fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 OWNER May Suspend Work

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

C. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.03 *OWNER May Terminate For Convenience*

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

ARTICLE 16 - DISPUTE RESOLUTION*

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS*

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to

exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

SUPPLEMENTAL GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition) and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemental, remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

SC-6.10 Delete paragraph 6.10 in its entirely and insert the following in its place:

The owner qualifies for the state and local tax exemption in the purchase of certain materials and equipment the Contractor shall utilize the form provided herewith in exhibit "D".

SC-11.01 Delete paragraph 11.01 in its entirety.

SC-11.02 Delete paragraph 11.02 in its entirety.

SC-12.01B.25 & B.3. Delete paragraph 12.01B.2 & B.3 in its entirety.

SC-12.01.C.2 Delete paragraph 12.01.C.2 in its entirety.

SC-14.02.C.1 Replace "ten days" with "thirty days" to read as follows:

Thirty days after presentation of the application for payment to OWNER with ENGINEERS recommendation, the amount recommended will (subject to provisions of paragraph 14.02.D) become due, and when due will be paid by the OWNER to CONTRACTOR.

SC Article 16 Add the following language at the end of the paragraph of Article 16:

There are no dispute resolution methods and procedures set forth in the Supplemental Conditions:

GENERAL PREVAILING WAGE LEGAL REQUIREMENTS

The Contractor's attention is called to Texas Government Code Chapter 2258, which must be complied with attached herewith as Exhibit "C"

General Notes

GENERAL NOTES:

1. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE HIDALGO COUNTY PRECINCT No. 2.

2. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT RICHARD GARCIA WITH NORTH ALAMO WATER SUPPLY CORP. 48 HOURS PRIOR TO COMMENCEMENT OF WORK @ (956) 383-1618 TO COORDINATE AND MEET ANY ADDITIONAL REQUIREMENTS AND/OR SPECIFICATIONS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALL DIG TESS 48 HOURS PRIOR TO COMMENCEMENT OF WORK FOR UTILITY SPOTTING @ (1-800-DIG-TESS).

4. THE CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES FOR VERIFICATION OF LOCATION OF EXISTING FACILITIES PRIOR TO BEGINNING ANY EXCAVATION.

5. LOCATIONS OF UNDERGROUND FACILITIES ARE FROM BEST INFORMATION AVAILABLE. NEITHER THE OWNER OR ENGINEER, WARRANT THE ACCURACY OF THE INFORMATION PROVIDED. ANY DEVIATIONS SHALL BE CALLED TO THE ENGINEER'S ATTENTION IMMEDIATELY.

6. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE CORRESPONDING UTILITY CORPORATION IN REGARDS TO THE RELOCATION OF ANY CONFLICTING UTILITIES.

7. THE CONTRACTOR SHALL REMOVE ALL FENCES LOCATED WITHIN THE EASEMENTS, INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCES SHALL BE REPLACED WITH A NEW FENCE OR UNDAMAGED ORIGINAL FENCING. REMOVAL AND REPLACEMENT OF EXISTING AND TEMPORARY FENCES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

8. ANY DAMAGES TO FENCES, WALKS, OR PRIVATE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

9. THE CONTRACTOR SHALL AT ALL TIME PROVIDE ACCESS TO EXISTING RESIDENCES.

10. THE CONTRACTOR IS TO MAINTAIN ALL EQUIPMENT AND TRANSPORTATION OF SAID EQUIPMENT WITHIN THE EXISTING RIGHT-OF-WAYS OF THE CITY, COUNTY OR STATE.

11. NO OPEN EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED, AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AND UNPAVED

AREAS SUBJECT TO VEHICULAR LOADING; ¾ PLYWOOD, WOOD PLANKING WITH O.S.H.A. ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS NOT SUBJECT TO VEHICULAR LOADING, OR AS APPROVED BY THE ENGINEER.

12. THE PREPARATION OF THESE PLANS REFLECTS INFORMATION, PROVIDED BY OTHERS, ON THE APPROXIMATE LOCATION AND EXISTENCE OF EXISTING UTILITY AND ADJACENT PHYSICAL FEATURES. HOWEVER, THEY DO NOT IMPLY OR AFFIRM THAT ALL UTILITIES OR PHYSICAL FEATURES ARE SHOWN. GENERALLY, UTILITY SERVICE CONNECTIONS ARE NOT INDICATED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATIONS OF THE OWNER IMMEDIATELY UPON ENCOUNTERING UNFORESEEN CONFLICTS.

13. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN, CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. CONTRACTOR TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES.

14. PUBLIC AND PRIVATE UTILITY LINES AND CUSTOMER SERVICE LINES MAY EXIST THAT ARE NOT SHOWN ON THE CONSTRUCTION DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE, MAINTAIN AND PROTECT THE INTEGRITY OF THESE LINES. HAND EXCAVATION MAY BE REQUIRED. THE CONTRACTOR SHALL RESTORE RELOCATED OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION. SAID RESTORATION SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

15. WHERE NEW WATER LINES AND SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC 317 (DESIGN OF SEWAGE SYSTEMS) OR 30 TAC 290 (WATER HYGIENE).

16. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER AND SEWER CONNECTIONS TO ALL HOMES AND BUSINESSES IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR CONNECTIONS TO BE REINSTALLED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO SAID SERVICES.

17. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY SURFACE IRREGULARITIES, AS DIRECTED BY THE ENGINEER, CAUSED BY THE CONTRACTOR'S WORKING OPERATIONS.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE DRAINAGE OF PROPOSED FACILITIES AT ALL TIMES DURING CONSTRUCTION.

19. THE CONTRACTOR SHALL CLEANUP AND RESTORE THE AREA OF OPERATIONS TO A CONDITION AS GOOD AS OR BETTER THAN THAT WHICH EXISTED PRIOR TO INSTALLATION OF ALL ITEMS TO BE CONSTRUCTED.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING AREA BETWEEN THE BACK OF CURB/EDGE OF PAVEMENT, ROAD SIDE DITCH AND RIGHT-OF-WAY TO HAVE POSITIVE FLOW TO THE PROPOSED DRAINAGE SYSTEM.

21. THE CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AT ALL TIMES DURING THE INSTALLATION OF THE STRUCTURES, DRAINAGE, UTILITY, IRRIGATION AND ROAD IMPROVEMENTS. DEWATERING OF THE TRENCH MAY BE REQUIRED DURING THE INSTALLATION OF THE DRAINAGE, UTILITY AND IRRIGATION FACILITIES/STRUCTURES. SAID DEWATERING SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

22. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION AND SUBMITTAL OF THE TRENCH EXCAVATION PROTECTION PLAN. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS BEFORE CONSTRUCTING THE SHORING AND/OR UTILIZING A TRENCH PROTECTION SYSTEM (BOX). THE ENGINEER RESERVES THE RIGHT TO REJECT DESIGNS NOT MEETING THE REQUIREMENTS OF SECTION ITEM 402 AND 403.

23. THE CONTRACTOR SHALL PROVIDE STORM WATER POLLUTION PREVENTION PLAN (SWP3) PRIOR TO COMMENCEMENT OF CONSTRUCTION AS REQUIRED BY HIDALGO COUNTY AND OR TCEQ.

24. ALL DEBRIS, VEGETATION AND SURPLUS MATERIAL, EXCEPT ROADWAY SECTION, RESULTING FROM DEMOLITION AND/OR CLEARING OF THE RIGHT-OF-WAY AND PROJECT LOCATION, IN PREPARATION OF PROPOSED IMPROVEMENTS, SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE TO HIDALGO COUNTY PRECINCT No 2. THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAYS WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE HIDALGO COUNTY PRECINCT No 2. IF THE CONTRACTOR PLACES EXCESS MATERIAL IN THE AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND CONTRACTOR SHALL REMOVE THE MATERIAL AT OWN COST.

25. ALL ROAD SHALL BE REPLACED WITH 8" COMPACTED CALICHE AND 2" HMAC.

26. COUNTY WILL PROVIDE CALICHE MATERIAL AND CONTROL POINTS (BENCHMARK AND PROPERTY CORNERS) FOR THE WORK TO BE PERFORMED BY THE CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING, INCLUDING BUT NOT LIMITED TO HORIZONTAL & VERTICAL GRADE CUTS FOR CURB & GUTTER AND ROADWAY. BASE AND SUB GRADE SHALL HAVE A MINIMUM CROSS SLOPE OF 3.0%.

27. EXISTING ROAD SECTION TO BE EXCAVATED AND STOCKPILED. THE PRODUCT OF THE CRUSHED ASPHALT PAVEMENT (MAX 2" PIECES IN SIZE) AND SALVAGE CALICHE SHALL BE TREATED WITH TWO (2) PERCENT LIME BY DRY WEIGHT OF SALVAGE MATERIAL. TREATED SALVAGE MATERIAL SHALL BE USED IN THE BOTTOM HALF OF THE PROPOSED ROAD. 8 IN. BASE SHALL HAVE A MINIMUM OF 4 IN. NEW CLAICHE AT THE TOP; THE REMAINING BOTTOM HALF SHALL BE ENTIRELY TREATED SALVAGE MATERIAL OR A COMBINATION OF TREATED SALVAGE MATERIAL AND NEW CALICHE. THE BASE SECTION SHALL BE COMPACTED TO 98% STANDARD PROCTOR DENSITY. IF APPLICABLE, THE EXCESS SALVAGE MATERIAL CAN BE TREATED AND USED AS SUB-GRADE TO ATTAIN THE PROPOSED CROSS SECTION OF THE ROAD. SUB-GRADE SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY. THE LIME TREATMENT OF THE EXISTING ROAD SECTION AND ADDITIONAL SUB-GRADE FILL, THE ADDITIONAL SUB-GRADE FILL MATERIAL (TO ATTAIN PROPOSED SUB-GRADE WIDTH) AND THE GRADING OF THE CROSS-SLOPE OF THE ROAD SECTION STARTING WITH THE SUB-GRADE SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM AND SHALL BE REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

28. NEW CALICHE MATERIAL SHALL BE TREATED WITH 0.5% LIME BY DRY WEIGHT OF MATERIAL IF THE PLASTICITY INDEX OF SAID MATERIAL IS GREATER THAN 12. THE GRADATION SHALL BE ARGILLACEOUS LIMESTONE, CALCAREOUS OR CALCAREOUS CLAY PARTICLES, WITH OR WITHOUT STONE CONGLOMERATE GRAVEL, SAND OR GRANULAR MATERIAL:

TYPE D GRADE 6

SIEVE No.	PERCENT RETAINED
2	0
½	20-60
4	40-75
40	75-85

29. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT/RELOCATION OF ALL REGULATORY SIGNS REMOVED DUE TO CONSTRUCTION OPERATIONS WITH THE SAME SIGN ON FIXED SUPPORT(S) IMMEDIATELY UPON ITS REMOVAL. APPROVAL BY THE ENGINEER IS NECESSARY BEFORE REMOVING ANY REGULATORY ROADWAY SIGN(S). FLAGGERS ARE REQUIRED TO BE AVAILABLE TO DIRECT TRAFFIC DURING SIGN INTERMEDIATE DOWN TIME. RELOCATION OF ANY DIRECTIONAL SIGN ASSEMBLIES REMOVED DURING CONSTRUCTION OPERATIONS, IMMEDIATELY UPON THEIR REMOVAL, IS REQUIRED. ALL SIGNING, BARRICADING AND TRAFFIC CONTROL SHALL CONFORM TO THE LATEST VERSION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". IN NO CASE WILL A SIGN BE REMOVED WITHOUT A REPLACEMENT SIGN AND SUPPORT(S) BEING READILY AVAILABLE AND A LOCATION ESTABLISHED. REMOVAL AND RELOCATION OF THESE SIGNS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED ON THE PROPOSED.

30. AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL INSTALL APPROPRIATE TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH THE TXMUTCD LATEST EDITION, AND AS PROVIDED BY THE ENGINEER.

31. THE CONTRACTOR SHALL RELOCATE OR RECONSTRUCT ALL MAIL BOXES TO BE 1' BEHIND BACK OF CURB. MAIL BOXES SHALL BE REPLACED TO THE SAME EXISTING CONDITIONS OR BETTER. SAID RELOCATION OF MAIL BOXES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

32. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL EXISTING WATER VALVES AND MANHOLES TO MATCH PROPOSED FINISH GRADE OF ROADWAY. CONCRETE COLLARS SHALL BE INSTALLED TO MATCH TOPS WITH PAVEMENT GRADE. THIS WORK SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED OTHERWISE.

33. DURING EXCAVATION OPERATIONS FOR DRAINAGE AND/OR UTILITIES, THE CONTRACTOR SHALL NOT PILE EXCAVATED MATERIAL OR EXCAVATE WITHIN THE DRIP LINE OF TREES THAT ARE TO BE PRESERVED.

34. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPROVING ALL EXISTING DRIVEWAYS AS PER PROPOSED CONDITIONS STATED IN DRIVEWAY TABLE WORKSHEET.

