CITY OF McALLEN

DEPARTMENT OF PUBLICWORKS AUTOMOTIVE WAREHOUSE EXPANSION AND ELEVATOR

PROJECT NO.: 07-19-C30-324

BID OPENING DATE: **HAS BEEN EXTENDED – PLEASE READ BELOW**

A D D E N D U M N O. 1

Prospective bidders are advised that for purposes of this project, all original bid requirements and Addendum No. 1 requirements as expressed herein shall be considered part of the bid package. As such, bidders are advised to recognize and comply with all aspects of this bid.

Bid Opening has been re-scheduled to: **July 30, 2018 at 4:00 p.m.**
Location: **Conference Room 2A**
(2nd floor) McAllen City Hall

Please find attached updated Specifications from Project Engineer.

_____ _____
Signature, Acknowledge Add. #1 Date

_____
Company Name (Print/Type Name)

_____ July 16, 2019
Gerardo Noriega, CTPM Date
Director of Purchasing & Contracting

GN/rl

All Addenda issued in respect to this project shall be considered official changes to the original bidding documents. It shall be the Respondent(s) responsibility to ensure that all Addenda have been received. Furthermore, respondents are advised that they must recognize, comply with, and recognize all Addendums on bid proposal form. Respondent(s) signature on bid form shall be interpreted as the bidder's "recognition and compliance to" official changes as outlined by the City of McAllen and as such are made part of the original solicitation/bidding documents.

DOCUMENT 00 91 13 - 01
ADDENDA

ADDENDUM NUMBER 01

07/10/19

DATE: 10 July 2019

PROJECT: Department of Public Works Automotive Warehouse Expansion & Elevator

PROJECT NUMBER: 1809

OWNER: City of McAllen

ARCHITECT: Negrete & Kolar Architects, LLP

TO: Prospective Bidders

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated June 7, 2019; with amendments and additions noted below.

Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

This Addendum consists of three (3) pages and the following Exhibits:

EXHIBIT ITEM	EXHIBIT TITLE	# EXHIBIT PAGES
	Civil (Specifications) Table of Contents	2
Section 01005	(Civil Specification) Definitions & Terminology	5
Section 01040	(Civil Specification) Project Administration	10
Section 01300	(Civil Specification) Submittals	9
Section 01310	(Civil Specification) Progress Schedule	10
Section 01411	(Civil Specification) Environmental Protection	7
Section 01460	(Civil Specification) Laboratory and Inspection Services	4
Section 01564	(Civil Specification) Ground Water Handling	5
Section 01568	(Civil Specification) Erosion and Sediment Control During Construction	10
Section 01700	(Civil Specification) Project Closeout Procedures Specification	2
Section 02101	(Civil Specification) Preparation of Right of Way	3
Section 02103	(Civil Specification) Concrete Removal	3
Section 02241	(Civil Specification) Cement Stabilization	4
Section 02601	(Civil Specification) Flexible Base	10
Section 02605	(Civil Specification) Salvaging and Replacing Existing Base	4
Section 02610	(Civil Specification) Prime Coat	5
Section 02612	(Civil Specification) HMAC	20

Section 02620	(Civil Specification) Concrete Curb & Gutter	5
Section 02640	(Civil Specification) Concrete Sidewalks	2
Section 02670	(Civil Specification) Milling	2
Section 02680	(Civil Specification) Flat Wheel Rolling	2
Section 02682	(Civil Specification) Pneumatic Tire Rolling	3
Section 03300	(Civil Specification) Cast In Place Concrete	21
Section 03310	(Civil Specification) Supplied Concrete	9
Section 03320	(Civil Specification) Concrete Admixtures	6
Section 03330	(Civil Specification) Reinforcing Steel	8
Section 09101	(Civil Specification) Construction Traffic Control	10
Section 09102	(Civil Specification) Filter Fabric	3
Section 07 95 13	Expansion Joint Cover Assemblies	4
C1	(Civil Drawing) Existing Topographic Map	1
C2	(Civil Drawing) Utility Plan	1
C3	(Civil Drawing) Demolition Plan	1
C4	(Civil Drawing) Foundation Layout	1
C5	(Civil Drawing) Grading Plan	1
ADD#1/S1	Wood Joist to CMU Wall	1
ADD#1/S2	Wood Joist to CMU Wall	1

CHANGES TO PREVIOUS ADDENDA:

None this addendum.

CHANGES TO THE PROJECT MANUAL:

Table of Contents:

- **ADD,** attached exhibit, Civil (Specifications) Table of Contents as sealed by Owner.

Table of Contents - Part Three: Specifications:

- **ADD,** attached exhibits, Civil Specification Sections 01005 thru 09102 (refer to list of Exhibits above).
- **ADD,** attached exhibit, Section 07 95 13 Expansion Joint Cover Assemblies.

Section 07 42 13 Insulated Metal Wall Panels; 2.4 Metal Wall Panel Accessories:

- **ADD,** 'F. 7.2 Panel, Light Transmitting Panel; MBCI #HW-1528 (Basis of Design).'

CHANGES TO THE DRAWINGS:

G.000 Cover Sheet; Drawing Index:

- **ADD,** attached exhibits, Civil Drawings (refer to list of Exhibits above).
- **ADD,** listing of the following sheets: M2.0 Mechanical Details & Schedules, E4.1 Electrical Details, E4.2 Electrical Details. These sheets are included in the Bid Set.
- **DELETE,** listing of the following sheets: AS.100 Architectural Site Plan, A.530 Canopy Details, A.600 Interior Elevations, & MD1.0 Mechanical Demo Floor Plan. These sheets do not exist and are not part of the Bid Set.

G.001 Drawing Index Notes & Symbols; Reference Notes Full List:

The following Reference Note modifications are listed on page G.001 and are intended to be conveyed throughout the Drawing Set.

- **DELETE,** 05 12 23 Structural Steel for Buildings, Re: Struct.
- **DELETE,** 07 21 13.A6 2-1/2" Rigid Board Insulation.
- **DELETE,** 07 21 19a Foamed-In-Place Insulation.
- **DELETE,** 07 21 19a.A2 Closed Cell Polyurethane Spray Foam Insulation, 1-1/2", min. R-10.3.
- **DELETE,** 08 51 23 Steel Windows.
- **CHANGE,** Cast-In-Place Concrete, Re: Struct reference number (03 30 00S) to read '03 33 00'.
- **CHANGE,** Masonry Mortaring and Grouting reference number (04 05 03) to read '04 05 14'.
- **CHANGE,** Masonry items reference numbers (04 20 00) to read '04 20 16'.
- **CHANGE,** Plywood items reference numbers (06 16 00) to read '06 10 00'.
- **CHANGE,** Sound Batt Insulation reference number (07 21 16.A0) to read '07 21 16'.
- **CHANGE,** Overhead Coiling Doors reference number (08 33 23) to read '08 33 00'.
- **CHANGE,** Plastic and Polycarbonate Glazing item reference numbers (08 80 00) to read '07 42 13'.

S.901 Details; 13/S.901 Wood Joist to CMU Wall:

- **DELETE,** existing detail.
- **ADD,** Exhibit ADD#1/S1.

S.901 Details; 14/S.901 Wood Member to CMU Wall:

- **DELETE,** existing detail.
- **ADD,** Exhibit ADD#1/S2.

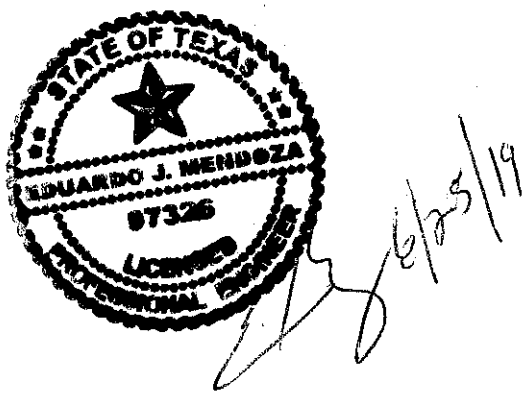
APPROVAL OF ADDITIONAL PRODUCTS/SYSTEMS:

Section 08 33 00 Insulated Rolling Service Doors; 2.1 Manufacturer:

- **ADD,** 'D. Raynor Garage Doors; DuraCoil, Model IF, with ControlHoist 2.0 operator.', as an acceptable manufacturer of electric operated overhead insulated rolling doors. Note single-source responsibility for all accessories and operators.

END OF ADDENDUM NUMBER 01

CIVIL TABLE OF CONTENS



Section 03330	Reinforcing Steel
Section 09101	Construction Traffic Control
Section 09102	Filter Fabric

END OF SECTION

PART 1 - GENERAL

1.01 SPECIFICATION TERMINOLOGY

A. “Certified” used in context with materials and equipment means the material and equipment has been tested and found by a nationally recognized testing laboratory to meet specification requirements, or nationally recognized standards if requirements are not specified, and is safe for use in the specified manner. A nationally recognized testing laboratory must periodically inspect production of the equipment and the equipment must bear a label, tag, or other record of certification.

B. “Certified” used in context with labor performance or ability to install materials and equipment means that the abilities of the proposed installer have been tested by a representative of the specified testing agency authorized to issue certificates of competency and has met the prescribed standards for certification.

C. “Certified” used in context with test reports, payment requests or other statements of fact means that the statements made on the document are a true statement as attested to by the certifying entity.

D. “Engineer” shall mean the City of McAllen Engineering Department, City Engineer or their designated representative.

E. ‘Furnish” means to supply, deliver and unload materials and equipment at the project site ready to install.

F. “Indicated” means graphic representations, notes, or schedules on drawings, or other requirements in Contract Documents. Words such as “shown’, “noted’, “scheduled”, are used to help locate the reference. No limitation on the location is intended unless specifically noted.

G. “Install” means the operations at the project site including unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, training and similar operations required to prepare the materials and equipment for use, verify conformance with Contract Documents and prepare for acceptance and operation by the Owner.

H. “Installer” means an entity engaged by Contractor, either as an employee, subcontractor, or sub-subcontractor to install materials and/or equipment. Installers are to have successfully completed a minimum of five projects similar in size and scope to this project, have a minimum of five years of experience in the installation of similar materials and equipment, and comply with the requirements of the authority having jurisdiction.

I. “Labeled” means equipment that embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories, Inc. and production is periodically inspected in accordance with nationally recognized standards or tests to determine safe use in a specified manner.

J. “Listed” means equipment is included in a list published by a nationally recognized laboratory which makes periodic inspection of production of such equipment and states that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.

K. “Manufacturer” means an entity engaged by Contractor, as a subcontractor, or sub-subcontractor to furnish materials and/or equipment. Manufacturers are to have a minimum of five years experience in the manufacture of materials and equipment similar in size, capacity and scope to the specified materials and equipment.

L. “Perform” means to complete the operations necessary to comply with the Contract Documents.

M. “Owner” means the City of McAllen.

N. “Project site” means the space available to perform the work, either exclusively or in conjunction with others performing construction at the project site.

0. “Provide” means to furnish and install materials and equipment.

P. “Regulations” means laws, statutes, ordinances, and lawful orders issued by authorities having jurisdiction, as well as, rules, conventions, and agreements within the construction industry that control performance of work, whether they are lawfully imposed by authorities having jurisdiction or not.

Q. “Specified” means written representations in the bid documents or the technical specifications.

1.02 SPECIFICATION SENTENCE STRUCTURE

A. Specifications are written in modified brief style. Requirements apply to all work of the same kind, class, and type even though the word “all” is not stated.

B. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words “furnish”, “install”, “provide”, or similar words include the meaning of the phrase “The Contractor shall.’ before these words.

C. It is understood that the words “directed”, ‘designated”, requested”,

'authorized", "approved", "selected', or similar words include the meaning of the phrase "by the Engineer" after these words unless otherwise stated. Use of these words does not extend the Engineers responsibility for construction supervision or responsibilities beyond those defined in the General Conditions.

D. "At no additional cost to Owner", "with no extra compensation to Contractor", "At Contractor's own expense", or similar words mean that the Contractor will perform or provide specified operation of work without any increase in the Contract Amount. It is understood that the cost for performing all work is included in the amount bid and will be performed at no additional cost to the Owner unless specifically stated otherwise.

1.03 DOCUMENT ORGANIZATION

A. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing work among subcontractors, or to establish the extent of work to be performed by any trade, subcontractor or vendor. Specification or details do not need to be indicated or specified in each specification or drawing. Items shown in the contract documents are applicable regardless of location in the Contract Documents.

B. Standard paragraph titles and other identifications of subject matter in the specifications are intended to aid in locating and recognizing various requirements of the specifications. Titles do not define, limit, or otherwise restrict specification text.

C. Capitalizing words in the text does not mean that these words convey special or unique meanings or have precedence over other parts of the Contract Documents. Specification text governs over titling and it is understood that the specification is to be interpreted as a whole.

D. Drawings and specifications do not indicate or describe all of the work required to complete the project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials or equipment required for a complete and functional system even if they are not detailed or specified.

1.04 INTERPRETATIONS OF DOCUMENTS

A. Comply with the most stringent requirements where compliance with two (2) or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.

1. Quantity or quality level shown or indicated shall be minimum to be provided or performed in every instance.

2. Actual installation may comply exactly with minimum quality indicated, or it may exceed that minimum within reasonable limits.

3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.

4. Refer instances of uncertainty to the Engineer for a decision before proceeding.

B. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the drawings but are not included in the specifications.

1.05 REFERENCE STANDARDS

A. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract, Documents where Contract Documents include more stringent requirements than the referenced standards.

1. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.

2. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.

B. Consider a referenced standard to be the latest edition with supplements or amendments when a standard is referred to in an individual specification section but is not listed by title and date.

C. Trade association names and title of general standards are frequently abbreviated. Acronyms or abbreviations used in the Contract Documents mean the recognized name of trade association, standards generating organization, authority having jurisdiction, or other entity applicable in the context of the Contract Documents.

D. Make copies of reference standards available as requested by Engineer or Owner.

1.06 SUBSTITUTIONS AND EQUAL PRODUCTS

Provide materials and equipment manufactured by the entities specifically listed in each technical specification section. Submit a Contractors Modification Request per Section 01300, SUBMITTALS for substitution of materials and equipment of manufacturers not specifically listed or for materials and equipment that does not strictly comply with the Contract Documents. Contractor may provide “equal” products manufactured by manufacturers other than those specifically listed in the technical specification section unless it is specifically stated that only the materials and equipment of the specified manufacturers shall be provided. Provide a request for approval of proposed equals per Section 01300 SUBMITTALS for any materials or equipment not specifically listed. Submit a Contractors Modification Request for substitution of materials and equipment of other manufacturers or for materials and equipment that does not strictly comply with the Contract Documents. A Field Order or Change Order will be issued if the contract modification is approved.

END OF SECTION

PART 1- GENERAL

1.01 WORK INCLUDED

A. Administer contract requirements to construct the project. Provide documentation per the requirements of this Section. Provide information as requested by the Engineer/Architect or Owner concerning this project.

1.02 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, SUBMITTALS.

1.03 COMMUNICATION DURING THE PROJECT

A. The Engineer is to be the first point of contact for all parties on matters concerning this project.

B. The Engineer will coordinate correspondence concerning:
   1. Submittals, including requests for payment
   2. Clarification and interpretation of the Contract Documents
   3. Contract modifications
   4. Observation of work and testing
   5. Claims

C. The Engineer will normally communicate only with the Contractor. Any required communication with suppliers or subcontractors shall only be with the direct involvement of the Contractor.

D. Written communications are to be directed to the Engineer at the address indicated in the Pre-construction Conference. Communications should include as a minimum:

   1. Name of the Owner

   2. Project name

   3. Contract title

   4. Project number

   5. Date

   6. A reference statement

E. Submit communications on the forms referenced in this Section or in Section

01300. SUBMITTALS.

1.04 PROJECT MEETINGS

A. Pre-construction Conference

1. Attend a pre-construction meeting.

2. The location of the conference will be determined by the Owner.

3. The time of the meeting will be determined by the Owner but will be after the Notice of Award is issued and not later than fifteen (15) days after the Notice to Proceed is issued or can be issued at the Pre-Construction Conference.

4. Meeting will be attended by the Owner, Engineer and the Contractors project manager and superintendent. Meeting may be attended by representative of utility companies and representatives from major subcontractors and suppliers.

5. Contractor should provide and be prepared to discuss:
   a. Preliminary construction schedule per Section 01310, PROGRESS SCHEDULE.
   b. Preliminary Submittal Schedule.
   c. Schedule of values and anticipated schedule of payments.
   d. List of Suppliers and Subcontractors.
   e. Contractor's organizational chart as it relates to this project.
   f. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents.

B. Periodical Progress Meetings

1. Attend meetings with the Engineer and Owner.

   a. Meet on a Monthly basis or as requested by the Engineer to discuss the project.

   b. Meet at the project site or other location as designated by the Engineer.

   c. Contractors superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.

2. Provide information as requested by the Engineer or Owner concerning this project.

a. Prepare to discuss:

1) Status of overall project schedule.

2) Contractors detailed schedule for the next month.

3) Anticipated delivery dates for equipment.

4) Coordination with the Owner.

5) Status of submittals.

6) Information or clarification of the Contract Documents.

7) Claims and proposed modifications to the contract.

8) Field observations, problems, or conflicts.

9) Maintenance of quality standards.

b. Notify the Engineer of any specific items to be discussed a minimum of one (1) week prior to the meeting.

3. Review minutes of meetings and notify the Engineer of any discrepancies within ten (10) days of the date of the memorandum.

a. Following that date, the minutes will stand as shown or as corrected.

b. Corrections will be reflected in the minutes of the following meeting.

c. Each item of business shall be numbered to indicate the meeting number and the item number. Items discussed will be documented and old business items will remain on minutes of subsequent meetings until the item is resolved.

1.05 REQUESTS FOR INFORMATION

A. Submit Request for Information (RFI) to the Engineer to obtain additional information or clarification of the Contract Documents.

1. Submit a separate RFI for each item.

2. Attach adequate information to permit a written response without further clarification. Engineer will return requests which do not have adequate information for additional information.

3. A response will be made when adequate information is provided. Response will be made on the RFI form or in attached information.

4. Assign a number to the RFI and sequence number in chronological order.

B. If the RFI indicates that a contract modification is required, the Engineer will initiate a Proposed Contract Modification (PCM) per Section 1.07.

1.06 NOTIFICATION BY CONTRACTOR

A. Notify the Engineer of:

1. Need for testing.

2. Intent to work outside regular working hours.

3. Request to shut down facilities or utilities.

4. Proposed utility connections.

5. Required observation by Owner or inspection agencies prior to covering work.

B. Notification must be provided in time for Owner and Engineer to respond appropriately to the notification.

C. Use “Notification By Contractor” form. Form can be requested from Owner or Engineer.

1.07 REQUESTS FOR MODIFICATIONS

A. Submit a request to the Engineer for any change in the Contract Documents or approval of any deviations from the Contract Documents.

1. Use the “Contractors Modification Request” (CMR) form. Contractor’s own form can also be submitted pending completeness of required information.

a. Assign a number to the CMR when issued and sequence number in chronological order.

b. Include with the CMR:

1) A complete description of the proposed modification.

2) The reason the modification is requested.

3) A detailed breakdown of the cost of the change (necessary only if the modification requires a
change in contract amount). The itemized breakdown is to include:
(a) list of materials and equipment to be installed,

(b) man hours for labor by classification,

(c) equipment used in construction,

(d) consumable supplies, fuels, and materials,

(e) royalties and patent fees,

(f) bonds and insurance,

(g) overhead and profit,

(h) field office costs,

(i) home office cost,

(j) and other items of cost.

4) A revised schedule indicating the effect on the critical path for the project and a statement of the number of days the project may be delayed by the modification.

2. A CMR is required for field changes.

   a. Request must be made a minimum of two (2) weeks in advance of performing the work affected.

   b. Request for field changes will be submitted to the Engineer.

3. A CMR is required for all substitutes or deviations from the Contract Documents.

4. Engineer will evaluate the request for a contract modification.

B. Owner will initiate changes through the Engineer.

1. Engineer will prepare a description of the proposed modifications to the Contract Documents.

2. Engineer will use the “Proposed Contract Modification’ form or own form. Engineer will assign a number to the PCM when issued and keep in

numerical order throughout project.

3. Return request with a proposal to incorporate the requested change. Include a breakdown of costs into materials and labor in sufficient detail to allow evaluation by the Engineer.

C. If a contract modification is required, the Engineer will issue a Field Order or a Change Order.

1. Modifications to the contract can only be made by a Field Order or a Change Order.

2. Changes in the project will be documented by Field Order or by a Change Order.

3. Field Orders may be issued by the Engineer for contract modifications that do not change the contract amount or contract time.

4. Any modifications that require a change in contract amount or contract time can only be approved by Change Order.

a. CMR's and proposals issued by the Contractor in response to a PCM will be evaluated by the Engineer.

b. If change order is recommended, the Engineer will prepare the change order.

c. The Change Order will be sent to the Contractor for execution with a copy to the Owner recommending approval.

d. Change Orders can only be approved by the Owner.

1) Work performed on the proposed contract modifications prior to the approval of the Change Order will be performed at the Contractor's risk.

2) No payment will be made for work on Change Orders until approved by the Owner.

D. The Contractor may be informed that the proposed modification is not approved and construction is to proceed in accordance with the Contract Documents.

1.08 EMERGENCY WORK

A. Notify the Owner and Engineer immediately of any additional work that must be performed to prevent injury or damage to existing structures, facilities, utilities, or work in place.

B. When possible, obtain authorization from the Owner before proceeding.

1.09 CLAIMS

A. Do not perform any work which is considered to be outside the scope of the Contract Documents without an approved Change Order.

B. File notice of claims with the Engineer within 10 days of the event giving rise to the claim.

C. Provide full documentation within 30 days of the notice.

D. Items not reported within the stipulated time will not be considered.

1. Failure to notify the Owner of potential claims does not allow the Owner to take alternative action to prevent the Contractor from incurring the cost for the item or to perform the work in a different manner.

2. Failure to notify the Owner does not allow operations to be monitored for the actual cost of performing the work.

E. When full documentation has been received by the Engineer, the claim will be reviewed in the context of the Contract Documents.

1. If the claim is valid, a Change Order will be prepared and payment of the Change Order will be recommended.

2. If the claim is not valid, then the claim will be denied with an explanation of the reasons.

3. Should the Contractor disagree with the decision of the Engineer, the Contractor may refuse to do the work.

a. If the Owner insists that the work be done, proceed with the work on a time and materials basis.

b. The validity of the claim will be resolved at a later time in accordance with the Contract Documents.

1.10 RECORD DOCUMENTS

A. Maintain at the site one (1) complete record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Contract modifications
5. Approved shop drawings and record data
6. One (I) set of construction photographs
7. Test records
8. Clarifications and other information provided in RFI responses.

B. Marking Drawings

1. Label each document as “Project Record” in large printed letters.
2. Record information as construction is being performed.

a. Do not conceal any work until the required information is recorded.

b. Mark drawings to record actual construction, including the following:

1) Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.

2) Horizontal and vertical locations of underground utilities and appurtenances constructed and existing utilities encountered during construction.

3) Location of internal utilities and appurtenances concealed in the construction. Make reference to permanent structure on the surface. Include the following equipment:

(a) Piping

(b) Ductwork

(c) Equipment and control devices requiring periodic maintenance or repair

(d) Valves, unions, traps, and tanks

(e) Services entrance

(f) Feeders
(g) Outlets

4) Changes of dimension and detail.

5) Changes made by Field Order and Change Order.

6) Details not on the original Contract Drawings.

c. Mark specifications and addenda to record materials and the equipment provided.

1) Record manufacturer name, trade name, catalog number, and each supplier (with address and phone number) of each product and item of equipment actually installed.

2) Record changes made by Field Order and Change Order.

d. Mark additional work or information in erasable pencil.

1) Use red for new or revised indication.

2) Use purple for work deleted or not installed (lines to be removed).

3) Highlight in yellow the items constructed per the plans.

e. Submit record documents to Engineer for review and acceptance 30 days prior to final completion of the project.

1) Provide one (1) set of marked up drawings.

2) Provide one (1) set of specifications.

f. Partial Payment Requests will not be recommended for payment if record documents are found to be: incomplete or not in order. Final payment will not be recommended without record documents.

PART 2- PRODUCTS (NOT INCLUDED)

PART 3- EXECUTION (NOT INCLUDED)

END OF SECTION

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Contractor shall submit documentation as required by the Contract Documents and as reasonably requested by the Owner and Engineer to:

1. Record the products incorporated into the Project for the Owner.

2. Provide information for operation and maintenance of the Project.

3. Provide information for the administration of the Contract.

4. Allow the Engineer to advise the Owner if products proposed for the project by the Contractor conform, in general, with the design concepts of the Contract Documents.

B. Contractors responsibility for full compliance with the Contract Documents is not relieved by the Engineers review of submittals, Contract modifications may only be approved by Change Order or Field Order.

1.02 CONTRACTORS RESPONSIBILITIES

A. Review all submittals prior to submission.

B. Determine and verify:

1. Field measurements.

2. Field construction requirements.

3. Location of all existing structures, utilities and equipment related to the submittals.

4. Submittals are complete for their intended purpose.

5. Conflicts between the submittals related to the various subcontractors and suppliers have been resolved.

6. Quantities and dimensions shown on the submittals.

C. Submit information per the procedures described in this section and the detailed specifications.

D. Furnish the following submittals:

1. As specified in the attached Submittal Schedule.

2. Schedules, data and other documentation as described in detail in this section or referenced in the General Conditions.

3. Submittals as required in the detailed specifications.

4. Submittals not required will be returned without Engineer's review.

E. Submit a schedule indicating the date submittals will be sent to the Engineer and proposed dates that the product will be incorporated into the project. Make submittals promptly in accordance with the schedule so as to cause no delay in the project.

1. Submittals shall be sent to Engineer allowing a reasonable time for delivery, review and marking submittals. Time for review is to include time for resubmission if necessary and to allow adequate time for the ordering, fabrication, and delivery of the product.

2. Schedule submittal to provide all information for interrelated work at one time. No review will be performed on submittals requiring coordination with other submittals. Engineer will return submittals for resubmission as a complete package.

F. Installation of any products prior to the approval of shop drawings is done at the Contractors risk. Products not meeting the requirements of Contract Documents are defective and may be rejected at the Owners option.

G. Payment will not be made for products for which submittals are required until the submittals have been approved. Payment will not be made for products for which shop drawings or samples are required until these are approved by the Engineer.

1.03 QUALITY ASSURANCE

A. Submit legible, accurate, complete documents presented in a clear, easily understood manner. Submittals not meeting this criteria will be returned without review.

B. Demonstrate that the proposed products are in full and complete compliance with the design criteria and requirements of the Contract Documents including drawings and specifications as modified by Addenda, Field Orders and Change Orders.

C. Furnish and install products that fully comply with the information included in

the submittal.

D. Review and approve submittals prior to submitting them to the Engineer for review. Submittals will not be accepted from subcontractors, suppliers, or anyone other than the Contractor.

1.04. OPERATION AND MAINTENANCE MANUAL

A. The Contractor shall obtain from the various Subcontractors various operation and maintenance data, replacement parts lists, maintenance schedule requirements, etc., and bind the information into a reference manual. Two sets shall be turned over to the Engineer/Architect prior to request for final payment.

B. Operation and maintenance manuals shall be neatly bound with each trade so indexed. In some cases, approved shop drawings and submittals may suffice for use in this regard. Equipment parts lists for replacement purposes shall be included wherever possible.

1.05 SUBMITTAL PROCEDURES

A. Deliver submittals to the Engineer.

B. Assign a number to the documents originated to allow tracking of the submittal during the review process.

1. Assign a number consisting of a prefix. a sequence number, and a letter suffix. Prefixes shall be as follows:

Prefix	Description	Originator

CO	Change Order	Contractor
CTR	Certified Test Report	Contractor
EIR	Equipment Installation Report	Contractor
FO	Field Order	Engineer
NBC	Notification by Contractor	Contractor
O&M	Operation & Maintenance Manuals	Contractor
PCM	Proposed Contract Modification	Engineer
PR	Payment Request	Contractor
PP	Project Photographs	Contractor
RD	Record Data	Contractor
RFI	Request for Information	Contractor
SAM	Sample	Contractor
SD	Shop Drawing	Contractor
SCH	Schedule of Progress	Contractor

2. Issue sequence numbers in chronological order for each type of submittal.

3. Issue numbers for re-submittals that have the same number as the original submittal followed by an alphabetical suffix indicating the number of times the same submittal has been sent to the Engineer for processing. For example: SD-025-A represents a shop drawing that is the twenty-fifth submittal of his type and is the second time this submittal has been sent for review.

4. Clearly note the submittal number on each page or sheet of the submittal.

5. Correct assignment of numbers is essential since different submittal types are processed in different ways.

D. Submit documents with uniform markings and page sizes.

1. Paper size shall allow for ease of reproduction.

   a. Submit documents on 8-1/2” X 11” paper here practical.

   b. Use II’ X 17” paper for larger drawings and schematics.

   c. Use full size blueline sheets for fabrications and layout drawings. Reproducible drawings may be submitted in lieu of bluelines.

2. Mark submittals to:

   a. Indicate Contractors corrections in green.
   b. Highlight items pertinent to the products being furnished in yellow and

delete items that are not when the Manufacturers standard drawings or information sheets are provided.

c. Cloud items and highlight in yellow where selections by the Engineer or Owner are required.

d. Mark dimensions with the prefix FD to indicate field verified dimensions on the drawings.

e. Provide a blank space 8" x 3" for Contractor's and Engineers stamp.

E. Mark submittals to reference the drawing number and/or section of the specifications, detail designation, schedule or location that corresponds with the data submitted. Other identification may also be required, such as layout drawings or schedules to allow the reviewer to determine where a particular product is to be used.

F. The number of copies of each submittal to be sent by the Contractor and the number of copies of each submittal to be returned are:

Prefix	Description	No. of Copies Sent	No. of Copies Returned
CO	Change Order	2	1
CTR	Certified Test Report	2	0
EIR	Equipment Installation Report	2	0
NBC	Notification by Contractor	2	1
O&M	Preliminary O&M Manuals	2	1
O&M	Final O&M Manuals	4	0
PR	Payment Request	2	1
PP	Project Photographs (including videotapes)	2	0
RD	Record Data	2	0
RFI	Request for Information	2	1
SAM	Sample	2	0
SD	Shop Drawings	3	1
SCH	Schedule of Progress	2	0

1.06 REVIEW PROCEDURES

A. Priority submittals will be reviewed before other submittals for this project which have been received but not reviewed.

1.07 REQUIREMENTS

A. Certifications. Warranties and Service Agreements include documents as specified in the detailed specifications. as shown in the submittal schedule or as follows:

1. Certified Test Reports (CTR) - A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the specifications.

2. Certification of Local Field Service (CLS) - A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300 mile radius of the project site. List names, addresses, and telephone numbers of approved service organizations on or attach to the certificate.

3. Extended Warranty (EW) - A guarantee of performance for the product or system beyond the normal one (1) year warranty described in the General Conditions, Issue the warranty certificate in the name of the Project Owner.

4. Extended Service Agreement (ESA) - A contract to provide maintenance beyond that required to fulfill requirements for warranty repairs, or to perform routine maintenance for a definite period of time beyond the warranty period. Issue the service agreement in the name of the Project Owner.

5. Certification of Adequacy of Design (CAD) - A certified letter from the manufacturer of the equipment stating that they have designed the equipment to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter shall state that mechanical and electrical equipment is adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.

6. Certification of Applicator/Subcontractor (CSQ) - A certified letter stating that the Applicator or Subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.

B. Submit record data to provide information to allow the Owner to adequately identify the products incorporated into the project and allow replacement or repair at some future date.

1. Provide record data for all products. Record data is not required for items for which shop drawings and/or operations and maintenance manuals are required.

2. Provide information only on the specified products. Submit a Contractor's Modification Request for approval of deviations or substitutions and obtain approval by Field Order or Change Order prior to submitting Record Data.

3. Record data will be received by the Engineer, logged, and provided to Owner for his/her record.

    a. Record data may be reviewed to see that the information provided is adequate for the purpose intended. Inadequate drawings may be returned as unacceptable.

    b. Record data is not reviewed for compliance with the Contract Documents. Comments may be returned if deviations from the Contract Documents are noted during the cursory review performed to see that the information is adequate.

1.08 REQUESTS FOR DEVIATION

A. Submit requests for deviation from the Contract Documents for any product that does not fully comply with the specifications.

B. Submit request by Contractor's Modification Request (CMR) per Section 01040. PROJECT ADMINISTRATION. Identify the deviations and the reason the change is requested.

C. Deviations that result in a reduction in cost shall also include the amount of the reduction to the Owner.

D. A Change Order or Field Order will be issued by the Engineer for deviations approved by the Owner. Deviations from the Contract Documents may only be approved by Change Order or Field Order.

1.09 SUBMITTALS FOR SUBSTITUTIONS

A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product.

