THE UTILITY OWNER AND ALL WORKER SAFETY REQUIREMENTS STRICTLY ENFORCED.

PROTECTION OF HAZARDOUS AREAS – EXCAVATION AND HAZARDOUS AREAS SHALL BE PROTECTED BY BARRICADES OR SNOW FENCE. BARRICADES LEFT IN PLACE AT NIGHT SHALL BE LIGHTED.

DISCREPANCIES – WHERE A DISCREPANCY OCCURS BETWEEN FIELD CONDITIONS AND PROPOSED WORK, THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY FOR CLARIFICATION.

SOIL EROSION & SEDIMENTATION CONTROL
ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE COUNTY SOIL EROSION DEPARTMENT.

DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR FOR EFFECTIVENESS OF THE EROSION AND SEDIMENT CONTROL MEASURES, AND ANY NECESSARY REPAIRS SHALL BE MADE WITHOUT DELAY.

EROSION AND SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT BE ALLOWED TO COLLECT ON ANY OFF SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES, AND PONDS.

THE CONTRACTOR SHALL APPLY TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES WHEN REQUIRED AND AS DIRECTED ON THESE PLANS. THE CONTRACTOR SHALL REMOVE TEMPORARY MEASURES AS SOON AS PERMANENT STABILIZATION OF SLOPES, DITCHES, AND OR EARTH CHANGES HAVE BEEN ACCOMPLISHED.

STAGING OF THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THE PLANS AND AS REQUIRED TO INSURE PROGRESSIVE STABILIZATION OF THE DISTURBED EARTH.

SOIL EROSION CONTROL PRACTICES WILL BE ESTABLISHED PRIOR TO CONSTRUCTION BY THE CONTRACTOR. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTATION OF SILT OFF THE SITE.

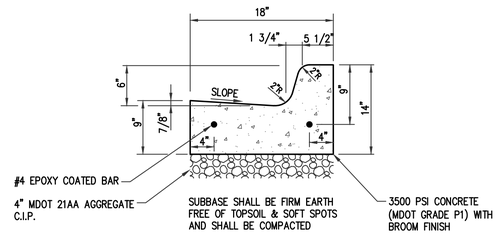
ALL MUD/DIRT TRACKED ONTO EXISTING PUBLIC ROADS FROM THIS SITE DUE TO THE CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR/BUILDER.

ALL SLOPES 3:1 OR STEEPER SHALL BE STABILIZED WITH PEGGED SOD OR SEED AND MULCH SECURED WITH EROSION MATTING FOLLOWING MASS GRADING OPERATIONS.

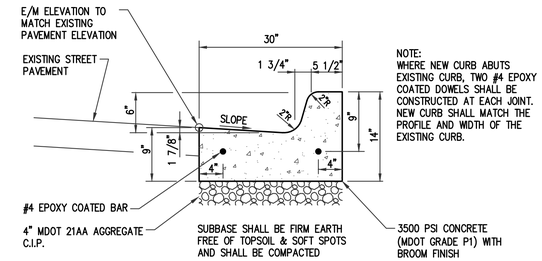
VEGETATION MUST BE ACCEPTABLY ESTABLISHED AND ALL TEMPORARY SOIL EROSION CONTROL MEASURES MUST BE REMOVED PRIOR TO ACCEPTANCE AND FINAL RELEASE OF THE CONSTRUCTION GUARANTEE BY THE COUNTY SOIL EROSION SEDIMENTATION CONTROL AGENT.

CATCH BASINS WITHIN PROJECT LIMITS AND ADJACENT CATCH BASINS DOWN GRADIENT FROM PROJECT LIMITS SHALL HAVE SESC MEASURE #36 INSTALLED UNTIL RESTORATION IS COMPLETE OR UNTIL CATCH BASIN IS REMOVED.

THE CONTRACTOR SHALL PLACE INLET PROTECTION ON ALL DRAINAGE STRUCTURES AND ROUTINELY CLEAN/CHANGE SILT SACKS UNTIL TIME THAT THE PAVING AND SLOPE RESTORATION IS COMPLETED.