Technical Specifications

TECHNICAL SPECIFICATIONS

ABBREVIATIONS AND DEFINITIONS ..... SECTION 00101

PRELIMINARY MATTERS ..... SECTION 00102

TESTING LABORATORY SERVICES ..... SECTION 00104

AVAILABILITY OF LANDS, PHYSICAL CONDITIONS & REFERENCE POINTS ..... SECTION 00105

SUSPENSION OF WORK AND TERMINATION ..... SECTION 00106

WORK BY OTHERS ..... SECTION 00107

CONTRACTOR'S RESPONSIBILITIES ..... SECTION 00108

SOILS AND SUBSURFACE INVESTIGATION ..... SECTION 00113

PREPARATION OF RIGHT OF WAY ..... SECTION 02101

CLEARING & GRUBBING ..... SECTION 02102

SUBGRADE PREPARATION ..... SECTION 02210

UNCLASSIFIED STREET EXCAVATION ..... SECTION 02225

EXCAVATION ..... SECTION 02230

REMOVAL OF CONCRETE ..... SECTION 02238

LIME STABILIZATION ..... SECTION 02240

FLEXIBLE BASE ..... SECTION 02601

PRIME COAT ..... SECTION 02610

HOT MIX ASPHALT CONCRETE PAVEMENT ..... SECTION 02612

STABILIZED AGGREGATE LAYER PAVED ROADWAY APPLICATIONS ..... SECTION 02615

CONCRETE CURB & GUTTER AND VALLEY GUTTER ..... SECTION 02660

FLAT WHEEL ROLLING ..... SECTION 02780

PNEUMATIC TIRE ROLLING ..... SECTION 02782

PROOF ROLLING ..... SECTION 02786

CAST IN PLACE CONCRETE ..... SECTION 03300

CONCRETE ADMIXTURES..... SECTION 03320

DRIVEWAY REPAIRS ..... SECTION 03336

CONSTRUCTION TRAFFIC CONTROL..... SECTION 09100

BIAXIAL GEOGRID REINFORCEMENT SPECIFICATION ..... SECTION 30040

EXCAVATION BACKFILL FOR STRUCTURES .....SECTION ITEM 400

CONCRETE STRUCTURES.....SECTION ITEM 420

PORTLAND CEMENT CONCRETE .....SECTION ITEM 421

REINFORCING STEEL.....SECTION ITEM 440

TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS.....SECTION ITEM 506

SECTION 00101

ABBREVIATIONS AND DEFINITIONS

PART 1 - ABBREVIATIONS

1.01 Wherever the following abbreviations or symbols are used, they are to be construed the same as the respective expressions represented:

AASHTO American Association of State Highway and Transportation Officials

AB ..... Aggregate Base
AC ..... Asphalt Concrete
ACB ..... Asphalt Concrete Institute
ACI ..... American Concrete Institute
ACP ..... Asbestos Cement Pipe
ACPA ..... American Concrete Pipe Association
AD ..... Assessment District
AGC ..... Associated General Contractors of America, Inc.
AIEE ..... American Institute of Electrical Engineers
AISC ..... American Institute of Steel Construction
ANSI ..... American National Standards Institute
APWA ..... American Public Work Association
AREA ..... American Railway Engineers Association
ASMI ..... American Society of Mechanical Engineers
ASCE ..... American Society of Civil Engineers
Asph ..... Asphalt
ASTM ..... American Society for Testing and Materials
AWG ..... American Wire Gage (Nonferrous Wire)
AWPA ..... American Wood Preservers Association
AWPI ..... American Wood Preservers Institute
AWS ..... American Welding Society
AWWA ..... American Water Works Association
BC ..... Beginning of Curb or Back of Curb
BCR ..... Beginning of Curve Return or Back of Curb Radius
BM ..... Bench Mark
BWG ..... Birmingham Wire Gage (Iron and Steel Wire)
CB ..... Catch Basin
C.C. or C/C ..... Center to Center
Cem. ..... Cement
CF ..... Curb Face
CI ..... Cast Iron
CIP ..... Cast-Iron Pipe
CIPP ..... Cast-in- Place Pipe
C.L. or CL. ..... Center Line
CMP ..... Corrugated Metal Pipe
CMPA ..... Corrugated Metal Pipe Arch
CO ..... Clean Out
Col ..... Column

Conc ..... Concrete
Const. ..... Construct
DF ..... Douglas Fir
DG ..... Decomposed Granite
DMH ..... Drop Manhole
D/W ..... Driveway
EC ..... End of Curve
EL. or Elev. ..... Elevation
Ex. or Exist. ..... Existing
F & C ..... Frame and Cover
FH ..... Fire Hydrant
FL ..... Flow Line
Fl. El. ..... Floor Elevation
FS ..... Federal Specification of Finished Surface
FHWA ..... Federal Highway Administration, Department of Transportation
Galv. ..... Galvanized
GL ..... Ground Line
Gr. ..... Grade
H ..... Height or High
HC ..... House Connection Sewer
Hor ..... Horizontal
ID ..... Inside Diameter
Inv. ..... Invert
IP ..... Iron Pipe
ITE ..... Institute of Transportation Engineers
Lin. ..... Liner
LL ..... Liquid Limit
Long ..... Longitudinal
Max. ..... Maximum
MH ..... Manhole
M ..... Thousand
m ..... meter or middle
Min. ..... Minutes or Minimum
Mon. ..... Monolithic or Monument
MTD ..... Multiple Tile Duct
NEC ..... National Electrical Code
NEMA ..... National Electrical Manufacturers Association
NFPA ..... National Fire Protection Association
NGS ..... National Geodetic Survey
OC ..... On Center
OD ..... Outside Diameter
PC ..... Point of Curvature
PCC ..... Point of Compound Curve or Portland Cement Concrete
PI ..... Point of Intersection or Plasticity Index
PL ..... Property Line or Plastic Limit
PP ..... Power Pole
ppm ..... Parts per Million
PRC ..... Point of Reverse Curve
Prop ..... Proposed or Property
psf ..... Point of Tangency

psi ..... Pavement
PT ..... Polyvinylchloride Pipe
Q ..... Rate of Flow
R ..... Radius
RC ..... Reinforced Concrete
RCP ..... Reinforced Concrete Pipe
Rdwy ..... Roadway
Ret.Wall ..... Retaining Wall
RGRCP ..... Rubber Gasket-Reinforced Concrete Pipe
s ..... Slope
SAE ..... Society of Automotive Engineer
San. ..... Sanitary
SCCP ..... Steel Cylinder Concrete Pipe
SD ..... Storm Drain
Sdl ..... Saddle
Sect. ..... Section
Spec. ..... Specification
San. S ..... Sanitary Sewer
St. ..... Street
Sta. ..... Station
Std. ..... Standard
T ..... Tangent Distance
TH ..... Test Hole
THM ..... Trap Manhole
UL ..... Underwriters' Laboratories, Inc.
USA ..... United States of America Standards Institute, Inc.
V ..... Velocity
VC ..... Vertical Curve
VCP ..... Vitrified Clay Pipe
VCPI ..... Vertical Curve Point of Intersection
Vert. ..... Vertical
W.I. ..... Wrought Iron

1.02 All abbreviations and symbols used on plans for structural steel construction shall conform to those given in the Steel Construction Manual of the American Institute of Steel Construction.

PART 2 - DEFINITIONS

2.01 Agreement-- The written agreement which constitutes a contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement.

2.02 Application for Payment-- The form furnished by ENGINEER which is to be used by CONTRACTOR in requesting progress payments and which is to include the schedule of values required by paragraph 14.1 and an affidavit of CONTRACTOR that progress payments theretofore received on account of the Work have been applied by CONTRACTOR to discharge in full all of CONTRACTOR'S obligations reflected in prior Applications for Payment.

2.03 Bid-- The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

2.04 Bidder-- Any person, firm, or corporation submitting a Bid for the Work.

2.05 Bonds-- bid, performance, and payment bonds and other instruments of security, furnished by CONTRACTOR and his surety in accordance with the Contract Documents.

2.06 Change Order-- A written order to CONTRACTOR signed by COUNTY authorizing an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Time issued after execution of the Agreement.

2.07 CITY -- A public body or authority or the contracting agency for whom the work is to be performed.

2.08 Contract Documents-- The Agreement, Addenda (whether issued prior to the opening of Bids of the execution of the Agreement), Instructions to Bidders, CONTRACTOR's Bid, the Bonds, the Certificate of Insurance, the Notice of Award, Notice to Proceed, these COUNTY of McAllen Standard Specifications, Plans and Drawings, and all Modifications.

2.09 Contract Price-- The total monies payable to CONTRACTOR under the Contract Documents.

2.10 Contract Time-- The number of days stated in the Agreement for the completion of the Work, computed of the Work, computed as provided in paragraph 17.2.

2.11 Contracting Agency-- (See COUNTY)

2.12 CONTRACTOR-- The person, firm, or corporation with whom OWNER has executed the Agreement.

2.13 Day-- A calendar day of twenty-four hours measured from midnight to the next midnight.

2.14 Drawings or Plans-- The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

2.15 ENGINEER-- The OWNER'S employee or agent responsible for the engineering design and construction inspection and supervision, acting directly or through duly authorized representatives.

2.16 Field Order-- A written order issued by ENGINEER which clarifies or interprets the Contract Documents in accordance with paragraph 9.3 or order minor changes in the Work in accordance with paragraph 10.2.

2.17 General Conditions -- Conditions which apply to all projects and which can be modified by Special conditions.

2.18 General Provisions-- A term having the same meaning as the term General Conditions.

2.19 Modification-- (a) A written amendment to the Contract Documents signed by both parties, (b) a Change Order, (c) a written clarification or interpretation issued by ENGINEER in accordance with paragraph 9.3, or (d) a written order for a minor change or alteration in the Work issued by ENGINEER pursuant to paragraph 10.2. A Modification may only be issued after execution of the Agreement.

2.20 Notice of Award-- The written notice by OWNER to the apparent successful Bidder stating that, upon compliance with the conditions precedent to be fulfilled by him within the time specified, OWNER will execute and deliver the Agreement to him.

2.21 Notice to Proceed-- A written notice given by COUNTY to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform his obligations under the Contract Documents.

2.22 Project-- The entire construction to be performed as provided in the Contract Documents.

2.23 Reference Specifications, Test Methods, and Applicable Codes-- All standard specifications and test methods of any society, association, or organization herein referred to are hereby made a part of these Contract Documents the same as if written in full. (Any reference to a paragraph or subparagraph within a section shall include all general provisions of the section to which reference is made.) Reference to such standards refer to the latest publiqhed issues as of the date of publication issues as of the date of Invitation to Bid. Reference to local or state codes and laws shall mean the latest adopted and published codes as of the date of the Invitation to Bid.

2.24 Resident Project Representative-- The authorized representative of ENGINEER who is assigned to the Project site or any part thereof.

2.25 Service Connections-- Service Connections shall be construed to mean all or any portion of the pipe, conduit, cable, or duct which connects a utility main or distribution line to a building, home, residence, or property.

2.26 Shop Drawings-- All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by CONTRACTOR, a Subcontractor, manufacturer, supplier, or distributor and which illustrate the equipment, material, or some portion of the Work.

2.27 Special Conditions-- Conditions which are written for a specific project and which modify any section or paragraph of the General Conditions.

2.28 Specifications, also Technical Specifications-- Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work. When Section Items 400, 402, 403, 420, 421, 440, 462, 464 make reference to the following Item numbers 132, 360, 404, 420, 424, 426, 427, 431, 437, 438, 441, 446, 448, 50, 522, 524, 526, 575, the CONTRACTOR shall use Texas Department of Transportation (TxDOT) Standard Specifications for Construction of Highways, Streets and Bridges Latest Edition for Specifications of the aforementioned Item Numbers.

2.29 Subcontractor-- An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

2.30 Substantial Completion-- The date as certified by ENGINEER when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with paragraph 14.13.

2.31 Supplementary Specifications-- which are written to modify any section or paragraph of the Technical Specifications of this document.

2.32 Utility--Overhead or underground wires, pipe lines, conduits, ducts, or structures, operated and maintained in or across a public right-of-way or easement or private easement.

A. Public Utility--Owned and operated by a municipality or another political subdivision of the State.

B. Private Utility--Owned and operated by a private company or corporation.

2.33 Work-- Any and all obligations, duties, and responsibilities necessary to the successful completion of the Project assigned to or undertaken by CONTRACTOR under the Contract Documents, including all labor, materials, equipment, and other incidentals, and the furnishing thereof.

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

SECTION 00102

PRELIMINARY MATTERS

PART 1 - EXECUTION OF AGREEMENT:

1.01 At least four (4) counterparts of the Agreement and such other Contract Documents as practicable will be executed and delivered by CONTRACTOR to COUNTY within fifteen days of the Notice of Award; and COUNTY will execute and deliver one counterpart to CONTRACTOR within ten days of receipt of the executed Agreement from CONTRACTOR. COUNTY will identify those portions of the Contract Documents not so signed and such identification will be bidding on all parties. COUNTY, CONTRACTOR, and Project ENGINEER shall receive and executed counterpart of the Contract Documents and additional conformed copies as required.

PART 2 - DELIVERY OF BONDS

2.01 When he delivers the executed Agreements to COUNTY, CONTRACTOR shall also deliver to OWNER such Bonds as he may be required to furnish in accordance with the contract documents.

PART 3 - CONTRACT DOCUMENTS

3.01 COUNTY shall furnish to CONTRACTOR up to three (3) copies, unless otherwise provided in the Special Conditions, of the Contract Documents as are reasonably necessary for the execution of the work. Additional copies will be furnished upon request at the cost of reproduction.

PART 4 - CONTRACTOR'S ACKNOWLEDGMENT

4.01 CONTRACTOR represents that he has familiarized himself with and assumes full responsibility for having familiarized himself with the nature and extent of the CONTRACT DOCUMENTS, Work, locality, and will all local conditions and federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect performance of the Work and represents that he has correlated his study and observations with the requirement of the Contract Documents.