B. If the Contractor desires to submit a manufacturer or product which is not specified, the Contractor must submit the following for consideration of approval of the substitution:

1. Contractor's Modification Request for deviation from the Contract Documents per Paragraph 1 .07.
2. Prove that the product is acceptable as a substitute. It is not the Engineers responsibility to prove the product is not acceptable as a

substitute.

a. Indicate on a point by point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.

b. Make a direct comparison with the specified manufacturers published data sheets and available information. Provide this printed material with the submittal.

c. The decision of the Engineer regarding the acceptability of the proposed substituted product is final.

3. Provide a typewritten certification that, in making the substitution request. The Contractor:

a. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product.

b. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the Manufacturer of the specified product.

c. Will assume all responsibility to coordinate and modifications that may be necessary to incorporate the substituted product into the project and will waive all claims for additional work which may be necessary to incorporate the substituted product into the project which may subsequently become apparent.

d. Will maintain the same time schedule as for the specified product.

1.10 GUARANTEES

A. Warranties and guarantees shall be submitted as required by the Contract Documents and submitted with the shop drawings or record data.

1.11 RESUBMISSION REQUIREMENTS

A. Make all corrections or changes in the submittals required by the Engineer and resubmit until approved.

B. Need for more than one resubmission or any other delay of obtaining Engineer’s review of submittals, will not entitle the Contractor to an extension of Contract Time. All costs associated with such delays shall be at the Contractor’s expense.

1.12 ENGINEER’S DUTIES

A. Revise the submittals and return with reasonable promptness.

B. Affix stamp, indicate approval with or without comments, rejection, and the need for re-submittal.

C. Distribute documents.

SUBMITTAL SCHEDULE

Spec. No.	Description	SD	SAM	CTR	CLS	EW	ESA	CAD	CSQ	RD	OM	EIR	PPB
01568	Erosion and Sediment Control during Construction									X			
01600	Products							X				X	
01650	Starting Systems										X	X	
01700	Contract Closeout									X			
01730	Operations and Maintenance Manual										X		
02556	Water Transmission Lines and/or Pressure Sewer Lines	X								X			
02570	Sanitary Sewer	X								X			
02575	Paving Repair and Resurfacing									X			
02590	Polyurthane Protective Coating									X			
03300	Cast in Place Concrete									X			
09101	Construction Traffic Control									X			
02223	Trench Protection System									X			
02236	Embankment		X							X			
02601	Flex base		X	X						X			
02610	Prime Coat		X	X						X			
02612	HMAC		X	X						X			

SD - Shop Drawing
SAM - Sample
CTR - Certified Test Report
CLS - Certification of Local Field Service
EW - Extended Warrant
ESA - Extended Service Agreement
PPB - Process Performance Bond
CAD - Certificate of Adequacy of Design
CSQ- Certification of Applicator/ Subcontractor Qualifications
RD - Record Data
OM - Operation and Maintenance Manuals
EIR - Equipment Installation Report

END OF SECTION

PART 1 - SCHEDULE REQUIREMENTS PROGRESS SCHEDULE

The work specified in this section includes planning, scheduling and reporting required by the CONTRACTOR. It is expressly understood and agreed that the time of beginning, the rate of progress, and the time of completion of the work are essential elements of this CONTRACT.

A. The Project Control Schedule (PCS) shall be prepared and maintained by the CONTRACTOR as described in this section.

B. The PCS shall be the CONTRACTOR'S working schedule and will be used by the CONTRACTOR to plan, organize, and execute the work, record and report actual performance and physical progress, and to show how the CONTRACTOR plans to complete all remaining work as of the beginning of each progress report period (data date).

C. In addition, the PCS shall provide the OWNER with a tool to monitor and follow the progress of all phases of the work. The PCS shall comply with the various limits imposed by the scope of the work, contractually specified milestones and completion dates included in the contract.

D. The PCS shall be a Critical Path Method (CPM) schedule.

E. The PCS must clearly show the sequence and interdependence of activities required for complete performance of the work, beginning with the Contract Start Date (CSD) and concluding with the Contract Completion Date (CCD). The maximum duration of any physical work activity shall not exceed twenty (20) working days unless approved by the OWNER.

F. The CONTRACTOR shall use a scheduling system capable of handling, processing, printing and plotting data to satisfy all requirements of this section. The scheduling system must be capable of producing project reports and other digital (electronic) data that can be directly read and interpreted by the OWNER.

PART 2 - SUBMITTAL PROCEDURES

The OWNER will schedule and conduct a Preconstruction Conference. At this meeting, the requirements of this section, as they apply to the contract, will be reviewed with the CONTRACTOR. The CONTRACTOR shall be prepared to review and discuss

methodology for the schedule and sequence of operations and labor, equipment and material constraints.

A. PROJECT CONTROL SCHEDULE (PCS)(PRELIMINARY) - within fifteen (15) working days after the Preconstruction Conference, the CONTRACTOR shall submit to the OWNER the Preliminary Project Schedule (PPS), which shall be the basis of the PROJECT CONTROL SCHEDULE (BASELINE), and which will be used to schedule early activities of the project. The PPS shall include a detailed plan of operations for the first sixty (60) calendar days from the Contract Start Date.

The PPS shall be a network diagram or bar chart, utilizing the CONTRACTOR'S WORK BREAKDOWN STRUCTURE showing in detail:

1. Notice of Acceptance of Proposal.
2. Pre-Construction Conference.
3. Contract start date.
4. Mobilization.
5. Submission and approval of key submittals.
6. Procurement of key materials and equipment.
7. All activities occurring or starting within the first sixty (60) calendar days.
8. Milestones and other contractual dates.
9. Contract completion date.

B. Submittal and acceptance of the Preliminary Project Schedule is a condition precedent to the issuance of any initial payment.

C. PROJECT CONTROL SCHEDULE (BASELINE) - within sixty (60) calendar days of the CSD, the CONTRACTOR shall submit, for acceptance by the OWNER, the Project Control Schedule (Baseline). The PCS-Baseline shall represent the CONTRACTOR'S complete plan for the execution of the CONTRACT in accordance with the BID and CONTRACT documents. Although limited technical assistance is available to the CONTRACTOR from the OWNER upon written request and prior to any formal review and/or finalization of the baseline schedule, it is the responsibility of the

CONTRACTOR to employ or engage the services of a technically qualified scheduler on this project.

D. PROJECT CONTROL SCHEDULE (UPDATES) - Once each month, or more often if deemed necessary by the OWNER, the CONTRACTOR shall review and update the PCS to incorporate all current information, including progress, approved adjustments of time and logic, and proposed changes in sequence and logic. All copies of the updated PCS submitted to the OWNER, shall be signed and dated by the CONTRACTOR.

E. PROJECT CONTROL SCHEDULE (AS-BUILT) - The last PCS update submitted shall be identified as the "As-Built Schedule", and is a condition precedent to issuance of Final Acceptance of the CONTRACT by the OWNER.

PART 3 - DEFINITIONS

The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication "The Use of CPM in Construction," copyright 1976. Additional definitions are set forth as follows:

A. Critical Path(s) - shall be defined as the longest path of activities from the Contract Start Date (CSD) to the Contract Completion Date (CCD).

B. Near Critical Path - shall be defined as those paths of activities having a total float value equal to the total float value of the defined critical path (longest path) plus ten (10) working days.

C. Activity Codes - are values assigned to schedule activities to organize the Schedule Activities into manageable groups for updating, analyzing, reporting, plotting, and summarizing.

D. WBS - (Work Breakdown Structure) is a definition of project related activity codes, to be used by the CONTRACTOR to organize the CONTRACTOR'S Project Control Schedule in a manner that facilitates the OWNER'S use of the PCS information.

E. Constraint - is a restriction imposed on the start, finish or duration of an activity. Project Control Schedule

F. Data Date - (DD) The date used as the starting point for schedule calculations. For Baselines, the DD is the first day of the project, the CSD date. For subsequent schedule updates, the DD is the first workday of the remainder of

the schedule, normally the first calendar day after the schedule close-out date (usually month end).

G. Total Float - is the amount of time that the start or finish of an activity can be delayed without impacting the Contract Completion Date. Total float is a CALCULATED value.

H. Free Float - is the amount of time that the start or finish of an activity can be delayed without impacting the early start or finish of a successor activity. Free float is a CALCULATED value.

I. Lag - is an offset or delay from an activity to its' successor, or from its' predecessor. Lag is physically defined by the scheduler. Lag is NOT CALCULATED.

J. Open End - is an activity that has either no predecessor or no successor relationships.

K. Out of Sequence Progress - means that all or a portion of an activity has been completed before the predecessors to the activity are complete.

L. Percent Complete - the portion of an activity that is complete based on physical measurement of the scope of work included in the activity that has been completed by the CONTRACTOR and accepted by the OWNER.

M. Target (Baseline) - a different version of the project schedule that can be compared to as the basis for measuring differences between the versions of the project schedule.

PART 4 - PROJECT CONTROL SCHEDULE (BASELINE)

The CONTRACTOR shall be responsible for assuring that all work sequences are logical and the network shows a coordinated plan for the complete performance of the CONTRACT. Failure of the CONTRACTOR to include any element of the work required for the performance of the CONTRACT in the network shall not relieve the CONTRACTOR from completing all work within the time specified for the completion of the CONTRACT. In the event the CONTRACTOR fails to define any element of the work in the network, when the omission or error is discovered by either the CONTRACTOR or OWNER, it shall be corrected by the CONTRACTOR at the next scheduled update or submittal.

A. The PCS Baseline shall be organized to clearly define separate groups of activities detailing:

1. key submittals,

2. procurement of major materials and equipment,

3. delivery of OWNER furnished materials and equipment,

4. approvals required by regulatory agencies or other third parties,

5. plans for all major subcontract work,

6. access to and availability of all work areas,

7. identification of interfaces and dependencies with preceding, concurrent, and follow-on contractors,

8. tests and inspections,

9. identification of any manpower, material or equipment restrictions.

B. Relationships shall be defined between the CONTRACTOR'S activities based on the following criteria.

PHYSICAL - relationships occur when a successor activity cannot physically start (or finish) until a predecessor activity completes (or starts). ***example: forming before pouring***

SAFETY - defined relationships exist when a successor activity cannot start until a predecessor activity (which may be creating a safety hazard for the successor activity), completes allowing for the start of the successor in a safe environment. ***example: completing overhead work before starting work underneath***

RESOURCE - driven relationships occur when a successor activity cannot start until a predecessor activity completes and releases its' resources to work on the successor. ***example: form slab # 1 before forming slab # 2 when allocating one crew to a job***

PREFERENTIAL - logic occurs when a contractor prefers to perform the work in a given sequence. ***example: completing painting before starting finished flooring***

NOTE: The basis of Safety, Resource and Preferential logic requirements for all critical or near critical activities shall be documented in the Baseline Schedule Narrative or as requested by the OWNER.

C. The basis of constraints and lags utilized in the PCS-BASELINE and subsequent UPDATES must be documented in an accompanying schedule narrative.

D. The CONTRACTOR shall not utilize float suppression techniques or artificial restraints, constraints, lags or durations to lessen or control the amount of total or free float contained in the network.

E. Float shall not be considered as time for the exclusive use of or benefit of either the OWNER or the CONTRACTOR. Float shall be considered as a resource available to both parties for the benefit of the project.

F. Early Completion - An early completion schedule is one which anticipates completion of the work ahead of the corresponding Contract Time. Since Total Float is measured to the Contract Completion Date (CCD), and belongs to the Project, the CONTRACTOR shall not be entitled to any extension in Contract Time, or recovery for any delay incurred because of extensions in an early completion date, until all total float is used or consumed and performance or completion of the WORK extends beyond the corresponding Contract Time.

G. Project Schedule Reports shall be submitted to the OWNER as follows:

Graphics - 11" x 17" (Tabloid)

1. Time Scaled Logic Diagram based on early dates, organized by OWNERWBS Codes with the longest (critical) path printed in red. (Attachment A.)

2. Bar chart, organized by CONTRACTOR-WBS, indicating early and late date bars with critical path printed in red.

Graphics – 8½" x 11" (A size)

3. Detailed Bar Chart, Grouped by CONTRACTOR-WBS

4. Estimated Cash Flow Histogram (if cost loaded) with planned value per period (bar) and cumulative to date (curve).

Tabular Reports – 8½" x 11" (A size)

5. Predecessor / Successor listing including relationship type and lag value, organized by Activity ID.

6. Tabular activity listing, sorted by Activity ID, with Early and Late Dates, Total and Free Float values.

7. Tabular activity listing, Grouped by Responsible party, sorted by Early Start, with Early Dates, Total and Free Float values.

8. Listing of all schedule constraints and open ends with explanation of each.

9. Identification of all lags contained in relationships and explanation of each.

10. Narrative report explaining the key "basis and assumptions" of the Project Control Schedule Baseline schedule.

11. Submittal / Procurement Status Report - A P3 Activity Matrix Report detailing for each submittal item, the Planned Dates for each step in the submittal/ procurement process.

12. Bid Item Listing.

H. Submittal

1. Six (6) sets of all graphics

2. Six (6) sets of all tabular reports

I. Acceptance

1. The OWNER may accept the PCS-Baseline submittal and subsequent updates as having been submitted in accordance with the Contract Specifications. The OWNER will review and make comments on the PCS. Meetings may be held between the OWNER and the CONTRACTOR, and all SUBCONTRACTORS and SUPPLIERS whom the CONTRACTOR may desire to invite or whom the OWNER may request be present.

2. The PCS submittal must meet in all respects the time and order of work requirements of the contract. The work shall be executed in the sequence indicated in the accepted baseline and subsequent accepted updates and revisions. If the CONTRACTOR changes the sequence of work, a baseline revision submittal will be required in accordance with Section 4.10.

3. Comments made by the OWNER on the PCS or any subsequent updates and revisions, will not relieve the CONTRACTOR from compliance with requirements of the Contract Documents.

4. If requested by the OWNER at any time during the project, the CONTRACTOR shall provide detailed, short term schedules for specific items of the work.

J. Baseline Schedule Revisions

1. No change shall be made to the accepted Project Control Schedule Baseline without the prior written authorization of the OWNER.

2. If the CONTRACTOR desires or the OWNER requests that the PCS Baseline be revised to reflect specific ISSUES of the current project plan, the CONTRACTOR shall prepare a detailed analysis of the time related impacts of the specific ISSUE, demonstrating how the CONTRACTOR proposes to incorporate the ISSUE into the PCS Baseline.

3. Each time impact analysis shall be submitted prior to approval of any change in the contract to facilitate the incorporation of the impact in the next schedule submittal by the CONTRACTOR.

4. Time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the remaining total float along the path of activities impacted by the ISSUE.

5. When an authorized revision is made to the PCS Baseline, the revised baseline shall be identified by a Revision Number, giving the revised Baseline a distinct identification separate from all previous or subsequent Baseline Revisions.

K. Schedule Updates

1. The CONTRACTOR shall submit the Project Control Schedule - Update to the OWNER each month, on a date assigned by the OWNER. The Update submittal shall include all information available up to the Data Date established by the OWNER.

2. The PCS-Update submittal shall be reviewed jointly (if necessary) with the OWNER for the purpose of verifying update information. The OWNER may request key SUBCONTRACTORS or SUPPLIERS to participate in the review with the CONTRACTOR. Information to verify includes but is not limited to:

a) Actual start / finish dates for activities started or finished in the current period.

b) Activity Percent Complete for activities that are currently in progress.

c) Remaining durations or expected finish dates for activities that are currently in progress.

d) Revised logic (as-built and projected) and changes in activity durations.

e) Impacts of Issues identified by the CONTRACTOR or OWNER.

f) Incorporation of OWNER approved time extensions.

3. The CONTRACTOR may not make changes to any actual events previously entered in prior updates without written concurrence by the OWNER.

4. PCS-Update submittals shall be prepared as follows:

Graphics - 11" x 17" (Tabloid size)

a) Time scaled Logic Diagram of early dates, organized by WBS Codes with the calculated critical path printed in red.

b) Bar chart, organized by WBS Codes, indicating early and late dates with critical path printed in red, with Target (Baseline) Bar.

Graphics - 8½” x 11" (A size)

c) Detailed Bar Chart , Grouped by OWNER-WBS, with Target (Baseline) Bar.

Tabular Reports - 8½" x 11" (A size)

d) Tabular activity listing, sorted by Activity ID, with Early and Late Dates, with Total and Free Float values.

e) Tabular activity listing, sorted by Early Start, with Current Early and Current Baseline dates and Variance between Current Early and Current Baseline Finish Dates.

f) Tabular activity listing, Grouped by Responsible party, sorted by Early Start, with Early Dates, Total and Free Float values.

g) Listing of any NEW or DELETED schedule constraints and open ends with explanation of each.

h) Identification of all NEW or DELETED lags contained in relationships and explanation of each.

i) Identification of all NEW or DELETED activities and an explanation of each.

j) Narrative report including description of problem areas, current and anticipated delaying factors, and their expected impact, and an explanation of current actions taken or proposed. In addition, alternative for possible schedule recovery to mitigate any potential delay and/or cost increases should be included in the monthly narrative by the CONTRACTOR.

k) Submittal/Procurement Status Report.

l) Bid Item Listing Report.

m) If the CONTRACTOR fails to submit any of the PCS update submittal deliverables, the OWNER may withhold approval of progress payment estimates until such time as the CONTRACTOR submits the required update submittal.

PART 5 - PAYMENT FOR PROJECT CONTROL SCHEDULE

A. Project Control Schedule will be considered incidental to the cost of the overall project. There shall be no separate pay for the Project Schedule.

END OF SECTION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

The contractor shall perform the work minimizing environmental pollution and damage as the result of construction operations. Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, as well as other pollutants. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract.

A. SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

B. PERMITS

The Contractor shall obtain all needed permits or licenses. The Owner will not obtain any permits for this project. The Environmental Protection Agency (EPA), through the national pollutant discharge elimination system (NPDES), requires general permits, a notice of intent, and a notice of discontinuation. The Contractor shall be responsible for implementing the terms and requirements of the appropriate permits as needed and for payment of all fees.

C. PRECONSTRUCTION SURVEY

Prior to starting any onsite construction activities, the Contractor and Owner shall make a joint condition survey, after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs, and grassed areas immediately adjacent to work sites and adjacent to the assigned storage area and access routes as applicable. This report will be signed by both the owner and the Contractor upon mutual agreement as to its accuracy and completeness.

D. MEETINGS

The Contractor shall meet with representatives of the Owner to change the environmental protection plan as needed for compliance with the environmental pollution control program.

E. NOTIFICATION

The Owner will notify the Contractor in writing of any observed noncompliance with the previously mentioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Owner of proposed corrective action and take such action when approved. If the Contractor fails to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspensions.

F. PREVIOUSLY USED EQUIPMENT

The Contractor shall thoroughly clean all construction equipment previously used at other sites before it is brought into the work areas, ensuring that soil residuals are removed.

G. PAYMENT

No separate payment will be made for work covered under this section; all costs associated with this section shall be included in the contract unit and/or lump sum prices in the Bidding Schedule.

1.02 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify the land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut , deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without permission. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such emergency use in permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, earth or other material displaced into uncleared areas shall be removed.

A. WORK AREA LIMITS

Prior to any construction, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall

be visible. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

B. LANDSCAPE

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Fencing shall be erected at sufficient distance from a tree trunk (usually equal to the diameter of the tree crown) to prevent compaction of soil over the root spread.

C. UNPROTECTED ERODIBLE SOILS

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Owner.

D. DISTURBED AREAS

The Contractor shall effectively prevent erosion and control sedimentation through approved methods and Best Management Practices (BMP's) including, but not limited to, the following:

1. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.

2. Erosion and sedimentation control devices. The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated on the drawings. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

3. Sediment basins. Sediment from construction areas maybe trapped in temporary or permanent sediment basins in accordance with the drawings. The basins shall accommodate the runoff of a local 5 year storm (6.1" in 24 hours). After each storm, the basins shall be pumped dry and accumulated sediment shall be removed to maintain basin effectiveness. Overflow shall be controlled by paved weirs or by vertical overflow pipes. The collected

topsoil sediment shall be reused for fill on the construction site, and/or stockpiled for use at another site. The Contractor shall institute effluent quality monitoring programs as requested by State and local environmental agencies.

4. De-watering of site and control of water quality. All water discharged from any excavation will be deposited at approved locations only. The Contractor will monitor water quality and not dispose of any material illegally. De-watering methods will be included in the Contractor's SWPPP.

E. CONTRACTOR FACILITIES AND WORK AREAS

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Owner. Temporary movement or relocation of Contractor facilities shall be made only when approved. Borrow areas shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings. Temporary excavation and embankments for plan and/or work areas shall be controlled to protect adjacent areas from despoilment.

1.03 WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction shall be the Contractor's responsibility. All water areas affected by construction activities shall be monitored by the Contractor.

A. WASHING AND CURING WATER

Waste waters directly derived from construction activities shall not be allowed to enter stormwater or wastewater facilities.

B. FISH AND WILDLIFE

The Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife.

1.04 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with the

State of Texas rules and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality, if required, shall be the Contractor's responsibility. All air areas affected by the construction activities shall be monitored by the Contractor. Monitoring results will be periodically reviewed by the Owner to ensure compliance.

A. PARTICULATES

Dust particles, aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor mush have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

B. HYDROCARBONS AND CARBON MONOXIDE

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

C. ODORS

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

D. SOUND INTRUSIONS

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the City ordinances.

1.05 WASTE DISPOSAL

Disposal of wastes shall comply with all applicable City requirements and as specified below.

A. SOLID WASTES

Solid wastes (excluding clearing debris) shall be placed in containers and emptied on a regular schedule. Handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. Contractor shall dispose of classified non-hazardous solid waste at disposal area. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

B. HAZARDOUS WASTES

The Contractor shall take sufficient measures to prevent spillage of hazardous materials during dispensing and collect waste in suitable containers observing compatibility. Toxic materials shall not be used within the construction site. The Contractor shall immediately transport hazardous waste and dispose of it in compliance with Federal and local laws and regulations. Storage of hazardous waste on the construction site is prohibited. Spills of hazardous materials shall be immediately reported to the Owner. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility.

C. BURNING

Burning will not be allowed.

1.06 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Owner, if any has been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. The Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Owner. While waiting for instructions the Contractor shall record, report, and preserve the finds in accordance with the requirements of the Texas State Historical Preservation Office.

1.07 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction.

1.08 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work areas at no costs to the OWNER.

1.09 MAINTENANCE OF ANTI-POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

1.10 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This item shall consist of all required testing and inspection services required to provide certification that the completed construction is in substantial compliance with the contract, plans and specifications.

B. Testing and inspections shall include: all underground utilities (water, sewer & drainage), roadway embankment, subgrade, base & asphalt, curbs of all types, concrete pavements, concrete structures, signage, striping, and all other facilities as may be included in the overall scope of construction.

C. Inspections may include observations to determine compliance with the prescribed stormwater pollution prevention plan (SW3P), trench safety, personal protection equipment and traffic control plans.

D. The ENGINEER has the authority to observe, test, inspect, approve, and accept the work. The ENGINEER decides all questions about the quality and acceptability of materials, work performed, work progress, Contract interpretations, and acceptable Contract fulfillment. The ENGINEER has the authority to enforce and make effective these decisions.

E. The ENGINEER acts as a referee in all questions arising under the terms of the Contract. The ENGINEER's decisions will be final and binding.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION

3.01 LABORATORY TESTING

A. All required laboratory testing shall be completed by an independent, qualified testing laboratory approved by the CITY. All initial testing shall be paid for by the CITY. Any retesting required shall be paid for by the CONTRACTOR.

B. Cost for additional review time will be billed to the CONTRACTOR by the OWNER for the actual hours required for the re-testing in accordance with the current rates as established by the contract between the CITY and the Testing Lab. Cost for the additional review shall be paid to the OWNER by the CONTRACTOR on a monthly basis.

3.02 INSPECTIONS

A. PROVIDERS: All required inspections shall be provided by either the independent testing laboratory or by the City of McAllen Engineering

department staff. All initial inspections conducted during normal business hours (8:00 am to 5:00 pm, Monday – Friday, excluding Holidays) shall be provided by the CITY at no charge. Any inspections or testing requested by the CONTRACTOR to be provided at any other time will be paid for by the CONTRACTOR. Any re-inspections or re-testing required shall be paid for by the CONTRACTOR.

B. COSTS: Cost for additional review time will be billed to the CONTRACTOR by the OWNER for the actual hours required for the retesting in accordance with the current rates as established by the contract between the CITY and the Testing Lab. Cost for the additional review shall be paid to the Owner by the CONTRACTOR on a monthly basis.

C. INSPECTORS: Inspectors are authorized representatives of the ENGINEER. Inspectors are authorized to examine all work performed and materials furnished, including preparation, fabrication, and material manufacture. Inspectors inform the CONTRACTOR of failures to meet Contract requirements. Inspectors may reject work or materials and may suspend work until any issues can be referred to and decided by the ENGINEER. Inspectors cannot alter, add, or waive Contract provisions, issue instructions contrary to the Contract, act as foremen for the CONTRACTOR, or interfere with the management of the work. Inspection or lack of inspection will not relieve the CONTRACTOR from obligation to provide materials or perform the work in accordance with the Contract. CONTRACTOR shall provide safe access to all parts of the work and provide information and assistance to the ENGINEER to allow a complete and detailed inspection and give the ENGINEER sufficient notice to inspect the work. Work performed without suitable inspection, as determined by the ENGINEER, may be ordered removed and replaced at CONTRACTOR's expense. CONTRACTOR shall remove or uncover portions of finished work as directed. Once inspected, restore work to Contract requirements. If the uncovered work is acceptable, the costs to uncover, remove, and replace or make good the parts removed will be paid for in accordance "Changes in the Work." If the work is unacceptable, CONTRACTOR shall assume all costs associated with repair or replacement, including the costs to uncover, remove, and replace or make good the parts removed. When a government entity, utility, railroad company, or other entity accepts or pays a portion of the Contract, that organization's representatives may inspect the work but cannot direct the CONTRACTOR. The right of inspection does not make that entity a party to the Contract and does not interfere with the rights of the parties to the Contract.

D. FINAL INSPECTION: After all work is complete, the CONTRACTOR will request a final inspection by the ENGINEER authorized to accept the work. The final inspection will be made as soon as possible, and not later than 10 calendar days after the request. No working day charges will be made between the date of request and final inspection. After the final inspection, if the work is

satisfactory, the ENGINEER will notify the CONTRACTOR in writing of the final acceptance of the work. If the final inspection finds any work to be unsatisfactory, the ENGINEER will identify in writing all deficiencies in the work requiring correction. Correct the deficiencies identified. Working day charges will resume if these deficiencies are not corrected within 7 calendar days, unless otherwise authorized by the ENGINEER. Upon correction, the ENGINEER will make an inspection to verify that all deficiencies were corrected satisfactorily. The ENGINEER will provide written notice of the final acceptance.

3.03 SCHEDULING

A. It shall be the CONTRACTOR'S responsibility to contact either the testing lab or the City of McAllen Engineering staff at least 48 hours before the required testing or inspection is to occur.

B. It shall be the CONTRACTOR'S responsibility to plan the construction in such a manner to allow the appropriate tests and inspections to be conducted without disruption to the construction process.

3.04 PREPARATION

A. CONTRACTOR shall be responsible for preparing the project site as necessary to conduct all required testing. This shall include, but may not be limited to: proper grading of construction site, completion of required compaction activities, complete installation of all forms, installation of all required reference points (grade stakes), provision of adequate traffic control, additional personnel and/or supplies and all necessary safety measures (i.e. OSHA compliant Trench Safety) as needed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. This work shall be considered incidental to the completion of the project and no additional compensation shall be paid for this work.

4.02 PAYMENT

A. No separate payment shall be made for this item.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations, and foundation beds in a stable condition, and controlling ground water conditions for tunnel excavations.

B. Protecting work against surface runoff and rising flood waters.

C. Disposing of removed water.

1.02 REFERENCES:

A. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

B. Federal Register 4O CFR (Vol. 53. No. 222) Part 122, EPA Administrator permit Programs (NPDES), Pam 122.26 (b) (l4) Storm Water Discharge.

1.03 DEFINITIONS:

A. Ground water control includes both dewatering and depressurization of water-bearing soil layers using well points, for either vacuum or educator systems, or deep wells. Use of sump pumps does not constitute ground water control.

1. Dewatering is lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations or into tunnels and shafts, and disposing of removed water.

2. Depressurization is reduction of piezometric pressure within a soil strata not controlled by dewatering alone.

B. Control of excavation drainage by sump pumping includes operating the sump pump and drainage facilities installed to collect water in the sump.

C. Control of surface drainage is diversion of surface water away from excavations.

1.04 PERFORMANCE REQUIREMENTS:

A. Conduct subsurface investigations as needed to identify ground water conditions and to provide parameters for installation and operation of ground water control systems. Perform pump tests, if necessary, to determine drawdown characteristics of water bearing layers.

B. Develop a ground water control system, compatible with requirements of Federal Regulations 29 CER Part 1926, to produce the following results:

1. Reduce hydrostatic pressure affecting excavations to the following levels as determined by piezometer observations.

a. For structural excavations, reduce the piezometric level to at least 3 feet below the excavation bottom elevation or within 2 feet above the top of clay layers.

b Where hydrostatic pressure in a confined water-bearing layer exist below the excavation, depressurize this zone to eliminate risk of uplift or other instability of the excavation or installed works.

2. Develop stable subgrade for subsequent construction operations.

3. Reduce hydrostatic pressure for tunnel excavations as necessary to maintain face stability, grade control, and to control seepage into tunnel

C. Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials such as crushed stone and filter fabric, together with sump pumping

D. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells

E. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells, if they affect potentially contaminated areas

1.05 SUBMITTALS:

A. Contractor to submit a Dewatering Plan to include: list of equipment to be used, pump capacity, length of dewatering operations to be in effect at any time, identification of point(s) of discharge, identification of location(s) of turbidity control measures.

1.06 ENVIRONMENTAL REQUIREMENTS:

A. Comply with the Texas Commission on Environmental Quality regulations and Texas Water Well Driller Association for development, drilling, and abandonment of wells used in dewatering system.

B. Where potentially contaminated areas are indicated on the Drawings, monitor

ground water discharge for contamination in accordance with the Project Engineer's instructions.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. Equipment and materials are at the option of Contractor as necessary to achieve desired results for ground water control. Ground water control systems may include single-stage or multiple-stage well point systems, educator and ejector-type systems, deep wells, or combinations of these equipment types. Excavation drainage and surface drainage may also include sump pumping subsidiary to bid item.

B. Maintain equipment in good repair and operating order.

C. Arrange for standby equipment and materials where required.

PART 3 - EXECUTION

3.01 GROUND WATER CONTROL

A. Install, operate and maintain the ground water control system in a manner compatible with construction methods and site conditions. Notify Project Engineer in writing of any changes made to accommodate field conditions and changes to the Work.

B. For above ground piping in ground water control system, include a length of clear transparent piping between every well point and discharge header so that discharge from each installation can be visually monitored.

C. Replace installations that produce noticeable amounts of sediments after development.

D. Provide additional ground water control installations, or change the methods, if the installation does not achieve satisfactory results.

E. Do not allow piezometric pressure levels to rise until foundation concrete has achieved design strength.

F. During backfilling, dewatering may be reduced to maintain water level a minimum of 2 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place.

G. Remove ground water control installations.

1. Remove pumping system components and piping when ground water control is no longer required.
2. Remove monitoring wells when directed by the Project Engineer.

3. Grout abandoned well. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.

3.02 MAINTENANCE AND OBSERVATION

A. Conduct daily maintenance and observation of the ground water control systems.

B. Replace inoperable or damaged system components as necessary to maintain operation.

C. Keep monitoring system piping accessible for observation,

3.03 MONITORING AND RECORDING

A. Observe and record elevation of water level daily as long as ground water control system is in operation. Observe levels weekly thereafter until the Work is completed or piezometers or wells are removed. Initiate more frequent observation when the Project Engineer determines that more frequent monitoring and recording are required.

3.04 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations. This includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.

B. Drive surface water and seepage water into sumps and pump it into drainage channels, setting basins, or storm drains,

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

The work as provided for by this specification shall be measured as lump sum or as noted on the bid request. When not line item is included in the Bid Proposal, this work shall be considered incidental to the completion of the project and no additional compensation shall be paid for this work.

4.02 PAYMENT

When shown as a specific line item in the proposal, the work as prescribed for in this specification shall include all labor, tools, equipment, over-excavation, trench bedding, backfilling, materials, and incidentals necessary to complete the work.

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment and incidentals necessary to provide erosion and sediment control for the duration of the construction period including furnishing, installing and maintaining erosion and sediment control structures and procedures and the proper removal when no longer required.

The intent of this specification is to provide guidelines for the Contractor to adhere to all State, Federal, and Local environmental regulations. It is also the intent to provide preventive measures to keep sediment from entering any storm water system, including open channels. It is the Contractor's responsibility to adhere to all State, Federal and Local requirements. While the Owner may require the Contractor to install erosion control devices during construction, this will in no way relieve the Contractor of his responsibility.

1.02 QUALITY ASSURANCE

A. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Plans are not represented as being comprehensive, but rather to convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property.

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire length of construction. On-site areas which are subject to severe erosion and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation are to be identified and receive additional erosion control measures as directed by the Owner or the Engineer.

C. All land-disturbing activities shall be planned and conducted to minimize the size of the area to be exposed at any one time and to minimize the time of exposure.