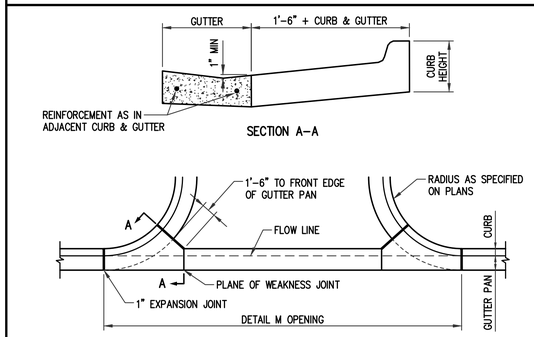


MDOT F2 CONCRETE CURB & GUTTER DETAIL

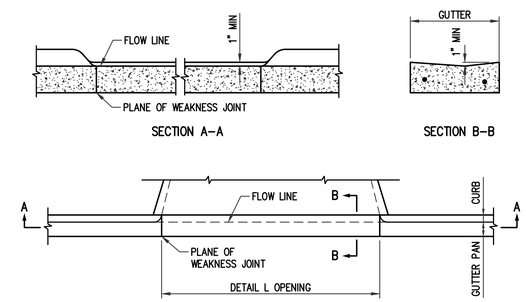


NOTE:
WHERE NEW CURB ABUTS EXISTING CURB, TWO #4 EPOXY COATED DOWELS SHALL BE CONSTRUCTED AT EACH JOINT. NEW CURB SHALL MATCH THE PROFILE AND WIDTH OF THE EXISTING CURB.

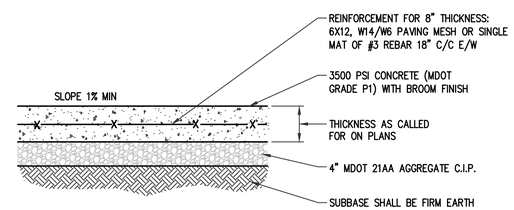
MDOT F6 CONCRETE CURB & GUTTER DETAIL



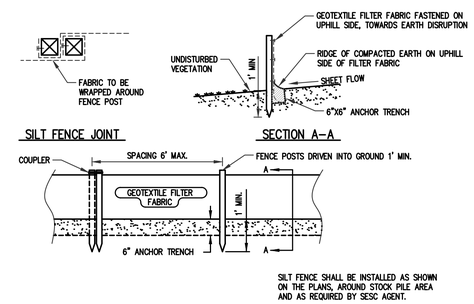
MDOT DRIVEWAY OPENING - DETAIL M



MDOT DRIVEWAY OPENING - DETAIL L

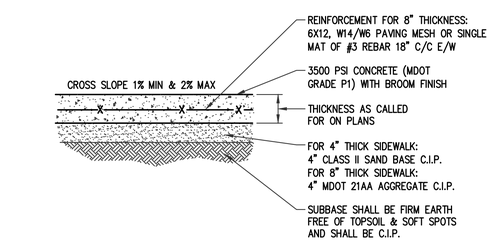


CONCRETE PAVEMENT CROSS SECTION



SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE PLANS, AROUND STOCK PILE AREA AND AS REQUIRED BY SESC AGENT.

SILT FENCE DETAIL



NOTE: SIDEWALK FLAGS SHALL BE EQUAL TO THE WIDTH
PROVIDE EXPANSION JOINTS EVERY 50 FEET AND AT
CHANGES IN DIRECTION

CONCRETE SIDEWALK CROSS SECTION

Know what's **below.**
Call before you dig.

PLAN SUBMITTALS AND CHANGES

BIDDING DOCUMENTS	
DATE	DESCRIPTION
6-8-2020	ISSUED FOR BIDS

PLAN DATE: JUNE 2020
PROJECT MGR: MCC
REVIEWER: DPS
SCALE: NO SCALE

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PREPARED FOR
CITY OF CARO
2020 SIDEWALK PROJECT
PROPOSED SIDEWALK AND SIDEWALK REPAIRS
MISCELLANEOUS NOTE AND DETAIL SHEET

REV:

SHT# 2 OF 5

JOB No: 16L0004

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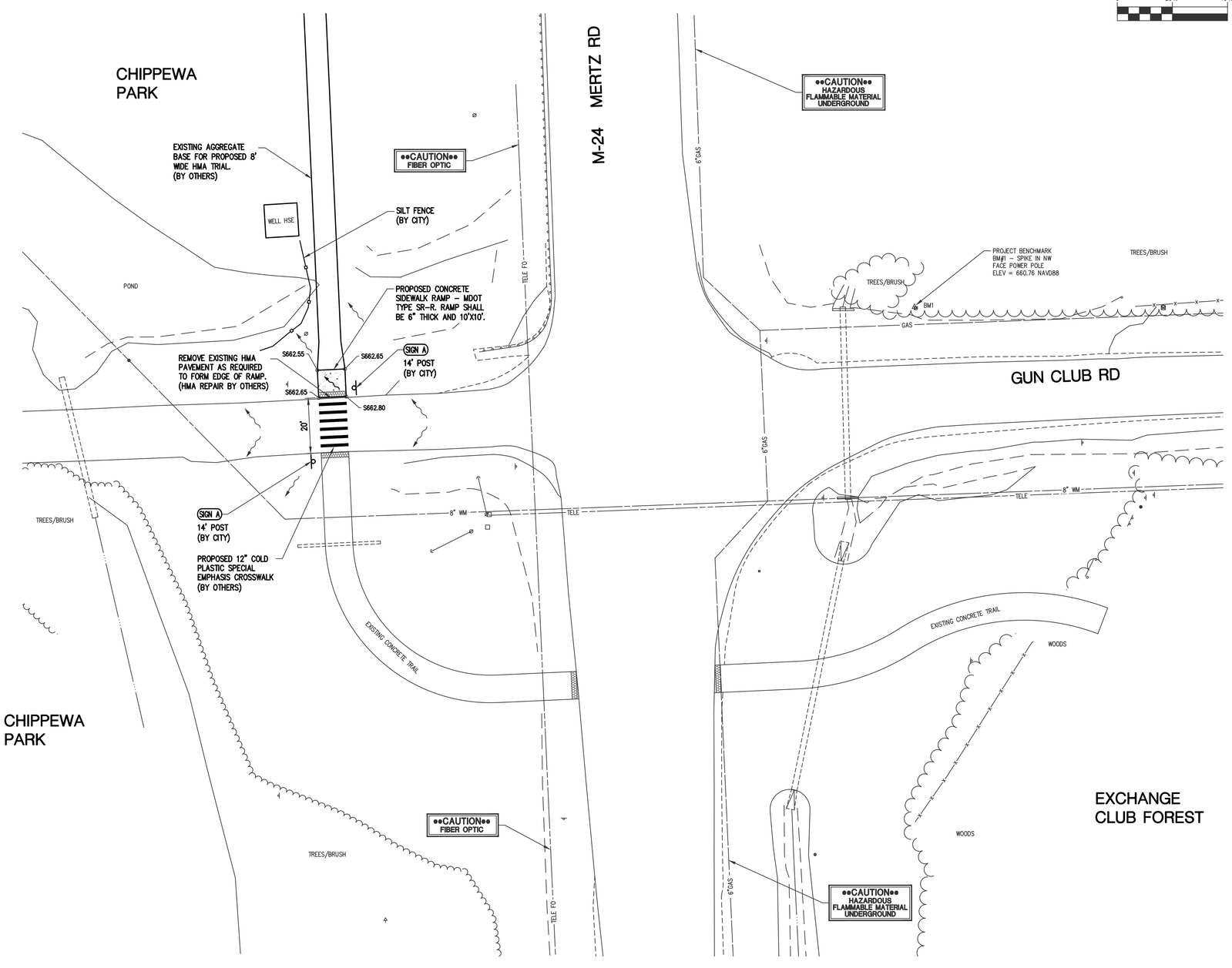

EXISTING TOPOGRAPHY NOTE:
EXISTING TOPOGRAPHY AND BASE PLAN INFORMATION OBTAINED FROM PREVIOUS M-24 PEDESTRIAN CROSSING PROJECT – ROWE JOB #17L0115

MISCELLANEOUS NOTES

1. SEE MISCELLANEOUS NOTE AND DETAIL SHEET FOR DETAILS OF PROPOSED WORK.
2. PROPOSED PAVEMENT, SIDEWALKS, ETC. ELEVATIONS SHALL MATCH EXISTING GRADE WHERE ABUTTING EXISTING MATERIALS TO REMAIN.
3. CONTRACTOR TO MAINTAIN TRAFFIC DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN PRIOR TO CONSTRUCTION.
4. ALL DISTURBED AREAS NOT HARD SURFACED SHALL BE RESTORED WITH TURF (4" OF TOPSOIL, SEED, FERTILIZER AND MULCH).