4.02 CONTRACTOR also represents that he has studied all surveys and investigation reports of subsurface and latent physical conditions referred to in the Specifications and made such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract Price in accordance with the requirements of the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.

PART 5 - COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED

5.01 The Contract Time will commence to run on the thirteenth day after the day on which the executed Agreement is delivered by COUNTY to CONTRACTOR or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed; but in no event shall the Contract Time commence to run later that the nineteenth day after the day on which COUNTY delivers the executed Agreement to CONTRACTOR. A Notice to Proceed may be given at any time within thirty days after the day on which COUNTY delivers the executed Agreement to CONTRACTOR.

PART 6 - PRE-COMMENCEMENT ACTIVITIES

6.01 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract documents and check and verify pertinent figures shows thereon and all applicable field measurements. He shall at once report in writing to ENGINEER any conflict, error or discrepancy which he may discover; however, he shall not be liable to ENGINEER for his failure to discover any conflict, error, or discrepancy in the Drawings of Specifications.

6.02 Within ten days after delivery of the executed Agreement by COUNTY to CONTRACTOR, CONTRACTOR shall submit to ENGINEER for approval an estimated progress schedule indicating the starting and completion dates of the various stages of the Work and a preliminary schedule of Shop Drawing submissions.

6.03 Before starting the work at the site, CONTRACTOR shall furnish ENGINEER certificates of insurance as required in the Contract Documents. Within twenty days after delivery of the executed Agreement by COUNTY to CONTRACTOR, but before starting the Work at the site, a conference will be held to review the above schedules, to establish procedures for handling Shop Drawings and other submissions and for processing Applications for Payment, and to establish a working understanding between the parties as to the Project. Present at the conference will be ENGINEER, Project Engineer, Project Inspector, CONTRACTOR and his Superintendent.

PART 7 - COMMENCEMENT

7.01 CONTRACTOR shall tart to perform his obligations under the Contract Documents on the date when the Contract Time commences to run. No Work shall be done at the site prior to the date on which the Contract time commences to run.

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

SECTION 00104

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 The Contractor shall be responsible for providing materials which meet the requirements indicated. For manufactured materials such as reinforcing steel, expansion joint materials, concrete pipe, cement, miscellaneous steel, cast iron materials, etc., the CONTRACTOR will be required to furnish a manufacturer's certificate that the material meets the requirements specified for this project.

1.02 The COUNTY shall monitor all materials incorporated into the project and their placement by testing at the COUNTY's expense. The COUNTY does not guarantee the accuracy or validity of the data nor does the COUNTY assume any responsibility for the CONTRACTOR'S interpretation of the data. Materials or work which do not meet the specifications shall be removed or modified.

1.03 All retesting for work rejected on the basis of the initial test results will be at the expense of the CONTRACTOR and the extent of the retesting shall be determined by the ENGINEER. The ENGINEER may require additional testing for failing tests and may require two passing retests acceptance will be made by the COUNTY.

1.04 The testing laboratory will be designated by the ENGINEER and shall perform all work in a professional manner and conform to the requirement of ASTM E 329.

1.05 Inspection, sampling and testing requirements, where applicable, are set forth in, but not necessarily limited to, the following Sections:

Section XXX Earthwork - Excavating, Backfilling and Compacting:

	Compaction Control and Testing.
Section	Sub-grade and Base Construction.
Section	Street Surface Courses.
Section	Concrete and Structures.
Section	Underground Piped Utilities.
Section	Incidental Construction.
Section	Soil Treatment, Termite Control.
Section	Pile Driving, Load Tests.
Section	Metal Fastening: Welding and Bolting.
Section	Structural Metal Framing.

PART 2 - LABORATORY DUTIES AND LIMITS OF AUTHORITY

2.01 Cooperate with ENGINEER and CONTRACTOR: provide qualified personnel as required promptly on notice.

2.02 Acquaint ENGINEER'S personnel with testing procedures and with all special conditions encountered at the site.

2.03 Perform specified inspections sampling and testing of materials and construction methods:

A. Comply with specified standards, ASTM and other recognized authorities.
B. Ascertain compliance with contract requirements.

2.04 Promptly notify the ENGINEER of irregularities or deficiencies of work which are observed during performance of services.

2.05 Promptly submit 3 copies of reports of observations and tests to the ENGINEER including but not limited to:

2.06 Perform additional services ordered by the ENGINEER.

2.07 Laboratory is not authorized to:
A. Release, revoke, alter or enlarge on contract requirements.
B. Approve or accept any portion of work.
C. Perform any duties of the CONTRACTOR.

PART 3 - CONTRACTOR'S RESPONSIBILITIES

3.01 Furnish product mix design together with the applicable design work sheets and data to meet or exceed contract requirements.

3.02 Cooperate with COUNTY's laboratory personnel, provide access to the work or to the manufacturer's operations.

3.03 Provide to laboratory preliminary representative samples of materials to be tested in specified quantities.

3.04 Furnish copies of mill test reports.

3.05 Furnish verification of compliance with contract requirements for materials and equipment.

3.06 Furnish casual labor and facilities:
A. To provide access to work to be tested.
B. To obtain and handle samples at site.
C. To facilitate inspections and tests.
D. For laboratory's exclusive use for storage and curing of test samples.

3.07 Notify ENGINEER 24 hours in advance of operations to allow for the assignment of personnel.

3.08 Notify laboratory 24 hours in advance of operations to allow for the assignment of personnel.

3.09 Correct work which is defective or which fails to conform to the Contract Documents. Corrective work shall not delay the project or the work of other CONTRACTORS.

3.10 Pay all costs of retesting when test results indicate non-compliance with contract requirements.

3.11 Patch all surfaces and areas disturbed by testing operation.

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

SECTION 00105

AVAILABILITY OF LAND, PHYSICAL CONDITIONS AND REFERENCE POINTS

PART 1 - AVAILABILITY OF LANDS

1.01 COUNTY shall furnish, as indicated in the Contract Documents and not later than the date when needed by CONTRACTOR, the lands upon which the Work is done, rights-of-way for access thereto, and such other lands which are designated for the use of CONTRACTOR.

1.02 Easement for permanent structures or permanent changes in existing facilities will be obtained and paid for by COUNTY, unless otherwise specified in the Contract Documents. If CONTRACTOR believes that any delay in COUNTY's furnishing these lands or easements entitles him to an extension of the Contract Time, he may make a claim therefore in the Contract Documents.

1.03 CONTRACTOR shall provide for all additional lands and access thereto may be required for temporary construction facilities or storage of materials and equipment.

PART 2 - PHYSICAL CONDITIONS; SURVEYS AND REPORTS

2.01 The COUNTY will, upon request, furnish to the CONTRACTOR copies of all boundary surveys, subsurface tests, and other pertinent reports and material which are available in ENGINEER'S office.

2.02 CONTRACTOR shall promptly notify ENGINEER in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents.

2.03 ENGINEER will promptly investigate those conditions and perform further surveys or subsurface tests deemed necessary. Promptly thereafter OWNER shall obtain the necessary additional surveys and tests and furnish copies to ENGINEER and CONTRACTOR.

2.04 If ENGINEER finds that the results of such surveys or tests indicate that there are subsurface or latent physical conditions which differ materially from those intended in the Contract Documents and which could not reasonably have been anticipated by CONTRACTOR, a Change Order shall be issued incorporating the necessary revisions.

PART 3 - REFERENCE POINTS

3.01 ENGINEER shall provide engineering surveys for construction to establish reference points which, in his judgment, are necessary to enable CONTRACTOR to proceed with the Work.

3.02 CONTRACTOR shall be responsible for surveying and laying out the Work (unless otherwise provided in the Special Conditions) and shall protect and preserve the established reference point and shall make no changes or relocations without the prior written approval of ENGINEER. He shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

3.03 CONTRACTOR shall replace and accurately relocate all reference points so lost, destroyed or moved.

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

SECTION 00106

SUSPENSION OF WORK AND TERMINATION

PART 1 - COUNTY SUSPENSION OF WORK

1.01 ENGINEER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR which shall fix the date on which work shall be resumed.

1.02 CONTRACTOR shall resume the work on the date so fixed.

1.03 CONTRACTOR will be allowed an extension of the contract time directly attributable to any suspension if he makes a claim therefore as provided in Section 107 and the contract documents.

PART 2 - COUNTY TERMINATION OF WORK

2.01 If CONTRACTOR is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act or to reorganize under the bankruptcy or similar laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to Subcontractors or for labor, materials, or equipment, or if he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction, or if he disregards the authority of ENGINEER, or if he otherwise violates any provision of the contract Documents, then ENGINEER may, without prejudice to any other right or remedy and after giving CONTRACTOR and his Surety seven day's written notice, terminate the services of CONTRACTOR and take possession of the project and of all materials, equipment, tools, construction equipment and machinery thereon owned by CONTRACTOR and finish the work by whatever method he may deem expedient.

2.02 In such case CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional service, such excess shall be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to COUNTY.

2.03 Such costs incurred by COUNTY shall be determined by ENGINEER and in corporate in a Change Order.

2.04 Where CONTRACTOR's services have been so terminated by ENGINEER, said terminations shall not affect any rights of COUNTY against CONTRACTOR then existing or which may thereafter accrue.

2.05 Any retention or payment of monies by COUNTY due CONTRACTOR will not release CONTRACTOR for liability.

2.06 Upon seven days written notice to CONTRACTOR, COUNTY may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the agreement. In such case, CONTRACTOR shall be paid for all work executed and any expense sustained plus a reasonable profit.

PART 3 - CONTRACTOR SUSPENSION OR TERMINATION OF WORK:

3.01 If, through no act or fault of CONTRACTOR, the work is suspended for a period of more than ninety days by COUNTY or under an order of court or other public authority, or ENGINEER fails to act on any application for payment within thirty days after it is submitted, or COUNTY fails to pay CONTRACTOR any sum approved by ENGINEER or awarded by arbitrators within thirty days written notice to ENGINEER, terminate the agreement and recover from COUNTY payment for all work executed and any expense sustained plus a reasonable profit.

3.02 In addition and in lieu of terminating the agreement, if ENGINEER has failed to act on an application for payment or COUNTY has failed to make any payment as a foresaid, CONTRACTOR may, upon seven days' notice to ENGINEER, stop the work until he has paid all amounts then due.

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

SECTION 00107

WORK BY OTHERS

PART 1 - GENERAL

1.01 COUNTY may perform additional work related to the Project by itself, or it may let other direct contracts therefore which shall contain General Conditions similar to these. CONTRACTOR shall afford the other contractors who are parties to such direct contracts (or COUNTY, if it is performing the additional work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work and shall properly connect and coordinate his work with theirs.

1.02 If any part of CONTRACTOR'S Work depends for proper execution or results upon the work of any such other contractor (or COUNTY,) CONTRACTOR shall inspect and promptly report to ENGINEER in writing any defects or deficiencies in such work that render it unsuitable for such proper execution and results. His failure so to report shall constitute an acceptance of the work as fit and proper for the relationship of his Work except as to defects and deficiencies which may appear in the other work after the execution of his Work.

1.03 CONTRACTOR shall do all cutting, fitting, and patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work with the written consent of ENGINEER and of the other contractors whose work will be affected.

1.04 If the performance of additional work by other contractors of COUNTY is not noted in the Contract Documents prior to the execution of the contract, written notice thereof shall be given to CONTRACTOR prior to starting any such additional work. If CONTRACTOR believes that the performance of such additional work by COUNTY or others involves him an additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore.

1.05 Work by the CONTRACTOR and work by others should be coordinated and expedited by the COUNTY of his representative to prevent time delays and additional cost to the CONTRACTORS. Any extension of time and/or additional costs caused by other contractors or utility service companies may be claimed.

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

SECTION 00108

CONTRACTOR'S RESPONSIBILITIES

PART 1 - SUPERVISION AND SUPERINTENDENCE

1.01 CONTRACTOR shall supervise and direct the work efficiently and with is best skill and attention. He shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction; but he shall not be solely responsible for the negligence of others in the design or selection of a specific means, method,technique,sequence, or procedure of construction which is indicated in and required by the contract documents. CONTRACTOR shall be responsible to see that the finished work complies accurately with the contract documents.

1.02 CONTRACTOR shall keep on the work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to the ENGINEER (Written Notice Only, Not Consent) except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

PART 2 - LABOR, MATERIALS AND EQUIPMENT

2.01 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the work and perform construction as required by the contract documents. He shall at all times maintain good discipline and order at the site.

2.02 CONTRACTOR shall furnish all material, equipment, labor, transportation,construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.

2.03 All materials and equipment shall be new, except as otherwise provided in the contract documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

2.04 All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, or processors, except asotherwise provided in the contract documents.

PART 3 - SUBCONTRACTORS

3.01 If the specifications, laws, ordinances, or applicable rules or regulations permit CONTRACTOR to furnish or use a substitute that is equal to any material or equipment specified, and if CONTRACTOR wishes to furnish or use a proposed substitute, he shall make written application to ENGINEER for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to the specified, and be suited to the same use and capable of performing the same function as that specified; stating whether or not its incorporation in or use in connection with the project is subject to the payment of any license fee or royalty; and

identifying all variations of the proposed substitute from that specified and indicating available maintenance service. No substitute shall be ordered or installed without the written approval of ENGINEER, who will be the judge of equality and may require CONTRACTOR to furnish such other data about the proposed substitute as he considers pertinent. No substitute shall be ordered or installed without such performance guarantee and bonds as ENGINEER may require which shall be furnished at CONTRACTOR's expense.