D. Surface water runoff originating upgrade of exposed area shall be controlled to reduce erosion and sediment loss during the period of exposure.

E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving ditch or stream, the Contractor shall install measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream as directed by the Owner or the Engineer.

F. All land-disturbing activities shall be planned and conducted so as to minimize

off-site sedimentation damage.

C. The Contractor shall be responsible for periodically cleaning out and disposing of all sediment once the storage capacity of the drainage feature or structure receiving the sediment is reduced by one-half. The Contractor shall also be responsible for cleaning out and disposing of all sediment at the time of completion of the Work.

1.03 SUBMITTALS

Submittals shall be in accordance with Section 01300, SUBMITTALS, and shall include:

A. Manufacturer's Literature: Descriptive data of installation methods and procedures.

B. Certificates: Manufacturer's certification that materials meet specification requirements.

1.04 JOB CONDITIONS AND ORDINANCES

Comply with the local ordinances. If local ordinances require *more* stringent or additional erosion and sediment control measures during construction, Contractor shall provide such measures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. STRAW BALES: Straw bales shall weigh a minimum of fifty (50) pounds and shall be at least 30" in length. Bales shall be composed entirely of vegetable matter and be free of seeds. Binding shall be either wire or nylon string. Jute or cotton binding is unacceptable. Bales shall be used for not more than three months before being replaced. However, if weather conditions cause biological degradation of the straw bales, they shall be replaced sooner than the three month time period to prevent a loss of structural integrity of the dike.

B. SILT FENCE: Silt fence fabric shall be a nylon reinforced polypropylene fabric which has a built-in cord running the entire length of the top edge of the fabric. The fabric must meet the following minimum criteria:

Tensile Strength, ASTM D4632	90 lbs.
Puncture Rating, ASTM D4833	60 lbs.
Mullen Burst Rating, ASTM D3786	200 psi.
Apparent Opening Size, U.S. Sieve No.	40

Silt fence shall be "Enviro Fence" preassembled silt fence, AMXCO Silt Stop prefabricated silt fence, AMOCO Style 2155 preassembled silt fence or

approved equal.

C. SILT FENCE POSTS: A minimum 2" x 2" (nominal) x 54" pressure treated wood posts of Number 2 Grade southern yellow pine or approved equal.

D. SAND BAG: Sand bag material shall be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight four (4) ounces per square yard, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70%. Length shall be 24 to 30 inches, width shall be l6 to 18 inches and thickness shall be six (6) to eight (8) inches and having an approximate weight of 40 pounds. Sand bags shall be filled with coarse grade sand, free from deleterious material. All sand shall pass through a No. 10 sieve.

E. P.V.C. PIPE: Pipe shall be SDR-35 polyvinyl chloride having a minimum nominal internal diameter of 4". Pipes shall be sized for anticipated flows.

F. SOIL RETENTION BLANKET: Soil retention blankets shall consist of a geocomposite of excelsior or fiber blanket with an extruded plastic net attached to the top side. The plastic net shall be photodegradable and the excelsior or fiber blanket shall be made smolder resistant without the use of chemicals. Soil retention blankets shall be high velocity type to resist severe runoff. The soil retention blanket shall be one (1) of the following classes and types:

1. Class 1. "Slope Protection"

   (a) Type A. Slopes of 3:1 or flatter-Clay soils

   (b) Type B. Slopes of 3:1 or flatter - Sandy soils

   (c) Type C. Slopes steeper than 3:1 - Clay soils

   (d) Type D. Slopes steeper than 3:1 - Sandy soils

2. Class 2. "Flexible Channel Liner"

   (a) Type E. Short-term duration (Up to 2 Years)
   Shear Stress (t_d) <1.0 lb./sq. ft.

   (b) Type F. Short-term duration (Up to 2 Years)
   Shear Stress (t_d) 1.0 to 2.0 lb./sq. ft.

   (c) Type C. Long-term duration (Longer than 2 Years)
   Shear Stress (t_d)> 2.0 to < 5.0 lb./sq. ft.

   (d) Type H. Long-term duration (Longer than 2 Years)
   Shear Stress (t_d) greater than 0 Equal to 5.0 lb/sq. ft.

The Contractor has the option of selecting an approved soil retention blanket provided that selection conforms to the following list of approved soil retention blankets for slope protection applications:

CLASS I. SLOPE PROTECTION

TYPE A: Slopes of 3: I or Flatter- Clay Soils

Airtrol® ANTI-WASH®/GEOJUTE® (Regular)
Contech Standards®
Contech Standards Plus®
Green Triangle Regular®
Green Triangle Superior®
GREENSTREAK® PEC MAT
Curlex®
North American Green® S150
North American Green® S75
North American Green® SC 150
POLYJUTEÔ 4O7/GT
SOIL SAVER®
TerraJute®
Verdyol® ERO-MAT®
Xcel Regular®
Xcel Superior®

TYPE B: Slopes of 3:1 or Flatter-Sandy Soils

Contech Standards®
Contech Standards Plus®
GEOCOIR®/DEKOWE® 700
Green Triangle Superior®
Green Triangle Regular®
North American Green® 575
North American Green® SC 150
North American Green® S150
POLYJUTEO 407/CT
TerraJute®
Verdyol® ERO-MAT®
XceI Superior®
XceI Regular®

TYPE C: Slopes Steeper than 3:1-Clay Soils

Airtrol®
ANTI-WASH®/GEOJUTE® (Regular)

Contech Standards Plus®
Curlex®
Green Triangle Superior®
GREENSTREAK® PEC-MAT
North American Green® SC 150
North American Green® S150
POLYJUTEÔ 407/CT
SOIL SAVER®
TerraJute®
Xcel Superior®

TYPE D: Slopes Steeper than 3:1-Sandy Soils

Contech Standards Plus®
GEOCOIR®/DEKOWE®700
Green Triangle Superior®
North American Green®S150
North American Green®SC150
POLYJUTEÔ 407GT
TerraJute®
Xcel Superior®

CLASS II: FLEXIBLE CHANNEL LINER PROTECTION

PART 3 - EXECUTION

3.01 PREPARATION

A. Contractor shall prepare the site for installation of the erosion and sediment control devices in accordance with the manufacturer's recommendations when applicable. At all times, CONTRACTOR, shall take extreme care during the installation of the applicable devices to minimize disturbance of the project site.

3.02 INSTALLATION

A. TEMPORARY STRAW BALE DIKE

1. Straw bales shall be embedded a minimum of 4" and securely anchored using 2" x 2" wood stakes driven through the bales into the ground a minimum of 6" Straw bales are to be placed directly adjacent to one another leaving no gap between them.

2. Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches, the barrier shall extend to such a length that the bottoms of the end bales

are higher in elevation than the top of the lowest middle bale. Additional bales shall be placed behind the first row where the bales abut each other. The additional bale is used to prevent unfiltered runoff from escaping between the bales.

3. The-excavated soil shall be backfilled against the barrier. Backfill shall conform to ground level on the downhill side and shall be built up to 4" above ground level on the uphill side. Loose straw shall be scattered over the area immediately uphill from a straw barrier.

B. SILT FENCE

The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas to a limited extent. The Contractor shall excavate a 6 inch wide by 6 inch deep trench for site fence bedding along the lower perimeters of the site where necessary to prevent sediment from entering any drainage system. The Contractor shall install the silt fence in accordance with the manufacturer's recommendations and instructions. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence shall remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way or where soil conditions prevent a minimum toe-in depth of 6" or installation of support post to depth of 12". Fabric shall overlap at abutting ends a minimum of 3' and shall be jointed such that no leakage or bypass occurs. If concentrated flow occurs after installation, corrective action must be taken such as placing rock berm in the areas of concentrated flow.

C. SAND BAG BERM

1. The purpose of a sandbag berm is to intercept sediment-laden water from disturbed areas such as construction in steam beds, create a retention pond, detain sediment and release water in sheet flow.

2. A temporary sand bag berm shall be installed across a channel or right of way in a developing or disturbed area and should be used when the contributing drainage area is greater than 5 acres. The berm shall be a minimum height of 18", measured from the top of the existing ground at the upslope toe to the top of the berm. The berm shall be sized to have a minimum width of 48" measured at the bottom of the berm and 18" measured at the top of the berm.

3. The sand bag berm shall be inspected after each rain. The sand bags shall be reshaped or replaced as needed during inspection. Additional inspections shall be made daily by the responsible party and when the silt reaches 6", the accumulated silt shall be removed and disposed of at an

approved site in a manner that will not contribute to additional siltation. The sand bag berm shall be left in place until all upstream areas are stabilized and accumulated silt removed; removal must be done by hand.

D. SOIL RETENTION BLANKETS

1. A soil retention blanket (SRB) is a geotextile or biodegradable fabric placed over disturbed areas to limit the effects of erosion due to rainfall impact and runoff across barren soil. Soil retention blankets are manufactured by a wide variety of vendors addressing a wide variety of conditions such as vegetation establishment and high velocity flow. Blankets are used in areas which are difficult to stabilize such as steep slopes, drainage swales or high pedestrian traffic areas.

2. The soil retention blanket, whether installed as slope protection or as flexible channel liner, shall be placed within 24 hours after seeding or sodding operations have been completed, or as approved by the Engineer. Prior to placing the blanket, the area to be covered shall be relatively free of all rocks or clods over 1-1/2" in maximum dimension and all sticks or other foreign material which will prevent the close contact of the blanket with the soil. The area shall be smooth and free of ruts and other depressions. If as a result of rain, the prepared bed becomes crusted or eroded or if any eroded places, ruts or depressions exist for any reason, the Contractor shall be required to rework the soil until it is smooth and to reseed or resod the area at the Contractor's expense.

3. Installation and anchorage of the soil retention blanket shall be in accordance with the manufacturer's recommendations.

E. PROTECTION OF BARE AREAS

1. Apply seeding and soil retention blanket to bare areas including new embankment areas, fills, stripped areas, graded areas or otherwise disturbed areas, which have a grade greater than *5%* or which will be exposed for more than 30 days.

2. Bare working areas on which it is not practical or desirable to install seeding and soil retention blankets, as determined by the Engineer, such as areas under proposed building slabs, shall be temporarily sloped to drain at a minimum of 0.2% and a maximum of 5% grade. These areas shall then be "track walked" with a crawler dozer traveling up and down the slope to form the effect of small "terraces" with the tracks of the dozer. Apply a minimum of three (3) coverages to each area with the dozer tracks,

3. Route runoff from the areas through the appropriate silt fence system.

4. Protect earth spoil areas by “trackwalking” and silt fences.

F. INTERCEPTOR SWALE

1. Interceptor swales may have a v-shape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. These are used to shorten the length of exposed slope by intercepting runoff and can also serve as perimeter swales preventing off-site runoff from entering the disturbed area or prevent sediment-laden runoff from leaving the construction site or disturbed area. The outflow from a swale must be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

2. Stone Stabilization shall be used when grades exceed 2% or velocities exceed 6 feet per second and shall consist of a layer of crushed stone *3”* thick, or flexible channel liner soil retention blankets. Stabilization shall extend across the bottom of the swale and up both sides of the channel to minimum height of 6 inches above the design water surface elevation based on a two year storm.

3. An interceptor swale shall be installed across exposed slopes during construction and should intercept no more than five *(5)* acres of runoff. Swales shall have a minimum bottom width of 2’-0” and a maximum depth of 1’-6” with side slopes of 3 :1 or flatter. Swale must have positive drainage for its entire length to an outlet. When the slope exceeds 3%, or velocities exceed 4 feet per second (regardless of slope), stone stabilization is required. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary. Swales should be inspected on a weekly basis during wet weather and repairs should be made promptly to maintain a consistent cross section.

4. All trees, brush, stumps, obstructions and other material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

5. The swale shall be excavated or shaped to line, grade, and cross-section as required to meet criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.

6. All earth removed and not needed in construction shall be disposed of in an approved spoils site so that it will be conveyed to a sediment trapping device.

7. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device.

8. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

9. Minimum compaction for the swale shall be 90% standard proctor.

G. LOCATION OF EROSION AND SEDIMENT CONTROL STRUCTURES

1. Locate erosion and sediment control structures as required to prevent erosion and removal of sediment from the project site. Silt fences shall be required for disturbed areas and soil stockpiles/spoil areas. Each silt fence installation shall have a minimum net length (exclusive of embedments into diversion dikes or other ineffective areas) of 25 feet. The runoff from a maximum of one (1) acre of disturbed area or soil stockpile/ spoil area shall be routed through any individual silt fence installation.

2. Install diversion dikes to divert runoff to the silt fence installation.

3. Install silt traps at the inlet (upstream) end of the drainage structures, including open channels, through which runoff from disturbed areas or soil stockpiles/spoil areas may drain.

4. Provide an overall erosion and sediment control system which protects disturbed areas and soil stockpiles/spoil areas. The system shall be modified by the Contractor from time to time to effectively control erosion and sediment during construction.

3.03 MAINTENANCE

A. Maintain erosion and sediment control structures and procedures in full working order at all times during construction. This shall include any necessary repair or replacement of items which have become damaged or ineffective. Remove sediment on a regular basis which accumulates in sediment control devices and place the material in approved earth spoil areas or return the material to the area from which it eroded.

B. Upon completion of construction, properly remove the temporary erosion and sediment control structures and complete the area as indicated.

C. Soil retention blankets will not require removal if installed on a finished graded area specified to receive seeding.

3.04 FIELD QUALITY CONTROL

In the event of conflict between the requirements and storm water pollution control laws, rules or regulations or other Federal, State or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

The work as provided for by this specification shall be measured as lump sum or as noted on the bid request. When not line item is included in the Bid Proposal, this work shall be considered incidental to the completion of the project and no additional compensation shall be paid for this work.

4.02 PAYMENT

When shown in the proposal, the work as prescribed for in this specification shall be paid for labor, tools, equipment, excavation, backfilling, materials, and incidentals necessary to complete the work.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK AND RELATED DOCUMENTS

A. Furnish all work and materials, appliances, tools, equipment, facilities, transportation and services required and incidental thereto, as shown on drawings and/or specified herein including but not limited to; the submittal of closeout documents, final cleaning of materials and equipment and furnishing permit clearances, guarantees and warranties.

B. Related Work Specified Elsewhere:

1. Submittal Requirements: Section 01300

C. The completion of the closeout procedures indicated in these specifications will be a condition for releasing final payment.

1.2 PROJECT CLEAN-UP

A. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness. Use only materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material, or as approved by the Engineer/Architect.

B. Final cleaning shall mean a level of cleanliness generally provided by skilled cleaners using commercial quality, site maintenance equipment and materials.

C. The Contractor shall schedule a final cleaning as approved by the Engineer/Architect.

D. The contractor shall restore any disturbed areas or structures to pre-construction conditions or improved conditions.

1.3 ONSITE TRAINING

A. The Contractor shall provide a demonstration of the operation techniques and methods of the mechanical, electrical and plumbing systems. This demonstration must be coordinated with the Engineer/Architect. The operation and maintenance manuals must be available for use during this training period.

B. The Contractor shall propose a time in writing to the Engineer/Architect allowing at least seventy-two (72) hours notice.

1.4 AS BUILT DRAWINGS

A. Final "As-Built" drawings shall be prepared by the Contractor in an Auto CAD 2005, Microstation or better format. These drawings shall indicate all changes or deviations from the construction documents. These drawings shall be

submitted to the Engineer/Architect on a CD. The drawings must clearly state AS BUILT and be neatly organized.

1.5 GUARANTEES AND WARRANTIES

A. The Contractor shall provide a construction warranty letter.

B. The Contractor shall provide final clearances from all permitting agencies.

1.6 FINAL COMPLETION

A. The Contractor shall supply a written request for a Final Completion inspection. This request shall include the following:

1. Certification that the work and actions specified in the Contract Documents has been completed and that the Owner has full use of the site.

2. All equipment has been tested and balanced and is fully functional.

3. The Onsite Training Program has been completed and there are no outstanding issues resulting from said program.

4. A copy of the list of deficiencies generated by the Substantial Completion Inspection, with each item initialed and showing date completed.

5. A list of all Subcontractors and material suppliers with name, address and phone number. Include source for parts replacement and local representative if different.

6. Submit all test/adjust/balance records and start-up performance reports.

7. Submit all tools, keys and any special devices to assure complete operation by the Owner.

8. Final application for payment.

9. Waivers, Sworn Statements and Affidavits of Payments to Subcontractors and Suppliers.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Removal and disposal of all obstructions from the right-of-way and from designated easements for construction operations, by removing and disposing of all obstructions when removal of such obstructions is not specifically shown on the plans to be paid by other items.

B. Obstructions shall include, but are not limited to:

1. Remains of houses not completely removed by others.

2. Concrete, foundations, floor slabs, curb and gutter, driveways, and sidewalk.

3. Building materials such as brick, lumber and plaster.

4. Water wells, septic tanks, manholes, inlets utility pipes and conduits.

5. Underground service station tanks, equipment or other foundations.

6. Fencing and retaining walls.

7. Paved parking areas.

8. Abandoned railroad tracks, ties, and scrap iron.

9. Ancillary structures such as shacks and outhouses.

10. Trees, stumps, bushes, shrubs, roots, limbs and logs.

11. All rubbish and debris whether above or below ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 GENERAL

A. Clear entire project right-of-way and such other areas, including public or corporate lands, specified in the plans of all structures and obstructions.

B. Trim carefully all trees and shrubs designated for preservation and protect from scarring or other injuries during construction operation.

C. Removal of all foundations and underground obstructions, unless otherwise specified, shall be removed to the following depths:

1. In embankment areas, two (2) feet below natural grounds.

2. In excavation areas, two (2) feet below the lower elevation of excavation.

3. In all other areas, one (1) foot below natural grade.

D. Backfill all holes, as directed by the ENGINEER, resulting from all removals.

E. Complete the preparation of right-of-way such that prepared right-of-way is free of holes, ditches and other abrupt changes in elevations and irregularities to contours.

F. Plug the remaining ends of all abandoned storm sewers, culverts, sanitary sewers, conduits and utility pipes with concrete, as specified by the ENGINEER, to form a tight closure.

G. On existing concrete where only a portion is to be removed, care shall be exercised to avoid damage to remaining concrete. Where concrete reinforcement is encountered in removed portions, a minimum of one (1) foot of such reinforcement shall be cleaned of old concrete and left in place to tie into new construction. Concrete to be preserved, but subsequently destroyed by the CONTRACTOR'S operations, shall be replaced by the CONTRACTOR at his expense in accordance with City Specifications, or as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PREPARATION OF RIGHT-OF-WAY

A. Preparation of right-of-way shall be measured by one of the following methods: on a lump-sum basis; by the acre; or by the linear foot along the centerline of construction (regardless of the width of the right of way). The measurement for payment made only on areas indicated and classified on the plans as preparation of right-of-way.

B. When not listed as a separate contract pay item, preparation of right-of-way shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of breaking up, removing and satisfactorily disposing of existing concrete, as classified, at locations indicated or as directed by the Engineer.

B. Existing concrete, when under this section, will be classified as follows:

1. Concrete Curb will include curb, curb-and-gutter and valley gutters.

2. Concrete Slabs will include, but not be limited to, patio slabs, porch slabs, foundation systems, riprap and concrete pavement.

3. Sidewalks and Driveways will include concrete sidewalks and driveways.

4. Concrete Walls will include all walls, regardless of height and wall footings.

5. Concrete Steps will include all steps and combinations of walls and steps.

6. Abandoned Foundations will include abandoned utilities foundations.

7. Miscellaneous Concrete shall include, but not be limited to, manholes, inlets, junction boxes and headwalls, as indicated by the plans or the Engineer.

PART 2 PRODUCTS

2.01 MORTAR:

A. Mortar, for repair of existing concrete structures, shall conform to the requirements thereof in Section 3300 - Cast-In-Place Concrete.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Prior to commencing this work, all erosion control and tree protection measures required shall be in place and all utilities located and protected. The existing concrete shall be broken up, removed in accordance with Section 2101 - "Preparation of Right-of-Way", and disposed of at a permitted disposal site by the Contractor.

B. Where only a portion of the existing concrete is to be removed and the remaining portion is to continue to serve its purpose, care shall be exercised to avoid damage to the portion that will remain in place.

C. The existing concrete shall be cut along neat lines when indicated, or as established by the Engineer, by sawing with an appropriate type circular concrete saw to a minimum depth of 1/2 inch.

D. Any reinforcing steel encountered shall be cut off 1 inch inside of the concrete sawed line. Any existing concrete which is damaged or destroyed beyond the neat lines so established, shall be replaced at the Contractor's expense.

E. The remaining concrete shall be grouted and / or sealed to protect the reinforcing steel while providing a neat, clean appearance.

F. When applicable, a minimum of 1 foot of steel length shall be cleaned of all old concrete and left in place to tie into the new construction when reinforcement is encountered in the removed portions of structures to be modified.

G. All unsuitable material shall be removed and replaced with approved material.

H. All foundation, walls or other objectionable material shall be removed to a minimum depth of 18 inches below all structures and 12 inches below areas to be vegetated.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Concrete curb when removed as prescribed above, will be measured by the linear foot, in its original position, regardless of the dimensions or size.

B. Concrete slabs and concrete sidewalks and driveways removed as prescribed above will be measured by the square foot or square yard in original position, regardless of the thickness and reinforcing.

C. Concrete steps removed will be measured per linear foot or square foot of each individual step tread including the bottom step.

D. Concrete foundation removed will be measured per square yard.

E. Miscellaneous concrete removed will be measured per square yard each.

4.02 PAYMENT:

A. This item will be paid for at the contract unit price bid for "Removed Concrete Curb", "Removed Concrete Slab", "Remove Concrete Sidewalks and Driveways", "Removed Concrete Foundations" and "Remove Miscellaneous Concrete", which price shall be full compensation for all work herein specified, including the disposal of all material not required in the work, the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the work.

B. When not listed as a separate contract pay item, removal of concrete shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work, will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Treating of subgrade, subbase, and base courses by the pulverization, addition of cement, mixing and compacting the mixed material to the required density.

B. Application to natural ground, embankment, existing pavement, base or subbase under this contract, or as directed by the ENGINEER, which shall be constructed as specified herein and in conformity with the typical section, lines, grades as shown on the plans.

PART 2 - PRODUCTS

2.01 Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer will verify that the specification requirements are met before the sources can be used. The Engineer may sample and test project materials at any time before compaction.

A. Cement. Furnish hydraulic cement that has been prequalified by TxDOT in accordance with TxDOT Departmental Material Specifications, DMS-4600, “Hydraulic Cement”.

B. Water. Furnish water free of industrial waste and other objectionable material.

2.02 Equipment. Provide machinery, tools, and equipment necessary for proper execution of the work.

A. Cement Storage Facility. Store cement in closed, weatherproof containers.
B. Cement Slurry Equipment. Use slurry tanks equipped with agitation devices to slurry cement on the project or other approved location. The Engineer may approve other slurrying methods. Provide a pump for agitating the slurry when the distributor truck is not equipped with an agitator. Equip the distributor truck with an approved sampling device.
C. Pulverization Equipment. Provide pulverization equipment that: • cuts and pulverizes material uniformly to the proper depth with cutters that will plane to a uniform surface over the entire width of the cut,
    i. provides a visible indication of the depth of cut at all times, and
    ii. uniformly mixes the materials.

PART 3 - EXECUTION

3.01 GENERAL: Construct each layer uniformly, free of loose or segregated areas and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the plans or as directed.

A. Preparation of Subgrade or Existing Base for Treatment. Before treating, remove existing asphalt concrete pavement in accordance with pertinent Items and the plans or as directed. Shape existing material in accordance with applicable bid items to conform to the typical sections shown on the plans and as directed.

   When shown on the plans or directed, proof roll the roadbed before pulverizing or scarifying existing material. Correct soft spots as directed.

   When new base is required to be mixed with existing base, deliver, place, and spread the new material in the required amount per station. Manipulate and thoroughly mix new base with existing material to provide a uniform mixture to the specified depth before shaping.

B. Pulverization. Pulverize or scarify existing material after shaping so that 100% passes a 2-1/2-in. sieve. If the material cannot be uniformly processed to the required depth in a single pass, excavate and windrow the material to expose a secondary grade to achieve processing to plan depth.

C. Application of Cement. Uniformly apply cement using dry placement unless otherwise shown on the plans. Add cement at the percentage indicated on the plans. Apply cement only on an area where mixing, compacting, and finishing can be completed during the same working day.

   Start cement application only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend application when the Engineer determines that weather conditions are unsuitable.

   1. Dry Placement. Before applying cement, bring the prepared roadway to approximately optimum moisture content. Distribute the required quantity of dry cement with approved equipment. Minimize dust and scattering of cement by wind. Do not apply cement when wind conditions, in the opinion of the Engineer, cause blowing cement to become dangerous to traffic or objectionable to adjacent property owners.
   2. Slurry Placement. Mix the required quantity of cement with water, as approved. Provide slurry free of objectionable materials and with a uniform consistency that can be easily applied. Agitate the slurry continuously. Apply slurry within 2 hours of adding water and when the roadway is at a moisture content drier than optimum. Distribute slurry uniformly by making successive passes over a measured section of the roadway until the specified cement content is reached.

D. Mixing. Thoroughly mix the material and cement using approved equipment. Mix until a homogeneous mixture is obtained. Sprinkle the treated materials during the mixing operation, as directed, to maintain optimum mixing moisture. Spread and shape the completed mixture in a uniform layer.

E. Compaction. Compact the mixture in one lift using density control unless otherwise shown on the plans. Complete compaction within 2 hours after the application of cement.

   Sprinkle or aerate the treated material to adjust the moisture content during compaction so that it is within 2.0 percentage points of optimum. Determine the moisture content of the mixture at the beginning and during compaction. Adjust operations as required.

   Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least one-half the width of the roller unit. On superelevated curves, begin rolling at the low side and progress toward the high side. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 MPH, as directed.

   Remove areas that lose required stability, compaction, or finish. Replace with cement-treated mixture at the Contractor's expense.

   1. Ordinary Compaction. Roll with approved compaction equipment, as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and recompacting.

   2. Density Control. Compact to at least 95% of the maximum density. Remove material that does not meet density requirements. Remove areas that lose required stability, compaction, or finish. Replace with cement-treated mixture and compact and test in accordance with density control methods.

   The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

F. Finishing. Immediately after completing compaction, clip, skin, or tight-blade the surface of the cement treated material with a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove loosened material and dispose of it at an approved location. Roll the clipped surface immediately with a pneumatic-tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines and grades shown on the plans or as directed. Do not surface patch.

G. Curing. Cure for at least 3 days by sprinkling or by applying an asphalt material at the rate of 0.05 to 0.20 gal. per square yard, as shown on the plans or directed. Maintain the moisture content during curing at no lower than 2 percentage points below optimum. Do not allow equipment on the finished course during curing except as required for sprinkling, unless otherwise approved. Continue curing until placing another course or opening the finished section to traffic.

3.02 MAINTENANCE:

A. Maintain the completed cement treated material within the limits of contract, in condition satisfactory to the ENGINEER as to grade, crown and cross section until surface course is constructed.

B. Immediately repair all irregularities and defects that may occur at no cost to the City of McAllen of McAllen and as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. When included as a separate line item, cement treatment may be measured for payment in square yards for the thickness of material shown on the plans for the surface area of completed and accepted work or cement will be measured by the ton of 2,000 pounds dry weight. Cement treatment shall be paid for at the contract unit price per square yard or paid at the contract unit cost per ton of 2,000 pounds dry weight.

B. When not included as a separate line item, cement treatment shall be considered incidental to the completion of construction and the costs thereof shall be included in the line items provided.

C. The contract unit price for cement treatment shall be the total compensation for preparing roadbed; for loosening, pulverizing, application of cement, water content of slurry mixture and the mixing water; mixing, shaping, sprinkling, compacting, finishing, curing and maintaining; for manipulations required, for all labor, equipment, fuels, tools and incidentals necessary to complete the work.

D. The contract unit price for cement shall be full compensation for furnishing the material; for all freight involved; for all unloading, storing and hauling; and for all labor, equipment, fuels, tools, and incidentals necessary to complete the work.

END OF SECTION

PART I - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.

B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, iron ore topsoil, shell, or crushed slag.

C. Flexible base shall be constructed as specified herein in one or more courses in conformance with the details, lines and grades shown on the plans, and as established by the ENGINEER.

PART 2 -PRODUCTS

2.01 MATERIALS:

A. Materials for flexible base shall be crushed or uncrushed as necessary to comply with the requirements hereinafter specified.

B. Materials shall consist of durable, coarse aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with the provisions of Section 02240.

2.03 TYPES:

A. Type A - Crushed or broken aggregate (excluding gravel aggregate).

B. Type B - Gravel Aggregate

C. Type F - Caliche

2.04 GRADES:

A. Unless otherwise shown on the plans or directed by the ENGINEER, the final course of base material shall consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.

B. Base courses or subbase materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.

C. All grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02601-1.

D. Testing of flexible base materials shall be in accordance with the following test procedures:

TEST	TESTING PROCEDURE
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Index	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Test	TEX-117-E (Part I or II)

E. Unless otherwise specified on the plans, samples for testing the material for Soil constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.

F. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.

TABLE 02601-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

TYPES	GRADES							
	Grade 1		Grade 2		Grade 3		Grade 4	
	Triaxial Class 1, Min. compressive strength, psi: 45 to 0 psi lateral pressure and 175 at 15 psi lateral pressure		(Triaxial Class 1 to 2.4) Min. compressive strength, psi: 35 to 0 psi lateral pressure and 175 at 15 psi lateral pressure		(Unspecified Triaxial Class)		(Unspecified Triaxial Class)	
TYPE A	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Crushed or Broken Aggregate (excluding gravel aggregate)	1-3/4	0	1-3/4	0-10	1-3/4	0-10	As Shown on Plans	
	7/8"	10-35	No. 4	45-75	No. 40	60-85		
	3/8"	30-50	No. 40	60-85	Max LL	45		
	No. 4	45-65	Max LL	40	Max PI	15		
	No. 40	70-85	Max PI	12	Wet Ball			
	Max LL	35	Wet Ball		Bill Amt	55		
	Max PI	10	Wet Ball Bill Amt	40	Wet Ball Bill Amt	40		
	Wet Ball Bill Amt	40	Max Increase in Passing No. 40	20	Max Increase in Passing No. 40	20		
	Max Increase in Passing No. 40	20						
TYPE B	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Gravel Aggregate	N/A		1-3/4	0-10	2-3/4"	0	As Shown on Plans	
			No. 4	30-75	No. 40	45-65		
			No. 40	70-85	Max LL	35		
			Max LL	35	Max PI	12		
			Max PI	12				
			Max PI	12	Max LL	35		
			No. 4	45-65	No. 40	45-65		
			No. 40	50-70	Max LL	35		
			Max LL	35	Max PI	12		
			Max PI	12				

TYPE F	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Caliche	N/A		1-3/4	0	1-3/4	0	As Shown on Plans	
			No. 4	45-75	No. 40	50-85		
			No. 40	50-85	Max LL	40		
			Max LL	40	Max PI	12		
			Max PI	12				

G. Materials exhibiting reasonably close conformity with the specified gradation and plasticity index are defined by the following criteria:

1. The ENGINEER may accept the material, providing not more than 2 of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.

2. The ENGINEER may accept the material providing not more than 2 of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:

A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.

B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stockpile for delivery to the road.

C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.

D. If the CONTRACTOR elects to produce the Type A material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the course aggregate stockpiles will be retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.

E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the

CONTRACTOR will be required to secure other materials which will meet specifications requirements.

F. The central mixing plant shall be of either the batch or continuous flow type, and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.

G. Mixing shall continue until a uniform mixture is obtained.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

A. The roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.

B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.

C. Flexible base shall not be placed until the Contractor has verified by proof rolling that the subgrade has been prepared and compacted in conformity with Standard Specification Item 02220, "Subgrade Preparation," to the typical sections, lines and grades indicated on the Drawings. Any deviation shall be corrected and proof rolled prior to placement of the flexible base material.

D. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material.

E. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans. Any deviation in excess of 1/2 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

F. Sufficient subgrade shall be prepared in advance to insure satisfactory execution of the work.

G. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed of as directed. Any additional material required for the completion of the shoulders

and slopes shall be secured from sources indicated on plans or as directed by the ENGINEER.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE F MATERIAL:

A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.

B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered to each 100-foot station.

C. Material deposited upon the subgrade shall be spread and shaped the same day.

D. In the event that inclement weather, or other unforeseen circumstances, renders the spreading of the material during the first 24-hour period impractical, the materials shall be scarified and spread as directed by the ENGINEER.

E. Throughout the entire operation the material shall be sprinkled, if directed, and shall be maintained by blading and, upon completion, shall be smooth and shall conform to the typical section indicated on the Drawings and to the established lines and grades, shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

F. Each lift shall be sprinkled as required to bring the material to optimum moisture content, then compacted to the extent necessary to provide not less than 95 percent nor more than 100 percent of the maximum dry density as determined in accordance with Test Method Tex-114-E. In addition to the requirements specified for density, the full depth of flexible base material shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section of flexible base material is completed, tests, as necessary, will be made by the Engineer or designated representative. As a minimum, three in-place density tests per section per day will be taken. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

G. All areas and "nests" of segregated coarse or fine material shall be removed and replaced with well graded material, as directed by the ENGINEER.

H. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplied in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.

I. The course shall be compacted by methods of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and rolled with approved compaction equipment as directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading. Upon completion, the surface shall be smooth and in conformity with the typical sections shown on plans and the established lines and grades.

b) In the area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing approved material, as required reshaping and re-compacting by sprinkling and rolling.

c) All irregularities, depressions and weak spots which develop in the laid course shall be corrected immediately by scarifying the areas affected, adding approved material as required, reshaping and recompacting by sprinkling and rolling.

2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".

b) In addition to the requirement specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.

c) After each section of flexible base is completed, tests as necessary will be made by the ENGINEER. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

d) Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to the established lines and grades.

e) In the areas on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section and 16 feet in length, measured longitudinally, shall be corrected by loosening, adding or removing approved material as required, reshaping and recompacting by sprinkling and rolling.

f) All irregularities, depressions, and weak spots which develop shall be corrected immediately by scarifying the areas affected, adding approved material as required, reshaping and recompacting by sprinkling and rolling. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete; it shall be re-compacted and refinished at the sole expense of the CONTRACTOR.

3.03 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

A. Construction methods shall be the same as prescribed for the first course.

B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.04 REWORKING AN EXISTING BASE COURSE

A. Existing base courses shall be reworked in accordance with TxDOT Item 251, or as directed by the ENGINEER, and result in a section that conforms the approved lines and grades.

3.05 DENSITY CONTROL:

A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.

B. The testing will be as outlined in Test Method Tex-114-E.

C. It is the intent of this specification to provide that the part of the base included in the top 8 inches, immediately below the finished surface of the roadway, be not less than 100 percent of the density, as determined by the compaction ratio method.

D. Field density determination shall be made in accordance with Test Method Tex-115-E.

3.06 TOLERANCES:

A. Flexible base will be measured by the square yard of surface area of completed and accepted work based on the thickness of flexible base as shown on the plans.

1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Flexible base will be measure by the square yard of surface area of completed and accepted work based on the thickness of flexible base as shown on the plans.

1. The flexible base shall be measured for depth by the units of 2,000 square yards minimum, with one measurement taken at a location selected by the ENGINEER. There shall be a minimum of three (3) locations measured per project.

2. In that unit where flexible base is deficient by more than 1/2 inch in thickness, the deficiency shall be corrected by scarifying, adding material as required, reshaping and re-compacting by sprinkling and rolling.

3. No additional payment over the contract unit price will be made for any flexible base of a thickness exceeding that required by plans.

B. The CONTRACTOR shall schedule his operations in such a manner as to facilitate the measurement of the pay item.

D. The ENGINEER may accept the work provided no more than 20% depth tests performed are deficient by not more 1/2 inch and where no two consecutive tests on continuous work are outside the specified depth.

4.02 PAYMENT:

A. The accepted quantities of flexible base of the type, grade, and compaction method specified will be paid at the contract unit bid price per square yard, complete and in place.

B. Where "Ordinary Compaction" is used, all sprinkling, rolling, and manipulation required will not be paid for directly, but will be incidental to this bid items.

C. The unit prices bid shall each be full compensation for shaping and fine grading the roadbed; for securing and furnishing all materials, including all royalty and freight involved; for furnishing scales and labor involved in weighing the material when required; for loosening, blasting, excavating, screening, crushing and temporary stockpiling when required; for loading all materials for all hauling and delivering on the road; for spreading, mixing, blading, dragging, shaping and finishing, and for all manipulation, labor, tools and incidentals necessary to complete the work.

END OF SECTION

PART 1 — GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of scarifying and reshaping of the existing base course, with or without asphalt surfacing, as herein specified, and in conformance with the typical sections on the plans and to the lines and grades established by the ENGINEER. Incorporate new base material when shown on plans.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Materials for flexible base shall consist of approved salvage material as specified by the approved plans or the ENGINEER. In the case where additional flex base material is needed to supplement the salvage material, the additional flex base material shall comply with the requirements specified in Section 2601. Furnish water free of industrial waste and other objectionable matter.

2.02 CEMENT STABILIZATION:

A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be cement stabilized in accordance with the provisions of Section 02241.

PART 3 - EXECUTION

3.01 SALVAGING EXISTING BASE:

A. Perform work to the width and depth shown on the typical sections for the type of work shown on the plans. Construct and shape exposed subgrade to conform to typical sections as shown on the plans or as directed. Proof roll when shown on the plans. Correct soft spots as directed.

B. The existing base shall first be cleaned of all bituminous material, dirt, or other objectionable material by blading, brooming, sweeping or other approved method, and scarified to the width and depth as may be required as shown on the plans. In no case shall the underlying subgrade be disturbed. CONTRACTOR may pulverize existing asphalt surface course into existing base. Cost for additional material required to stabilize additional material shall be borne by the CONTRACTOR.

C. The salvaged material shall be placed in stockpiles or windrows until sufficient subgrade has been prepared to receive the salvaged material; then, if the Contractor so elects, the remaining old base material as salvaged may be placed directly upon the prepared

subgrade as directed by the ENGINEER and with any additional base material added as needed, eliminating stockpiling.

D. It shall be the responsibility of the Contractor to make sure that all of the available material being salvaged and replaced is kept reasonably free of soil from the subgrade or roadbed during the salvaging and replacing operations.

E. When material is windrowed or stockpiled, it shall be so placed as not to interfere with traffic, proper drainage or the general progress of the work.

3.02 PREPARATION OF SUBGRADE:

A. When the salvaged material is to be replaced directly upon the subgrade, the roadbed shall be excavated and shaped in conformity with the typical sections shown on plans and to the lines and grades as established by the ENGINEER.

B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.

C. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water, reshaped, and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the salvaged base material.

D. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans, and any deviation in excess of 1/2 inch in cross section and in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

E. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.

F. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed of as directed.

G. Any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as designated by the ENGINEER.

3.03 REPLACEMENT OF SALVAGED MATERIAL:

A. The material shall be deposited on the subgrade or other base course, sprinkled as needed, bladed, dragged and shaped to conform with the typical sections shown on plans.

B. All areas and “nests” of segregated course or fine material shall be corrected or removed and replaced with satisfactory salvage material as directed by the ENGINEER.

C. The course shall be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum density of 95 percent the maximum dry density as determined by ASTM D698, or as directed by the ENGINEER.

D. All irregularities, depressions, or weak spots which develop shall be corrected immediately. The areas affected shall be scarified for the full depth, suitable material added as required, reshaped and recompacted.

E. Throughout this entire operation the shape of the course shall be maintained by blading, and the surface shall be smooth and in conformity with the typical sections shown on the plans and to the established lines and grades.

F. In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section and in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting.

G. It is the responsibility of the Contractor to protect his work. Should the base course, due to any reason or cause, lose the required stability, density and finish before the surfacing is complete, it shall be recompacted and refinished at the sole expense of the Contractor.

3.04 DENSITY TESTING:

A. Field density determinations shall be made in accordance with ASTM D698, and conducted as necessary by the ENGINEER.

B. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

C. The limits establishing reasonably close conformity with percent density specified are defined by the following:

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Salvaging and replacement of existing base will be measured by the square yards.

4.02 PAYMENT:

A. The accepted quantities of salvaging and replacing existing base will be paid for at the contract unit bid price per square yard of material.

B. The unit prices bid for salvaging and replacing base shall each be full compensation for shaping and fine grading the roadbed; for cleaning and scarifying, removing, windrowing or stockpiling all salvaged material; for all hauling; for replacing the salvaged material on the prepared subgrade; for spreading, blading, dragging, shaping and finishing; and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work as specified above.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION:

A. Prime coat shall consist of the application of asphaltic materials on a newly completed base course and/or other approved area, which shall be applied in accordance with these specifications, as shown on the plans, and as directed by the ENGINEER.

1.02 QUALITY ASSURANCE:

A. Test and Certification of Bituminous Materials.

1. Bituminous materials to be tested in accordance with the requirements of AASHTO M-82 and sampled in conformance with AASHTO T-40.

2. Supply, at the time of delivery of each shipment of asphalt, two certified copies of test reports from the supplying vendor to the ENGINEER.

3. Test reports shall indicate name of vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, purchase order number, and result of specified tests.

4. The test report shall be signed by an authorized representative of the vendor and certify that the product delivered conforms to the specifications for type and grade indicated.

5. Certified test reports and the testing required in the preparation of such report shall be at no cost to the City.

6. Final acceptance of bituminous materials shall be dependent on the determination by the ENGINEER that the material meets prescribed standards.

PART 2- PRODUCTS

2.01 MEDIUM CURING CUTBACK ASPHALT:

A. Medium-curing liquid asphalt, designated by the letters MC, shall consist of an uncracked petroleum base stock, produced by the processing of asphaltic or semi-asphaltic base crude petroleum, blended with a kerosene-type solvent. The base stock for all MC materials shall be straight run asphalt produced within the penetration range of 100 to 300, and the end point of the kerosene type solvent shall not exceed 525° F. Medium curing liquid cutback asphalt shall be free from water and show no separation.

B. Medium curing cutback asphalt shall consist of materials specified above and shall conform to the requirements set forth in Table 2610-1.

TABLE 2610-1

Specification Designation	AASHTO Test Method	ASTM Test Method	MC 30	MC 70	MC 250	MC 800	MC 3000
Flash Point (Open Cleave) °F, Min.	T 48	D 92	100	100	150	150	150
Viscosity, 140°F, Kinematic, CS	T 201	D 2170	30 - 60	70 - 140	250 - 500	800 - 1600	3000 – 6000
Furol Visocity at:	T 72	D 88					
77° F (Sec.)			75-150				
122° F (Sec.)				60-120			
140° F (Sec.)					125-250		
180° F (Sec.)						100-200	300-600
Distillation Distillate (% of Total Distillate to 680° F)	T 78	D 402					
437° F			0-25	0-20	0-10	0	0
500° F			40-70	25-60	20-55	10-35	0-15
600° F			75-93	75-90	70-85	65-80	50-75
Reside from Distillation to 680° F Volume % by Difference Min.			50	55	67	75	80
Tests on Residue from Distillation	T 49	D 5					
Penetration at 77° F			120 - 250	120 - 250	120 - 250	120 - 250	120 – 250
* Ductility 77° F, cm, Min.	T 51	D 113	100	100	100	100	100
Solubility in CCl_4, % Min.	T 44		99.5	99.5	99.5	99.5	99.5
Water, % Max.	T 55	D 95	0.2	0.2	0.2	0.2	0.2

Reaction to Spot Test	T 102**	0	0	0	0	0

* If penetration of residue is more than 200 and its ductility at 77° F is less than 100, the material will be acceptable if the ductility at 60° F is greater than 100.

** Using 85% Standard Naptha and 15% Xylene.

NOTE: Viscosity tests may be made by either Kinematic or Furol test methods.

C. Unless otherwise noted on the plans or directed by the ENGINEER, cutback asphalt Grade MC-30 shall be used.

2.02 BLOTTER MATERIAL:

A. Supply blotter material consisting of native sand and/or sweepings from base course.

B. Native sand shall be local material obtained from approved sources as approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Unless otherwise specified on the plans or required by the ENGINEER, only asphaltic material shall be used. Where required, a combination of asphaltic and blotter material shall be used.

B. Application of Asphaltic Materials Only.

1. Apply prime coat to prepared surface when ambient air temperature is above 40° F and rising and shall not be applied when the ambient air temperature is below 50° F and falling.

2. Apply prime coat to surfaces that have been cleaned by sweeping or other approved methods and where base is thoroughly dry and satisfactory for receiving prime coat.

3. Apply prime coat to cleaned base, at a rate of 0.2 to 0.5 gallons per square yard of surface area, using an approved type of self-propelled pressure distributor so constructed and operated to distribute the material evenly and smoothly.

4. Provide necessary facilities for the determination of temperature of asphaltic material in all heating equipment and distributors; and for

determination of rate at which it is applied; and for securing uniformity at the junction of two distributor loads.

5. Keep in clean and good working condition all storage tanks, piping, reports, booster tanks and distributors used in the storage and handling of asphaltic materials.

6. Operate all associated equipment in a manner such that there is no contamination of asphaltic material with foreign material.

7. Calibrate distributor and furnish ENGINEER with an accurate and satisfactory record of such calibrations.

8. Recalibrate distributor, in a manner satisfactory to the ENGINEER, after the beginning of work, should the yield on the asphaltic material applied appear to be in error.

9. No traffic, hauling or placing of subsequent courses shall be permitted over freshly applied prime coat until authorized by the ENGINEER.

10. Apply asphaltic material at a temperature within 15° F of temperature of application selected by the ENGINEER based on temperature viscosity relationship noted in Table 2610-1.

11. Maintain surface until work is Blotter Material.

C. Application of Asphaltic and Blotter Material

1. Haul blotter material in vehicles of uniform capacity and placed on shoulders at a spacing designated by the ENGINEER.

2. After application of asphaltic material as specified above, cover surface with blotter material as directed by the ENGINEER.

3. After application of blotter material, drag surface with approved drag broom, evenly and smoothly distributing the blotter material. Brooming or dragging operation shall continue, as directed by the ENGINEER, until the course has properly cured under traffic.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PRIME COAT:

A. When listed as a separate contract pay item “Prime Coat”, asphaltic material for prime coat will be measured for payment at point of delivery on the project

in gallons at applied temperature. Payment will be paid at the unit bid price for "Prime Coat".

B. When not listed as a separate contract pay item, prime coat shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all material, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

4.02 BLOTTER MATERIALS:

A. Blotter material will be considered incidental to asphaltic material for prime coat with no direct payment.

END OF SECTION

SECTION 02612

HOT MIX ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Hot mix asphalt concrete (HMAC) pavement shall consist of a binder course, a leveling up course, a surface course or a combination of the courses as shown on the plans, or as directed by the ENGINEER.

B. HMAC pavement shall be composed of a compacted mixture of mineral aggregate and asphaltic material, constructed on previously completed and approved subgrade, subbase course, base course, or existing pavement.

C. HMAC pavement shall be in accordance with the specifications herein and in conformity with the lines, grades, quantities and typical sections in the contract and/or as directed by the ENGINEER.

1.02 QUALITY CONTROL:

A. HMAC pavement and its constituent part shall conform to the ASTM, AASHTO and/or TxDOT test methods noted below.

PART 2 - PRODUCTS

2.01 ASPHALTIC MATERIALS:

A. Asphalt cement binders shall be uncracked petroleum asphalt and shall be carefully refined, by steam, vacuum, or solvent, from asphaltic or semi-asphaltic base crude petroleum at a temperature not to exceed 700° F. Asphalt cements shall be free from thermal decomposition products and shall not be blended with any materials which have been subjected to cracking or produced from a crude petroleum source other than that of the original material. The asphalt cement shall not contain residues from non-asphaltic sources. Asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 347° F.

B. Paving asphalt shall be classified by penetration or viscosity and shall conform to the requirements set forth in one of the following tables as designated by the ENGINEER. The CONTRACTOR may supply asphalt meeting the requirements of one of the following tables provided that the CONTRACTOR obtains prior approval of the ENGINEER and with the provision that once approval has been obtained, that the CONTRACTOR will remain with that grade throughout the project.

TABLE 2612-1

Specification	AASHTO Test	ASTM Test						
Designation	Method	Method	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Flash Point (Open Cup) Min	T48	D92	--	450	450	450	450	350
Penetration of Orig. Sample at 77° F	T49	D5	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Thin-Film Oven Loss, Hours at 325°F, % Max	T179	D1754	0.75	0.75	0.75	0.75	1.00	1.00
Test of Residue from Thin-Film Oven Test; % of Orig. Pen., Min.	T49	D5	52	50	50	50	50	50
Ductility at 77° F cm. after los at 325° F, Min.	T51	D113	50	50	100	100	100	100
Solubility in CCl_4 Min.	T44*	None	99.5	99.5	99.5	99.5	99.5	99.5
Reaction to Spot Test	T102**	None	0	0	0	0	0	0

* Procedure No. 1 with CCl_4 substituted for CS_2.

** Using 85% Standard Naphtha Solvent and 15% Xylene.

TABLE 2612-2

TYPE-GRADE	OA-30		OA-175*8		OA-400	
	Min	Max	Min	Max	Min	Max
Penetration at 32° F, 200 g, 60 sec	15	--	--	--	--	--
Penetration at 77° F, 100 g, 5 sec	25	35	150	200	--	--
Penetration at 115° F, 50 g, 5 sec	--	65	--	--	--	--
Ductility at 77° F, 5 cm/min, cms; Original OA	2	--	70	--	--	--
Flash Point COC, °F	450	--	425	--	425	--
Softening Point, R&B, °F	185	--	95	130	--	--
Thin Film Oven Test, 1/8 in. Film 50 g, 5 hrs, 325° F, % Loss by wt.	--	0.4	--	1.4	--	20
Penetration of Residue, at 77° F, 100 g, 5 sec % of Original Pen	--	--	40	--	--	--
Ductility of Residue at 77°F, 5 cm/min, cms	--	--	--	100	--	--
Solubility in Trichloroethylene, %	99	--	99	--	99	--
Spot Test on Original OA	Neg		Neg		Neg	
Float Test at 122° F, sec	--	--	--	--	120	150
Test on 85 to 115 Pen. Residue* Residue by Wt., %	--	--	--	--	75	--
Ductility, 77° F, 5 cm/min: Original Res, cms	--	--	--	--	100	--
Subjected to Thin Film Test, cms	--	--	--	--	100	--

*Determined by Vacuum Distillation (by evaporation if unable to reduce by vacuum).

** For use with Latex Additive only.

TABLE 2612-3

PROPERTIES	AC-1.5		AC-3		AC-5		AC-10		AC-20		AC-40	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Viscosity, 140° F stokes …	150	50	300	100	500	100	1000	200	2000	400	4000	800
Viscosity, 275° F stokes …	0.7	--	1.1	--	1.4	--	1.9	--	2.5	--	3.5	--
Penetration, 77° F 100 g, 5 sec	250	--	210	--	135	--	85	--	55	--	35	--
Flash Point, COC, ° F	425	--	425	--	425	--	450	--	450	--	450	--
Solubility in trichloroethylene, percent …	99	--	99	--	99	--	99	--	99	--	99	--
Test on residues from thin film oven test: Viscosity, 140° F stokes …	--	450	--	900	1500	--	3000	--	6000	--	--	12000
Ductility, 77° F, 5 cms per min, cms	100	--	100	--	100	--	70	--	50	--	30	--
Spot Test	Negative for all grades											

C. A minimum of two percent, by weight, latex additive (solids basis) shall be added to the OA-175 Asphalt or to AC-5 Asphalt when specified in the contract. The latex additive shall be governed by the following specifications:

The latex is to be an anionic emulsion of butadiene-styrene low-temperature copolymer in water, stabilized with fatty-acid soap so as to have good storage stability, and possessing the following properties:

Monomer ratio, B/S	70/30
Minimum solids content	67%
Solids content per gal.@ 67%	5.3 lbs.
Coagulum on 80-mesh screen	0.01% max.
Type Anti-oxidant	staining
Mooney viscosity of Polymer (M/L 4@212° F)	100 min.
pH of Latex	9.4 - 10.5
Surface tension	28-42 dynes/cm2

The finished latex-asphalt blend shall meet the following requirements:

Viscosity at 140° F, stokes	1500 max.
Ductility at 39.2° F, 1 cm. per min., cm.	100 min.

D. Asphalt content shall be within the limits noted below:

Table 2612-4

HMAC Type	Percent of Mixture by Weight	Percent of Mixture by Volume
"A"	3.5 - 7.0	8.0 - 16.0
"B"	3.5 - 7.0	8.0 - 16.0
"C"	3.5 - 7.0	8.0 - 16.0
"D"	4.0 - 8.0	9.0 - 19.0
"F"	3.5 - 6.5	8.0 - 16.0

E. At the time of delivery of each shipment of asphalt, the vendor supplying the material shall deliver to the purchaser certified copies of the test report which shall indicate the name of the vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, and results of the above-specified tests. The test report shall be certified and signed by an authorized representative of the vendor that the product delivered conforms to the specifications for the type and grade indicated.

F. Until the certified test reports and samples of the material have been checked by the ENGINEER to determine their conformity with the prescribed requirements, the material to which such report relates and any work in which it may have been incorporated as an integral component will be only tentatively accepted by the City. Final acceptance will be dependent upon the determination of the ENGINEER that the material involved fulfills the requirements prescribed therefor. The certified test reports and the testing required in connection with the reports will be at the expense to the City.

G. Unless otherwise specified in these specifications or in the Supplementary Specifications, the various grades of paving asphalt shall be applied at a temperature range of from 210° F to 325° F, the exact temperature to be determined by the ENGINEER.

H. Paving asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the paving asphalt during heating. The CONTRACTOR shall furnish and keep on the site, at all times, an accurate thermometer suitable for determining the temperature of the paving asphalt.

I. HMAC asphalt shall be the grade having the highest penetration, within specified limits, to produce a mix having a maximum stability of the compacted mixtures.

J. Only one (1) grade of asphalt shall be required unless otherwise shown on the plans or as required by the ENGINEER.

2.02 AGGREGATES:

A. HMAC aggregate will be tested in accordance with the following test standards:

AASHTO T-30	Mechanic Testing
AASHTO T-27	Passing No. 200 Sieve
AASHTO T-89	Liquid Limit
AASHTO T-96	Los Angeles Abrasion
AASHTO T-104	Soundness (Magnesium Sulfate)
ASTM C – 131	Resistance to Degradation
ASTM C – 136	Sieve Analysis
ASTM C – 2419	Sand Equivalence Value
TxDOT Tex -106-E	Method of Calculating Plasticity Index of Solids
TxDOT Tex-217 – F	(I & II) Determination of Deleterious Materials and Decantation Test
TxDOT Tex-203 – F	Quality Tests for Mineral Aggregates

B. Aggregates shall have an abrasion of not more than 40 for all courses except the non-skid surface course, which shall have an abrasion of not more than 35.

C. When properly proportioned, HMAC aggregate shall produce a gradation which will conform to the limitations for classification for HMAC type shown below, or as directed by the ENGINEER.

D. Course aggregate to be crushed limestone rock or crushed gravel with hydrated lime or limestone filler. (Crushed gravel shall be per TxDOT Specifications.)

E. Binder aggregate to be composed of 15% crushed limestone screening or as directed by the engineer.

1. Type "A" - Course Graded Base Course

	Percent Aggregate by Weight or Volume
Passing 2" sieve ….....	100
Passing 1-3/4" sieve…….....95	to 100
Passing 1-3/4" sieve, retained on 7/8"sieve..... 16	to 42
Passing 7/8" sieve, retained on 3/8" sieve..... 16	to 42
Passing 3/8" sieve, retained on No. 4 sieve..... 10	to 26
Passing No. 4 sieve, retained on No. 10 sieve 5	to 21
Total retained on No. 10 sieve..... 68	to 84
Passing No. 10 sieve, retained on No. 40 sieve 5	to 21
Passing No. 40 sieve, retained on No. 80 sieve 3	to 16

Passing No. 80 sieve, retained on No. 200 sieve ..... 2 to 16
Passing No. 200 sieve .... 1 to 8

2. Type "B" - Fine Graded or Leveling-Up Course

	Percent Aggregate by Weight or Volume
Passing 1" sieve	100
Passing 7/8" sieve	95 to 100
Passing 7/8" sieve, retained on 3/8" sieve	21 to 53
Passing 3/8" sieve, retained on No. 4 sieve	11 to 42
Passing No. 4 sieve, retained on No. 10 sieve	5 to 26
Total retained on No. 10 sieve	58 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 21
Passing No. 80 sieve, retained on No. 200 sieve	3 to 21
Passing No. 200 sieve	1 to 8

3. Type "C" - Course Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 7/8" sieve	100
Passing 5/8" sieve	95 to 100
Passing 5/8" sieve, retained on 3/8" sieve	16 to 42
Passing 3/8" sieve, retained on No. 4 sieve	11 to 37
Passing No. 4 sieve, retained on No. 10 sieve	11 to 32
Total retained on No. 10 sieve	54 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 27
Passing No. 80 sieve, retained on No. 200 sieve	3 to 27
Passing No. 200 sieve	1 to 8

4. Type "D" - Fine Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 1/2" sieve	100
Passing 3/8" sieve	85 to 100
Passing 3/8" sieve, retained on No. 4 sieve	21 to 53
Passing No. 4 sieve, retained on No. 10 sieve	11 to 32
Total retained on No. 10 sieve	54 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 27
Passing No. 80 sieve, retained on No. 200 sieve	3 to 27
Passing No. 200 sieve	1 to 8

5. Type "F" - Fine Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 3/8" sieve	100
Passing No. 4 sieve	95 to 100
Passing No. 4 sieve, retained on No. 10 sieve	58 to 73
Passing No. 10 sieve, retained on No. 40 sieve	6 to 26
Passing No. 40 sieve, retained on No. 80 sieve	3 to 13
Passing No. 80 sieve, retained on No. 200 sieve	2 to 11
Passing No. 200 sieve	1 to 8

2.03 PRIME COAT:

A. Prime coat, when specified on the plans, or directed by the ENGINEER, shall be in accordance with Section 02610 - Prime Coat, and as specified herein.

B. Prime coat shall be applied to the surfaces of bases at least 12 hours prior to placing the HMAC unless otherwise directed by the ENGINEER.

C. Asphalt prime shall be applied uniformly at the rate in accordance with Section 02610 - Prime Coat.

D. In order to prevent lapping at the junction of two applications, the distributor shall be promptly shut off. A hand spray shall be used to touch up all spots unavoidably missed by the distributor.

E. Immediately prior to application of the asphalt prime, an inspection will be made by the ENGINEER to verify that the base course has been constructed as specified. Also, all loose and foreign material shall be removed by light sweeping. Material so removed shall not be mixed with cover aggregate.

F. The surface to be primed shall be in a smooth and well-compacted condition, true to grade and cross section, and free from ruts and inequalities.

G. The pressure distributor used for applying prime coat material shall be equipped with pneumatic tires and shall be so designed and operated as to distribute the prime material in a uniform spray without atomization, in the amount and between the limits of temperature specified. It shall be equipped with a speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate.

H. The pressure distributor shall be equipped with a tachometer registering the pump speed, pressure gauge, and a volume gauge. The rates of application shall not vary from the rates specified by the ENGINEER by more than 10%. Suitable means for accuracy indicating at all times the temperature of the prime material

shall be provided. The thermometer well shall be so placed as not to be in contact with a heating tube.

I. The distributor shall be so designed that the normal width of application shall be not less than 6 feet, with provisions for the application of lesser width when necessary. If provided with heating attachments, the distributor shall be so equipped and operated that the prime material shall be circulated or agitated through the entire heating process.

J. The asphalt prime coat should preferably be entirely absorbed by the base course and, therefore, require no sand cover. If, however, it has not been completely absorbed prior to the start of placing the asphalt concrete mixture and in the meantime it is necessary to permit traffic thereon, sufficient sand shall be spread over the surface to blot up the excess liquid asphalt and prevent it from being picked it up by traffic. Also, sand shall be used in areas where traffic may pass over the prime coat. Prior to placing the asphalt concrete, loose or excess sand shall be swept from the base. If a sand cover is specified in the Supplementary Specifications or noted on the plans to cover asphalt prime, it shall be applied within 4 hours after the application of said prime coat, unless otherwise ordered by the ENGINEER.

K. Liquid asphalt shall be prevented from being sprayed upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; other facilities or that portion of the traveled way being used by traffic.

L. The CONTRACTOR shall protect the prime coat against all damage and markings, both from foot and vehicle traffic. Barricades shall be placed where necessary to protect the prime coat. If, after the prime coat has been applied to the satisfaction of the ENGINEER and has been accepted, if it is disturbed by negligence on the part of the CONTRACTOR, it shall be restored at his expense to its condition at the time of acceptance. No material shall be placed until the prime coat is in a condition satisfactory to the ENGINEER.

2.04 TACK COAT:

A. If the asphalt concrete pavement is being constructed directly upon an existing hard-surfaced pavement, a tack coat shall be evenly and uniformly applied to the existing pavement prior to the placing of the new asphalt concrete. The surface shall be free of water, all-foreign material, or dust when the tack coat is applied. No area shall be treated in any one day greater than will be covered by the asphalt concrete during the same day. Traffic will not be permitted over tack coating.

B. Tack coat for HMAC shall consist of either rapid curing cut-back asphalt RC-2 diluted by addition of (not to exceed 15 percent by volume) an approved grade of gasoline and/or kerosene; emulsified asphalt, EA-11M diluted with 50 percent water, or a cut-back asphalt made by combining 50 to 70 percent of the asphaltic

materials specified for the paving mixture with 30 to 50 percent gasoline and/or kerosene by volume.

C. Tack coat shall conform to the requirements of Section 02620 - Tack Coat, or as specified herein.

D. Application of tack coat shall be 0.10 to 0.15 gallons per square yard, or as directed by the ENGINEER.

E. A similar tack coat shall be applied to the surface of any course if, in the opinion of the ENGINEER, the surface is such that a satisfactory bond cannot be obtained between it and the succeeding course.

F. When required, the contact surfaces of all cold pavement joints, curbs, gutters, manholes, and the like shall be painted with a tack coat immediately before the adjoining asphalt concrete is placed. Asphalt tack coat shall be applied in controlled amounts as shown on the plans or determined by the ENGINEER. Surfaces where a tack coat is required shall be cleaned to the satisfaction of the ENGINEER before the tack coat is applied.

2.05 MINERAL FILLER:

A. Mineral filler, other than hydrated lime, shall consist of a thoroughly dry stone dust, portland cement or other mineral dust approved by the ENGINEER.

B. The mineral filler shall be free from foreign or other deleterious matter.

C. When tested by the method outlined in TxDOT Test Method Tex-200-F (Part 1 or 3), mineral filler shall meet the following gradations by weight:

Passing No. 30 Sieve	95-100%
Passing No. 80 Sieve	75%
Passing No. 200 Sieve	55%

2.06 ANTI-STRIPPING COMPOUND

A. Anti-Stripping compound, as required in the job mix formula, shall be furnished in the amounts calculated therein.

2.07 JOB MIX FORMULA:

A. A job mix formula based on representative samples, including filler if required, shall be determined submitted by the CONTRACTOR for approval of the ENGINEER.

B. The resultant job mix formula shall be within the master range for the specified type of HMAC.

C. The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size and a single percentage of bituminous material to be added to the aggregate and shall provide for 3 to 5% air voids in the resultant design mix. During the mix design process the following factors will be considered: air voids, Marshall stability, durability, water resistance, and asphalt film thickness.

D. After the job mix formula is established, mixtures for the project shall conform to the following tolerances which may fall outside of the specified master range:

	Percent by Weight or Volume as Applicable
Passing 1-3/4" sieve, retained on 7/8" sieve	± 5
Passing 7/8" sieve, retained on 5/8" sieve	± 5
Passing 5/8" sieve, retained on 3/8" sieve	± 5
Passing 3/8" sieve, retained on No.4 sieve	± 5
Passing No.4 sieve, retained on No.10 sieve	± 5
Total retained on No.10 sieve	± 5
Passing No.10 sieve, retained on No.40 sieve	± 3
Passing No.40 sieve, retained on No.80 sieve	± 3
Passing No.80 sieve, retained on No.200 sieve	± 3
Passing No.200 sieve	± 3
Asphaltic Material	± 0.05 by wt or 1.2 by vol.
Mixing Temperature	± 20° F

E. Asphaltic mixture shall be tested in accordance with TxDOT Test Method Tex-200-4 (Part I or Part III) and shall have the following laboratory values:

		Surface Course	Base Course
Density:	Minimum	95%	95%
	Maximum	98%	99%
	Optimum	96.5%	96.5%
Stability (Hveem)			
	Minimum	30%	30%
	Maximum	45%	45%
Stability (Marshall – 75 Blow Briquette)		1500 lbs	1500 lbs.
Voids		3 - 7%	4 - 7%
Voids Filled With Asphalt		75 - 85%	65 - 80%

Sand Equivalent	40	40

2.08 EQUIPMENT:

A. All equipment for the handling of all material, mixing, and placing of HMAC shall be in accordance with the provisions of TxDOT Item 340.

2.09 STOCKPILING, STORAGE, PROPORTIONING AND MIXING:

A. Stockpiling, storage proportioning and mixing operations shall be in accordance with the Provisions of TxDOT Item 340.

PART 3 - EXECUTION

3.01 WEATHER AND TEMPERATURE LIMITATIONS:

A. Asphaltic mixture, when placed with a spreading and finishing machine, or the tack coat shall not be placed when the air temperature is 50° F and falling, but may be placed when the air temperature is 40° F and rising.

B. Asphaltic mixture, when placed with a motor grader, shall not be placed when the air temperature is less than or equal to 60° F and falling, but may be placed when the air temperature is greater than or equal to 50° F and rising.

C. Mat thicknesses of 1 inch or less shall not be placed when the temperature on which the mat is to be laid is below 50° F.

D. No tack coat or asphaltic mixture shall be placed when the humidity, general weather conditions and temperature and moisture condition of the base, in the opinion of the ENGINEER, are unsuitable.