PROPOSED LEGEND

S976.00 PROPOSED SIDEWALK ELEVATION

PROPOSED DRAINAGE FLOW DIRECTION

PROPOSED SIGN "A"

2 REQ'D

NOTES:

1. ALL SIGNS SHALL BE INSTALLED ACCORDING TO THE CURRENT EDITION OF "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND THE CURRENT EDITION OF MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) "STANDARD SPECIFICATIONS FOR CONSTRUCTION."
2. REFLECTIVE SHEETING SHALL BE HIGH INTENSITY PRISMATIC FOR ALL SIGNS.
3. SIGN POSTS SHALL BE 3 LBS/FT GALVANIZED STEEL AND DRIVEN 42"± PER MDOT DETAIL SIGN-200.
4. SIGN CLEARANCES AND HEIGHT SHALL BE PER MDOT DETAIL SIGN-120.

PERMANENT SIGNAGE DETAILS

(TO BE CONSTRUCTED BY CITY)

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PLAN SUBMITTALS AND CHANGES

BIDDING DOCUMENTS

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6-8-2020	ISSUED FOR BIDS

PLAN DATE: JUNE 2020
PROJECT MGR: MCC
REVIEWER: DPS
SCALE: 1" = 20'

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PROPOSED SIDEWALK AND SIDEWALK REPAIRS
LOCATION #1 - CHIPPEWA PARK PLAN SHEET

REV:

SHT# 3 OF 5

JOB No: 16L0004

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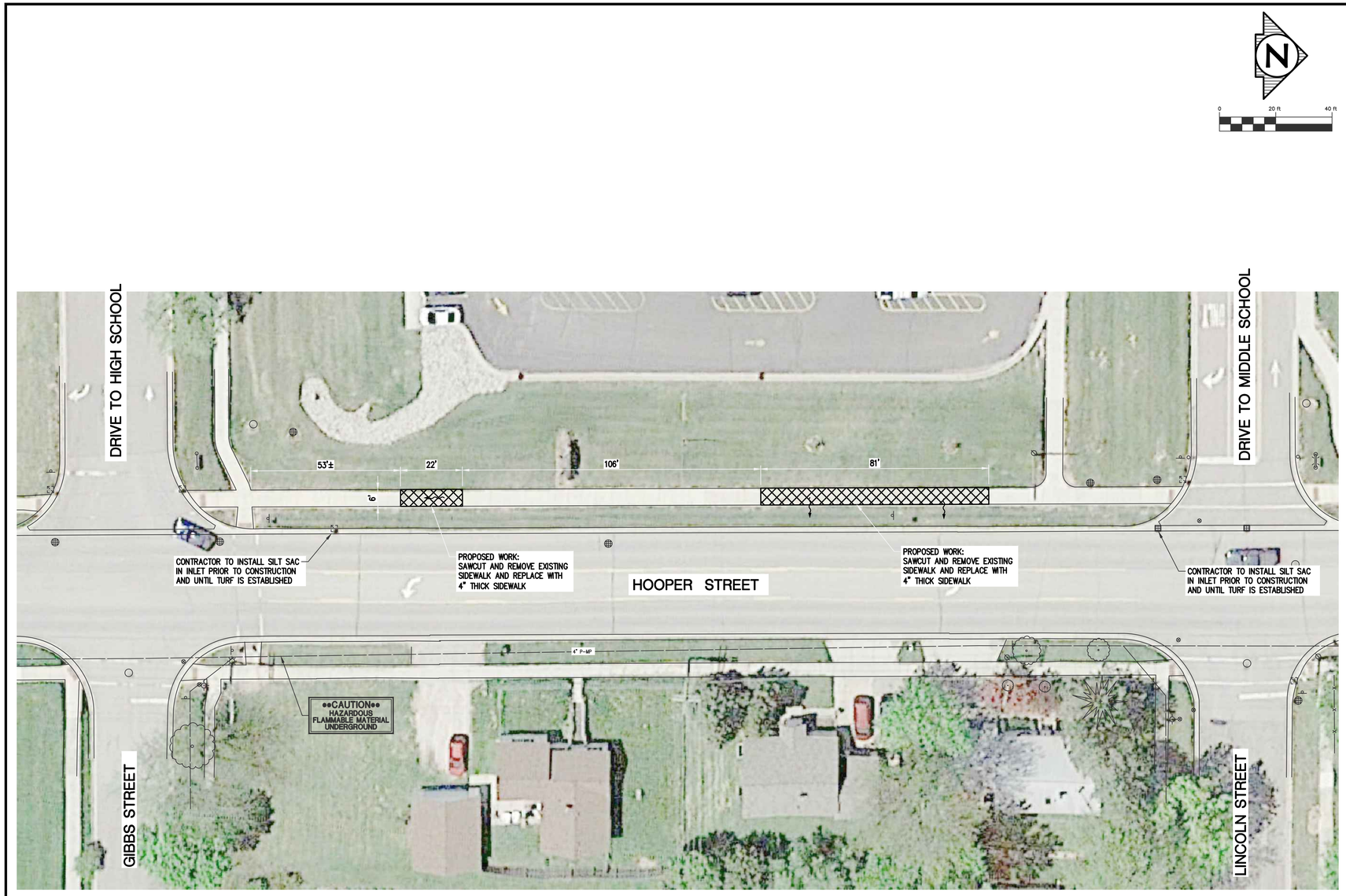