PART 4 - SUBCONTRACTORS

4.01 CONTRACTOR shall not employ and subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom COUNTY or ENGINEER may have reasonable objection. A subcontractor or other person or organization identified in writing to COUNTY and ENGINEER by CONTRACTOR prior to the notice of award and not objected to in writing by COUNTY or ENGINEER prior to the Notice of Award will be deemed acceptable to COUNTY and ENGINEER. Acceptance of any subcontractor, other person, or organization by COUNTY or ENGINEER shall not constitute a waiver of any right of COUNTY or ENGINEER to reject defective work or work not in conformance with the contract documents.

4.02 If COUNTY or ENGINEER, after due investigation, have reasonable objection to any subcontractor,other person, or organization proposed by CONTRACTOR after the notice of award, CONTRACTOR shall submit an acceptable substitute and the contract price shall be increased or decreased by the difference in cost occasioned by such substitution and on appropriate change order shall be issued. CONTRACTOR shall not be required to employ any subcontractor, other person, or organization against whom he has reasonable objection. CONTRACTOR shall not, without the consent of COUNTY and ENGINEER, make any substitution for any subcontractor, other person, organization who has been accepted by COUNTY and ENGINEER unless ENGINEER determines that there is good cause for doing so.

4.03 CONTRACTOR shall be fully responsible for all acts and omissions of his subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the contract documents shall create any contractual relationship between COUNTY or ENGINEER and any subcontractor or other person or organization having a direct contract with CONTRACTOR, nor shall it create any obligation on the part of COUNTY or ENGINEER to pay or to see to the payment of any monies due any subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR on account of specific work done in accordance with the schedule of values.

4.04 The sections of the specifications and the identifications of any drawings shall not control CONTRACTOR in dividing the work among subcontractors or delineating the work to be performed by any specific trade.

4.05 CONTRACTOR agrees to bind specifically every subcontractor to the applicable terms and conditions of the contract documents for the benefit of COUNTY.

PART 5 - PATENT FEES AND ROYALTIES

5.01 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the work of any invention, design, process, product, or device

which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the contract documents for use in the performance of two work and if, to the actual knowledge of COUNTY or ENGINEER, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by COUNTY in the contract documents.

5.02 CONTRACTOR shall indemnify and hold harmless COUNTY and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses, including attorneys' fees, arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, product, or device not specified in the contract documents and shall defend all such claims in connection with any alleged infringement of such rights.

PART 6 - PERMITS

6.01 CONTRACTOR shall obtain and pay for all construction permits and licenses and shall pay all governmental charges and inspection fees necessary for the prosecution of the work, which are applicable at the time of his bid. COUNTY shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACT, when necessary, in obtaining such permits and licenses. CONTRACTOR shall also pay all public utility charges.

PART 7 - LAWS, REGULATIONS AND ORDINANCE

7.01 Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the work. If CONTRACTOR observes that the specifications or drawings are at variance-therewith, he shall give ENGINEER prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If CONTRACTOR performs any work knowing it to be contrary to such law, ordinances, rules, and regulations and without such notice to ENGINEER, he shall bear all costs arising there from; however, it shall not be is primary responsibility to make certain that the specifications and drawings are in accordance with such laws, ordinances, rules and regulations.

PART 8 - TAXES

8.01 CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by him in accordance with the laws and ordinances.

PART 9 - USE OF PREMISES

9.01 CONTRACTOR shall confine his equipment, the storage of materials and equipment, and the operations of his workmen to areas permitted by law, ordinances, permits, or the requirements of the contract documents and shall not unreasonably encumber the premises with materials or equipment.

9.02 CONTRACTOR shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the work to stresses or pressures that will endanger it.

PART 10 - RECORD DRAWINGS

10.01 CONTRACTOR shall keep one record copy of all specifications, drawings, addenda, modifications, and shop drawings at the site in good order and annotated to show all changes made during the construction process. These shall be available to ENGINEER and shall be delivered to him for COUNTY upon completion of the project.

PART 11 - SAFETY AND PROTECTION

11.01 CONTRACTOR shall be responsible for initiating maintaining, and supervising all safety precautions and programs in connection with work. He shall take all necessary precautions for the safety of and provide the necessary protection to prevent damage, injury, or loss to:

A. All employees on the work and other persons who may be affected thereby:

B. All the work and materials or equipment to be incorporated there-in whether in storage on or off the site; and

C. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

11.02 The CONTRACTOR shall conduct his operations in a manner which will minimize interference with the normal use of property adjacent to the construction work and shall give owners of such property at least 24 hours notice of the commencement of work in the area abutting their property. CONTRACTOR shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for its safety and protection. He shall notify owners of adjacent utilities at least 48 hours in advance when prospection of the work may effect them. All damage, injury, or loss to any property referred to above caused, directly or indirectly, in whole or in part, by CONTRACTOR, any subcontractor, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR, except damage or loss attributable to the fault of drawings or specifications or to the acts or omissions of ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault of negligence of CONTRACTOR.

11.03 CONTRACTOR's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and ENGINEER has issued a notice to CONTRACTOR that work is acceptable.

11.04 CONTRACTOR shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent, unless otherwise designated in writing by CONTRACTOR to OWNER.

PART 12 - EMERGENCIES

12.01 In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER,

is obligated to act, at his discretion, to prevent threatened damage, injury, or loss. He shall give ENGINEER prompt written notice of any significant changes in the work or deviations from the contract documents caused thereby; and a change order shall thereupon be issued covering the changes and deviations involved.

12.02 If CONTRACTOR believes that additional work done by him in any emergency which arose from causes beyond his control entitles him to an increase in the contract price or an extension of the contract time, he may make a claim there for.

PART 13 - SHOP DRAWINGS AND SAMPLES

13.01 After checking and verifying all field measurements, CONTRACTOR shall submit to ENGINEER for approval, in accordance with the accepted schedule of shop drawing submissions, five copies (or, to ENGINEER's option, one reproducible copy) of all shop drawings which shall have been checked by and stamped with the approval of CONTRACTOR and identified as ENGINEER may require. The date shown on the shop drawing will be complete with respect to dimensions, design criteria, materials of construction, and the like to enable ENGINEER to review the information as required.

13.02 CONTRACTOR shall also submit to ENGINEER for approval, with such promptness as to cause no delay in work, all samples required by the contract documents. All samples will have been checked by and stamped with the approval of CONTRACTOR, identified clearly as to material, manufacturer, and pertinent catalog numbers and the use for which intended.

13.03 At the time of each submission, CONTRACTOR shall in writing call ENGINEER's attention to any deviations that the shop drawings or sample may have from the requirements of the contract documents.

13.04 ENGINEER will review and approve with reasonable promptness shop drawings and samples, but his review and approval shall be only for conformance with the design concept of the project and for compliance with the information given in the contract documents. The approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make any corrections required by ENGINEER and shall return the required number of corrected copies of shop drawings and resubmit new samples until approved. CONTRACTOR shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections called by the ENGINEER on previous submissions. CONTRACTOR's stamp of approval on any shop drawing or sample shall constitute a representation to ENGINEER that CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or he assumes full responsibility for doing so and that he has reviewed or coordinated each shop drawing or sample with the requirements of the work and the contract documents.

13.05 Where a shop drawing or sample submission is required by the specifications, no related work shall be commenced until the submission has been approved by ENGINEER. A copy of each approved shop drawing and each approved sample shall be kept in a good order by CONTRACTOR at the site and shall be available to ENGINEER.

13.06 ENGINEER approval of shop drawings or samples shall not relieve CONTRACTOR from his responsibility for any deviations from the requirements of the contract documents unless

CONTRACTOR has in writing called ENGINEER's attention to such deviation at the time of submission and ENGINEER has given written approval to the specific deviation, nor shall any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the shop drawings.

PART 14- CLEANING

14.01 CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish, and debris from and about the premises, as well as all tools, construction equipment and machinery, and surplus materials and shall leave the site clean and ready for occupancy by COUNTY. CONTRACTOR shall restore to their original condition those portions of the site not designated for alterations by the contract documents, unless the completion of the work is directly affected by the item in dispute.

PART 15 - INDEMNIFICATION

15.01 CONTRACTOR shall indemnify and hold harmless COUNTY and ENGINEER and their agents and employees from and against all claims, damages, losses, and expenses including attorneys' fees arising out of or resulting from the performance of the work by the CONTRACTOR, provided that any such claim, damage, loss, or expense (a) is attributable to bodily injury, sickness, disease, or death or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there-from and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

15.02 In any and all claims against COUNTY or ENGINEER or any of their agents or employees by copy any employees of CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 15.01 shall not be limited in any way by any limitation on the amount of type of damages, compensation, or benefits payable by or for CONTRACTOR or any subcontractor under workmen's compensation acts, disability benefit acts, or other employee benefit acts.

15.03 The obligations of CONTRACTOR under paragraph 15.01 shall not extend to the liability of ENGINEER, his agents, or employees arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys change orders, designs, or specifications or (b) the giving of or giving or failure to give is the primary cause of injury or damage.

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

SECTION 00113

SOILS AND SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 Depending on the project requirements, the ENGINEER may have obtained geotechnical information, which may include subsurface date, logs of soil borings and recommendations from geotechnical consultants.

1.02 Any information obtained is solely for use by the ENGINEER in the design of the project and are not part of the contract. If soil borings have been prepared they will be included in the section or on the plans.

1.03 Any geotechnical information included is for information only. The COUNTY and the ENGINEER do not guarantee the accuracy or validity of the data, nor do they assume any responsibility for the CONTRACTOR'S interpretation or conclusions drawn from the data.

1.04 The CONTRACTOR may, at his option, perform additional subsurface investigations at his own expense.

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

SECTION 02101

PREPARATION OF RIGHT-OF-WAY

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, as noted in the plans.

B. Obstructions shall include:

1. Remains of houses not completely removed by others.
2. Concrete, foundations, floorslabs 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 ground.
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'S operations, shall be replaced by the CONTRACTOR at his expense in accordance with County 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 on a lump-sum basis with 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*****

SECTION 02102

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Clearing and grubbing on project site of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter within limits described in specifications or as shown on plans.

B. Clearing and grubbing shall be in advance of grading operation except that in cuts over 3 feet in depth, grubbing may be done simultaneously with excavation, provided objectionable matter is removed as specified.

C. Disposal of all debris resulting from clearing and grubbing work.

1.02 PROTECTION OF ADJACENT WORK:

A. Protect all areas outside indicated construction areas.

B. Protect existing improvements, adjacent property, utilities and other facilities, and trees and plants not to be removed from injury or damage.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 CLEARING:

A. Clear all areas covered by dikes, roads, structures and embankments within project limits unless otherwise shown in plans.

B. Remove all saplings, brush, down-timber and debris unless shown or directed otherwise.

C. Use tree wound paint to treat scars, gashes or limb stubs on trees not removed.

3.02 GRUBBING:

A. Trees, stumps, root systems, rocks and other obstructions shall be removed to the depths shown when they fall within the construction templates for the following items:

1.	Footings	18" below bottom of footing
2.	Sidewalks (or other types of walks)	12" below bottom of walk
3.	Roadways or Streets	18" below bottom of sub-grade
4.	Parking Areas	18" below bottom of sub-grade
5.	Grassed Areas	18" below top soil
6.	Fills	24" below bottom of fill

B. Blasting not permitted.

3.03 REMOVAL OF DEBRIS AND CLEANUP:

A. Burn as permitted by regulating agencies or the ENGINEER as work progresses.

B. Unguarded fires will not be permitted.

C. Permits will be obtained, where required, for necessary burning or disposal sites.

D. Dispose of all waste materials not burned by removal from site.

E. Materials cleared and grubbed shall be the property of the CONTRACTOR and shall be his responsibility for disposal.

PART 4 - MEASUREMENT AND PAYMENT

4.01 CLEARING AND GRUBBING:

A. Clearing and Grubbing shall be measured for payment either in acres or by lump sum only for areas indicated on the plans, or as provided in the proposal and contract.

B. When not listed as a separate contract pay item, Clearing and Grubbing shall be considered as incidental work, and the cost thereof shall be included in such contract pay items as are provided in the proposal contract.

C. Compensation, whether by contract pay items or incidental work will be 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 02210

SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of scarifying, blading and rolling the sub-grade to obtain a uniform texture and provide as nearly as practical a uniform density for the 6-inches of the sub-grade.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. All preparing of the right-of-way and/or clearing and grubbing shall be complete before starting the sub-grade preparation.

B. The sub-grade shall be scarified and shaped in conformity with the typical sections and the lines and grades indicated or as established by the ENGINEER by the removal of existing material or addition of approved material.

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

D. All foundations, walls or other objectionable material shall be removed to a minimum depth of 18-inches under all structures and 12-inches under areas to be vegetated. All holes, ruts and depressions shall be filled with approved material.

E. The surface of the sub-grade shall be finished to the lines and grades as established and be in conformity with the typical sections indicated.

F. Any deviation in excess of 1/2 inch cross section and in a length of 10 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and compacting by sprinkling and rolling.

G. Sufficient sub-grade shall be prepared in advance to insure satisfactory prosecution of the work.

H. The CONTRACTOR will be required to set blue tops for the sub-grade on centerline, at quarter points and curb lines or edge of pavement at intervals not exceeding 50 feet.