E. If, after being discharged from the mixer and prior to placing, the temperature of the asphaltic mixture is 50° F or more below the temperature established by the ENGINEER, all or any part of the load may be rejected and payment will not be made for the rejected material.

3.02 EQUIPMENT:

A. Hauling Equipment:

1. Trucks used for hauling asphaltic mixtures shall have tight, clean, smooth metal beds that have been thinly coated with a minimal amount of paraffin oil, lime slurry, tine solution or other approved material to prevent mixture adhesion to the bed.

2. The dispatching of hauling equipment shall be arranged so that all material delivered may be placed and all rolling completed during daylight hours, unless otherwise directed by the ENGINEER.

3. All trucks shall be equipped with a cover of canvas, or other suitable material to protect the mixture from weather or on hauls where the temperature of the mixture will fall below specified level. Use of covers will be as directed by the ENGINEER.

B. Rollers:

1. Pneumatic Tire Roller. This roller shall consist of not less than seven pneumatic tire wheels, running on axles in such manner that the rear group of tires shall cover the entire gap between adjacent tires of the forward group; mounted in a rigid frame; and provided with a loading platform or body suitable for ballast loading. The front axle shall be attached to the frame in such manner that the roller may be turned within a minimum circle. The tire shall provide surface contact pressures up to 90 pounds per square inch or more. The roller shall be so constructed as to operate in both a forward and a reverse direction with suitable provisions for moistening the surface of the tires while operating; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

2. Two Axle Tandem Roller. This roller shall be an acceptable power-driven, steel-wheel, tandem roller weighing not less than eight tons. It must operate in forward and reverse directions; contain provision for moistening the surface of the wheels while in motion; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

3. Three Wheel Roller. This roller shall be an acceptable power- driven, all steel, three wheel roller weighing not less than 10 tons. It must operate in forward and reverse directions; contain provisions for moistening the surface of the wheel while in motion; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

4. Vibratory Steel Wheel Roller. If approved for use by the OWNER, this roller shall have a minimum weight of six tons. The compactor shall be equipped with amplitude and frequency controls and shall be specifically designed to compact the material on which it is used. It shall be operated in accordance with the manufacturer's recommendations.

C. Straight Edges:

1. The CONTRACTOR shall provide an acceptable 16-foot straight-edge for surface testing. Satisfactory templates shall be provided as required by the ENGINEER.

D. Spreading and Finishing Machine:

1. Bituminous pavers shall be self-contained, power-propelled units, provided with an activated screed or a strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the plans.

2. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. Design will be such that no part of the truck weight will be supported by the paver.

3. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture. The screed shall be adjustable for both height and crown and shall be equipped with a controlled heating device.

4. The bituminous paver shall be equipped with an automatic leveling device controlled from an external guide. The initial pass for each course shall be made using a paver equipped with a 40-foot minimum external reference, except that these requirements will not apply when asphalt concrete is placed adjacent to portland cement concrete pavement. Subsequent passes may utilize the matching device of one foot minimum length riding on the adjacent lay.

3.03 CONSTRUCTION METHODS:

A. Spreading and Finishing:

1. The asphalt concrete mixture shall be laid on the approved surface, spread and struck off to the grade and elevation established. It shall be spread and compacted in layers as shown on the plans or as directed by the ENGINEER. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

2. The ENGINEER will determine a minimum placement temperature within a range from 220° F to 300° F which will produce the required density. The established placement temperature, which is measured immediately behind the laydown machine, shall not vary more than 20° F.

3. A conventional paver or suitable equipment approved by the ENGINEER may be used to place asphalt concrete material on shoulders depressed from the traveled lanes in order to establish a uniform typical section. Approval of the equipment used will be based upon the results obtained.

4. The asphalt concrete may be dumped from the hauling vehicles directly into the paving machine or it may be dumped upon the surface being paved and subsequently loaded into the paving machine; however, no asphaltic concrete shall be dumped from the hauling vehicles at a distance greater than 250 feet in front of the paving machine. When asphaltic concrete is dumped first upon the surface being paved, the loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete dumped shall be picked up and loaded into the paving machine.

5. To achieve, as far as practicable, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant. Sufficient hauling equipment shall be available to insure continuous operation.

6. The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other indirectly either through controlling the transverse slope or alternately when directed, by controlling the elevation of each end independently, including any screed attachment used for widening, etc. Failure of the control system to function properly shall be cause for the suspension of the asphaltic concrete operations.

7. When dumping directly into the paving machine from trucks, care shall be taken to avoid jarring the machine or moving it out of alignment.

8. All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the ENGINEER deems the use of self-propelled, paving machines impracticable.

9. Self-propelled paving machines shall spread the asphaltic concrete without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the plans. Pavers shall be equipped with hoppers and augers which will place the asphaltic concrete evenly in front of adjustable screeds without segregation. Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the asphaltic concrete and which produces a finished surface of an even and uniform texture for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required.

10. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked, fluted and compacted with hand tools. For such areas the mixture shall be dumped, spread and screed to give the required compacted thickness.

B. Compaction:

1. Rolling with the 3-wheel and tandem roller shall start longitudinally at the sides and proceed toward the center of the surface course, overlapping on successive trips by at least half the width of the rear wheels.

2. Alternate trips of the roller shall be slightly different in length.

3. Rolling with a pneumatic tired roller shall be as directed by the ENGINEER.

4. Rolling shall continue with no further compression can be obtained and all roller marks are eliminated.

5. The motion of the roller shall be slow enough at all times to avoid displacement of asphaltic materials. If displacement occurs, it shall be corrected immediately by use of rakes and fresh asphaltic mixtures, where required.

6. The roller shall not be allowed to stand on the surface course when it has not been fully compacted and allowed to cool.

7. To prevent adhesion of the surface course to the roller, the wheels shall be kept thoroughly moistened with water; however, excess water shall not be allowed.

8. All precautions shall be taken to prevent dripping of gasoline, oil, grease, or other foreign substances on the surface or base courses during rolling operations or while rollers are standing.

9. With the approval of the ENGINEER, a vibratory steel wheeled roller may be substituted for the 3-wheel roller and tandem roller.

10. Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

11. Any mixture that becomes loose, broken, mixed with dirt, segregated, or is in any way defective shall be removed and replaced with fresh hot bituminous mixture, which shall be compacted to conform with the surrounding area. Any area showing excess or deficiency of bituminous material shall be corrected immediately as directed by the ENGINEER.

C. In-Place Density:

1. In-place density shall be required for all mixtures except thin irregular depth leveling courses.

2. Each course, after final compaction, shall have a density of not less than 95 percent of the density developed in the laboratory test method outlined in TxDOT Bulletin C-14.

3. Density shall be determined with a portable nuclear test device in conformity with ASTM D-2950.76.

4. Calibration of the portable nuclear device will be established by the ENGINEER from cut pavement samples tested in accordance with AASHTO T-166 (weight, volume method). The density readings of the cut pavement samples determined in accordance with AASHTO T-166 (weight, volume method), and the density readings of the pavement samples determined by the portable nuclear test device in conformity with ASTM D 2950 will be correlated by the ENGINEER.

5. Other methods of determining in-place density may be used as deemed necessary by the ENGINEER.

6. It is intended that acceptance density testing will be done while the bituminous mixture is hot enough to permit further compaction if necessary. If the density of an acceptance section does not meet the specified requirements, the CONTRACTOR shall continue the compaction effort until the optimum density is obtained. Rolling for any compactive effort will not be allowed when the temperature of the mix is below 175° F unless authorized in writing by the ENGINEER. Rerolling the paved surface after it has initially cooled will not be allowed.

7. If in-place density tests of the mixture produce a value lower than specified and in the opinion of the ENGINEER is not due to a change in the quality of the material, production may proceed with subsequent changes in the mix and/or construction procedures until in-place density equals or exceeds the specified density.

8. In-place density tests will be provided by the ENGINEER unless otherwise specified.

D. Joints:

1. Placing of the asphalt concrete shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the ENGINEER.

2. When plant mix bituminous pavement is placed over plant mix bituminous treated base or when plant mixed seal coat is placed over plant mix bituminous pavement, longitudinal joints shall be staggered at least 6 inches with relation to the longitudinal joints of the underlying course.

3. Transverse joints shall have a two foot or 12:1 minimum taper. Longitudinal joints shall have a one foot or 6:1 minimum taper. All transverse tapers shall be cut and squared off prior to commencing new work. Tapered longitudinal joints from previous operations shall be cleaned and tack coated if directed by the ENGINEER. All joints shall be completely bonded. The surface of each course at all joints shall be smooth and shall not show any deviations in excess of 3/16 of an inch when tested with a 10-foot straightedge in any direction.

4. When paving under traffic, the CONTRACTOR shall plan his daily surfacing operations on a schedule which will result in not more than one (1) day's operation of exposed longitudinal joints. The longitudinal joints shall not have a height greater than two (2) inches and shall not be left exposed longer than 24 hours.

E. Surface Tolerance:

1. Upon completion, the pavement shall be true to grade and cross section. Except at intersections or any changes of grade, when a 16 foot straight edge is laid on the finished surface parallel to the centerline of the roadway, the surface shall not vary from the edge of the straight edge more than 1/16-inch per foot. Areas that are not within this tolerance shall be brought to grade immediately following the initial rolling. After the completion of final rolling, the smoothness of the course shall be checked, and the irregularities that exceed the specified tolerances or that retain any water on the surface shall be corrected by removing the defective work and replacing with new material as directed by the ENGINEER at the expense of the CONTRACTOR.

F. Manholes and Valve Covers:

1. Manhole frames and valve covers shall be adjusted prior to placing the surface course.

G. Compacted Thickness of HMAC Surface and Base Courses:

1. Surface Courses. The compacted thickness or depth of the asphaltic concrete surface course shall be as shown on the plans. Where the plans require a depth or thickness of the surface course greater than two inches compacted depth, same shall be placed in multiple courses of equal depth, each of which shall not exceed two inches compacted depth. If, in the opinion of the ENGINEER, an additional tack coat is considered necessary between any of the multiple courses, it shall be applied at the rate as directed.

2. Base Courses. The compacted thickness or depth of each base course shall be as shown on the plans. Where the plans require a depth or thickness of the course greater than 4 inches, same shall be accomplished by constructing multiple lifts of approximately equal depth, each of which shall not exceed these maximum compacted depths. If, in the opinion of the ENGINEER, an additional

tack coat is considered necessary between any of the multiple lifts, it shall be applied as hereinbefore specified and at the rate as directed.

H. Pavement Thickness Tests:

1. Pavement Thickness Test. Upon completion of the work and before final acceptance and final payment shall be made, pavement thickness test shall be made by the ENGINEER or his authorized representative unless otherwise specified in the special provisions or in the plans. The number and location of tests shall be at the discretion of the OWNER. The cost for the initial pavement thickness test shall be at the expense of the ENGINEER. In the event a deficiency in the thickness of pavement is revealed during normal testing operations, subsequent tests necessary to isolate the deficiency shall be at the CONTRACTOR's expense.

I. Price Adjustment for Roadway Density

1. The payment of the unit price will be adjusted for roadway density as outlined in the following table. The adjustment will be applied on a lot by lot basis for each lift. The adjustment will be based on the average of five density tests. The price adjustment will be applied to the entire asphalt concrete mix which includes the HMAC aggregate, the asphalt cement and anti-stripping compound, if used.

Average Density % of Lab Density	Percent of Contract Price To Be Paid
Above 95%	100%
94.0 to 94.99	96%
93.0 to 93.99	91%
92.0 to 92.99	85%
Less than 92.00	*

* This lot shall be removed and replaced to meet specification requirements as ordered by the ENGINEER. In lieu thereof, the CONTRACTOR and the ENGINEER may agree in writing that for practical purposes, the lot shall not be removed and will be paid for at 50% of the contract price.

PART 4 - MEASUREMENT AND PAYMENT

4.01 INCIDENTAL WORK:

A. Prime coat, anti-stripping compound, where used, and tack coat shall not be measured for direct payment, but shall be considered as subsidiary work pertaining to the placing of asphaltic mixtures of the contract price.

4.02 MEASUREMENT:

A. Hot-mix asphalt concrete material shall be measured by the ton of 2,000 pounds or by the square yard of the type or types used in the completed and accepted work, as shown on the Bid Proposal.

B. Weight shall be determined by a certified scale approved by the OWNER and recorded serially numbered weight tickets, identifying the vehicle and presented to the ENGINEER's representative on the job.

4.03 PAYMENT:

A. Work performed and materials furnished, as prescribed by this item, measured as provided herein, shall be paid at the unit bid price per ton or square yard for the type or types of hot mix asphalt concrete pavement shown on the proposal.

B. Unit bid price shall be payment in full for quarrying; furnishing all materials; for all heating; mixing; hauling; cleaning existing base course or pavement; placing asphaltic mixtures; rolling and finishing; and for all labor, tools, equipment and incidentals necessary to complete the work, including the work and materials involved in the application of prime coat and tack coat.

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

SECTION 02620 CONCRETE CURB AND GUTTER

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the construction of concrete curb, concrete curb and gutter, concrete gutter or valley gutter, or combination thereof in compliance with the specifications, lines, grades, and details shown on the plans, or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Concrete and manufactured curb and gutter materials shall be subject to inspection and tests at plants and construction sites for compliance with quality requirements.

B. Concrete curb and gutter or concrete valley gutter shall be constructed with concrete conforming to the provisions of Section 02630 - Concrete Pavement, or Class "B" concrete conforming to the requirements of Section 03300 - Cast-In-Place Concrete.

C. Pre-formed expansion Joint Filler shall conform to the requirements of AASHTO M-33 or M-153.

D. Linseed Oil shall conform to the requirements of AASHTO D-260.

E. Mineral Spirits shall conform to the requirements of AASHTO D-235.

2.02 FOUNDATION:

A. Concrete curb and gutter or concrete valley gutter shall be placed on an approved foundation conforming to the requirements of the following City of McAllen Specifications:

1. Section 02220 - Subgrade Preparation

2. Section 02226 - Excavation, Backfill & Compaction for Pavement

3. Section 02601 - Flexible Base

PART 3 - EXECUTION

3.01 EXCAVATION:

A. When required, excavation shall be made to the specified depth, and the base upon which the curb and gutter or valley gutter is to be placed shall be compacted to a firm, even surface conforming to the requirements of Subsection 2.02 above.

B. All soft and unacceptable material shall be removed and replaced with material approved by the ENGINEER in conformance with the requirements of Subsection 2.02 above.

3.02 FORMS:

A. Forms shall be of wood or metal, straight, free from warp, and of such construction that facilitates the inspection of the grade and alignment for compliance with the approved plans and specifications.

B. All forms shall extend for the entire depth of the curb and gutter and shall be braced and secured sufficiently so that no deflection from alignment or grade will occur during the placement of the concrete. Flexible forms shall be used in curved sections so that the top surface of the forms will form a smooth, continuous arc.

3.03 MIXING AND PLACING:

A. Concrete shall be proportioned, mixed, and placed in accordance with the requirements of Section 02630 – Concrete Pavement and Section 03300 – Cast in Place Concrete.

B. Compaction of the concrete placed in forms shall be by vibration or other acceptable methods.

C. Unless otherwise provided. After initial set, the exposed surfaces of curbs and gutters shall be finished by belting, or with steel or wooden floats then broom finish to achieve a uniform texture to the satisfaction of the Engineer. Forms shall be left in place until the concrete has set sufficiently so that they can be removed without injury to the curb and gutter.

3.04 SECTIONS:

A. Curb and gutter shall be constructed in sections having a uniform length of 20 feet, unless otherwise directed by the ENGINEER. Except at expansion joints, sections shall be separated by open joints 1/8 inch wide x ½" deep.

3.05 EXPANSION JOINTS:

A. Expansion joints shall be formed at the intervals shown on the plans using preformed expansion joints filler having a thickness of 3/4 inch. If not shown on the plans, expansion joints shall be placed at no greater than 100 foot intervals.

B. When the curb and gutter or concrete valley gutter is constructed adjacent to an existing concrete pavement, an expansion joint shall be located between the curb and gutter section and the existing concrete pavement.

3.06 CURING

A. Immediately upon completion of the finishing, the curb and gutter shall be moistened and kept moist for 3 days, or the curb and gutter shall be cured by the use of a membrane-forming material. The method and details of curing shall be subject to the approval of the ENGINEER.

3.07 SURFACE TREATMENT:

A. The surface of concrete curb and gutter or concrete valley gutter shall be treated with a solution of Linseed Oil and Mineral Spirits in accordance with the applicable requirements of Section 03300 - Cast-In-Place Concrete.

3.08 BACKFILLING:

A. After the concrete has set sufficiently, the spaces in front and behind the curb and gutter section shall be refilled to the required elevation with material approved by the ENGINEER, and shall be thoroughly tamped in layers of not more than 6 inches.

3.09 SLIP-FORM CONCRETE CURB, CONCRETE CURB AND GUTTER OR CONCRETE VALLEY GUTTER:

A. Any concrete curb or concrete curb and gutter, except on structures, may be placed using a slip form machine provided that the finished concrete curb or concrete curb and gutter is true to line and grade, the concrete is dense, and of the required surface texture.

B. The concrete shall be of a consistency that it will maintain the shape of the concrete curb or concrete curb and gutter section without support after slip forming.

C. The top and face of the finished concrete curb or concrete curb and gutter shall be true and straight and the top surface of the concrete curb or concrete curb and gutter shall be of uniform width and free from humps, sags, or other irregularities.

D. The forming portion of the slip form machine shall be readily adjustable vertically during the forward motion of the slip form machine to provide a variable height of concrete curb or concrete curb and gutter grade when necessary. A grade line gauge or pointer shall be attached to the slip form machine in such a manner that a continual comparison can be made between the concrete curb or concrete curb and gutter grade as indicated by the offset guidelines.

E. Concrete shall be fed to the slip form machine at a uniform rate. The slip form machine shall be operated under sufficient uniform restraint to forward motion to produce a well compacted mass of concrete free from surface pits larger than 3/16 inch in diameter and requiring no further finishing, other than light brushing with a wet brush. Finishing with a brush application of grout will not be permitted.

F. Transverse weakened planes and expansion joints shall be constructed at right angles to the line of the concrete curb, concrete curb and gutter, or concrete valley gutter.

G. Expansion joints may be constructed by sawing through the concrete curb or concrete curb and gutter section to its full depth. The width of the cut shall be such as to admit the joint filler with a snug fit.

H. The operations of sawing and inserting the joint filler shall be completed before curing the concrete. At the conclusion of the curing period the filler in each joint shall be checked for tightness of fit. Loose filler in any joint shall be mortared in place and cured.

I. Excavation shall be as per Subsection 3.02 above.

J. All remaining provisions of Subsection 2.02 above also apply, unless otherwise specified.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Curb and gutter, curb, and valley gutter shall be measured by the linear foot.

1. Curb shall be measured along the front face of the section at the finished grade elevation.

2. Combination curb and gutter will be measured along the face of the curb at the flow line of the gutter.

3. Valley gutter will be measured along the flow line of the gutter.

B. A deduction in length **shall be** made for drainage structures, such as catch basins or inlets, in the curb, gutter, or combination thereof.

C. There will be no direct measurement or payment of materials used to construct curb and gutter, curb, or valley gutter.

D. Excavation or construction of embankment for foundation of curb, valley gutter, or combination curb and gutter will not be measured for payment.

4.02 PAYMENT:

A. The accepted quantities of curb, valley gutter, and curb and gutter will be paid for at the contract unit bid price per linear foot for each kind and type specified, complete and in place.

B. Foundation preparation by excavating or constructing embankment to the required subgrade elevation is considered incidental to the completion of the work and no direct payment will be made thereof.

C. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This item shall govern the installation of sidewalks, with reinforcing steel, composed of Portland Cement concrete, constructed on an approved subgrades in conformity with the lines and grades established by the plans and details, and for the disposal of all material obtained from such installation. The work to be done under this item shall include all necessary forming, compaction, concrete work, and the removal of all structures or portions thereof such as trees, brush, mail boxes, and all other obstructions necessary to the proposed construction.

PART 2 - MATERIAL

2.01 Concrete

A. Materials and proportions used in construction under this item shall conform to the requirements of Class "A" Concrete 4 ½ 5 sack cement mix and shall have a minimum compressive 28 days strength of 3,000 pounds per square inch.

B. Reinforcing Steel - The reinforcing steel shall be a welded wire fabric made from cold-drawn wire smooth with a minimum yield strength of 56,000 pounds per square inch. The style designation shall be 6" x 6" x W 1.4 or Equal. (6" x 6" No. 10 6).

PART 3 - CONSTRUCTION METHOD

A. The subgrade shall be excavated and shaped to line, grade and cross section and if considered necessary in the opinion of the ENGINEER, place 2" of sand cushion, hand tamped and sprinkled. The subgrade shall be moist at the time the concrete is placed.

B. Forms shall be of wood or metal, straight, free from warp, and of a depth equal to the thickness of the finished work. They shall be securely staked to line and grade and maintained in a true position during the depositing of concrete.

C. The reinforcing steel shall be placed in position as shown on the plans. Care shall be taken to keep all reinforcing steel in its proper locations.

D. Sidewalks shall be constructed in sections of the lengths shown on plans. The different sections shall be separated by 2 pre-molded or board joint of the thickness shown on the plans, placed vertically and at right angles to the longitudinal axis of the sidewalk. Where the sidewalk abut a curb or retaining wall, approved expansion material shall be places along their entire length.

Similar expansion material shall be placed around all obstructions protruding through sidewalk.

E. Concrete shall be mixed in a manner satisfactory to the Engineer, placed in the forms to the depth specified and spaded and tamped until thoroughly compacted and mortar entirely covers the surface. The top surface shall be floated with a wooden float to a gritty texture to the satisfaction of the Engineer.

F. Sidewalks shall be marked into sections, each 6 feet maximum in length, by the use of approved jointing tools.

G. When completed, the, sidewalks shall be cured in accordance with the requirements of the Item, "Membrane Curing", Type 2, white pigmented.

PART 4 - PAYMENT

A. The work performed and materials furnished as prescribed by the item shall be measured by the square foot of surface area of completed sidewalk. This item will be paid for at contract unit price bid for "Concrete Sidewalks", which price shall be full compensation for preparing the subgrade; for furnishing and placing all materials, including all reinforcing steel and expansion joint materials; and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. The item shall consist of milling the existing pavement to a depth of 1" at the lip of gutter and transition it to match the existing pavement at a minimum width of 5 feet. The existing pavement to be milled will either be asphalt, concrete, or brick pavement.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. The equipment for removing the pavement surface shall be a self propelled milling machine or other approved equal that is capable of mechanically removing, in either one pass or two passes, the necessary pavement thickness in minimum width of 5 feet. The equipment shall be self-propelled with sufficient power, traction, and stability to maintain accurate depth of cut and slope. The machine shall be equipped with an integral loading and reclaiming process that immediately removes the material being cut from the surface of the roadway and discharges the cuttings into a truck in a single application or pass. The machine shall be equipped with a means to control dust created by the cutting action and shall have a manual system that allows for the depth of cut to be uniformly varied while the machine is in motion, allowing for cuts to be made flush to all inlets, manholes, or other obstructions within the paved area.

B. Adequate back-up equipment such as mechanical street sweepers, loaders, water, truck, etc., and personnel shall be readily available to keep the flying dust produced by the milling operations down to a minimum and to insure that all cuttings are removed from street surface daily.

C. Stockpiling of planned material will not be permitted on the project site unless designated by the Engineer.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Milling should be conducted along all areas as outlined in the plans and as directed by the Engineer.

B. Milling of the pavement along any curb and gutter section should extend to a depth of 1 inch along the gutter face and taper to match the existing pavement at a minimum width of 5 feet.

C. In all situations where the existing HMAC surface contacts the curb face, the wedge milling shall include the removal of the existing asphalt covering the gutter up to and along the face of curb.

D. The wedge milling operations shall be performed in a continuous manner.

E. The machine shall be equipped with a manual system that allows for the depth of cut to be uniformly varied while the machine is in motion, allowing for cuts to be made flush to all inlets, manholes, or other obstructions within the paved area.

F. The milled surface shall provide a smooth surface, free from gouges, ridges, oil film, and other imperfections of workmanship and shall have a uniform textured appearance.

G. The material being cut from the surface of the roadway shall be immediately removed and discharged into a truck after a single pass.

H. Provision should be made to keep any dust caused as a result of the cutting operations down to a minimal.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. Unless otherwise noted on the bid request, no additional compensation will be made for materials, equipment, or labor required by this item and shall be considered incidental to the other items included in this contract.

END OF SECTION

PART 1- GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the compaction of subgrade, embankment, flexible base, surface treatments and asphalt surfaces by the operation of an approved power roller as herein specified and as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. Embankments and Flexible Bases

1. Power rollers shall be of the 3-wheel, self-propelled type, weighing not less than 10 tons and shall provide a compression on the rear wheels of not less than 325 pounds per linear foot of wheel width. All wheels shall be flat.

2. The rear wheels shall have a diameter of not less than 48 inches and each shall have a wheel width of not less than 20 inches.

B. Surface Treatments and Pavements

1. Power rollers shall be the 3-wheel or tandem, self-propelled type, weighing not less than 3 tons nor more than 6 tons. All wheels shall be flat.

2. Rollers shall be equipped with an adequate scraping or cleaning device on each wheel.

3. Rollers used to compact asphalt mixture shall be equipped with a water system which will keep all tires uniformly wet.

4. In lieu of the rolling equipment specified, the CONTRACTOR may operate other compacting equipment that will produce equivalent relative compaction in the same period of time as the specified equipment. If the substituted compaction equipment fails to produce the desired compaction within the same period of time, its use shall be discontinued.

5. Rollers shall be maintained in good repair and operating condition and shall be approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Subgrades, Embankments and Flexible Base

1. The subgrade, embankment layer, or the base course shall be sprinkled if directed. Rolling with a power roller shall start longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the rear wheel of the power roller.

2. On super-elevated curves, rolling shall begin at the low sides and progress toward the high sides. Alternate trips of the roller shall be slightly different in length.

3. The rollers, unless otherwise directed, shall be operated at a speed between 2 and 3 miles per hour.

B. Surface Treatments and Pavements

1. Rolling shall be done to produce a satisfactory surface as called for in surface treatment and pavement items.

2. The sequence of work shall be as indicated for embankment layer or base course.

3. The operating speed shall be determined by the CONTRACTOR.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional compensation will be made for materials, equipment or labor required by this item, and shall be considered incidental to the other items included in the contract.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the compaction of embankment, flexible base, surface treatments, or pavements by the operation of approved pneumatic tire rollers.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

A. When used on seal coats, asphaltic surface treatments, and bituminous mixture pavements, the roller shall be self propelled and equipped with smooth tread tires with a tire pressure of 45 psi.

B. The roller shall be so constructed as to be capable of being operated in both a forward and a reverse direction.

C. When used on bituminous mixture pavements, the roller shall have suitable provision for moistening the surface of the tires while operating.

D. When turning is impractical or detrimental to the work and when specifically directed by the ENGINEER, the roller shall be of the self-propelled type.

E. In lieu of the rolling equipment specified, the CONTRACTOR may operate other compacting equipment that will produce equivalent relative compaction in the same period of time as the specified equipment. If the substituted compaction equipment fails to produce the desired compaction within the same period of time, its use shall be discontinued.

F. Rollers shall be maintained in good repair and operating condition and shall be subject to approval of the ENGINEER.

2.02 LIGHT PNEUMATIC TIRE ROLLER:

A. The light pneumatic tire roller shall consist of not less than 9 pneumatic tire wheels, running on axles in such manner that the rear group of tires will cover the entire gap between adjacent tires of the forward group, mounted in a rigid frame, and provided with a loading platform or body suitable for ballast loading.

B. The front axle shall be attached to the frame in such manner that the roller may be turned within a minimum circle.

C. Under working conditions the pneumatic tire roller shall have an effective rolling width of approximately 60 inches and shall be so designed that by ballast

loading the total load can be varied uniformly from 9,000 pounds to 18,000 pounds.

D. The roller shall be equipped with tires that will afford ground contact pressures to 45 pounds per square inch or more. The operating load and tire air pressure shall be within the range of the manufacturer's chart. The roller under working conditions shall provide a uniform compression under all wheels.

E. Individuals tire inflation pressures shall be within +5 psi of each other.

F. The pneumatic tire roller shall be drawn by a suitable crawler type tractor, a pneumatic tired tractor, a truck of adequate tractive effort or may be of the self-propelled type and the roller, when drawn or propelled by either type of equipment, shall be considered a light pneumatic tire roller unit.

2.03 MEDIUM PNEUMATIC TIRE ROLLER (TYPE A):

A. The medium pneumatic tire roller (Type A) shall consist of not less than 7 pneumatic tired wheels, running on axles in such manner that the rear group of tires will cover the entire gap between adjacent tires of the forward group and mounted in a rigid frame and provided with a loading platform or body suitable for ballast loading.

B. The front axles shall be attached to the frame in such a manner that the roller may be turned within a minimum circle. The pneumatic tire roller, under working conditions, shall have an effective rolling width of approximately 84 inches and shall be so designed that, by ballast loading, the total load may be varied uniformly from 23,500 pounds to 50,000 pounds.

C. The roller shall be equipped with tires that will afford ground contact pressures to 80 pounds per square inch or more. Individual tire inflation pressures shall be within +5 psi of each other.

D. The operating load and tire air pressure shall be within the range of the manufacturer's chart.

E. The pneumatic tire roller shall be drawn by a suitable crawler type tractor, a pneumatic tired tractor, a truck of adequate tractive effort or may be of the self-propelled type.

F. The roller, when drawn or propelled by any type of equipment, shall be considered a medium pneumatic tire roller unit.

G. The power unit shall have adequate tractive effort to properly move the operating roller at variable uniform speeds up to approximately 5 miles per hour.

2.04 MEDIUM PNEUMATIC TIRE ROLLER (Type B):

A. The medium pneumatic tire roller (Type B) shall conform to the requirements for Medium Pneumatic Tire Roller (Type A) as specified above, except that the roller shall be equipped with tires that will afford ground contact pressures to 90 psi or more.

PART 3 -EXECUTION

3.01 CONSTRUCTION METHODS:

A. The embankment layer or the base course be sprinkled if directed and rolling with a pneumatic tire roller shall start longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 of width of the pneumatic tire roller.

B. On super-elevated curves, rolling shall begin at the low sides and progress towards the high sides.

C. Alternative trips of the roller shall be slightly different in length.

D. The light pneumatic tire roller shall be operated at speeds between 2 and 6 miles per hour for asphalt surfacing work and all other work.

E. The medium pneumatic tire roller shall be operated at speeds which produce a satisfactory product.

F. Sufficient rollers shall be provided to compact the material in a satisfactory manner. When operations are so isolated from one another that 1 roller unit cannot perform the required compaction satisfactorily, additional roller units shall be provided.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional compensation will be made for materials, equipment or labor required by this item, but shall be considered subsidiary to the various items of the contract.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED:

A. Mixing, placing, finishing and providing all related services necessary to construct all cast-in-place concrete work indicated on plans.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes. Applicable standards and codes include, but are not limited to, the following:

1. ASTM A36 - Structural Steel.
2. ASTM C33 - Concrete Aggregates.
3. ASTM C39 - Concrete Strength of Molded Concrete Cylinders.
4. ASTM C94 - Ready-Mixed Concrete.
5. ASTM C143 - Slump of Portland Cement Concrete.
6. ASTM C150 - Portland Cement Concrete.
7. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
8. ACI 301 - Specification for Structural Concrete for Building.
9. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
10. ACI 315 - Manual of Standard practice for Detailing.
11. ACI 318 - Building Code Requirements for Reinforced Concrete.
12. ACI 347 - Recommended Practice for Concrete Formwork.

B. Submit compliance submittals as specified in Division 1, including but not limited to the following: bar schedule, bar details, shop drawings including size and location of openings, waterstops, joint systems and curing method.

C. Submit proposed concrete mix proportions to Engineer prior to placing concrete.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT:

A. Type I, Type II or Type III, conforming to ASTM C150, as modified by Texas State Department of Highways and Public Transportation, 1982 Standard Specifications.

B. Type I or II cement may be used unless Type II is specified.

C. Except when Type II is specified, Type III may be used when the anticipated air temperature for the 12 hours following the placement of the concrete is not anticipated to exceed 60°F.

D. Type III may be used in all pre-cast, pre-stressed concrete, except in piling when Type II cement is required for use as substructure concrete.

E. All cement used in a monolithic placement shall be of the same type.

F. Cements may be either bagged or bulk. Partially set or caked cement will be rejected.

G. All types of cements shall be "low alkali" cements.

2.02 WATER:

A. Water shall be clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter, or other deleterious substances and shall not contain more than 1000 parts per million of chlorides, as Cl, nor more than 1000 parts per million of sulfates, as SO_4.

B. Water of known potable quality requires no testing. Other sources shall meet the requirements of AASHTO T-26.

C. Water shall have a pH of not less than 4.5 or more than 8.5.

2.03 FINE AGGREGATE:

A. Natural sand, manufactured sand or a combination of the two, with or without mineral filler.

B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, uncoated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.

C. The maximum permissible percentage, by weight of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate or mineral filler.