EXISTING TOPOGRAPHY NOTE:
EXISTING TOPOGRAPHY AND BASE PLAN INFORMATION OBTAINED FROM PREVIOUS HOOPER STREET PROJECT – ROWE JOB #09L0039

MISCELLANEOUS NOTES

1. SEE MISCELLANEOUS NOTE AND DETAIL SHEET FOR DETAILS OF PROPOSED WORK.
2. PROPOSED PAVEMENT, SIDEWALKS, ETC. ELEVATIONS SHALL MATCH EXISTING GRADE WHERE ABUTTING EXISTING MATERIALS TO REMAIN.
3. CONTRACTOR TO MAINTAIN TRAFFIC DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN PRIOR TO CONSTRUCTION.
4. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO BEGINNING WORK ON THE PROJECT.
5. ALL DISTURBED AREAS NOT HARD SURFACED SHALL BE RESTORED WITH TURF (4" OF TOPSOIL, SEED, FERTILIZER AND MULCH).

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PLAN SUBMITTALS AND CHANGES	
BIDDING DOCUMENTS	
DATE	DESCRIPTION
6-8-2020	ISSUED FOR BIDS

PLAN DATE: JUNE 2020
PROJECT MGR: MCC
REVIEWER: DPS
SCALE: 1" = 20'

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LOCATION #2 - HOOPER STREET PLAN SHEET

REV:

SHT# 4 OF 5

JOB No: 16L0004

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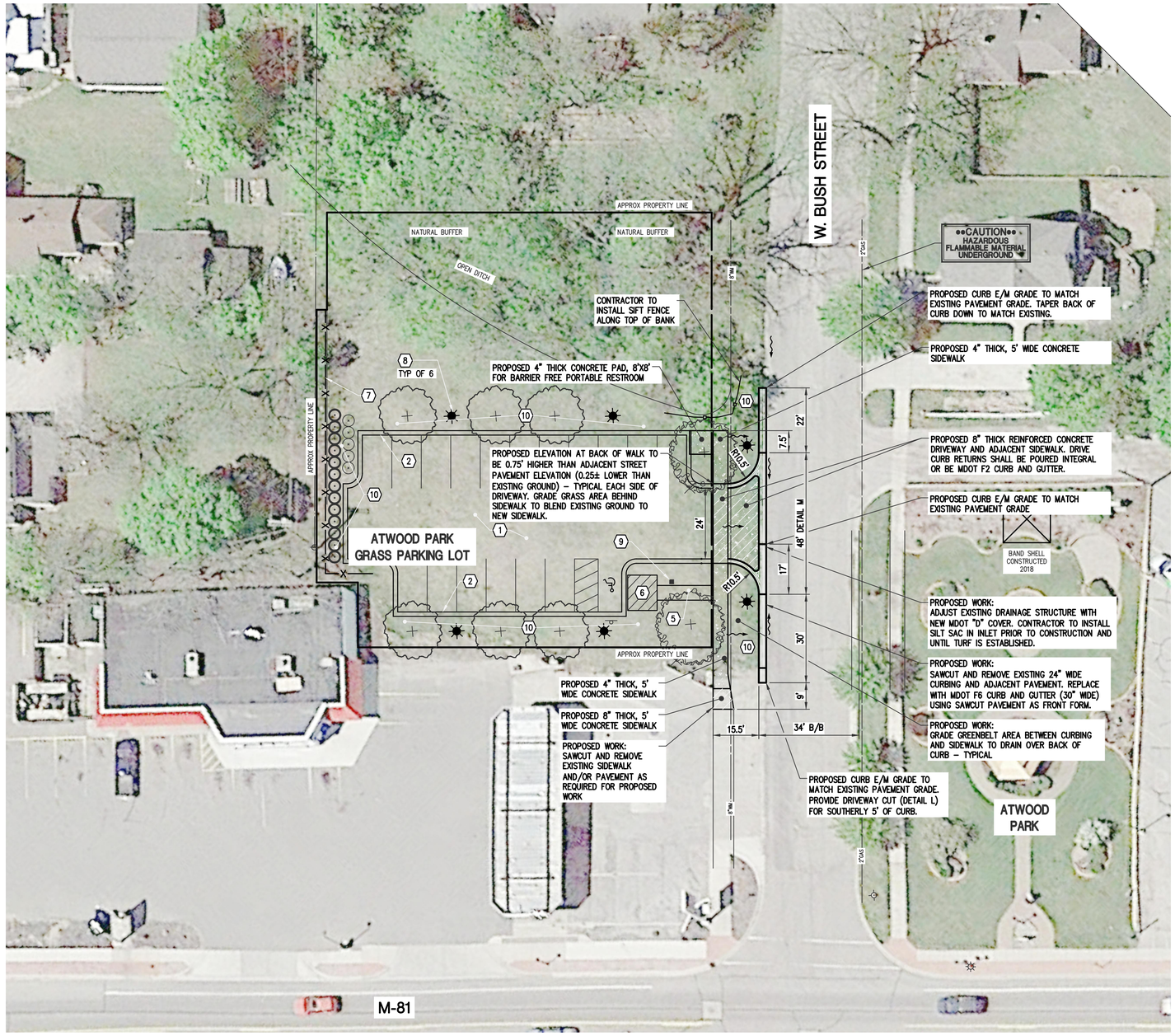