I. All suitable material removed may be utilized in the sub-grade with the approval of the ENGINEER. All other material required for completion of the sub-grade shall also be subject to approval by the ENGINEER.

J. Sub-grade materials on which structures shall be placed shall be compacted by approved mechanical tamping equipment to a dry density of the total material of not less than 95 percent nor more than 100 percent of the maximum dry density s determined in accordance with SDHPT test method tex-114-E.

K. Sub-grade materials on which planting or turf will be established shall be compacted to a minimum of 85 percent of the maximum dry density as determined in accordance with SDHPT test method tex-114-E.

L. Tests for density will be made as soon as possible after compacting operations are completed. If the material fails to meet the density specified, it shall be reworked as necessary to obtain the density required.

M. Just prior to placing any base materials, density and moisture content of the top 6-inches of compacted sub-grade shall be checked and if tests show the density to be more than 2 percent below the specified minimum or the moisture content to be more than 3 percent above or below the optimum, the sub-grade shall be reworked as necessary to obtain the specified compaction and moisture content.

N. When lime stabilization of the sub-grade is specified, the lime is to be added in accordance with Section 02240, Lime Stabilization.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. All acceptable sub-grade preparation will be measured by the square yard.

B. The measured area includes the entire width of the roadway for the entire length as indicated.

4.02 PAYMENT

A. The accepted quantities of sub-grade preparation will be paid for at contract unit bid price per square yard.

B. When not listed as a separate contract pay item, sub-grade preparation 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 * * ***

SECTION 02225

UNCLASSIFIED STREET EXCAVATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Perform all required excavation within the limits of right-of-way and adjacent thereto (except excavations specifically described and provided for elsewhere in the specifications).

B. Remove, properly use, or dispose of all excavated materials.

C. Shape and finish all earthwork in conformance with lines and grades as shown on the plans or as specified by the ENGINEER.

D. Schedule work to avoid property owner inconvenience as practical during construction.

E. Exercise care in operating applicable equipment beneath or adjacent to trees, sidewalks, poles, and other existing features to prevent damage.

F. Restore obstructions removed to accommodate construction equipment or to facilitate excavation.

1.02 CLASSIFICATION:

A. All street excavation shall be unclassified, regardless of material encountered.

B. Any reference to rock or any other material on the plans, or in these specifications, is not to be constructed as classification of the excavation.

PART 2 - PRODUCTS

2.01 SUBGRADE:

A. Use on-site material moved from cut areas to fill areas as approved by ENGINEER.

B. Use borrow materials from areas designated as needed.

2.02 DRAINAGE PROVISIONS:

A. Interruptions of natural surface drainage, or flow of artificial drains shall be mitigated by the CONTRACTOR by use of temporary drainage facilities, as approved by the ENGINEER, to prevent damage to public or private interest.

B. Restore original drainage as soon as the work shall permit.

C. The CONTRACTOR shall be held liable for all damages which may result from neglect to provide for either natural or artificial drainage which his work may have interrupted.

PART 3 - EXECUTION

3.01 UNCLASSIFIED STREET EXCAVATION:

A. Perform all excavation, embankment and grading required for pavement and/or curb and/or gutter as shown on plans.

B. Move suitable excavated material to areas requiring fill and place in accordance with these specifications. Determination of suitable material will be made by ENGINEER. Haul unsuitable material to waste sites.

C. Slope cut or fill sections uniformly from curb line to sidewalk or other controlling feature, as designated by ENGINEER. Smooth bank to provide a neat finished appearance.

D. Remove and replace unstable soils encountered during grading operations with suitable material. Notify ENGINEER of suspected unsuitable material before commencing removal. Authorized replacement with select material will be paid for by change order.

E. Replace gravel or rock driveway surfaces disturbed by grading with like material at no additional cost to OWNER.

F. Strip, salvage and stockpile topsoil in sufficient quantity to allow a uniform 6-inch lift over all disturbed areas not otherwise surfaced. Topsoil is included in unclassified excavation.

G. Removed existing culvert pipe where shown as part of incidental to unclassified excavation.

3.02 UNSTABLE OR UNSUITABLE SUBGRADE:

A. Excavate unstable subgrade at least 2 feet below grade where directed by ENGINEER.

B. Replace with suitable stable material approved by ENGINEER.

C. Compact to uniform density in 6-inch lifts.

D. Density of compacted subgrade to be equal to or greater than adjacent undisturbed grade.

E. Payment will be as specified for unclassified excavation.

F. Conduct operations in such a manner such that measurements may be taken before any backfill, as required above, is placed.

3.03 EXCESS OR UNSUITABLE EXCAVATION:

A. Dispose of excavation in excess of that needed or unsuitable for construction. As directed by the ENGINEER, excess or unsuitable excavation may be used for widening of embankments, or flattening of slopes, or as otherwise specified.

B. Obtain approval of the ENGINEER as to disposition and method for disposal of excess or unsuitable excavation.

3.04 GENERAL:

A. Provide all labor, equipment and associated materials to excavate areas specified.

PART 4 - MEASUREMENT AND PAYMENT

4.01 UNCLASSIFIED STREET EXCAVATION:

A. Unclassified street excavation, as authorized, shall be measured in its original position and the volume determined by the average end area method. All work performed shall be paid for at the contract bid price per cubic yard for unclassified street excavation.

B. When not listed as a separate contract pay item, unclassified street excavation 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 by the work, all in accordance with the plans and these specifications.

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

SECTION 02230

EXCAVATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. This work shall consist of excavating and properly utilizing or otherwise satisfactorily disposing of all excavated materials, of whatever character, within the limits of work.

B. Excavation shall also consist of constructing, compacting, shaping and finishing of all earthwork in designated areas on the plans, as specified herein, and in conformity with the required lines grades and typical cross sections or as directed by the ENGINEER.

C. When not otherwise included, this item shall include the work described in Section 02101 - Preparation of Right-of Way, Section 02102 - Clearing and Grubbing, Section 02236 - Embankment, Section 02238 - Removal of Concrete, and Section 02210 – Sub-grade Preparation.

Introduction

The Occupational Safety and Health Administration (OSHA) issued its first Excavation and Trenching Standard Standard in 1971 to protect workers from excavation hazards. Since then, OSHA has amended the standard several times to increase worker protection and to reduce the frequency and severity of excavation accidents and injuries. Despite these efforts, excavation-related accidents resulting in injuries and fatalities continue to occur.

To better assist excavation firms and contractors, OSHA has completed updated the existing standard to simplify many of the existing provisions, add and clarify definitions, eliminate duplicate provisions and ambiguous language, and give employers added flexibility in providing protection for employees. The standard is effective as of March 5, 1990.

In addition, the standard provides several new appendices. One appendix provides a consistent method of soil classification. Others provide sloping and benching requirements pictorial examples of shoring and shielding devises, timber tables, hydraulic shoring tables, and selection charts that provide a graphic summary of the requirements contained in the standard.

This booklet highlights the requirements in the updated standard excavation and trenching operations, provides methods for protecting employees against cave-ins, and described safe work practices for employees.

Scope and Application

OSHA's revised rule applies to all open excavations in the earth's surface, which includes

trenches.

According to the OSHA construction safety and health standards, a trench is referred to as a narrow excavation made below the surface of the ground in which the depth is greater than the width-the width not exceeding 15 feet. An excavation is any man-made cut, cavity, trench, or depression in the earth's surface formed by earth removal. This can include excavations for anything from cellars to highways.

General Requirements

Planning for Safety

Many on-the-job accidents are a direct result of inadequate initial planning. Correcting mistakes in shoring and/or sloping after work has begun slows down the operation, adds to the cost, and increases the possibility of an excavation failure. The contractor should build safety into the pre-bid planning in the same way all other pre-bid factors are considered.

It is a good idea for contractors to develop safety checklists before preparing a bid, to make certain there is adequate information about the job site and all needed items are on hand.

These checklists should incorporate elements of the relevant OSHA standards as well as other information necessary for safe operations.

Before preparing a bid, these specific site conditions should be taken into account:

- Traffic,
- Nearness of structures and their conditions,
- Soil,
- Surface and ground water,
- The water table,
- Overhead and underground utilities and
- Weather.

These and other conditions can be determined by job site studies, observations, test borings for soil type or conditions, and consultations with local officials and utility companies.

Before any excavation actually begins, the standard requires the employer to determine the estimated location of utility installations-sewer, telephone, fuel, electric, water lines, or any other underground installations-that may be encountered during digging. Also, before starting the excavation, the contractor must contact the utility companies or owners include and inform them, within established or customary local response times, of the proposed work. The contractor must also ask the utility companies or owners to find the exact location of the underground installations. If they cannot respond within 24 hours (unless the period required by the state or local law is longer), or if they cannot find the exact location of the utility installations, the contractor may proceed with caution. To find the exact location of underground installations, workers must use safe and acceptable means. If underground installations are exposed, OSHA regulations also require that they be removed, protected or properly supported.

When all necessary specific information about the job site is assembled, the contractor is ready

to determine the amount, kind, and cost of safety equipment needed. A careful inventory of the safety items on hand should be made before deciding what additional safety material must be acquired. No matter how may trenching, shoring and backfilling jobs have been done in the past, each job should be approached with the utmost care and preparation.

Before Beginning the Job

It is important, before beginning the job, for the contractor to establish and maintain a safety and health program for the work site that provides adequate systematic policies, procedures, and practices to protect employees from, and allow them to recognize, job-related safety and health hazards.

An effective program includes provisions for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards, and potential hazards that may arise from foreseeable conditions. The program may be written or verbal but it should reflect the unique characteristics of the job site.

To help contractors develop an effective safety and health program, in 1989 OSHA issued recommended guidelines for the effective management and protection of worker safety and health. The complete original text of the non-mandatory guidelines is found in the Federal Register (54 FR(18):3904-3916, January 26, 1989).

A copy of the guidelines can be obtained from the OSHA Publications Office, U.S. Department of Labor, 20 Constitution Avenue, N.W., Room N-3101, Washington, D.C. 20210, or from the nearest OSHA Regional Office listed in this booklet.

To be sure safety policies are implemented effectively, there must be cooperation among supervisors, employee groups, including union, and individual employees. Each supervisor must understand the degree of responsibility and authority he or she holds in a particular area. For effective labor support, affected unions should be notified of construction plans and asked to cooperate.

It is also important, before beginning work, for employers to provide employees who are exposed to public vehicular traffic with warning vests or other suitable garments marked with or made of reflectorized or high-visibility material and ensure that they wear them. Workers must also be instructed to remove or neutralize surface encumbrances that may create a hazard.

In addition, no employee should operate a piece of equipment, without first being properly trained to handle it and fully alerted to its potential hazards.

In the training and in the site safety and health program, it also is important to incorporate procedures for fast notification and investigation of accidents.

On-the-Job Evaluation

The Standard requires that a competent person inspect, on a daily basis, excavations and the adjacent areas for possible cave-ins, failures of protective systems and equipment, hazardous

atmospheres, or other hazardous conditions. If these conditions are encountered, exposed employees must be removed from the hazardous area until the necessary safety precautions have been taken. Inspections are also required after natural (e.g. heavy rains) or man-made events such as blasting that may increase the potential for hazards.

Larger and more complex operations should have a full-time safety official who makes recommendations to improve the implementation of the safety plan. In a smaller operation, the safety official may be part-time and usually will be a supervisor.

Supervisors are the contractor's representatives on the job. Supervisors should conduct inspections, investigate accidents, and anticipate hazards. They should ensure that employees receive on-the-job safety and health training. They should also review and strengthen overall safety and health precautions to guard against potential hazards, get the necessary worker cooperation in safety manners, and make frequent reports to the contractor.

It is important that managers and supervisors set the example for safety at the job site. It is essential that when visiting the job site, all managers, regardless of status, wear the prescribed protective equipment such as safety shoes, safety glasses, hard hats, and other necessary gear (see CFR 1926.100 and 102).

Employees must also take an active role in job safety. The contractor and supervisor should make certain that workers have been properly trained in the use and fit of the prescribed protective gear and equipment, that they are wearing and using the equipment correctly, and that they are using safe work practices.

Cave-Ins and Protective Support Systems

Support Systems

Excavation workers are exposed to many hazards, but the chief hazard is danger of cave-ins. OSHA requires that in all excavation employees exposed to potential cave-ins must be protected by sloping, or benching the sides of the excavation; supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area.

Designing a protective system can be complex because of the number of factors involved-soil classification, depth of cut, water content of soil, changes due to weather and climate, or other operation in the vicinity. The standard, however, provides several different methods and approaches (four for sloping and four for shoring, including the use of shields)* for designing protective systems that can be used to provide the required level of protection against cave-ins.

One method of ensuring the safety and health of workers in an excavation is to slope the side to an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal). These slopes must be excavated to form configurations that are in accordance with those for Type C soil found in Appendix B of the standard. A slope of this graduation or less is considered safe for any type soil (see Figure 1).