D. Gradation, percent of weight retained:

Sieve Size	Percent Retained
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	15 - 50
No. 30	35 - 75
No. 50	65 - 90
No. 100	90 - 100
No. 200	97 - 100

E. Fineness Modulus:

1. For Grade 1 only - 2.3 minimum, 3.1 maximum.

F. Mineral Filler:

1. May be added upon written authorization of Engineer
2. Shall be stone dust or clean crushed sand, or other approved inert material.
3. Shall not exceed 5% of the fine aggregate.
4. Shall meet the following requirements:
    a. Passing No. 30 sieve 95 to 100%
    b. Passing No. 100 sieve 70 to 100%

2.04 COARSE AGGREGATE:

A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.

B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.

C. Crushed stone shall consist of the clean, dust free product resulting from the crushing of stone. There shall be no adherent coatings, clay, loam, organic or deleterious substances, salt or alkali, and other foreign material.

D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.00%
Shale, Slate or other similar material	1.00%
Clay lumps	0.25%

Soft fragments	3.00%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.00%
The sum of all deleterious substances exclusive of material removed by decantation	5.00%

E. Coarse aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.

F. Gradation, percent of weight retained:

1. Grade No. 1 - Maximum Nominal Size 2 1/2-inches (63 mm)

Sieve	Percentage Retained
2 1/2-inches	0
2-inches	0 - 20
1 1/2-inches	15 - 50
3/4-inches	60 - 80
No. 4	95 - 100

2. Grade No. 2 - Maximum Nominal Size 1 1/2-inches (37.5 mm)

Sieve	Percentage Retained
2-inches	0
1 1/2-inches	0 - 5
3/4-inches	30 - 65
3/8-inches	70 - 90
No. 4	95 - 100

3. Grade No. 3 - Maximum Nominal Size 1-inch (25 mm)

Sieve	Percentage Retained
1 1/2-inches	0 - 5
3/4-inches	10 - 40
1/2-inches	40 - 75
No. 4	95 - 100

4. Grade No. 4 - Maximum Nominal Size 3/8-inch (9.5 mm)

Sieve	Percentage Retained
1/2-inches	0 - 5
3/8-inches	5 - 30
No. 4	75 - 100

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:

1. One-sixth (1/6) of the least dimension between forms of that part of the structure in which concrete is to be placed.
2. Three-fourths (3/4) of the clear space between reinforcement.
3. The maximum size aggregate is defined as the clear space between the sides of the smallest square openings through which 95 percent of the weight of the aggregate can be passed.
4. Unless otherwise noted or restricted by above, the Grade No. 2 gradation shall be used.

2.05 PIT-RUN AGGREGATE:

A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or coarse aggregates, and shall consist of hard, durable, uncoated pebbles or stone particles mixed with sand.

B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.

C. Pit-run aggregate shall be well graded from coarse to fine when tested by standard laboratory methods and shall meet the following minimum requirements for percentages by weight:

1. Retained on 1/4 in sieve 55 to 60%

D. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and stronger.

E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

A. Concrete admixtures shall comply with Section 03320.

2.07 REINFORCING STEEL:

A. Reinforcing steel shall comply with Section 03330.

2.08 CURING MATERIALS:

A. Liquid Membrane: white pigmented chlorinated rubber, ASTM C309.

B. Liquid Membrane: resin base, clear compound, permitting application of paint, Servicised Products Corporation - Code 2802 or equal.

C. Plastic Film: White pigmented, 0.00085-inches (minimum) thick.

D. Burlap: jute fabric, lean, free of impurities.

E. Surface Hardener: gray crystal, acidic fluosilicate base, slightly hygroscopic chemical surface hardener, SIKA Hardener, SIKA Chemical Corporation, or equal.

2.09 JOINT MATERIALS:

A. Joint Sealer: hot poured, non-extruding, elastic, ASTM D1190.

B. Preformed Expansion Joint Filler: non-extruding, bituminous fiber, ASTM D1751.

2.10 WATERSTOP:

A. Polyvinyl chloride or rubber, centerbulb.

B. Size to suit joinings, minimum 6-inches.

2.11 FORM MATERIALS:

A. Use plywood, metal, metal framed plywood faced or other acceptable panel-type material.

B. Coat forms with non-bonding, non-staining commercial compounds.

2.12 MOISTURE BARRIER:

A. Polyethylene sheet, minimum 8-mil., ASTM E154.

2.13 CONCRETE MIX DESIGN AND CONTROL:

A. Submit not less than 10 days prior to the start of concreting operations to the Engineer:

1. Mix design, using a coarse aggregate factor acceptable to the Engineer.
2. Sufficient samples of all materials to be incorporated into the mix for testing.
3. Full description of the source of supply of each material component.

B. Coarse aggregate factor:

1. Not more than 0.82 when voids less than 48%.
2. Not more than 0.85 when voids exceed 48%.
3. Not less than 0.68.

C. No changes or deviations from proportions or sources of supply without approval of Engineer.

D. No concrete may be placed on the job site until the mix design has been approved by Engineer in writing to the Contractor.

2.14 CONCRETE QUALITY:

A. Consistency:

1. Mortar shall cling to the coarse aggregate.
2. The aggregate shall not segregate during transport.
3. The concrete and mortar shall show no free water when removed from the mixer.

B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.

C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.

D. Excessive bleeding shall be avoided.

E. Slump requirements shall be as follows:

Structural Concrete	Average Slump	Maximum Slump
1. Cased Drilled Shafts and Thin-walled Sections (9-inches or less)	4	5
2. Slabs, Caps, Columns, Piers,	3	4

wall sections over 9-inches.
etc.

3.	Slip Form Paving	1/2	2
4.	Underwater or Seal Concrete	5	6
5.	Rip-rap, Curb, Gutter and other Miscellaneous Surfaces	As Specified By Owner	As Specified By Owner

NOTE: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE

Class Of Concrete	Minimum Maximum SX Cement Per CY	Minimum Comp. Strength 28-day PSI	Minimum Beam Strength 7-day psi ****	Maximum Water Cement Item 2.1.1 (c)(4)	Coarse Aggregate Number
A	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3**
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5 - 8.0	ASP	NA	5.5	3

ASP = As Specified on Plans.
*Entrained Air.
**No. 1 coarse aggregate may be used in foundations only (Except cased drilled shafts).
***Prestressed Concrete.
****ASTI C293 (Center Point).

2.15 GROUT:

A. Non-Shrink:

1. Use premixed non-shrink, Embeco Pre-Mixed Grout or Embeco Pre-Mixed Mortar by Master Builders Company or equal.
2. Keep water to a minimum for placing by the dry packing method.

PART 3 - EXECUTION

3.01 SUBGRADE:

A. Insure subgrade is true to line and grade and compacted as specified.

B. Fill and recompact any ruts or depressions.

C. Check cross section with a template.

D. Place moisture barrier or moisten subgrade prior to placing of concrete. Method to be approved by Engineer.

3.02 FORMS:

A. Provide forms for all concrete work, including footings and base slabs.

B. Construct forms so that completed concrete will conform to shapes, lines, grades and dimensions indicated and required.

C. Forms shall be true, plumb and level with reasonably tight joints. Adequately support and brace forms.

D. Place anchors, inserts, blots, sleeves and other devices indicated or required for the various portions of all the work.

E. Oil temporary forms with non-staining form oil before reinforcing steel is placed.

F. Rough form finish as defined by ACI 301 permitted for concealed concrete.

G. Smooth form finish as defined by ACI 301 permitted for concealed concrete.

H. Provide 3/4 inch chamfer on exposed corners and edges, and 1-foot below ground level.

3.03 REMOVAL OF FORMS:

A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.

B. Remove formwork for columns, walls, beam sides and other parts not supporting the weight of the concrete as soon as the concrete has hardened sufficiently to resist damage from removal operations.

C. Formwork for slabs, beam soffits and other parts supporting the weight of the concrete shall remain in place until the concrete has reached its specified 28-day strength.

D. Protect concrete from damage prior to acceptance.

E. Prohibit traffic until concrete is at least 10 days old.

F. Cure areas previously covered by forms.

3.04 MIXING CONCRETE:

A. Maintain all equipment, tools, and machinery used for hauling materials and performing any part of the work to insure completion of the work underway without excessive delays for repairs or replacement.

B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.

C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.

D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

E. The entire contents of the drum shall be discharged before any materials are placed.

F. Improperly mixed concrete will not be placed.

G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transit Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.
2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.
3. Concrete shall not be placed on the job after a period of 1 hour after the cement has been placed in the mixer, with mixer turning; 30 minutes without turning.

I. Continuous Volumetric Mix Concrete:

1. A mobile, continuous, volumetric mixer of the rotating puddle type may be used for when approved by Engineer.
2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mixed to the required consistency before discharging.
3. The mixers shall have adequate water supply and metering devices.
4. Calibration of these mixers will be required.

3.05 PLACING CONCRETE:

A. The minimum temperature of all concrete at the time of placement shall not be less than 50°F.

B. Clean transporting equipment, reinforcing and embedded items before placing concrete.

C. Batch trucks or paving equipment not permitted on prepared subgrade unless authorized by the Engineer based on actual job conditions.

D. Place no concrete until after inspection of forms by Engineer.

E. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

Air or Concrete Temperature	Non-Agitated Concrete	Maximum Time
80°F or Above	26.6°C	15 minutes
35 to 79°F	1.6 to 26.1°C	30 minutes

Air or Concrete Temperature	Agitated Concrete	Maximum Time
90°F or Above	32.2°C	45 minutes
75 to 89°F	23.9 to 31.6°C	60 minutes
35 to 74°F	1.6 to 23.3°C	90 minutes

F. Prevent segregation during placing.

G. Consolidate flat work with one pass of mechanical vibrator moving parallel to centerline. Unusual section and widths may be hand puddled and finished.

H. Place concrete continuously so that each pour unit will be monolithic in construction and will terminate at expansion, contraction or construction joint. Permit not more than 30 minutes between depositing adjacent batches.

I. Place slab concrete over membrane before the waterproofing membrane becomes damaged or dirty.

J. Concrete placement will not be permitted when impending weather conditions will impair the quality of the work.

K. Slope horizontal surfaces of exterior concrete for drainage.

L. Deposit concrete in forms in horizontal layers not deeper than 24 inches. Avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.

M. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

N. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate placed layer of concrete and at least 6-inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

3.06 PLACING CONCRETE IN WATER:

A. Concrete shall be deposited in water only when specified on the plans or with written permission of the Engineer.

B. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is deposited.

C. Pump will not be permitted during the concrete placing, nor until it has set for at least 36 hours.

D. The concrete shall be placed with a tremie, closed bottom-dump bucket or other approved method.

E. The concrete shall not be allowed to fall freely through the water nor shall it be disturbed after it has been placed. Its surface shall be kept approximately level during placement.

F. The tremie shall consist of a water-tight tube 14-inches or less in diameter. It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete. It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow. The lower end of the tremie shall be submerged in the concrete at all times.

G. Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard. It shall be lowered gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.

H. The placing operations shall be continuous until the work is complete.

I. Unless otherwise specified, all concrete placed under water, except seal concrete, shall contain an additional sack of cement per cubic yard.

3.07 JOINTS:

A. Type ‘A’ (Contraction) Joints:

1. Extend entirely across flat slabs at locations shown.
2. Where location is not shown, maximum spacing is:
    a. Driveways: 10-feet.
    b. Sidewalks: 4-feet.
    c. Other flat slabs: 20 times slab thickness.

3. Saw depth not less than 1/4 slab thickness.

B. Type ‘B’ (Isolation) Joint:

1. Install where shown on the plans.
2. Where location is not shown, place between all structures and features which project through, into or against slab.
3. Install according to manufacturer's recommendations. Set material securely before placing concrete.
4. Install 1/2-inch width unless shown otherwise.

C. Filling Joints:

1. Fill no later than 14 days after sawing.
2. Fill immediately following cleaning.
3. Fill to 1/8-inch of surface.
4. Remove excess while material is still pliable.
5. Refill low areas where necessary.
6. Omit filling sidewalk joints.

3.08 FINISHING EXTERIOR FLAT WORK:

A. Strike off and float as required.

B. Check surface with ten foot straight edge, maximum variance allowed is 1/8-inch.

C. Drag concrete surface longitudinally with double thickness burlap drag after completion of straight edging unless noted otherwise.

D. Use edger on edges of slab.

E. Use hand finishing only when approved by Engineer.

3.09 FINISHING OTHER CONCRETE:

A. Interior floors: smooth, steel-troweled finish. Use edger on exposed edges. Grind smooth defects which would telegraph through applied finish flooring.

B. Exterior walks and steps: lightly broomed finish transverse to traffic flow. Use edger on exposed edges.

C. Other surfaces:

1. Remove fins, projections and loose material.

2. Clean surfaces of form oil.
3. Patch honeycomb, aggregate pockets, voids and holes as follows:
    a. Chip out until sound concrete is exposed to minimum depth of 1-inch .
    b. Prepare patching mortar with approximately two parts of normal Portland Cement, one part white cement, nine parts fine aggregate; vary proportions of aggregate as necessary to match color of adjacent concrete.
4. Fill holes left by form ties to within 1 inch of surface with non-shrink grout. Fill remainder with patching mortar specified hereinbefore.
5. Apply grout-cleaned finish to all exposed vertical surfaces. Wet surface and rub grout on surfaces with rubber or cork float. Scrape off excess grout and finish with brick rubbing or as approved by Engineer.

D. Coordinate required finish with Engineer.

3.10 CURING:

A. Contractor shall inform the Engineer fully of the methods and procedures proposed for curing; shall provide proper equipment and in adequate amounts; and shall have approval of the proposed method, equipment and materials prior to placing concrete.

B. All concrete shall be cured for a period of 4 days except as noted herein.

1. Exceptions to 4-day Curing.
    a. Upper surfaces of Bridge Roadways, Median and Sidewalk Slabs, and Top Slabs of Direct Traffic Culverts require 8 curing days.
    b. A curing day is defined as a calendar day when the ambient temperature, taken in the shade away from artificial heat, is above 50° F(10°C) for at least 19 hours. If the ambient temperature is 50° F or less, a curing day is accepted only if satisfactory provisions are made to maintain the temperature at all surfaces of the concrete above 40° Fahrenheit (4.4°C) for the entire 24 hours.

C. Form Curing:

1. When forms are left in contact with the concrete, other curing methods shall not be required except for cold-weather protection.

D. Water Curing:

1. All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet requirements for concrete mixing water.
    a. Wet Mat:
        (1) Cotton mats shall be used for this curing method. The mats shall not be placed in contact with the concrete until such time that damage shall not occur to the surfaces.
        (2) Damp burlap blankets made from 9-ounce stock may be placed upon the damp concrete surface for temporary protection prior to the application of the cotton mats.
        (3) The mats may be placed by and wetted down after placement.
        (4) Mat curing, except for continuous placements, shall commence not later than three hours after finishing of the roadway slab.
        (5) The mats shall be weighted down adequately to provide continuous contact with all concrete surfaces where possible.
        (6) The surfaces of the concrete shall be kept wet for the required curing time.
        (7) Surfaces which cannot be cured by contact shall be enclosed with mats, anchored positively to the forms, or to the ground, so that outside air cannot enter the enclosure. Sufficient moisture shall be provided inside the enclosure to keep all surfaces of the concrete wet.
    b. Water spray:
        (1) This method shall be accomplished by overlapping sprays or sprinklers, so that all unformed surfaces are kept continuously wet.
    c. Ponding:

        (1) This method requires the covering of the surface with a minimum of two inches (5 cm) of clean granular material, kept wet at all times; or water to a minimum depth of one inch (2.5 cm). Satisfactory provisions shall be made to provide a dam to retain the granular material or water.

E. Membrane Curing

1. Unless otherwise shown on the plans, Type 2 membrane curing compound may be used where permitted.
2. A membrane shall be applied in a single, uniform coating at the rate of coverage recommended by the manufacturer and as approved by the Engineer, but not less than nine gallons per 210 feet (.0038M^3 63M) of area. Tests for acceptance shall be at this specified rate.
3. Membrane curing shall not be applied to dry surfaces; but shall be applied to horizontal surfaces just before free moisture has disappeared.

4. Formed surfaces and surfaces which have been given a first rub shall be dampened and shall be moist at the time of application of the membrane.

	REQUIRED		PERMITTED	
Structure Unit Description	Water for Complete Curing	Membrane for Interim Curing	Water for Complete Curing	Membrane for Interim Curing
Upper surfaces of bridge roadway; median *and* sidewalk slabs; top slabs of direct traffic culverts; top surface of any concrete unit upon which concrete is to be placed and bonded at a later interval (stub walls risers, etc.) Other super-structure concrete (curbs, wing-walls, parapet walls, etc.)	X	X		Resin Basin
Top surface of precast and/or prestressed piling	X	X		
All substructure con-crete culverts box sewers inlets man-holes retaining walls riprap	X	X		

*Polyethylene sheeting or burlap polyethylene mats fastened to prevent outside air from entering into the concrete shall be considered equivalent to water or membrane curing per this item.

5. When membrane is used for complete curing, the film shall remain unbroken for the minimum curing period specified. Membrane which is damaged shall be corrected immediately by reapplication of membrane.

3.11 TESTING:

A. Furnish at least five cylinders or beams from each 50 cubic yard, or portion thereof for test purposes unless otherwise directed by Engineer. Test two cylinder at 7

days, test two cylinders at 28 days and test final cylinder only if needed for confirmation of compression strength.

3.12 MISCELLANEOUS CONCRETE ITEMS:

A. Filling-in: fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Use non-shrink grout as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Equipment bases and foundations: provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing machines and equipment. Use non-shrink grout as shown on plans.

C. Steel pan stairs: provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screen, tamp and finish concrete surfaces as scheduled.

D. Reinforced masonry: provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Cast-in-place concrete for the work shown on the plans shall be measured by the cubic yard as specified in the pans and contract.

4.02 PAYMENT:

A. The accepted quantities of cast-in-place concrete shall be paid for at the unit bid price per cubic yard.

B. The unit bid price shall be full compensation for furnishing, hauling, and mixing all concrete materials, including trial batches; placing curing and finishing all concrete; for all grouting and joints; furnishing and placing all expansion and construction joints, except as provided in the plans; furnishing and placing metal flashing strips and waterstops; and for all forms and false-work, labor tools, equipment and incidentals necessary to complete the work.

C. The preceding provisions for payment shall not be interpreted to provide payment of concrete in railing, piling, precast, prestressed concrete units or other concrete items of which provision is otherwise made in the contract.

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

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED:

A. This work shall consist of furnishing, hauling, and mixing concrete materials.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes. Applicable standards and codes include, but are not limited to, the following:

1. ASTM C33 - Concrete Aggregates.

2. ASTM C39 - Concrete Strength of Molded Concrete Cylinders.

3. ASTM C94 - Ready-Mixed Concrete.

4. ASTM C143 - Slump of Portland Cement Concrete.

5. ASTM C150 - Portland Cement Concrete.

6. ACI 301 - Specification for Structural Concrete for Building.

7. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and

B. Submit proposed concrete mix proportions to Engineer prior to placing concrete.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT:

A. Conforming to ASTM C150, as modified by Texas Department of Transportation, 1993 Standard Specifications.

B. Cements may be either bagged or bulk. Partially set or caked cement will be rejected.

C. All types of cements shall be "low alkali" cements.

2.02 WATER:

A. Water shall be clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter, or other deleterious substances and shall not contain more than 1000 parts per million of chlorides, as Cl, nor more than 1000 parts per million of sulfates, as SO_4.

B. Water of known potable quality requires no testing. Other sources shall meet the requirements of AASHTO T-26.

C. Water shall have a pH of not less than 4.5 or more than 8.5.

2.03 FINE AGGREGATE:

A. Natural sand, manufactured sand or a combination of the two, with or without mineral filler.

B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, uncoated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.

C. The maximum permissible percentage, by weight of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate or mineral filler.

D. Gradation, percent of weight retained:

Sieve Size	Percent Retained
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	15 - 50
No. 30	35 - 75
No. 50	65 - 90
No. 100	90 - 100
No. 200	97 - 100

E. Fineness Modulus:

1. For Grade 1 only - 2.3 minimum, 3.1 maximum.

F. Mineral Filler:

1. May be added upon written authorization of Engineer

2. Shall be stone dust or clean crushed sand, or other approved inert material.

3. Shall not exceed 5% of the fine aggregate.

4. Shall meet the following requirements:

a. Passing No. 30 sieve 95 to 100%

b. Passing No. 100 sieve 70 to 100%

2.04 COARSE AGGREGATE:

A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.

B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.

C. Crushed stone shall consist of the clean, dust free product resulting from the crushing of stone. There shall be no adherent coatings, clay, loam, organic or deleterious substances, salt or alkali, and other foreign material.

D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.00%
Shale, Slate or other similar material	1.00%
Clay lumps	0.25%
Soft fragments	3.00%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.00%
The sum of all deleterious substances exclusive of material removed by decantation	5.00%

E. Coarse aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.

F. Gradation, percent of weight retained:

1. Grade No. 1 - Maximum Nominal Size 2 1/2-inches (63 mm)

Sieve	Percentage Retained
2 1/2-inches	0
2-inches	0 - 20
1 1/2-inches	15 - 50
3/4-inches	60 - 80
No. 4	95 - 100

2. Grade No. 2 - Maximum Nominal Size 1 1/2-inches (37.5 mm)

Sieve	Percentage Retained
2-inches	0
1 1/2-inches	0 - 5
3/4-inches	30 - 65
3/8-inches	70 - 90
No. 4	95 - 100

3. Grade No. 3 - Maximum Nominal Size 1-inch (25 mm)

Sieve	Percentage Retained
1 1/2-inches	0 - 5
3/4-inches	10 - 40
1/2-inches	40 - 75
No. 4	95 - 100

4. Grade No. 4 - Maximum Nominal Size 3/8-inch (9.5 mm)

Sieve	Percentage Retained
1/2-inches	0 - 5
3/8-inches	5 - 30
No. 4	75 - 100

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:
   1. One-sixth (1/6) of the least dimension between forms of that part of the structure in which concrete is to be placed.

2. Three-fourths (3/4) of the clear space between reinforcement.

3. The maximum size aggregate is defined as the clear space between the sides of the smallest square openings through which 95 percent of the weight of the aggregate can be passed.

4. Unless otherwise noted or restricted by above, the Grade No. 2 gradation shall be used.

2.05 PIT-RUN AGGREGATE:

A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or coarse aggregates, and shall consist of hard, durable, uncoated pebbles or stone particles mixed with sand.

B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.

C. Pit-run aggregate shall be well graded from coarse to fine when tested by standard laboratory methods and shall meet the following minimum requirements for percentages by weight:

1. Retained on 1/4 in sieve 55 to 60%

D. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and stronger.

E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

A. Concrete admixtures shall comply with Section 03320.

2.07 CONCRETE MIX DESIGN AND CONTROL:

A. Submit not less than 10 days prior to the start of concreting operations to the Engineer:

1. Mix design, using a coarse aggregate factor acceptable to the Engineer.

2. Sufficient samples of all materials to be incorporated into the mix for testing.

3. Full description of the source of supply of each material component.

B. Coarse aggregate factor:

1. Not more than 0.82 when voids less than 48%.

2. Not more than 0.85 when voids exceed 48%.

3. Not less than 0.68.

C. No changes or deviations from proportions or sources of supply without approval of Engineer.

D. No concrete may be placed on the job site until the mix design has been approved by Engineer in writing to the Contractor.

2.08 CONCRETE QUALITY:

A. Consistency:

1. Mortar shall cling to the coarse aggregate.

2. The aggregate shall not segregate during transport.

3. The concrete and mortar shall show no free water when removed from the mixer.

B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.

C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.

D. Excessive bleeding shall be avoided.

E. Slump requirements shall be as follows:

Structural Concrete	Average Slump	Maximum* Slump
1. Cased Drilled Shafts and Thin-walled Sections (9-inches or less)	4	5

2. Slabs, Caps, Columns, Piers, wall sections over 9-inches, etc.	3	4
3. Slip Form Paving	1/2	2
4. Underwater or Seal Concrete	5	6
5. Sidewalks	4	5
6. Rip-rap, Curb, Gutter and other Miscellaneous Surfaces	As Specified By Owner	As Specified By Owner

* NOTE: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE

Class Of Concrete	Minimum-Maximum SX Cement Per CY	Minimum Comp. Strength 28-day PSI	Minimum Beam Strength 7-day psi ****	Maximum Water Cement Item 2.1.1 (c)(4)	Coarse Aggregate Number
A	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3**
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5 - 8.0	ASP	NA	5.5	3

ASP = As Specified on Plans.
*Entrained Air.
**No. 1 coarse aggregate may be used in foundations only (Except cased drilled shafts).
***Prestressed Concrete.
****ASTI C293 (Center Point).

PART 3 - EXECUTION

3.01 MIXING CONCRETE:

A. Maintain all equipment, tools, and machinery needed for timely production and delivery of concrete to jib site.

B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.

C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.

D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

E. The entire contents of the drum shall be discharged before any materials are placed.

F. Improperly mixed concrete will not be placed.

G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transit Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.

2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.

3. Concrete shall not be placed on the job after a period of 1 hour after the cement has been placed in the mixer, with mixer turning; 30 minutes without turning.

4. All delivery trucks shall have batch tickets that clearly indicate the name of the supplier, the time the concrete was batched, the truck number, the design strength, the amount of concrete delivered in cubic yards, the amount of cement, the amount of water added at the batch plant and at the site, and the amount and type of any admixtures added to the mix.

I. Continuous Volumetric Mix Concrete:

1. A mobile, continuous, volumetric mixer of the rotating puddle type may be used for when approved by Engineer.

2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mixed to the required consistency before discharging.

3. The mixers shall have adequate water supply and metering devices.

4. Calibration of these mixers will be required.

3.02 TESTING:

A. If directed by the Engineer, a trial batch shall be mixed for the purpose of testing the design mix. A total of two sets of four cylinders shall be obtained in accordance with ASTM C 31-95 from two separate samples of the trial batch for compressive strength tests in accordance with ASTM C 39-86. One cylinder from each set will be tested at 3 days and 7 days. The remaining two cylinders shall be tested at 28 days. The Engineer may also elect to have two sets of two beams constructed for flexural strength testing at 28 days in accordance with ASTM C 78-94.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Concrete supplied for work shown on approved plans shall be measured by the cubic yard.
B. A delivery ticket indicating the name of the supplier, the time the concrete was batched, the truck number, the design strength, the amount of concrete delivered in cubic yards, the amount of cement, the amount of water added at the batch plant and at the site, and the amount and type of any admixtures added to the mix, shall be provided to the Engineer for all deliveries.

4.02 PAYMENT:

A. The accepted quantities of supplied concrete shall be paid for at the unit bid price per cubic yard.

B. The unit bid price shall be full compensation for furnishing and mixing all concrete materials, including trial batches and delivery.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing materials for use as admixtures in concrete.

PART 2 - PRODUCTS

2.01 AIR ENTRAINING ADMIXTURE:

A. An " Air Entraining Admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will entrain uniformly dispersed microscopic air.

B. This admixture shall conform to ASTM C 260, modified as follows:

1. The cement used in any series of tests shall be either the cement proposed for specific work or a "reference" Type I cement from a mill.

2. Unless otherwise indicated, the minimum relative durability factor shall be 80.

C. The air entraining admixture used in the reference concrete shall be high quality neutralized Vinsol Resin.

2.02 WATER – REDUCING, RETARDING ADMIXTURE:

A. A "Water-reducing, Retarding Admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and retard the initial set of the concrete.

B. This mixture shall conform to ASTM C 494, Type A or D, modified as follows:

1. The water-reducing retarder shall retard the initial set of the plastic conrete a minimum of 2 hours and a maximum of 4 hours when the materials are at a temperature of 90 F, the dosage rate specified by the manufacturer.

2. The cement used in any series of tests shall be either the cement proposed for specific work or a "reference" Type I cement from one mill.

3. All concrete tested shall contain entrained air.

2.03 WATER – REDUCING ADMIXTURE:

A. A “Water-reducing Admixture” is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and required strength.

B. This admixture shall conform to ASTM C 494, Type A.

2.04 ACCERLERATING ADMIXTURE:

A. An “Accelerating Admixture” is defined as an admixture that accelerates the setting time and the early strength development of concrete.

B. This admixture shall conform to ASTM C 494, Type C, modified as follows:

1. The accelerating admixture will contain no chlorides and shall be used in the liquid form only.

2.05 HIGH – RANGE WATER REDUCING ADMIXTURES:

A “High-range Water Reducing Admixture,” referred to as a superplastersize, is defined as a synthetic polymer material which, when added to a low slump concrete mixture increases the slump without segregation, impermeability and durability of the mix.

B. This admixture shall conform to ASTM C 494, Type F or G, modified as follows:

1. It shall reduce the required water by a minimum of 15 percent.

2. It shall increase the 7 day compressive strength of the concrete by a minimum of 25 percent.

C. The admixture when added to the mix shall produce the following:

1. Modify a low slump concrete, without the addition of water, to produce a slump which conforms to the range indicated.

2. It shall prevent a temperature rise of the mix above 100 F during high ambient conditions.

3. It shall not increase the chloride content of the mix.

2.06 CERTIFICATION:

A. The CONTRACTOR shall submit the name of the admixture proposed and manufacturer's certification that products selected meet the requirements of this item and of ADTM C 260 and C 494 as required.

B. If more than one admixture is proposed in the concrete mix, a statement of compatibility of components shall accompany certification.

C. The ENGINEER may request additional information to be submitted such as infrared spectrophotometry scan, solids content, ph value, etc., for further identification.

D. A change in formulation discovered by any of the tests prescribed herein or other means and not reported and retested, may be cause to permanently bar the manufacturer from furnishing admixtures for City of McAllen work.

E. The ENGINEER reserves the right to perform any or all of the tests required by ASTM C 260 and C 494 as a check on the tests reported by the manufacturer.

F. In case of any variance, the ENGINEER tests will govern.

2.07 APPROVAL:

A. The ENGINEER shall approve all admixtures and dosage. Approval of admixtures shall be based on previous performance of the admixture.

B. The dosage will be determined from the manufacturer's recommendations, trial mixes or current job approved mix designs, if it is shown that no substantial change in any of the proposed ingredients has been made.

C. Should the CONTRACTOR desire to change the admixture or dosage approved during the progress of the work, the CONTRACTOR shall perform trial mixes at his own expense and submit the new mix design for approval.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. No concrete shall be delivered to the project until the mix design is approved. All concrete delivered shall conform to the approved job mix formula. Unless otherwise indicated, all concrete shall be air entrained. All admixtures will be added at the Batch Plant. All admixtures shall be in the liquid state. No admixtures shall be dispensed on dry aggregates. Each admixture shall be dispensed separately, but at the same time as the mixing water.

B. An approved job mix formula for normal hot weather concreting may not perform satisfactory for extended retardation, in which case its use will not be permitted.

C. The rotation of the mixer shall be sufficient to thoroughly mix the admixture into the concrete.

D. Admixtures shall be agitated as required to prevent separation or sedimentation of solids. Air agitation of Neutralized Vinsol Resin will not be permitted.

E. Normally Air entraining agents shall be charged into the mixer at the beginning of the batch and retarding or water reducing admixtures shall be charged into the mixer during the last part (approximately 1/3) of the batch when an air-entraining agent is used.

F. Accelerating admixtures will be used only on the written approval of the ENGINEER. Accelerating admixtures will not be permitted in bridge decks, direct traffic culvert slabs at any time nor when Type II cement is specified.

G. All admixtures shall be of the same brand from only one manufacturer for the entire project, unless otherwise approved by the ENGINEER.

H Accelerators will be used only to meet special project requirements and will require the approval of the ENGINEER.

I For individual placements of concrete of 25 cubic yards or more and for all ready-mix concrete, the admixture shall be measured and dispensed by a readily adjustable dispenser. When set to a predetermined volume, the dispenser shall fill to the preset amount and hold it positively without leakage until the operator releases the content into the mixing water by some positive means. Unless otherwise indicated, completely automatic dispensing will not be required, except for use with a fully automatic plant.

J The calibrated container shall be a measuring reservoir of the type where the level of the admixture is visible at all times. A strip gauge with one ounce increments for air entraining admixtures, ten ounce increments for dispersing admixtures, shall be attached securely to the measuring apparatus. This strip shall be a material possessing weather resistant qualities. The accuracy equipment shall visibly show the total amount to be dispensed for ready check by the ENGINEER.

K When individual placements of less than 25 cubic yards and with the concrete batched on the job site, the ENGINEER may waive the requirements for mechanical dispensing equipment.

L When high-range water reducing admixtures are indicated the following will be observed:

1. Ready-mix concrete shall be delivered in transit mixers and the capacity of the transit mixer shall be reduced for each bath by 25 percent of the rated capacity to assure proper mixing.

2. If during the placement of concrete, a change in slump resulting in a slump loss in excess of 3 inches is noted, the remaining concrete shall be rejected.

3. The addition of water will not be permitted at the job site.

4. Only one liquid admixture shall be used to achieve the desired results, except where air entrainment is indicated, the air entrainment agent will be permitted.