EXISTING BASE PLAN NOTE:
EXISTING BASE PLAN INFORMATION AND FUTURE IMPROVEMENTS OBTAINED FROM PREVIOUS CARO DDA PROJECT – ROWE JOB #19L0052

ATWOOD PARK PARKING LOT - FUTURE IMPROVEMENT LEGEND

FOR REFERENCE ONLY

1. HMA PARKING LOT – 18 SPACES INCLUDING ONE ADA
2. CONCRETE CURB & GUTTER
5. CONCRETE SIDEWALK
6. PORTABLE RESTROOM SHELTER, 10'x12' W/ METAL ROOF & CONC FLOOR
7. 6' HIGH VINYL PRIVACY FENCE
8. DECORATIVE LIGHTING
9. DRINKING FOUNTAIN
10. LANDSCAPING / GREENBELT / GREEN SPACE

MISCELLANEOUS NOTES

1. SEE MISCELLANEOUS NOTE AND DETAIL SHEET FOR DETAILS OF PROPOSED WORK.
2. PROPOSED CURB & GUTTER FLOW LINE SHALL MATCH EXISTING FLOW LINE WHERE CONNECTING TO EXISTING CURB & GUTTER.
3. PROPOSED PAVEMENT, SIDEWALKS AND ETC. ELEVATIONS SHALL MATCH EXISTING GRADE WHERE ABUTTING EXISTING MATERIALS TO REMAIN.EXISTING MATERIALS TO REMAIN.
4. SIDEWALK THRU DRIVEWAY – PROVIDE CONSTRUCTION JOINT (BREAK IN GRADE) IN CONCRETE DRIVEWAY AT FRONT OF SIDEWALK LINE EXTENDED ACROSS DRIVEWAY OPENING TO CREATE A SIDEWALK MEETING MINIMUM AND MAXIMUM CROSS SLOPES.
5. CONTRACTOR TO MAINTAIN TRAFFIC DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN PRIOR TO CONSTRUCTION.
6. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO BEGINNING WORK ON THE PROJECT.
7. ALL DISTURBED AREAS NOT HARD SURFACED SHALL BE RESTORED WITH TURF (4" OF TOPSOIL, SEED, FERTILIZER AND MULCH).

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PLAN SUBMITTALS AND CHANGES

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PLAN DATE: JUNE 2020
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LOCATION #3 - W. BUSH STREET PLAN SHEET

REV:

SHT# 5 OF 5
JOB No: 16L0004

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