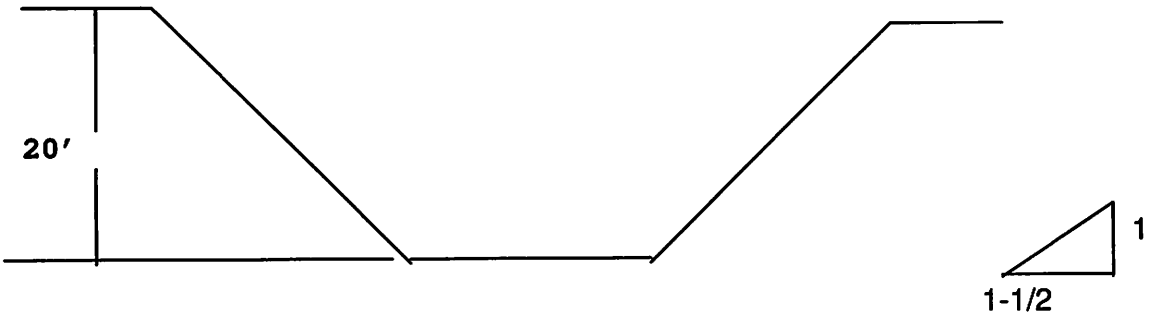

Figure 1. Excavations Made in Type C Soil

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.

*See Appendix F to the standard for a complete overview of all options.

A second design method, which can be applied for both sloping and shoring, involves using tabulated data, such as tables and charts, approved by a registered professional engineer. These data must be in writing and must include sufficient explanatory information to enable the user to make a selection, including the criteria for determining the selection and the limits on the use of the data.

At least one copy of the information, including the identity of the registered professional engineer who approved the data, must be kept at the worksite during construction of the protective system. Upon completion of the system, the data must be stored away from the job site, but a copy must be made available, upon request, to the Assistant Secretary of Labor for OSHA.

Contractors also may use a trench box or shield that is either designed or approved by a registered professional engineer or is based on tabulated data prepared or approved by a registered professional engineer. Timber, aluminum, or other suitable materials may also be used. OSHA standards permit the use of a trench shield (also known as a welder's hut) as long as the protection it provides is equal to or greater than the protection that would be provided by the appropriate shoring system (see Figure 2).

The employer is free to choose the most practical design approach for any particular circumstance. Once an approach has been selected, however, the required performance criteria must be met by that system.

The standard does not require the installation and use of a protective system when an excavation (1) is made entirely in stable rock, or (2) is less than 5 feet deep and a competent person has examined the ground and found no indication of a potential cave-in.

Safety Precautions

The standard requires the employer to provide support systems such as shoring, bracing, or

underpinning to ensure the stability of adjacent structures such as buildings, walls, sidewalks or pavements.

Figure 2. Trench Shields

The standard prohibits excavation below the level of the base or footing of any foundation or retaining wall unless (1) a support system such as underpinning is provided, (2) the excavation is in stable rock, or (3) a registered professional engineer determines that the structure is sufficiently removed from the excavation and that excavation will not pose a hazard to employees.

Excavations under sidewalks and pavements are also prohibited unless an appropriately designed support system is provided or another effective method is used.

Installation and Removal of Protective Systems

The standard requires the following procedures for the protection of employees when installing support systems:

- Securely connect members of support system,
- Safely install support systems,
- Never overload members of support systems, and
- Install other structural members to carry loads imposed on the support system when temporary removal of a individual members is necessary.

In addition, the standard permits excavation of 2 feet or less below the bottom of the members of a support or shield system of a trench if (1) the system is designed to resist the loads calculated for the full depth of the trench, and (2) there are no indications, while the trench is open, of a possible cave-in below the bottom of the support system. Also, the installation of support systems must be closely coordinated with the excavation of trenches.

As soon as work is completed, the excavation should be back-filled as the protective system is designated. After the excavation has been cleared, workers should slowly remove the protective system from the bottom up, taking care to release members slowly.

Materials and Equipment

The employer is responsible for the safe condition of materials and equipment used for protective systems. Defective and damaged materials and equipment can result in the failure of a protective system and cause excavation hazards.

To avoid possible failure of a protective system, the employer must ensure that (1) materials and equipment are free from damage or defects, (2) manufactured materials and equipment are used and maintained in a manner consistent with the recommendations of the manufacture and in a way that will prevent employee exposure to hazards, and (3) while in operation, damaged materials and equipment are examined by a competent person to determine if they are suitable

for continued use. If the materials and equipment are not safe for use, they must be removed from service. These materials cannot be returned to service without the evaluation and approval of a registered professional engineer.

Other Hazards

Falls and Equipment

In addition to cave-in hazards and secondary hazards related to cave-ins, there are other hazards from which workers must be protected during excavation-related work. These hazards include exposure to falls, falling loads, and mobile equipment. To protect employees from these hazards, OSHA requires the employer to take the following precautions:

- Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge of excavations, or have retaining devices, or both.
- Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alter operations of the edge of an excavation. If possible, keep the grade away from the excavation.
- Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees from the hazard of falling, rolling, or sliding material or equipment.
- Prohibit employees from working on faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.
- Prohibit employees under loads that are handled by lifting or digging equipment. To avoid being struck by any spillage or falling materials, require employees to stand away from vehicles being loaded or unloaded. If cabs of vehicles provide adequate protection from falling loads during loading and unloading operations, the operators may remain in them.

Water Accumulation

The standard prohibits employees from working in excavations where water has accumulated or is accumulating unless adequate protection has been taken. If water removal equipment is used to control or prevent water from accumulating, the equipment and operations of the equipment must be monitored by a competent person to ensure proper use.

OSHA standards also require that diversion ditches, dikes, or other suitable means be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Also, a competent person must inspect excavations subject to runoffs from heavy rains.

Hazardous Atmospheres

Under this provision, a competent person must test excavations greater than 4 feet in depth as well as ones where oxygen deficiency or a hazardous atmosphere exists or could reasonably be expected to exist, before an employee enters the excavation. If hazardous conditions exist, controls such as proper respiratory protection or ventilation must be provided. Also, controls

used to reduce atmospheric contaminants to acceptable levels must be tested regularly.

Where adverse atmospheric conditions may exist or develop in an excavation, the employer also must provide and ensure that emergency rescue equipment, (e.g., breathing apparatus, a safety harness and line, basket stretcher, etc.) is readily available. This equipment must be attended when used.

When an employee enters bell-bottom pier holes and similar deep and confined footing excavations, the employee must wear a harness with a lifeline. The lifeline must be securely attached to the harness and must be separate from any line used to handle materials. Also, while the employee wearing a lifeline is in the excavation, an observer must be present to ensure that the lifeline is working properly and to maintain communication with the employee.

Access and Egress

Under the standard, the employer must provide safe access and egress to all excavations. According to OSHA regulations, when employees are required to be in trench excavations 4-feet deep or more, adequate means of exit, such as ladders, steps, ramps or other safe means of egress, must be provided and be within 25 feet of lateral travel. If structure ramps are used as a means of access or egress, they must be designed by a competent person if used for employee access or egress, or a competent person qualified in structural design if used by vehicles. Also, structural members used for ramps or runways must be uniform in thickness and joined in a manner to prevent tripping or displacement.

Related Issues

Hazard Communication

The Hazard Communication Standard (29 CFR 1910.1200) requires employers to inform employees of the identities, properties, characteristics, and hazards of chemicals they use and the protective measures they can take to prevent adverse effects. The standard covers both physical hazards (e.g., flammability) and health hazards (e.g., lung damage, cancer). Knowledge acquired under the Hazard Communication Standard will help employers provide safer workplaces for their employees, establish proper work practices, and help prevent chemical-related illnesses and injuries.

Access to Medical and Exposure Records

Under the provision of the Access to Medical and Exposure Records standard (29 CFR 1910.20), employees, their designated representatives, and OSHA are permitted direct access to employer-maintained exposure and medical records. This access is designed to yield both direct and indirect improvements in the detention, treatment, and prevention of occupational disease. Also, access to these records will assist employees in the management of their own safety and health.

Recordkeeping

Each employer must preserve and maintain accurate medical and exposure records for each employee. The standard requires that exposure records be kept for 30 years and medical records be kept for at least the duration of employment plus 30 years. Background data for exposure records such as laboratory reports and work sheets need to be kept only for 1 year. Records of employees who have worked for less than 1 year need not be retained after employment, but the employer must provide these records to the employee upon termination of employment. First-aid records of one-time treatment need not be retained for any specified period.

The employer must inform each employee of the existence, location, and availability of these records. When an employer plans to stop doing business and there is no successor employer to receive and maintain these records, the employer must notify employees of the right to access of the records at least 3 months before the employer ceases to do business. At the same time, the employer also must inform the National Institute for Occupational Safety and Health.

State Plan States

States administering their own occupational safety and health program (see listing on page), through plans approved under section 18(b) of the Occupational Safety and Health Act of 1970, must adopt standards and enforce requirements at least as effective as Federal requirements. There are currently 25 State plan States; 23 covering private and public (State and local government) sectors and two covering public sector only.

Summary

Trenching and excavation work presents serious risks to all workers involved. The greatest risk, and one of primary concern, is that of cave-ins. Furthermore, when cave-in accidents occur, they are much more likely to result in worker fatalities than other excavation-related accidents. Strict compliance, however, with all sections of the standard will prevent or greatly reduce the risk of cave-ins as well as other excavation-related accidents.

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Utah Occupational Safety and Health
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(809)773-1994

COMMISSIONER
Virginia Department of Labor and Industry
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Richmond, VIRGINIA 23241-0064
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DIRECTOR
Department of Employment Division of Employment Affairs
Occupational Safety and Health Administration
Herchfer Building, 2nd Floor East
122 West 25th Street
(307)777-7786 or 777-7787

DIRECTOR
Washington Department of Labor and Industries
General Administration Building
Room 334 - AX-31
Olympia, WASHINGTON 98504-0631

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Related Publications

A single free copy of the following publications can be obtained from the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., Room N-301, Washington, D.C., 20210.

Please send a self-addressed label with your request.

All about OSHA - OSHA 2056

Chemical Hazard Communication - OSHA 3084

Construction Industry Digest - OSHA 2207

Consultation Services for the Employer - OSHA 3047

Ground-Fault Protection on Construction Sites - OSHA 3007

OSHA Inspections - OSHA 2098

OSHA: Safety and Health is our Middle Name - OSHA 3076

Personal Protective Equipment - OSHA 3077

Respiratory Protection - OSHA 3079

Safety and Health Program Management Guidelines
(Federal Register (54 FR (18):3904-3916, January 1989))

A Hazard Communication Compliance Kit may be ordered from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402 for $18.00 ($22.00 for foreign addresses). OSHA Publication 3104, GPO order No. 929-022-00000-9. The kit can be ordered from GPO by phone using Visa or Mastercard; call (202)783-3238.

* U.S. Government Printing Office: 1991 282-150/45367

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- These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with

approved programs must have a standard that is identical to or at least as effective as, the federal standard.

PART 2 - PRODUCTS

2.01 CLASSIFICATION

A. All excavations shall be unclassified as shall include all materials encountered regardless of their nature or the manner in which they are removed.

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.

B. Construction equipment shall not be operated within the drip line of trees, unless otherwise indicated.

C. Construction materials shall not be stockpiles under the canopies of trees. No excavation or embankment shall be placed within the drip line of trees until tree wells are constructed.

D. All excavation shall be performed as specified herein and shall conform to the established alignment, grades and cross sections.

E. Suitable excavated materials shall be utilized, in so far as practical, in constructing required embankments.

F. The construction of all embankments shall conform to Section 02236 - Embankment. No material shall be stockpiled within the banks of a waterway.

G. Unsuitable excavated materials or excavation in excess of that needed for construction shall be known as "Waste" and shall become the property of the CONTRACTOR and it shall become his sole responsibility to dispose of this material off the limits of the right-of-way in an environmentally sound manner at a permitted disposal site.

H. Adequate dewatering and drainage of excavation shall be maintained throughout the time required to complete the work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement of the volume of excavation in cubic yards by the average end areas. Cross sectional areas shall be computed from the existing ground section to the established line of the sub-grade, as shown on typical sections for the limits

of the right-of-way or other work limits, including parkway slopes and sidewalk areas.

B. Measurement of the area in square yards of surface area excavated as shown on the typical sections included in the plans.

C. Measurement of the volume of excavation is in cubic yards, based upon the average end areas taken from pre-construction cross sections and planned grades. The planned quantities for excavation will be used as the measurement for payment for this item.

4.02 PAYMENT

A. This item will be paid for at the contract unit price bid for "Excavation", as provided under the measurement method as included in the bid, which price shall be full compensation for all work herein specified including: dewatering, drainage, sub-grade preparation, unless otherwise indicated and 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, excavation 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 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 02238

REMOVAL OF CONCRETE

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 combinations thereof.
2. Concrete Slabs will include, but not be limited to, patio slabs, porch slabs, concrete 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 Electric Department foundations.
7. Miscellaneous Concrete shall include but not be limited to manholes, inlets, junction boxes and headwalls.

PART 2 PRODUCTS

2.01 MORTAR:

A. Mortar, for repair of existing concrete structures, shall conform to the requirements thereof in Section 03300 - 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 to conform to Section 02101 - "Preparing Right-of-Way" and disposed of by the Contractor and deposited at a permitted at a permitted disposal site.

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

C. The existing concrete shall be cut to the 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 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. Remaining concrete shall be mortared to protect the reinforcing steel and provide a neat clean appearance.

F. Where reinforcement is encountered in the removed portions of structures to be modified, 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 where applicable.

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 and concrete wall 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 in original position, regardless of the thickness and reinforcing.