5. The concrete design shall meet the following requirements:

Item	Test	Value
Air entrainment	ASTM C 260	3 to 6 percent
High range water Reducing admixture	ASTM C 494 Type F or G	
Water cement ratio Gal/Sack Max.		6.25
Minimum cement content In Sacks (94 lb. Sack)		6.0
Coarse aggregate factor		6.5
Slump Maximum, inches		10
Flexural strength @ 7 days, psi		650
Maximum concrete Temperature, F		100

PART 4 - MEASUREMENT AND PAYMENT

4.01 No additional compensation will be made for the materials, equipment tests or methods required by this item, but shall be considered subsidiary to various items included in the contract.

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE:

This work shall consist of the furnishing and placing of reinforcing steel, deformed and smooth, of the size and quantity indicated and in accordance with these specifications.

PART 2 - PRODUCTS

2.01 BARS

A. Bar reinforcement shall be deformed and shall conform to ASTM A 615, A 616, Grades 40, 60 or 75 and shall be open-hearth, basic oxygen or electric furnace new billet steel, unless otherwise indicated. Large diameter new billet steel (Nos. 14 and 18), Grade 75, will be permitted for straight bars only.

B. Where bending of bar sizes No. 14 or No. 18 of Grades 40 or 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM specification. The required bend shall be 90 degrees at a minimum temperature of 60 F around a pin having a diameter of 10 times the nominal diameter of the bar and shall be free of cracking.

C. Spiral reinforcement shall be either smooth or deformed bars or wire of the minimum diameter indicated. Bars for spiral reinforcement shall comply with ASTM A 675, A 615 or A 617. Wire shall comply with ASTM A 82. The minimum yield strength for spiral reinforcement shall be 40,000 psi.

D. In cases where the provisions of this item are in conflict with the provisions of the ASTM Designation to which reference is made, the provisions of this item shall govern.

E. Report of chemical analysis showing the percentages of carbon, manganese, phosphorus and sulfur will be required for all reinforcing steel when it is to be welded, except for drill shafts. No tack welding will be allowed. All welding shall conform to the requirements of AWS D-1-72.

F. The nominal size and area and the theoretical weight (lbs) of reinforcing steel bars covered by these specifications are as follows:

BAR SIZE NUMBER	NOMINAL DIAMETER (INCHES)	NOMINAL AREA (SQ INCHES)	WEIGHT PER LINEAR FOOT (POUNDS)
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.65
18	2.257	4.00	13.60

G. Smooth bars, larger than No. 4, may be steel conforming to the above or may be furnished in any steel that meets the physical requirements of ASTM A36.

H. Smooth, round bars shall be designated by size number through No. 4. Smooth bars above No. 4 shall be designated by diameter in inches.

2.03 WELDED WIRE FABRIC

A. Wire for fabric reinforcement shall be cold-drawn from rods hot-rolled from open-hearth, basic oxygen or electric furnace billet. Wire shall conform to the requirements of the standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement, ASTM A82 or A 496. Wire fabric, when used as reinforcement, shall conform to ASTM A 185 or A 497.

B. When wire is ordered by size numbers, the following relations between size number, diameter in inches and area shall apply unless otherwise indicated:

SIZE W NUMBER	NOMINAL DIAMETER (INCH)	NOMINAL AREA (SQ INCHES)
31	0.628	0.310
30	0.618	0.300
28	0.597	0.280
26	0.575	0.260
24	0.553	0.240
22	0.529	0.220
20	0.505	0.200
18	0.479	0.180
16	0.451	0.160
14	0.391	0.140
12	0.391	0.120

10 SIZE W NUMBER	0.357 NOMINAL DIAMETER (INCH)	0.100 NOMINAL AREA (SQ INCHES)
8	0.319	0.080
7	0.299	0.070
6	0.276	0.060
5.5	0.265	0.055
5	0.252	0.050
4.5	0.239	0.045
4	0.226	0.040
3.5	0.211	0.035
3	0.195	0.030
2.5	0.178	0.025
2	0.160	0.020
1.5	0.138	0.015
1.2	0.124	0.012
1	0.113	0.010
0.5	0.080	0.005

C. When deformed wire is required, the size number shall be preceded by D and for smooth wire the prefix W shall be shown.

2.04 CHAIRS AND SUPPORTS

A. Chairs and Supports shall be steel, precast mortar or concrete block cast in molds meeting the approval of the ENGINEER of sufficient strength to position the reinforcement as indicated when supporting the dead load of the reinforcement, the weight of the workers placing concrete and the weight of the concrete bearing on the steel.

B. Chairs shall be plastic coated when indicated.

C. Chair types and uses shall be as follows:

Structural or Architectural Elements (columns, beams, walls, slabs) feet. exposed to weather, not subjected to sand blasting, water blasting or grinding.	Galvanized steel or steel chairs with plastic coated
Structural or Architectural Elements exposed to weather and subject to sand blasting, water blasting or grinding.	Stainless steel chairs.
Structural or Architectural Elements exposed to weather or corrosive	Uncoated steel chairs.

conditions.

Slabs and grade beams cast on grade. Steel chairs with a base with 9 inch^2 minimum area or sufficient area to prevent the chair from sinking into fill or subgrade. Precast mortar or concrete blocks meeting the requirements of this item may be used.

2.05 BENDING

A. The reinforcement shall be bent cold, true to the shapes indicated. Bending shall preferably be done in the shop.

B. Irregularities in bending shall be cause for rejection.

C. Unless otherwise indicated, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as follows:

1. Bends of 90 degrees and greater in stirrups, ties and other secondary bars that enclose another bar in the bend:

Bar Number	Grade 40	Grade 50
3, 4, 5	3d	4d
6, 7, 8	4d	5d

2. All bends in main bars and in secondary bars not covered above:

Bar Number	Grade 40	Grade 60	Grade 75
3 - 8	6d	6d	--
9, 10	8d	8d	--
11	8d	8d	8d
14, 18	10d	10d	--

2.06 STORAGE

A. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust.

B. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations.

C. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross sectional area and tensile

properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel indicated.

2.07 SPLICES

A. No splicing of bars, except when indicated or specified herein, will be permitted without written approval of the ENGINEER.

B. No substitution of bars will be allowed without the approval of the ENGINEER. Any splicing of substituted bars shall conform to Table 03330-1.

C. Splices not indicted will be permitted in slabs no more than 15 inches in thickness, columns, walls and parapets, but not included for measurement, subject to the following:

1. Splices will not be permitted in bars 30 feet or less in plan length.

2. For bars exceeding 30 feet in plan length, the distance center to center of splices shall not be less than 30 feet minus 1 splice length, with no more than 1 individual bar length less than 10 feet.

3. Splices not indicated, but permitted hereby, shall conform to Table 03330-1. The specified concrete cover shall be maintained at such splices and the bars placed in contact and securely tied together.

Table 03330-1
Minimum Lap Requirements

Bar Number	Grade 40	Grade 60
3	1 foot 0 inches	1 foot 0 inches
4	1 foot 2 inches	1 foot 9 inches
5	1 foot 5 inches	2 feet 2 inches
6	1 foot 9 inches	2 feet 7 inches
7	2 feet 4 inches	3 feet 5 inches
8	3 feet 0 inches	4 feet 6 inches
9	3 feet 10 inches	5 feet 6 inches
10	4 feet 10 inches	7 feet 3 inches
11	5 feet 11 inches	8 feet 11 inches

D. Spiral steel shall be lapped a minimum of 1 turn. Bar No. 14 and No. 18 may not be lapped.

E. Welding of reinforcing bars may be used only where indicated or as permitted herein. all welding operations, processes, equipment, materials,

workmanship and inspection shall conform to the requirements indicated. All splices shall be of such dimension and character as to develop the full strength of the bar being spliced.

F. End preparation for butt welding reinforcing bars shall be done in the field, except Bar No. 6 and larger shall be done in the shop. Delivered bars shall be of sufficient length to permit this practice.

G. For box culvert extensions with less than 1 foot of fill, the existing longitudinal bars shall have a lap with the new bars as shown in Table 03330-1.

H. For box extensions with more than 1 foot of fill, a minimum lap of 6 inches will be required.

I. Unless otherwise indicated, dowel bars transferring tensile stress shall have a minimum embedment equal to the minimum lap requirements shown in Table 03330-1.

J. Shear transfer dowels shall have a minimum embedment of 12 inches.

PART 3 - EXECUTION

3.01 PLACING

A. Reinforcement shall be placed as near as possible in the position indicated. Unless otherwise indicated, dimensions shown for reinforcement are to the center of the bars.

B. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch.

C. Cover of concrete to the nearest surface of steel shall be as follows:

Item		Min. Cover (Inches)
1.	Concrete cast against and permanently exposed to earth.	3
2.	Concrete exposed to earth or weather:	
	Bar No. 6 through 18 bars	2
	Bar No. 5, W31 or D31 wire and smaller	1-1/2
3.	Concrete not exposed to weather or in contact with ground:	

(slabs, walls, joists)	
Bar No. 14 and 18	1-1/2
Bar No. 11 and smaller	1
(Beams, columns)	
Primary reinforcement, ties, stirrups, spirals	1-1/2
(Shells, folded plate members)	
Bar No. 6 and larger	1
Bar No. 5, W31 or D31 wire, and smaller	1

D. Vertical stirrups shall always pass around the main tension members and be attached securely thereto. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers or approved precast mortar or concrete blocks. For approval of plastic spacers on a project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.

E. All reinforcing steel shall be tied at all intersections, except that where spacing is less than 1 foot in each direction, alternate intersections only need be tied. For reinforcing steel cages for other structural members, the steel shall be tied at enough intersections to provide a rigid cage of steel. Mats of wire fabric shall overlap each other 1 full space as a minimum to maintain a uniform strength and shall be tied at the ends and edges.

F. Where prefabricated deformed wire mats are specified or if the CONTRACTOR requests, welded wire fabric may be substituted for a comparable area of steel reinforcing bar plan, subject to the approval of the ENGINEER.

G. A suitable tie wire shall be provided in each block, to be used for anchoring to the steel. Except in unusual cases and when specifically authorized by the

ENGINEER, the size of the surface to be placed adjacent to the forms shall not exceed 2 1/2 inches square or the equivalent thereof in cases where circular or rectangular areas are provided. Blocks shall be cast accurately the thickness required and the surface to be placed adjacent to the forms shall be a true plan, free of surface imperfections.

H. Reinforcement shall be supported and tied in such a manner that sufficiently rigid cage of steel is provided. If the cage is not adequately supported to resist settlement or floating upward of the steel, overturning of truss bars or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken. Sufficient measurements shall be made during concrete placement to insure compliance with the above.

I. No concrete shall be deposited until the ENGINEER has reviewed the placement of the reinforcing steel and all mortar, mud, dirt, etc., shall be cleaned from the reinforcement, forms, workers' boots and tools.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. The measurement of quantities of reinforcement furnished and placed will be based on the calculated weight of the steel actually placed as indicated, with

no allowance made for added bar lengths for splices requested by the CONTRACTOR nor for extra steel used when bars larger than those indicated or with a higher grade of steel are substituted with the permission of the ENGINEER.

B. Tie wires and supporting devices will not be included in the calculated weights.

C. The calculated weight of bar reinforcement will be determined using the theoretical bar weight set forth in this item.

D. Measurement required by a change in design will be computed as described above for the actual steel required to complete the work.

4.02 PAYMENT

A. The accepted quantities of reinforcing steel will be paid for at the contract unit bid price per pound complete in place.

B. When not listed as a separate contract pay item, reinforcing steel shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work, will be for furnishing, bending, fabricating, welding and placing reinforcement, for all clips, blocks, metal spacers, ties, chairs, wire or other materials used for fastening reinforcement in place and for all tools, labor, equipment and incidentals necessary to complete the work.

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

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This item shall consist of the construction, manipulation, maintenance and removal, if required, of detours of the length and to the lines, grades, and typical sections indicated and providing for installing, moving, replacing, maintaining, cleaning and removing upon completion of the work, as required, all detour markers, signs, barricades and other devices used in traffic control and handling at the construction site as indicated or as directed by the ENGINEER.

B. CONTRACTOR shall be responsible for submittal of a traffic control plan sealed by a registered professional engineer in the state of Texas prior to the start of construction. CONTRACTOR shall be responsible for all traffic control measures and implementation. All proposed routing of traffic must be approved in writing prior to implementation. All traffic control devices shall be in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD), latest edition.

C. This item shall also consist of providing, installing, moving, replacing, maintaining, cleaning and removing temporary or permanent street closure barricades, signs or other devices required to handle the traffic in conformance with the current edition of the Texas Manual of Uniform Traffic Control Devices for Street and Highways and as indicated or directed by the ENGINEER.

D. Implementation. Before beginning work, designate in writing a Contractor's Responsible Person (CRP) to be the representative of the Contractor who is responsible for taking or directing corrective measures of installation and maintenance deficiencies as soon as possible. The CRP must be accessible by phone and able to respond to emergencies 24 hours per day.

E. Follow the Traffic Control Plan (TCP) and install traffic control devices as shown on the plans and as directed. Install traffic control devices straight and plumb. Do not make changes to the location of any device or implement any other changes to the TCP without the approval of the Engineer. Minor adjustments to meet field constructability and visibility are allowed.

F. Submit Contractor-proposed TCP changes, signed and sealed by a licensed professional engineer, to the Engineer for approval. The Engineer may develop, sign, and seal Contractor-proposed changes. Changes must conform to guidelines established in the TMUTCD using approved products from the Texas DOT Compliant Work Zone Traffic Control Device List (CWZTCDL).

G. Maintain traffic control devices by taking corrective action as soon as possible. Corrective action includes but is not limited to cleaning, replacing,

straightening, covering, or removing devices. Maintain the devices such that they are properly positioned, spaced, and legible, and that reflective characteristics meet requirements during darkness and rain.

H. Flaggers. Provide a Contractor representative who has been certified as a flagging instructor through courses offered by the Texas Engineering Extension Service, the American Traffic Safety Services Association, the National Safety Council, or other approved organizations. Provide the certificate indicating course completion when requested. This representative is responsible for training and assuring that all flaggers are qualified to perform flagging duties. A qualified flagger must be independently certified by one of the organizations listed above or trained by the Contractor's certified flagging instructor. Provide the Engineer with a current list of qualified flaggers before beginning flagging activities. Use only flaggers on the qualified list. Flaggers must be courteous and able to effectively communicate with the public. When directing traffic, flaggers must use standard attire, flags, signs, and signals and follow the flagging procedures set forth in the TMUTCD.

I. Removal. Upon completion of work, remove all barricades, signs, cones, lights, and other traffic control devices used for work-zone traffic handling, unless otherwise shown on the plans.

J. Traffic control shall be provided to vehicular and non-vehicular traffic, including pedestrians and cyclists.

PART 2 - PRODUCTS

2.01 CONSTRUCTION TRAFFIC CONTROL SIGNS:

A. Construction traffic control signs shall conform to the State of Texas DOT Manual of Uniform Traffic Control Devices, Parts 5 & 6 unless otherwise directed by the ENGINEER.

B. The substrate for construction signs need only be sufficiently durable to last the life of the project and sufficiently rigid to hold the sheeting in a flat plane.

2.02 SIGN SUPPORTS:

A. Supports for construction traffic control signs shall be grade #2 fir or yellow pine, pressure treated with pentachlorophenol.

B. Supports shall have a minimum nominal size of 4-inches x 4-inches and conform to the details shown on the plans.

2.03 PORTABLE SIGN SUPPORT:

A. Materials for portable sign supports shall comply with the details shown on the plans. Portable sign supports other than those shown on the plans shall be submitted to the ENGINEER for approval prior to use.

2.04 BARRICADES:

A. Barricades shall be classified as Type I, Type II, or Type III and shall comply with the details shown on the plans and the TMUTCD.

B. Barricade rails shall be fabricated using grade #2 fir or yellow pine and reflectorized sheeting conforming to the requirements shown in Section 2.08(5).

2.05 VERTICAL PANELS:

A. Materials for vertical panels shall conform to the details shown on the plans. Vertical panels shall be reflectorized with orange and white reflective sheeting or tape in accordance with the requirements of the TMUTCD and Table 9000-3.

2.06 CONSTRUCTION TRAFFIC MARKINGS:

A. Construction traffic markings shall comply with Section 9101 and the details shown in the plans.

2.07 ABBREVIATED PAVEMENT MARKINGS FOR CONSTRUCTION:

A. The pavement-marking material shall consist of an adhesive-backed reflective tape that can be applied to the pavement. Markings shall be of good appearance, have straight, unbroken edges and have a color that complies with all federal regulations.

1. Color

a) The markings, as well as retroreflected light from the markings, shall be white or yellow as indicated.

2. Visibility

a) The pavement markings (during daylight hours) shall be distinctively visible for a minimum of 300 feet unless sight distance is restricted by geometric roadway features.

b) The pavement markings (when illuminated by automobile low beam headlights at night) shall be distinctly visible for a minimum of 160 feet unless sight distance is restricted by geometric features.

c) The above day and night visibility requirements shall be met when viewed from an automobile traveling on the roadway.

2.08 CHANNELIZATION DEVICES:

A. Barrels

1 Barrels shall be of metal or nonmetal composition approved by the ENGINEER and of 30 to 55 gallon capacity. Only one size may be used on the project. The barrels shall be reflectorized with orange and white reflective sheeting or tape in accordance with the requirements of TMUTCD. The markings on the barrels shall be horizontal, circumferential, orange, and wide. There shall be a minimum of 5 alternating orange and white stripes on each barrel. Barrels shall also conform to the details shown on the plans.

2. Type "B" barrels shall be equipped with either Type "A" low intensity or Type "C" steady-burn warning lights complying with the provisions to TMUTCD and the Institute of Transportation Engineers (ITE) standard for flashing and steady-burn lights. The use of warning lights shall be as directed by the ENGINEER.

B. Traffic Cones

1. Traffic cones shall conform to the details shown on the plans.

C. Tubular Traffic Markers

1. Post

a) The post shall be of a thermoplastic or pliable elastomeric composition meeting the manufacturer's requirements.

b) Properties:

Outside Diameter…....2.23 inches to 4 inches
Wall Thickness…….0.125 inches min.
Length……...18 to 36 inches

Color……..Orange

2. Base

a) The base shall be of a thermoplastic or pliable elastomeric composition meeting the manufacturer's requirements.

b) Properties:
Height:……1/2 to 2 inches
Outside Diameter:… 7 to 12 inches
Color: ……..black or same color as post

3. Assembly Units

a) Assembly units which are inherent with the particular marker shall be as per manufacturer's recommendations.

4. Adhesives

a) Adhesive shall be epoxy type (temporary installation, permanent installation or butyl type) as per manufacturer's recommendations.

b) Other methods approved by the ENGINEER prior to initiating the work may be used; however, said approval does not abrogate the CONTRACTOR'S responsibility of effecting the temporary or permanent installation.

5. Reflectorization

a) If used at night, tubular traffic markers shall have two 3-inch, circumferential reflective bands, no more than 2-inches from the top with no more than 6-inches separating the bands. Reflective material shall be SIA-250 or higher sheeting conforming to the provisions of Section 9000. The color of reflective material shall be as shown in the plans.

2.09 SEQUENTIAL ARROW DISPLAYS

A. Sequential arrow displays shall be sequentially lighted and roof or trailer mounted. The minimum panel size shall be 30-inches high an 54-inches wide. The display shall have 22 hooded sealed beam amber lamps rated at a maximum intensity of 8800 candlepower.

B. Light intensity shall be adjustable by dimmer switch. The operating modes shall be as follows:

1 Pass Left. 3 chevrons of 5 lamps each sequence in right to left pattern, 40 to 50 times per minute.

2 Pass Right. 3 chevrons of 5 lamps each sequence in left to right pattern, 40 to 50 times per minute.

3 Pass Either Side. The two outermost chevrons on each end of the panel pointing like arrowheads and flashing 40 to 50 times per minute with crossing row of lamps burning continuously.

4 Warning. 4 lamps, one at each corner of the panel, flashing 40 to 50 times per minute.

2.10 MATERIALS FOR CONSTRUCTION DETOURS

A. Flexible Base

1. Flexible base shall conform to Section 02601.

B. Prime Coat

1. Prime Coat shall conform to Section 02610.

C. Seal Coat

1. Seal Coat shall conform to Section 02617.

D. Hot Mix Asphaltic Concrete Pavement

1. Hot Mix shall be Type D conforming to Section 02612.

E. Seeding

1. Seeding shall conform to Section 02936.

PART 3 - EXECUTION

3.01 CONSTRUCTION TRAFFIC CONTROL SIGNS AND SIGN SUPPORTS:

A. Construction traffic control signs and sign supports shall be installed at locations noted on the plans in conformance with the TMUTCD or as directed by the ENGINEER.

3.02 PORTABLE SIGN SUPPORTS:

A. Portable sign supports for traffic control devices for detours shall be furnished by the CONTRACTOR or shall be installed at the locations shown on the plans, and shall remain the property of the CONTRACTOR.

B. Unless otherwise specified, portable sign supports shall be of the dimensions shown on the plans.

3.03 BARRICADES:

A. Barricades shall be installed in conformity with the details noted on the plans or as directed by the ENGINEER.

3.04 VERTICAL PANELS:

A. Vertical panels shall be installed in conformity with the details noted on the plans or as directed by the ENGINEER.

3.05 CONSTRUCTION TRAFFIC MARKINGS:

A. Construction traffic markings shall be installed in conformity with TxDOT MUTCD, Part 5, Section 5E.01 and the details shown on the plans or as directed by the ENGINEER.

3.06 ABBREVIATED PAVEMENT MARKING FOR CONSTRUCTION:

A. Abbreviated markings meeting all specification requirements shall be in place on all roadways on which traffic is allowed and where suitable standard pavement marking is not in place. The transverse location of the line(s) formed by the markings shall be as determined by the ENGINEER.

B. Unless otherwise indicated, the abbreviated markings shall be placed as follows:

Condition	**Spacing**	**Length of Stripe**
Straight	40 feet approximately	48 inch
Curve greater than 2 degrees	20 feet maximum	48 inch
Curve less than or equal 2 degrees	40 feet maximum	48 inch

C. Pavement markings shall be a minimum of 3-7/8 inches wide. Length and spacing will be in accordance with these specifications.

D. The spacing of stripes may be modified by the ENGINEER. However, the maximum spacing specified above shall not be exceeded in any case.

E. The CONTRACTOR will be responsible for maintaining the abbreviated pavement markings until standard pavement markings are in place.

F. Abbreviated pavement markings shall be removed after all permanent markings have been placed.

3.07 CHANNELIZATION DEVICES:

A. Type "A" Barrels

1. Type "A" barrels shall be used during daylight hours only and shall not be equipped with warning lights of any type. The term "daylight hours" refers to those hours between dawn and dusk.

B. Type "B" Barrels

1. Type "B" barrels shall be equipped with warning lights. Type "B" barrels shall be used during nighttime hours only, unless otherwise shown on the plans or directed by the Project Manager. The term "nighttime hours" refers to those hours between dusk and dawn.

C. Traffic Cones

1. Traffic cones shall be installed in conformity with the plans and the TMUTCD or as directed by the ENGINEER.

D. Tubular Traffic Markers

1. The metal, concrete, or bituminous surface where the tubular traffic markers are to be placed shall be thoroughly cleaned.

2. Metal and concrete surfaces shall be sandblasted or wire brushed. Bituminous surfaces shall be cleaned in accordance with manufacturer's recommendations.

3. All loose sand, dust and other deleterious debris from cleaned mounting surfaces shall be removed.

4. Tubular traffic markers shall be installed in conformity with details and at locations shown on the plans or as directed by the ENGINEER and in accordance with the manufacturer's recommendation.

5. In the event that removal of an installation (temporary or permanent) is effected and the metal, concrete, or bituminous surface is damaged the CONTRACTOR shall repair and otherwise restore said surface to its original condition at no additional cost to the City.

6. All defective post(s), base(s), assembly unit(s), adhesive(s), or reflective sheeting contributing to the detriment of the intended function of the tubular traffic markers shall be replaced by the CONTRACTOR at no additional cost to the City.

E. Channelization devices shall be installed and of the type in accordance with the details shown on the plans. Barrels shall be as noted herein.

3.08 SEQUENTIAL ARROW DISPLAY:

A. Sequential arrow displays shall be used according to the requirements shown on the plans and as shown in TxDOT MUTCD.

3.09 CONSTRUCTION DETOURS:

A. The detours shall be constructed at the locations and to the lines and grades indicated. It shall be the entire responsibility of the CONTRACTOR to provide for the passage of traffic in comfort and safety without creating a dust problem.

3.10 CONSTRUCTION METHODS:

B. Prior to commencing construction, suitable "Construction Traffic Control" devices shall be installed to protect the workers and the public.

C. The CONTRACTOR shall be responsible for installing all markers, signs and barricades conforming to The Texas Manual on Uniform Traffic Control Devices and/or as indicated. If, in the opinion of the ENGINEER, additional markers, signs or barricades are needed in the interest of safety, the CONTRACTOR will install such as are required or as directed by the ENGINEER.

3.11 MAINTENANCE:

A. It shall be the CONTRACTOR’S responsibility to maintain, clean, move and replace if necessary, barricades, signs and traffic handling devices during the time required for construction of the project. Permanent barricades shall be constructed as required after the completion of the streets by drilling holes to place the posts and concrete foundations. Foundation concrete shall be cured before the rails are attached.

B. When no longer needed, all temporary barricades, signs and traffic handling devices shall be removed and the area restored to its original condition or as directed by the ENGINEER.

PART 4 - PAYMENT

4.02 PAYMENT:

A. Traffic control will be considered incidental to the cost of the overall project. There shall be no separate pay for the traffic control.

END OF SECTION

SECTION 09102 FILTER FABRIC

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and placing of the materials for placing filter fabric as indicated or directed by the Engineer.

B. The filter fabric shall have the capacity of passing ground water without the transportation of soil placed around the filter fabric.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General

1. The fabric shall be constructed exclusively of synthetic thermoplastic fibers and may be either woven or non-woven to form a mat of uniform quality.

2. Fabric fibers may be either continuous or discontinuous and oriented in either a random or an aligned pattern throughout the fabric.

3. The fabric shall be mildew resistant, rot proof, shall be satisfactory for use in a wet soil and aggregate environment, contain ultraviolet stabilizers and have non-ravelling edges.

B. Physical Requirements

1. The fabric shall meet the following requirements when sampled and tested in accordance with the methods indicated in table below.

Fabric Requirements		
Physical Property	**Test Method**	**Requirement**
Tensile Strength, N (lb.)	ASTM D 4632	445 (100) Minimum
Elongation @ Yield, %	ASTM D 4632	10-40
Trapezoidal Tear, N (lb.)	ASTM D 4533	222 (50) Minimum
Apparent Opening Size	ASTM D 4751	20-50
Permittivity, 1/sec	ASTM D 4491	0.1 Minimum

Ultraviolet Stability original tensile strength retained after 500 hrs. exposure,%	ASTM D 4355	80 Minimum

2. All materials shall be shipped with suitable wrapping to protect the fabric during shipping and storage at the job site.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Catalog cuts, samples of material selected and the manufacturer's certification of compliance with the specification shall be submitted for review before any materials are ordered.

B. The "Filter Fabric" shall be installed in accordance with the manufacturer's recommendations, as indicated or as directed by the Engineer.

C. When lapping is required, it shall be in accordance with the manufacturer's recommendations.

D. Backfilling around the Filter Fabric shall be done in such a way as not to damage the Filter Fabric material during the placement.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Work and acceptable material for "Filter Fabric" will be measured by the square yard, complete in place.

4.02 PAYMENT:

A. The accepted quantities of filter fabric shall be paid for at the contract unit price per square yard in place.

B. When not listed as a separate contract pay item, filter fabric shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provide in the proposal contract.

C. Compensation, whether by contract pay items or incidental work will be for furnishing all materials, labor, equipment, tools, and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

SECTION 07 95 13

EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:
   1. Expansion and seismic joint systems for building interiors.
   2. Expansion and seismic joint systems for building exteriors.

1.2 RELATED WORK

A. Related work that is specified elsewhere:
   1. Section 03300: Cast-In-Place Concrete.
   2. Section 04200: Unit Masonry.
   3. Section 05120: Structural Steel.

1.3 DEFINITIONS

A. Nominal Joint Width: The width of the expansion joint opening as specified in the project documents, at which the expansion joint will be constructed, and the cover will be installed.
B. Maximum Joint Width: The widest expansion joint width which the joint cover is required to accommodate without damage to its components.
C. Minimum Joint Width: The narrowest expansion joint width which the joint cover is required to accommodate without damage to its components.
D. Movement Capability: The amount of movement in a single direction (open or close), given as a percentage of the nominal joint width, that the joint cover is required to accommodate without damage to its components.
E. Lateral Shear: Movement horizontally and parallel to the expansion joint.
F. Vertical Shear: Movement vertically and parallel to the expansion joint.

1.4 SUBMITTALS

A. Submittals shall contain the following as required for each specified system:
   1. Shop Drawings showing complete fabrication details for all joint covers, including required anchorage to surrounding construction, recesses, blocking, backing, and connections between similar and dissimilar joint cover assemblies
   2. Manufacturer's product data including product details, installation instructions, maintenance and cleaning instructions, and Safety Data Sheets.

1.5 QUALITY ASSURANCE

A. Manufacturer: Obtain joint cover assemblies through one source from a single manufacturer.
   1. Manufacturer shall have a third-party certified ISO 9001 quality management system.
   2. Manufacturer shall have a minimum of ten (10) years of experience in the fabrication of joint cover assemblies.
B. Installer: All products listed in this section shall be installed by a single installer with demonstrated experience in installing products of the same type and scope as specified.

1.6 COORDINATION

A. Submittals shall be completed and approved prior to fabrication and shipment of material to the jobsite.
B. Schedule for the work of this section shall be planned to allow sufficient time for manufacturer's production and delivery scheduling.
C. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful and proper installation.
D. Coordinate installation of exterior joint assemblies to ensure that transitions are watertight.
E. Verify product types, quantities, dimensions, and attachment methods shown on shop drawings against field conditions prior to releasing materials for fabrication by the manufacturer.
F. Communicate necessary changes on the manufacturer's shop drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary protective cover on anodized aluminum, stainless steel, and bronze finished surfaces.
B. Deliver joint covers to jobsite in clean, unopened crates of sufficient size and strength to protect materials during transit.
C. Store components in original containers in a clean, dry location.

1.8 WARRANTY

A. Submit manufacturer's warranty that materials furnished will perform as specified for a period of not less than one (1) year when installed in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Balco, Inc. (Basis of Design); Wichita, KS; phone: (800) 767-0082.
B. Inpro; Muskego WI; phone: (800) 222-5556.
C. Construction Specialties; Lebanon NJ; phone: (800) 233-8493.
D. Substitutions: Section 01 60 00 - Product Requirements.

2.2 EXPANSION AND SEISMIC JOINT SYSTEMS

A. Interior Expansion and Seismic Joint Systems:
    1. Floor Expansion Joint Systems: Balco BHS-2 & BHSL-2.
        a. Joint Width: 2".
        b. Movement per ASTM E1399: Expansion / Contraction 25%.
        c. Load Capacity: Pedestrians, Gurney / Bed, X-Ray, Slow Vehicular.
        d. Fire Rating per UL 2079/ASTM 1966: Not less than the fire rating of the adjacent construction.
        e. Finish: Mill finish aluminum extrusions, AA-M10. All surfaces in contact with concrete or masonry shall be protected by a factory-applied coating.
    2. Wall and Ceiling Expansion Joint Systems: Balco WDC-1.
        a. Joint Width: 2".
        b. Movement per ASTM E1399: Expansion / Contraction 50%.
        c. Fire Rating per UL 2079/ASTM 1966: Not less than the fire rating of the adjacent construction.
        d. Finish: Clear anodized aluminum, Class II, AA-M12 C22 A31. All surfaces in contact with concrete or masonry shall be protected by a factory-applied coating.
B. Exterior Expansion Joint Systems:
    1. Wall Expansion Joint Systems: Balco CMXL-1.5-3.
        a. Joint Width: 3".
        b. Movement per ASTM E1399: Expansion / Contraction 50%.
        c. Fire Rating per UL 2079/ASTM 1966: Not less than the fire rating of the adjacent construction.
        d. 45 Mil EPDM water barrier.
        e. Finish: Mill finish aluminum extrusions, AA-M10. All surfaces in contact with concrete or masonry shall be protected by a factory-applied coating.

2.3 MATERIALS

A. Metals
    1. Aluminum extrusions: ASTM B221, alloys 6063-T5, 6005A-T6, 6061-T6.
    2. Aluminum plate and sheet: ASTM B209, alloys 6061-T6, 5052-H32.
    3. Steel: ASTM A36 Plate.
    4. Stainless steel: ASTM A666, type 304.
    5. Bronze extrusions: ASTM B455, alloy C38500.
    6. Bronze sheet and plate: ASTM B36, C28000 Muntz metal.
B. PVC Vinyl: 90 Shore A, ASTM D2240.
C. Silicone: ASTM D 2000 4GE 709 M.
D. Santoprene:
    1. 75 shore A durometer, 15 sec, ISO 868.
    2. Face seals to be installed in exterior conditions shall be UV resistant.
E. Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.