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

D. Concrete foundation removed will be measured per each.

E. Miscellaneous concrete removed will be measured per 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 * * ***

SECTION 02240

LIME STABILIZATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

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

B. Application to natural ground, embankment, existing pavement, base or sub-bases 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.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition (or addended portions thereof) of the following standards and codes:

1. ASTM c-207 or Type N - Requirements for Hydrated Lime
2. ASTM Designation C5 - Quick Lime for Structural Purposes
3. Texas SDHPT Test Method Tex-600-J - Hydrated Lime
4. ASTM D-1557 - Density of Compacted Materials
5. ASTM D-2049 - Density of Compacted Materials
6. Texas SDHPT Test Method Tex 113-E - Density of Compacted Materials
7. AASHTO T-99, Method C - Density of Compacted Materials
8. AASHTO M-216 - Hydrated Lime

PART 2 - PRODUCTS

2.01 HYDRATED (DRY) LIME:

A. Use, for stabilization of soils, a dry powder consisting primarily of calcium hydroxide (Ca(OH)2).

B. Provide Material in accordance with Texas SDHPT Test Method TEX-600-J and conforming to the following chemical composition:

Hydrate Alkalinity, Percent by Weight Ca(OH)2	90% Min.
Un-hydrate Lime Content, Percent by Weight CaO	5% Max.
"Free Water" Content, Percent by Weight H2O	4% Max.

And with the following residue retainage:

Residue Retained on No 6 Sieve	None
Residue Retained on No. 10 Sieve	1% Max.
Residue Retained on No. 30 Sieve	2.5% Max.

C. Store and handle hydrated lime in closed, weather proof containers, storage bins, or bags until immediately before application to the road.

D. Furnish hydrated lime in trucks, as applicable, with weight of lime measured on certified scales and clearly marked on the truck or stamped on a haul ticket.

E. Furnish hydrated lime in bags, as applicable, bearing the manufacturer's certified weight. Bags varying more than five percent may be rejected.

2.02 HYDRATED LIME SLURRY:

A. Provide a pumpable suspension of solids, principally composed of hydrated lime, in water.

B. Provide material with a "Solids Content" having a hydrated alkalinity Ca (OH) 2 of not less than 90 percent by weight and a residue retainage equal to the retainage specified in Part 2.01 above.

C. Supply Type B, commercial lime slurry, with a "dry solids content" of at least 31% by weight of the slurry (Grade 1).

D. Procure mixing water only from County of Hidalgo water mains. The Contractor shall make arrangements with the Water Department to obtain a meter and subsequent payment for water used.

2.03 QUICKLIME (MASON'S LIME):

A. Provide quicklime, as a dry powder in a tank, to form a lime slurry.

PART 3 - EXECUTION

3.01 GENERAL:

A. Provide a completed course of treated materials containing a uniform lime mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth, and with a smooth surface and suitable for placement of subsequent courses.

B. Regulate sequence work, use proper amounts of lime, maintain the work and rework the courses as necessary to meet the requirements of this specification.

C. Construct and shape roadbed to conform with typical sections, lines and grades as shown on the plans, or as directed by the ENGINEER.

D. Excavate materials to be treated to the proposed bottom of lime treatment grade, or secondary grade and remove or window to expose.

E. Correct any wet or unstable material below the secondary grade by scarifying, adding lime and compacting until uniform stability is achieved.

F. Use a cutting or pulverizing machine, as applicable, to remove subgrade material accurately to secondary grade and to pulverize the material at the same time. When cutting or pulverizing machine is used, the requirement for exposing and windowing the material is waived.

G. Roll subgrade before use of pulverizing machinery and correct any soft areas that rolling operations shall reveal.

H. Materials for new bases and sub-bases shall be delivered, placed and spread in the required amount per station. The material shall be thoroughly mixed prior in the same working day.

I. Lime shall be spread only on that area where first mixing operation can be completed in the same working day.

3.02 SLURRY PLACING:

A. Mix lime, in amounts as shown on plans or as specified by the Materials Engineering Laboratory, with water in trucks or approved distributors and apply as a thin water suspension or slurry.

B. The distribution of lime at the rates shown on the plans, as directed herein, and/or as directed by the ENGINEER. Shall be attained by successive passes over a measured surface of roadway until the proper moisture and lime content is achieved.

C. Lime slurry distributors shall be equipped with an agitator for maintaining lime and water in a uniform mixture.

3.03 DRY PLACING:

A. Spread lime by an approved screw type spreader box or by bag distribution at the rate shown in the plans.

B. Distribute lime at a uniform rate and in such a manner as to reduce scattering of lime to a minimum. Lime shall not be applied when wind conditions, in the opinion of the ENGINEER, will cause objectionable blowing of lime to traffic or adjacent properties.

C. Motor graders shall not be used to spread lime.

D. Sprinkle material until proper moisture and lime content has been secured.

3.04 MIXING

A. Mixing procedures shall be the same for "Dry Placing" or "Slurry Placing" or lime.

B. Treatment for Materials in Place:

1. Thoroughly mix material and lime using approved road mixers or other approved equipment, until a homogeneous, friable mixture of material is obtained, free from all clods and lumps.
2. Mix as thoroughly as possible at the time of lime application of materials containing plastic clay or other materials not readily mixed with lime, bring to proper moisture content, seal with a pneumatic roller, and leave to cure one to four days, as directed by the ENGINEER.
3. During curing period, material shall be kept moist by method(s) approved by the ENGINEER.
4. Uniformly mix, after required curing time, using approved methods.
5. Clods in soil binder - Lime mixture shall be reduced in size by raking, blading, dicing, harrowing, scarifying or by other approved pulverization methods such that non-slaking aggregates obtained on the No. 4 sieve are removed. The remainder of the material shall meet the following requirements when test dry by laboratory sieves:

Minimum Passing 1 3/4 inch	100%
Minimum Passing No. 4 Sieve	60%

C. Treatment of New Material

1. Thoroughly mix and blend, using approved road mixers or other approved equipment, the base or sub-base material, lime and required water until a homogeneous, friable mixture is obtained.
2. When lime is placed as a slurry and mixed by use of blades, the material shall be bladed as the lime water mixture is applied.

D. During the time between application and mixing, hydrated lime that has been exposed to the open air for a period of six hours or more, or to excessive loss due to washing or blowing, shall not be accepted for payment.

3.05 COMPACTION:

A. Compaction of the mixture shall begin immediately after final mixing and in no case later than three calendar days after final mixing.

B. Aerate or sprinkle material as required to provide optimum moisture.

C. Compaction shall begin at the bottom and shall continue until entire depth of mixture is uniformly compacted to 95% of maximum density as determined by AASHTO T-99, Method C.

D. If any portion fails to meet the density specified, it shall be reworked as required to obtain specified density.

3.06 FINISHING, CURING, AND PREPARATION FOR SURFACING:

A. Shape surface after compaction to the required lines, grades, and cross sections, followed by thorough rolling sufficiently light to prevent hair-line cracking.

B. Complete section shall be moist cured for a minimum of seven days before further coursed are added or any traffic permitted, other than sprinkling equipment.

C. The surface or compacted layer shall be kept moist until covered by other base or paving material, or until an application of CSS-1 or SS-1 emulsified asphalt as a curing seal. Curing seal shall be applied as soon as possible after final rolling at a rate of 0.10 to 0.20 gallons per square yard. The exact rate will be as directed by the ENGINEER.

No equipment or traffic will be permitted on lime treated materials for 72 hours after application of curing seal.

3.07 MAINTENANCE:

A. Maintain the completed lime 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 County and as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. Lime treatment shall 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. Lime treatment shall be paid for at the contract unit price per square yard.

B. Lime will be measured by the ton 2000 pounds dry weight. Lime will be paid for at the contract unit cost per ton of 2000 pounds dry weight.

C. The contract unit price for lime treatment shall be the total compensation for preparing roadbed; for loosening, pulverizing, application of lime, 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 lime 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 * * ***

SECTION 02601

FLEXIBLE BASE

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 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 un-crushed as necessary to comply with the requirements hereinafter specified.

B. Materials shall consist of durable course 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 C - Iron Ore Topsoil

D. Type D - Shell Aggregate with Sand Admixture

E. Type E - Shell Aggregate with Sand and Caliche Admixture

F. Type F - Caliche

G. Type G - Crushed Slag

H. Unless otherwise noted on the plans, the CONTRACTOR may use any one type of these types provided the material used meet the requirements set forth in the specification test limits herein.

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 sub-base 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 Limit	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Tests	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

	GRADES			
TYPES	**GRADE 1:**	**GRADE 2:**	**GRADE 3:**	**GRADE 4:**
	(Triaxial Class 1 Min compressive strength, psi: 45 at 0 psi lateral pressure and 175 at 15 psi lateral pressure.	(Traxial class 1 to 2.3) Min. compressive strength, psi: 35 at 0 psi lateral pressure and 175 at 15 psi lateral pressure.	(Unspecified Triaxial Class)	
TYPE A	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Crushed or Broken Aggregate (excluding gravel aggregate)	1-3/4 .....0 7/8" .....10-35 3/8" .....30-50 No. 4.....45-65 No. 40.....70-85 Max LL.....35 Max PI .....10 **Wet Ball Mill** Max Amt. .....40 Max Increase in Passing No. 40.....20	!-3/4" ..... 0-10 No. 4..... 45-75 No. 40..... 60-85 Max LL..... 40 Max PI ..... 12 **Wet Ball Mill** Max. Amt. ..... 50 Max Increase in Passing No. 40..... 20	1-3/4".....0-10 No. 40.....60-85 Max LL..... 45 Max PI ..... 15 **Wet Ball Mill** Max. Amt. ..... 55 Max. Increase in Passing No. 40..... 20	As Shown On Plans
TYPE B	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Gravel Aggregate		1-3/4" ..... 0-10 No. 4..... 30-75 No. 40..... 70-85 Max LL..... 35 Max PI 12	1-3/4" 0-5 No. 4 30-75 No. 40.....65-85 Max. LL.....35 Max. PI 12	As Shown On Plans
TYPE C	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Iron Ore Topsoil		2-1/2" ..... 0 No. 40..... 50-85 Max. LL..... 35 Max. PI 12	2-3/4".....0 No. 40.....45-85 Max. LL.....35 Max. PI 12	As Shown On Plans

TABLE 02601-1 CONT'D

TYPE D		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Sand-Shell		1-3/4" ..... 0-10 No. 4 ..... 45-65 No. 40 ..... 50-70 Max. LL ..... 35 Max. PI 12	1-3/4" ..... 0-10 No. 40 ..... 45-65 Max. LL ..... 35 Max PI 12	As Shown On Plans
TYPE E		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Shell with Sand and Caliche		1-3/4" ..... 0 No. 40 ..... 45-65 Max. LL ..... 35 Max. PI 10	1-3/4" ..... 0 No. 40... .... 45-65 Max. LL ..... 35 Max. PI 12	As Shown On Plans
TYPE F		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Caliche		1-3/4" ..... 0 No. 4 ..... 45-75 No. 40 ..... 50-85 Max. LL ..... 40 Max. PI 12	1-3/4" ..... 0 No. 40 ..... 50-85 Max. LL ..... 40 Max. PI 12	As Shown On Plans
TYPE G				
Crushed Blast Furnace Slag				As Shown On Plans

G. The limits establishing reasonable close conformity with the specified gradation and plasticity index are defined by the following:

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 stock- pile 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 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. Type 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 sub-grade and replaced with approved material.

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

D. The surface of the sub-grade 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 re-compacting by sprinkling and rolling.

E. Sufficient sub-grade shall be prepared in advance to insure satisfactory prosecution of the work.

F. Material excavated in the preparation of the sub-grade shall be utilized in the construction of adjacent shoulders and slopes or other- wise disposed on as directed, and 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 C, TYPE F, AND TYPE G MATERIAL:

A. Immediately before placing the base material, the sub-grade 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 in each 100- foot station.

C. Material deposited upon the sub-grade shall be spread and shaped the same day.

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

E. The material shall be sprinkled, if directed, and shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

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

G. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplies 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.

H. The course shall be compacted by method 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 ad directed until a uniform compaction is secured. 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 plans and to the established lines and grades.

b) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section 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.

c) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting 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 established lined and grades.

e) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section 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) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.

I. 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.

J. Where Type C material is used, the material shall be scarified, thoroughly wetted, mixed, manipulated, and bladed so as to secure a uniformly wetted material, and pulled in over the sub-grade in courses and set under the action of blading and rolling. The work of mixing, blading, rolling, shaping, and subsequent maintenance shall be performed by the continuous use of sufficient number of satisfactory rollers and power maintainers with adequate scarifier attachments.

3.03 PLACEMENT OF FIRST COURSE - TYPE D MATERIAL:

A. Immediately before placing the base material, the sub-grade shall be checked as to conformity with grade and section, and corrections made if necessary.

B. All materials shall be delivered in approved vehicles of a uniform capacity.

C. The required amount of shell shall be uniformly spread across the section and allowed to dry sufficiently to insure proper slaking and mixing of the binder material. Immediately upon completion of the drying period, as determined by the ENGINEER, the specified amount of sand admixture as required to produce a combined material meeting the requirements hereinbefore specified, shall be spread uniformly across the shell.

D. The material shall then be sprinkled as required and thoroughly mixed by blading and harrowing, or other approved methods.

E. Failure to proceed with the placing of sand admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

F. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

G. The course shall be compacted by the method 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 plans indicate that the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a) After mixing, all material shall be windrowed, and then spread over the section in layers.

b) The layer shall not exceed 2 inches in loose depth.

c) If necessary to prevent segregation, the material shall be wetted in the window prior to spreading.

d) After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction as directed by the ENGINEER. Succeeding layers shall then be placed similarly until the course is completed.