F. Water Barrier: Flexible EPDM, Class I, ASTM D4637, 45 mils thick (minimum).
G. Fire Barriers: Designed for indicated or required dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Tested in maximum joint width condition with a field splice as a component of an expansion joint cover by an independent, nationally recognized testing entity in accordance with UL 2079, or ASTM E1966, including hose stream test, where applicable, at the full rated period. Assemblies shall be listed with an independent, nationally recognized testing and listing entity.
H. Standard fasteners required for assembly and installation shall be included.
I. All surfaces in contact with masonry or concrete shall be protected by a factory-applied coating.

2.4 FINISHES

A. Aluminum:
   1. Floors: Mill finish extrusions, AA-M10.
   2. Interior Walls and Ceilings: Clear anodized, Class II, AA-M12 C22 A31.
   3. Exterior Walls and Roofs: AA-M10.
   4. All surfaces in contact with masonry or concrete shall be protected by a factory-applied coating.
B. Steel:
   1. Galvanized steel plate shall meet ASTM 123.
   2. Galvanized sheet metal shall meet ASTM A65 G90.
   3. All surfaces in contact with masonry or concrete shall be protected by a factory-applied coating.
C. Elastomeric Seals: Color as selected and approved from manufacturer's samples.
D. Foam seals with silicone face: Color as selected and approved from manufacturer's samples.
E. Abrasive: Black.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Installer shall examine conditions under which work is to be performed and shall notify the contractor in writing of unsatisfactory conditions. Installer shall not proceed until all unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 PREPARATION

A. Prepare surfaces using methods recommended by the manufacturer for achieving the required results within project conditions.
B. Corner blockouts should be square, level, free of spalling or laitance, and meet the dimensions shown on shop drawings. Repairs should be made using appropriate materials as recommended by concrete repair material manufacturer, based on project-specific conditions.
C. Concrete repair material must be applied and allowed to cure in accordance to the manufacturer of the product recommendations and instructions.
D. Clean dirt, debris, and other contaminants from both the blockout and joint opening.
E. Mask areas adjacent to the joint as required to achieve neat, clean joint lines. Remove masking prior to the curing process.

3.3 INSTALLATION

A. Install expansion and seismic joint covers in accordance with the manufacturer's instructions.
B. Centering bars shall be fully engaged with base members.
C. Locate fasteners at interval recommended by manufacturer as shown on shop drawings.
D. Floor systems: Where shimming is required, provide continuous support for base members to prevent vertical deflection when in service.
E. Heavy-duty floor systems: Repair or grout blockouts as required for continuous frame support. Bring base members to proper level; shimming is not allowed.

F. Fire-rated joint covers: Install fire rated covers in accordance with requirements of applicable fire rated product. Install fire barriers and flame sealant as shown on shop drawings and in accordance with installation instructions.
G. Water barrier: Install water barriers at exterior joints and where called for on shop drawings. Provide drainage fittings where called for on shop drawings.

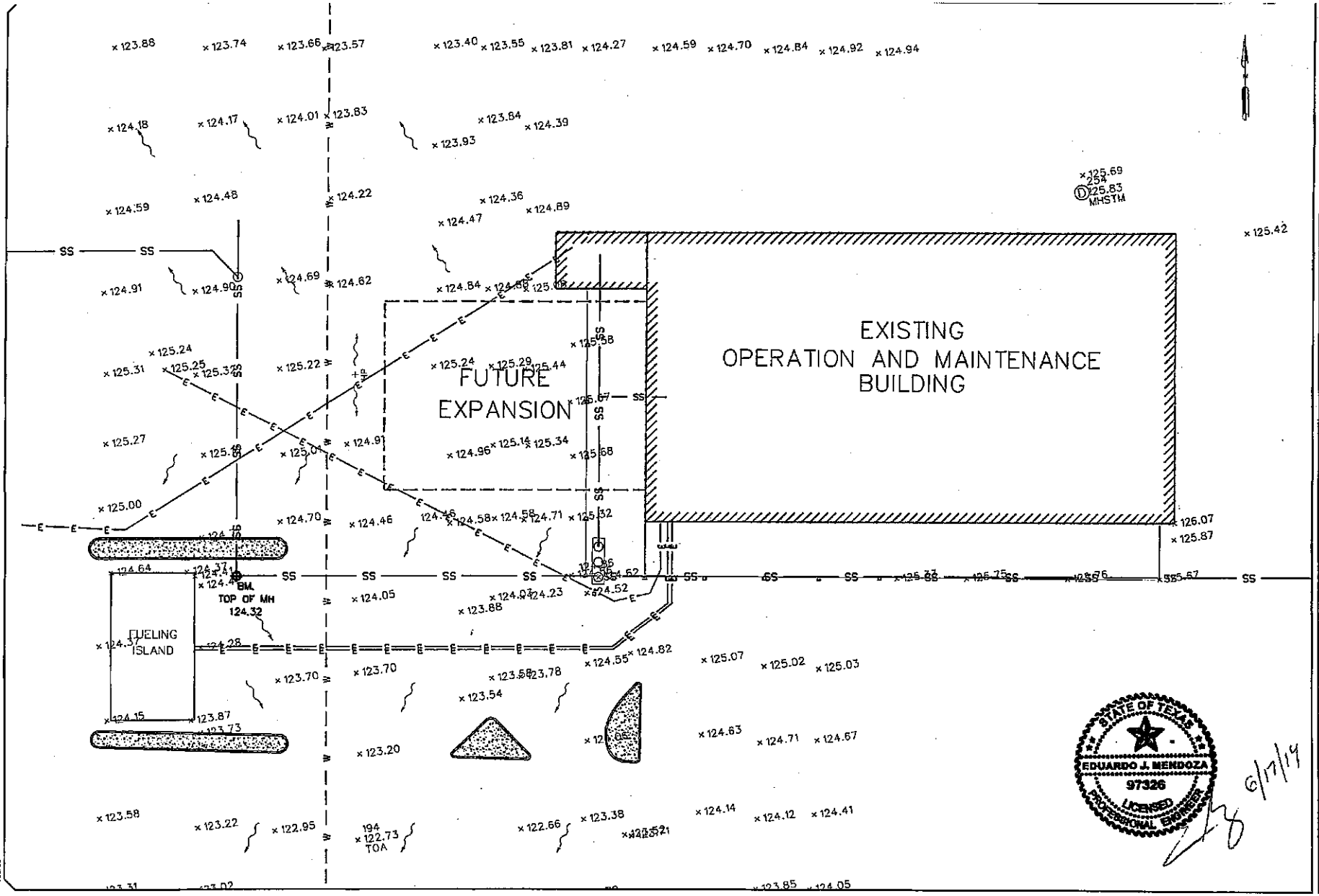
3.4 PROTECTION AND CLEANING

A. Protect the installation from damage by work of other sections.
B. Where required, remove and store cover plates and install temporary protection over joints and re-install cover plates prior to substantial completion of work.
C. Do not remove protective coverings until finish work in adjacent areas is complete.
D. Prior to project closeout, clean exposed surfaces with a suitable cleaner as recommended by manufacturer.

3.5 SCHEDULE

A. Interior Floor: Provide and install new expansion joint covers at new addition adjacent to existing concrete slab.
B. Interior Wall and Ceiling: Provide and install new expansion joint covers at new addition adjacent to existing walls and ceilings.
C. Exterior Wall: Provide and install new expansion joint covers at new addition adjacent to existing walls.

END OF SECTION



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DATE: 04.10.2019
SURVEYED BY: SURVEYOR
DESIGNED BY: DESIGNER
DRAWN BY: R.R.R.
CHECKED BY: CHECKED
PROJECT NO.: PROJECT

AUTOMOTIVE WAREOUSE
EXPANSION & ELEVATOR

EXISTING TOPOGRAPHIC MAP

CITY OF
MCALLEN
ENGINEERING DEPARTMENT

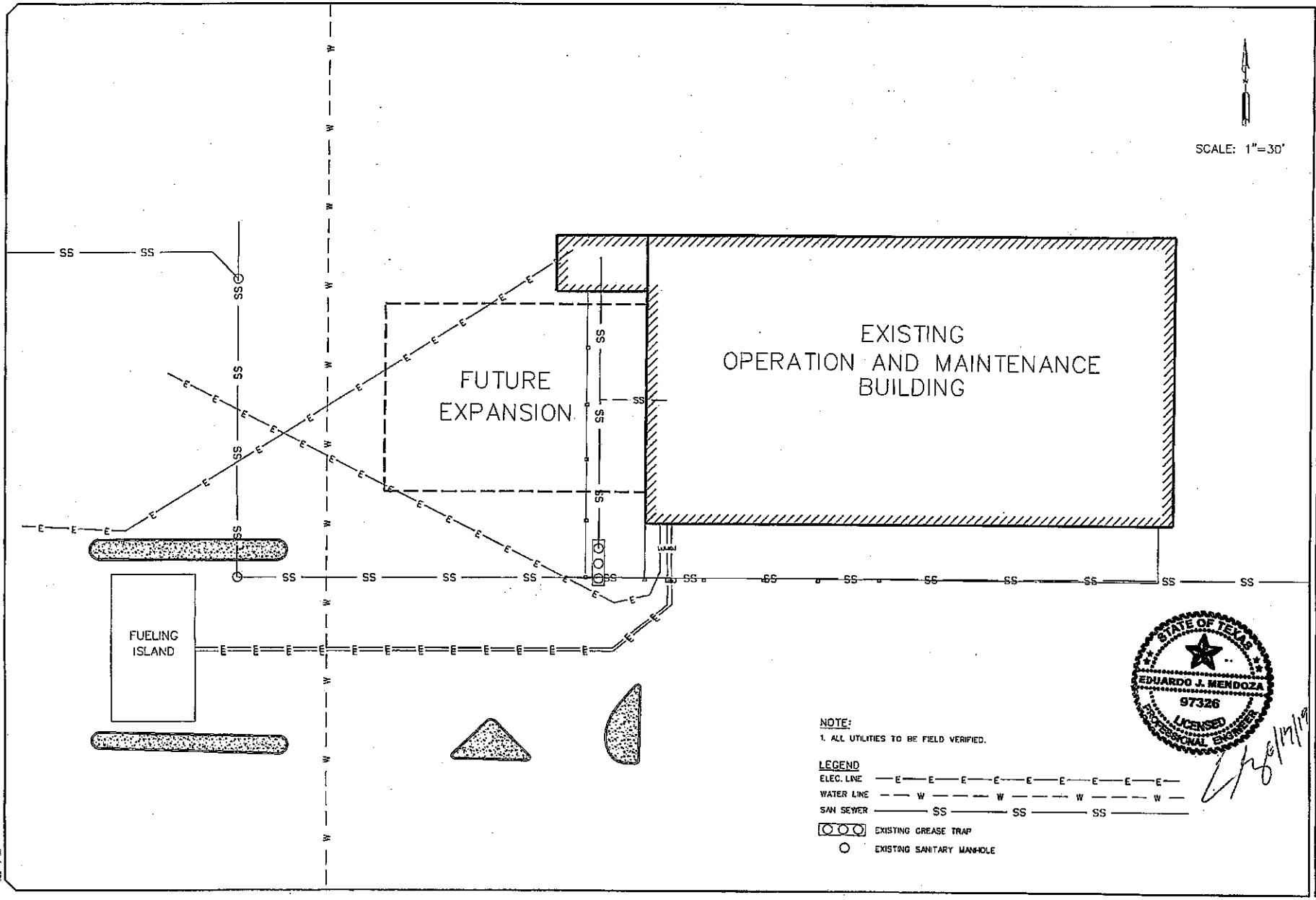
SCALE: HORZ. 1" = 30'
VERT. 1" = VER

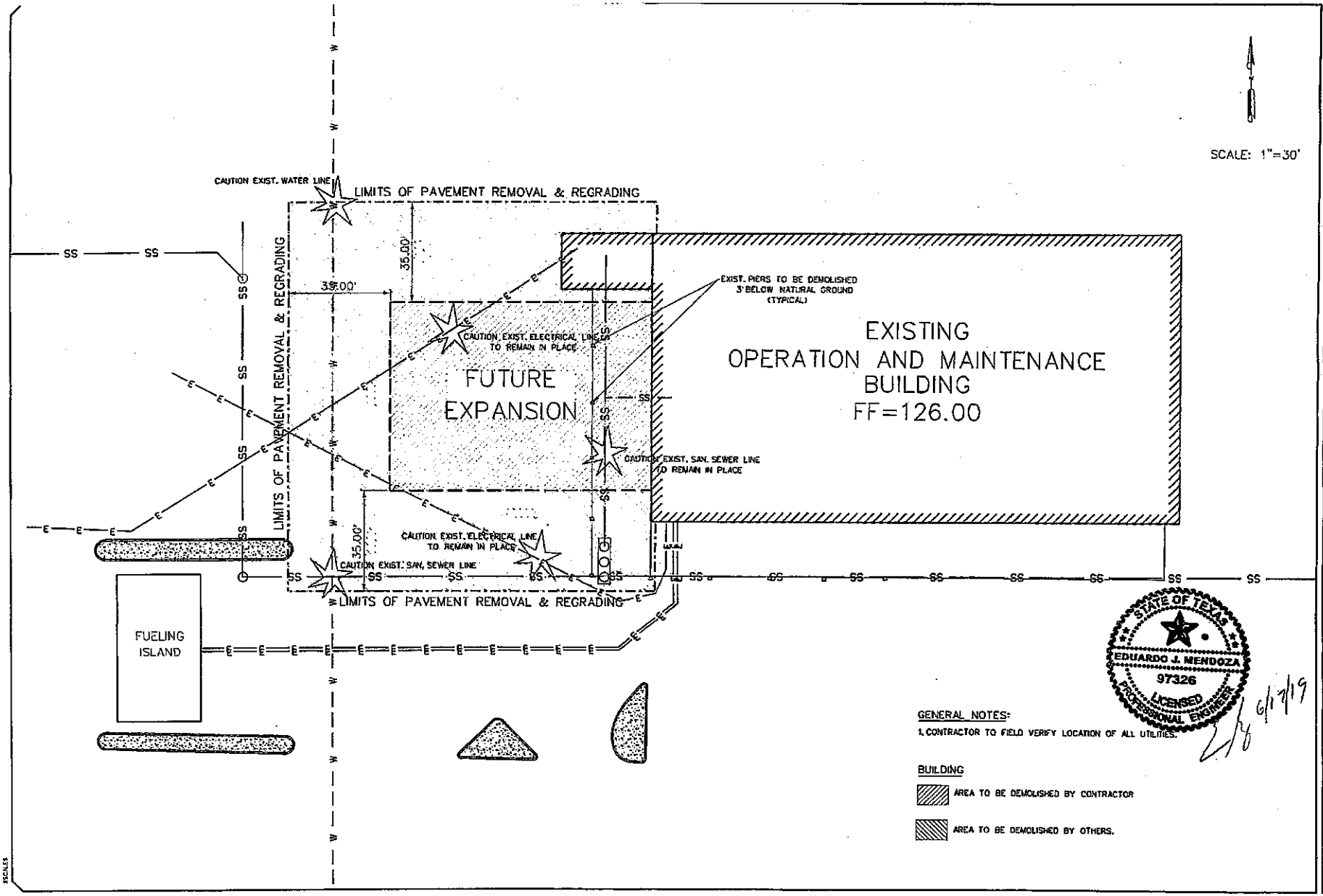
REVISIONS

SEAL:

DATE:

SHEET NO.: C1 OF


SCALE: 1"=30'
FUTURE EXPANSION
EXISTING OPERATION AND MAINTENANCE BUILDING
FUELING ISLAND
SS
W
E
NOTE:
1. ALL UTILITIES TO BE FIELD VERIFIED.
LEGEND
ELEC. LINE
WATER LINE
SAN SEWER
EXISTING GREASE TRAP
EXISTING SANITARY MANHOLE
STATE OF TEXAS
EDUARDO J. MENDOZA
97326
LICENSED
PROFESSIONAL ENGINEER
FILE NAME
04.10.2019
SURVEYOR
DESIGNER
R.R.R.
CHECKED
PROJECT
AUTOMOTIVE WAREOUSE EXPANSION & ELEVATOR
UTILIY PLAN
CITY OF McALLEN
ENGINEERING DEPARTMENT
HOR: 1" = 30'
VERT: 1"= VER
C2


SCALE: 1"=30'
CAUTION EXIST. WATER LINE
LIMITS OF PAVEMENT REMOVAL & REGRADING
35.00'
35.00'
LIMITS OF PAVEMENT REMOVAL & REGRADING
EXIST. PIERS TO BE DEMOLISHED 3' BELOW NATURAL GROUND (TYPICAL)
CAUTION EXIST. ELECTRICAL LINE TO REMAIN IN PLACE
FUTURE EXPANSION
EXISTING OPERATION AND MAINTENANCE BUILDING FF=126.00
CAUTION EXIST. SAN. SEWER LINE TO REMAIN IN PLACE
CAUTION EXIST. ELECTRICAL LINE TO REMAIN IN PLACE
CAUTION EXIST. SAN. SEWER LINE
LIMITS OF PAVEMENT REMOVAL & REGRADING
FUELING ISLAND
SS
E
W
STATE OF TEXAS
EDUARDO J. MENDOZA
97326
LICENSED
PROFESSIONAL ENGINEER
6/7/19
GENERAL NOTES:
1. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL UTILITIES.
BUILDING
AREA TO BE DEMOLISHED BY CONTRACTOR
AREA TO BE DEMOLISHED BY OTHERS.
FILE NAME: FILE NAME
DATE: 04.10.2019
SURVEYED BY: SURVEYOR
DESIGNED BY: DESIGNER
DRAWN BY: R.R.R.
CHECKED BY: CHECKED
PROJECT NO: PROJECT
TITLE: AUTOMOTIVE WAREOUSE EXPANSION & ELEVATOR
DEMOLITION PLAN
CITY OF MCALLEN
ENGINEERING DEPARTMENT
SCALE: HOR: 1" = 30' VERT: 1"= VER
REVISIONS:
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DATE:
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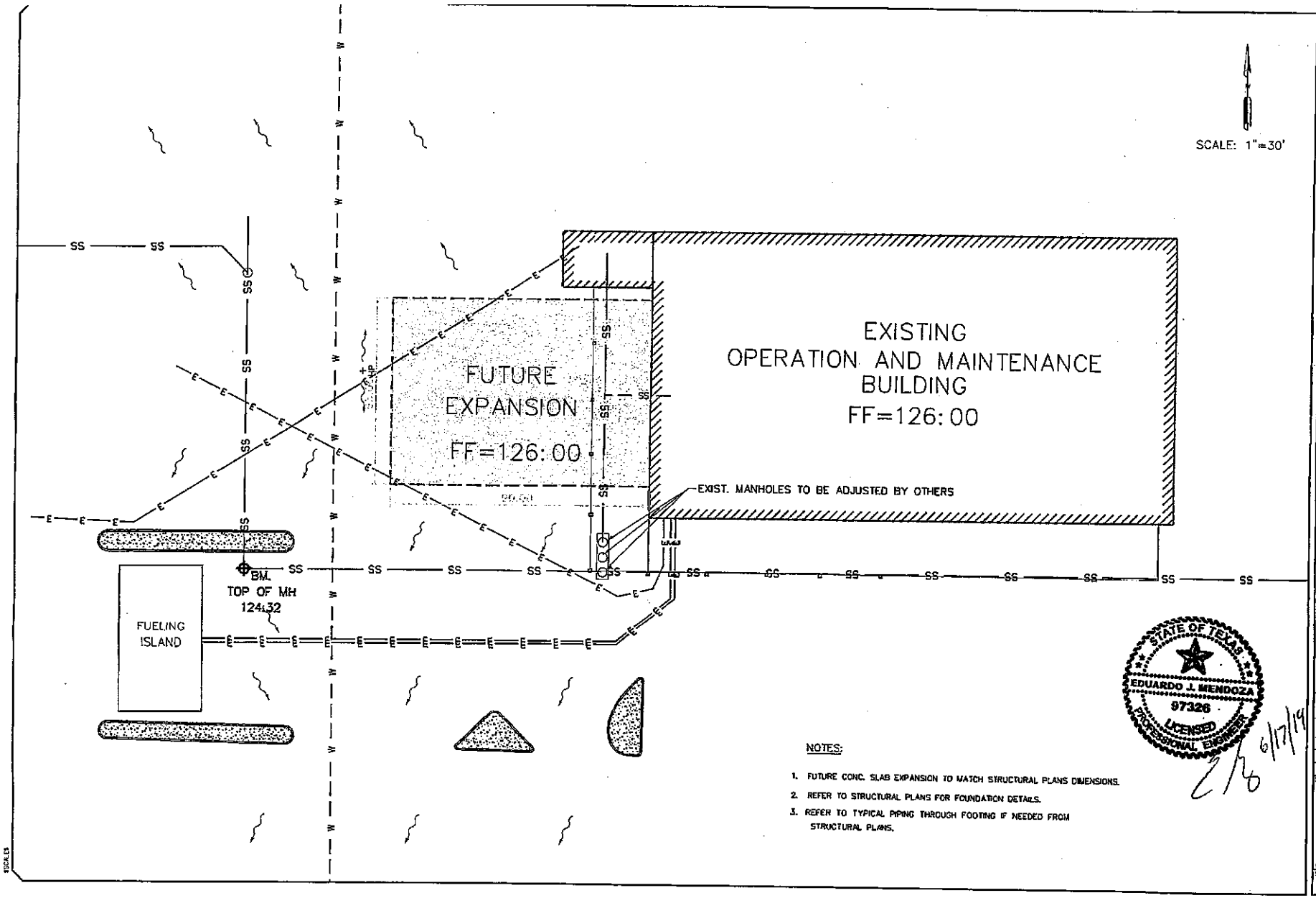

NOTES:

1. FUTURE CONC. SLAB EXPANSION TO MATCH STRUCTURAL PLANS DIMENSIONS.
2. REFER TO STRUCTURAL PLANS FOR FOUNDATION DETAILS.
3. REFER TO TYPICAL PIPING THROUGH FOOTING IF NEEDED FROM STRUCTURAL PLANS.

STATE OF TEXAS
EDUARDO J. MENDOZA
97326
LICENSED
PROFESSIONAL ENGINEER
6/17/19

FILE NAME
DATE: 04.10.2019
SURVEYED BY: SURVEYOR
DESIGNED BY: DESIGNER
DRAWN BY: R.R.R.
CHECKED BY: CHECKED
PROJECT NO: PROJECT

AUTOMOTIVE WAREOUSE EXPANSION & ELEVATOR

FOUNDATION LAYOUT

CITY OF MCALLEN
ENGINEERING DEPARTMENT

SCALE: HOR: 1" = 30' VERT: 1"=

REVISIONS:

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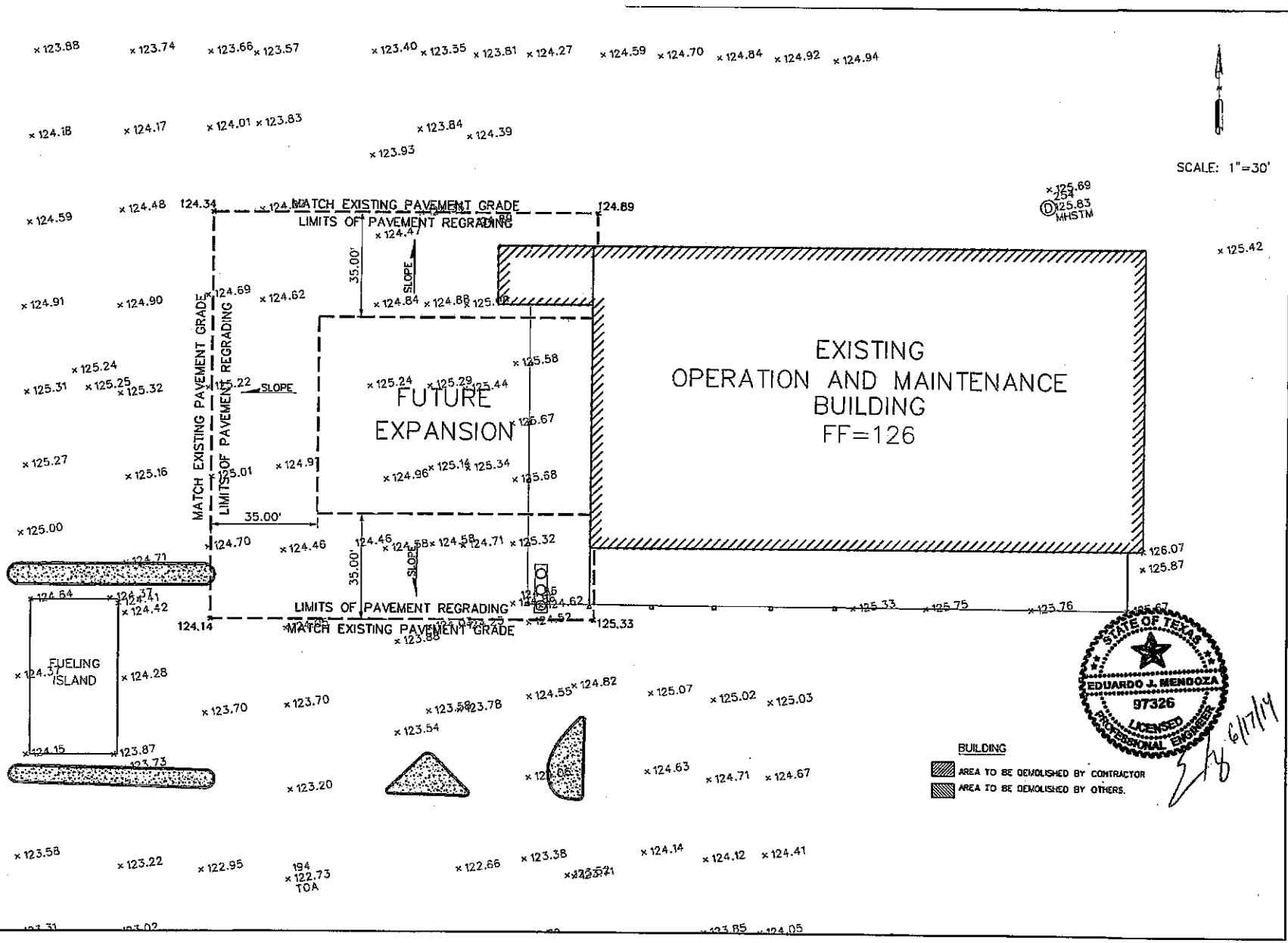

FILE NAME: FILE NAME
DATE: 04.10.2019
SURVEYED BY: SURVEYOR
DESIGNED BY: DESIGNER
DRAWN BY: R.R.R.
CHECKED BY: CHECKED
PROJECT NO: PROJECT

AUTOMOTIVE WAREOUSE EXPANSION & ELEVATOR

GRADING PLAN

CITY OF McALLEN
ENGINEERING DEPARTMENT

SCALE: HORZ 1" = 30' VERT 1"= VER

REVISIONS:

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DATE:

SHEET NO.: C5 of

CHANIN
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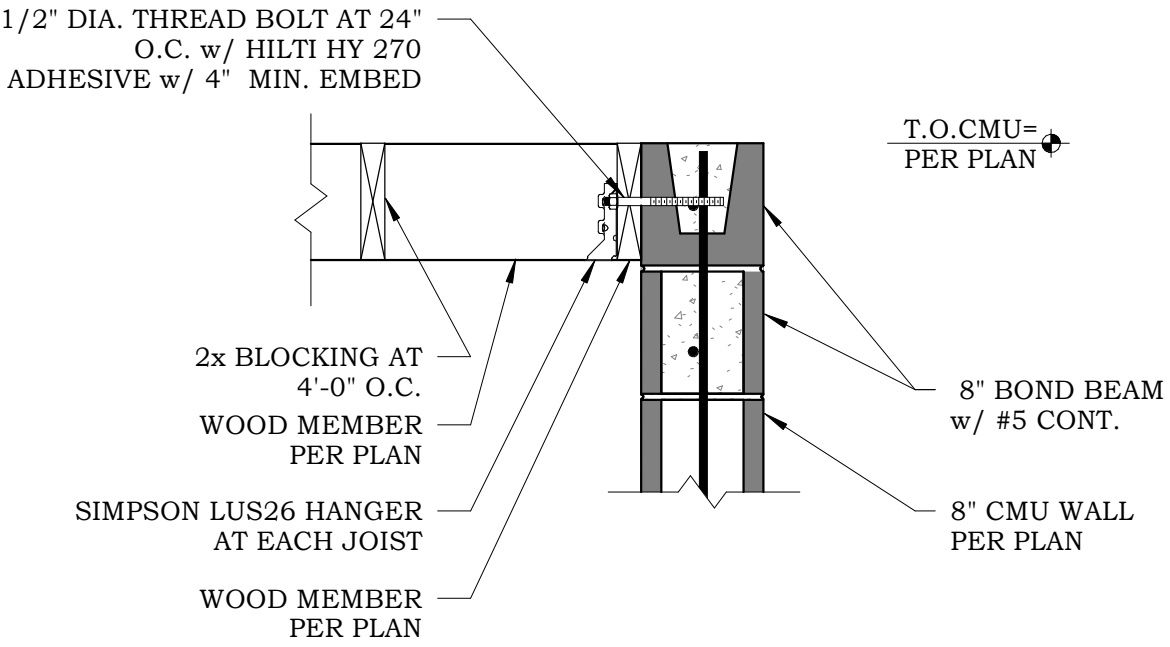
FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

STATE OF TEXAS
MIGUEL CHANIN
93127
LICENSED
PROFESSIONAL ENGINEER
6-26-19



REPLACE DETAIL: 13/S.901

WOOD JOIST TO CMU WALL

1

NEGRETE & KOLAR ARCHITECTS LLP 1601 EAST 7TH STREET AUSTIN TEXAS 78702 | P: 512.474.6526 F: 512.474.6761 204 E. STUBBS ST., EDINBURG, TEXAS 78539 | P: 956.386.0611 F: 956.386.0613	DEPT OF PUBLIC WORKS McAllen, Texas	SCALE: 1" = 1'-0" REF: ADD#1 DATE: 06/26/19 DRAWN BY E.F.S. PROJ. NO.: 18237	REF SHEET NO.: EXHIBIT NO.: ADD#1/S1

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400 Nolana, Suite H2
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TBPE FIRM REG. NUMBER F-9369

STATE OF TEXAS
MIGUEL CHANIN
93127
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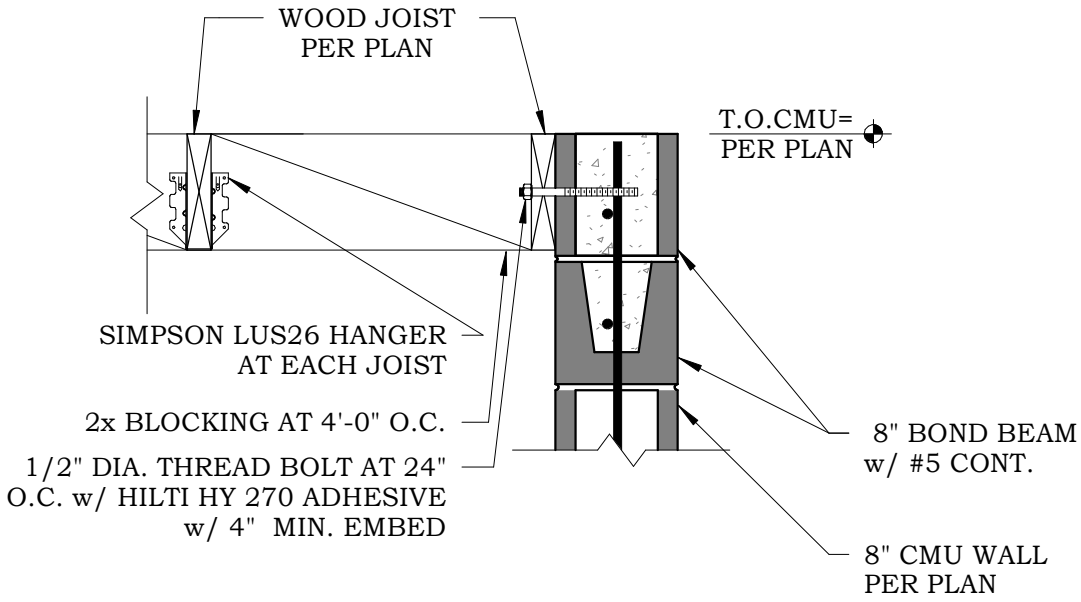
PROFESSIONAL ENGINEER
6-26-19



REPLACE DETAIL: 14/S.901

WOOD JOIST TO CMU WALL

1

NEGRETE & KOLAR ARCHITECTS, LLP
1601 EAST 7TH STREET AUSTIN TEXAS 78702 | P: 512.474.6526 F: 512.474.6761
204 E. STUBBS ST., EDINBURG, TEXAS 78539 | P: 956.386.0611 F: 956.386.0613

DEPT OF PUBLIC WORKS
McAllen, Texas

SCALE: 1" = 1'-0"	REF SHEET NO.:
REF: ADD#1	EXHIBIT NO.:
DATE: 06/26/19	ADD#1/S2
DRAWN BY E.F.S.	
PROJ. NO.: 18237	