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

f) The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured.

g) 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 plans, and to the established lines and grades.

h) In that area on which pavement is to be place, any deviation in excess of 1/4 inch in cross section 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.

i) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.

2. When the plans indicate that the "Density Control" method of compaction is to be used, the compaction method shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

H. When indicated on the plans or permitted by the ENGINEER, Type D material may be mixed in a central mixing plant and delivered to the road as a combined mixture. When this method is used, the combined mixture shall meet the requirements for type D material as hereinbefore specified and the placing and compaction requirement shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

3.04 PLACEMENT OF FIRST COURSE - TYPE E MATERIAL:

A. The construction methods for placing the first course of Type E material shall be the same as prescribed for Type D material except that after the shell and sand have been placed, the prescribed amount of caliche shall then be spread across the sand and shell.

B. The composite mixture shall then be sprinkled as required and thoroughly mixed by blading and harrowing or other approved methods.

C. Compaction of the first course of Type E material shall be the same as prescribed above for Type D material.

D. Failure to proceed with placing the sand and caliche admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

E. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

3.05 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.

3.06 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 in that part of the base included in the top 8 inches immediately below the finished surface of the roadway 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.

3.07 TOLERANCES:

A. When tolerances are permitted by the plans, the limits establishing reasonable close conformity with percent density specified are defined by the following:

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 width of flexible base as shown on the plans.

1. The flexible base shall be measured for depth by the units of 2000 square yards, with one measurement taken at a location selected by the ENGINEER.
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.

C. The ENGINEER may accept the work provided no more than 2 out of 10 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 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 other 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 * * ***

SECTION 02610

PRIME COAT

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION:

A. Prime coat shall consist of application of asphaltic materials on 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 material is 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 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.

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

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

4. 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 degrees 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

conforming to the requirements set forth in Table 2610-1.

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 degrees F. and is rising and shall not be applied when the ambient air temperature is below 50 degrees 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.

TABLE 2610-1

Specification Designation	Test	AASHTO Test Method	ASTM MC Method	Grade MC 30	MC 70	MC 250	MC 800	MC 3000
Flash Point (Open Cleve) oF, Min.		T 48	D 92	100	100	150	150	150
Viscosity 140oF, Kinematic, CS		T 201	D 2170 60	30 to 140	70 to 500	250 to 1600	800 to 6000	3000 to
Furol Viscosity at 77 F. (Secs.)		T 72	D 88	75-150				
at 122 F. (Secs.)				60-120	300			
at 140 F. (Secs.)				125-250	to			
at 180 F. (Secs.)				100-200	600			
Distillation Distillate (% of Total Distillate		T 78	D 402					
to 680 F)								
to 437 F)				0-25	0-20	0-10	-0-	-0-
to 500 F				40-70	25-60	20-55	10-35	0-15
to 600 F				75-93	75-90	70-85	65-80	50-75
Residue from Distillation to 680 F Volume % by Difference Min.				50	55	67	75	80
Tests on Residue From Distillation Penetration at 77 F		T 49	D 5	120 to 250	120 to 250	120 to 250	120 to 250	120 to 250
*Ductility 77 F cm., Min.		T 51	D 113	100	100	100	100	100
Solubility in CC1 4, % Min.		T44	NONE	99.5	99.5	99.5	99.5	99.5

Water, % Min.	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 Naphtha and 15% Xylene.

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

8. Recalibrates 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 spacings 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. 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 mater will be considered incidental to asphaltic material for prime coat with no direct payment or payment therefor.

*** * * * 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 sub-grade, sub-base 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 Texas SDHPT test methods noted below.

PART 2 PRODUCTS

2.01 ASPHALTIC MATERIALS

A. Asphalt cement binders shall be un-cracked 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 degrees 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 degrees 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 he 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 02612-1

Specification Designation	AASHTO Test Method	ASTM Test 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	425	350
Penetration of Original 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 % or Orig. Pen., Min.	T49	D5	52	50	50	50	50	50
Ductility at 77 F, cm. after Loss at 325 F, Min.	T51	D113	50	50	100	100	100	100
Solubility in CC1 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 CC1 4 substituted for CS2.

** Using 85% Standard Naphtha Solvent and 15% xylene,

TABLE 02612-2

	OA-30		OA-175*8		OA-400	
TYPE-GRADE	**MIN.**	**MAX.**	**MIN.**	**MAX.**	**MIN.**	**MAX.**
Penetration at 32 F, 200g., 60 sec.	15	--	--	--	--	--
Penetration at 77 F, 100g., 5 sec.	25	35	150	200	--	--
Penetration at 115 F, 50g., 5 sec.	--	65	--	--	--	--
Ductility at 77 F, 5 Original OA	2	--	70	--	--	--
Flash Point C.O.C., F	450	--	425	--	425	--
Softening Point, R. & B., F	185	--	95	130	--	--
Thin Film Oven Test, 1/8 in. Film 50g., 5 hrs., 325 F, % Loss by Wt.	--	0.4	--	1.4	--	2.0
Penetration of Residue, at 77 F, 100g., 5 sec. % of Original Pen	--	--	40	--	--	--
Ductility of Residue at 77 F, 5 cm/min., cms	--	--	--	100	--	--
Solubility in Trichloroethylene, %	99.0	---	99.0	---	99.0	---
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 02612-3

PROPERTIES	AC-1.5		AC-3		AC-5		AC-10		AC-20		AC-20	
	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, C.O.C., F...	425	--	425	--	425	--	450	--	450	--	450	--
Solubility in trichloroethylene percent.....	99.0	--	99.0	--	99.0	--	99.0	--	99.0	--	99.0	--
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 (solid 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 ration, 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@212F) 100 min.

PH of Latex ..... 9.4 - 10.5
Surface tension ..... 28 - 42 dynes/cm2

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

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

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

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 an any work in which it may have been incorporated as an integral component will be only tentatively accepted by the COUNTY. 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 COUNTY.

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, 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:

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
SDHPT Tex - 416 - E	Method of Calculating Plasticity Index of Solids
SDHPT Tex - 217 - F	(I & II) Determination of Deleterious Materials and Decantation Test
SDHPT Tex - 203 - F	Quality Test for Mineral Aggregates

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

C. When property 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 Highway Department 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. 40 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	21 to 53
Passing 3/8" sieve, retained on 3/8" 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, retained on 3/8" sieve	95 to 100
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	to 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 as directed by the ENGINEER, shall be in accordance with Section 02610 - Prime Coat, and as specified herein.

B. Prime coat shall be applied to 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 of 0.10 to 0.30 gallon per square yard or as directed by the ENGINEER. It shall be applied only when permitted by the ENGINEER and when the air temperature is not less than 40 F.

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 an 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 an 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 not be 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, just sufficient sand shall be spread over the surface to blot up the excess liquid asphalt and prevent picking it up under 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 spraying upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; and 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 and other traffic. Barricades shall be places where necessary to protect the prime coat. If, after prime coat has been applied satisfaction of the ENGINEER and has been accepted by him, it is distributed 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-surfaces pavement, a tack coat shall be evenly and uniformly applied to such existing pavement preceding the placing of the asphalt concrete. The surface shall be free of water, all foreign material, or dust when the tack coat is applied. No greater area shall be treated in any one day 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 rate shall be 0.10 it 0.15 gallons per square yard 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 outlines in SDHPT Test Method Tex-200-F (Part 1 or 3), mineral filler shall meet the following gradations by weight:

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

2.06 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 determines by the ENGINEER, or 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 established 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 ENGINEER will consider other factors, in addition to air voids and Marshall stability, such as durability, water resistance and asphalt film thickness when developing the mix design.

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

Passing 1-3/4" sieve, retained on 7/8" sieve ..... Plus or minus 5
Passing 7/8" sieve, retained on 3/8" sieve ..... Plus or minus 5
Passing 5/8" sieve, retained on 3/8" sieve ..... Plus or minus 5
Passing 3/8" sieve, retained on No. 4 sieve ..... Plus or minus 5
Passing No. 4 sieve, retained on No. 10 sieve ..... Plus or minus 5
Total retained on No. 10 sieve ..... Plus or minus 5
Passing No. 10 sieve, retained on No. 40 sieve ..... Plus or minus 3
Passing No. 40 sieve, retained on No. 80 sieve ..... Plus or minus 3
Passing No. 80 sieve, retained on No. 200 sieve ..... Plus or minus 3
Passing No. 200 sieve ..... Plus or minus 3

Asphaltic Material ..... Plus or minus 0.05 by weight or 1.2 by volume

Mixing Temperature ..... Plus or minus 20 F

E. Asphaltic mixture shall be tested in accordance with SDHPT 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	99%	99%
Optimum	97%	97%

Stability - (Hveenm)		
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 Texas SDHPT Item 340.

2.09 STOCKPILING, STORAGE, PROPORTIONING AND MIXING:

A. Stockpiling, storage proportioning and mixing operations shall be in accordance with the Provisions of Texas SDHPT 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 60 F and falling, but may be placed when the air temperature is 50 F and rising.

C. Mat thicknesses of 1> inches 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 which have been thinly coated with a minimal amount of paraffin oil, lime slurry, time 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 Tile 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 afford 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 suitable provisions for moistening the surface of the tires while operating; and shall be approved by the ENGINEER.
2. Two Axle Tandem Roller. This roller shall be acceptable power-driver, 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.
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.
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-edges 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 from 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 this 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, 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 established 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 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 longtitudally 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 outlines in Texas SDHPT 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, but 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 places over plant mix bituminous treated base or when plant mixed seal coat is places 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 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 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 herein before 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. The cost for the additional coring test shall be at the same rate charged by commercial laboratories.

I. Price Adjustment for Roadway Density:

1. The pavement 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, is 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 92.0	*

* 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.

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 02615

STABILIZED AGGREGATE LAYER (SAL)
PAVED ROADWAY APPLICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes – These specifications cover the requirements for constructing a Stabilized Aggregate Layer (SAL) in conjunction with other components and/or activities typical of paved or unpaved roadways or parking lots (i.e. subgrade preparation, asphalt, etc.). The work includes all materials, labor, equipment, storage, private lab testing, sampling, handling, excavation, disposal, tools, removal, placement, hauling, shaping, compacting, surveying, finishing to grade, curing, fees, permits, test-rolling and/or proof-rolling the aggregate including all appurtenances and incidentals necessary to complete the work. This specification is for stabilization of the pavement section aggregate base layer only. The properties and performance of the SAL have been considered in and are integral to the structural design of the pavement structure; thus no modification of the pavement structure shall be made other than the alternative stabilization methods described herein and in accordance with the requirements for submission of alternatives described herein.

B. Mechanically Stabilized Layer - This work shall consist of Mechanical Stabilization to reinforce the aggregate base layer. Mechanically Stabilized Aggregate includes, but is not limited to, the confinement of the aggregate material by use of a geogrid reinforcement system whereby the design requirements of the project are achieved.

C. Related Sections
   1. Section 02200 - Site Preparation
   2. Section 02300 - Earthwork
   3. Section 02700 - Bases, Ballasts, Pavements, and Appurtenances

1.02 DEFINITIONS

A. Stabilized Aggregate Layer (SAL) – A SAL is a layer of a defined thickness of unbound aggregate or base course materials that have been modified or improved through mechanical or chemical methods whereby the resulting layer behaves as a composite layer and has improved properties and performance capabilities.'

B. Mechanically Stabilized Layer (MSL) – A composite layer of a defined thickness comprised of unbound aggregate or base course materials combined with one or more layers of a polymeric geogrid grid structure that has been formed by a regular network of integrally connected, multi-directional tensile elements of appropriate orientation, size and shape with triangular apertures of appropriate size and shape to allow interlocking with the unbound aggregate or base course materials. The combination of the two materials creates an improved or modified composite layer with significantly improved properties and performance capabilities.

C. Chemical Stabilized Layer (CSL) – A composite layer of a defined thickness comprised of unbound aggregate or base course materials combined with some means of chemical (lime, cement, or other) that creates an improved or modified composite layer with significantly improved properties and performance capabilities.

D. Unbound Aggregate Layer – A layer of a defined thickness of unbound aggregate or base course materials that has not be modified or improved in any way. To achieve equivalent properties and performance to a SAL, an unbound aggregate layer will require greater thickness than a SAL.

E. Unpaved Application – Use of a SAL immediately over a soft subgrade soil in order to improve the bearing capacity and mitigate deformation of the subgrade soil under repeated loads. The goal of this application may be to reduce undercut requirements, improve construction efficiency, reduce the amount of aggregate subbase/base material required, provide a stiff working platform for pavement construction, or combination of these. The use of a SAL may also be considered as "unpaved" when the composite structure is utilized beneath a paved surface (rigid or flexible pavement) for the purpose of achieving the needed subgrade improvement for construction trafficking and site access.

F. Paved Application – Use of a SAL beneath or within the aggregate base course of a flexible (asphalt) pavement system to improve the stiffness of the system. The goal of this application may be to reduce the amount of aggregate or asphalt material required (reducing initial cost), increase the life of the pavement (reduce life-cycle cost), or a combination of the two.

1.04 SYSTEM DESCRIPTION

A. Option A – Mechanically Stabilized Layer - This work shall consist of Mechanical Stabilization to reinforce the aggregate base layer. Mechanically Stabilized Aggregate includes, but is not limited to, the confinement of the aggregate material by use of a geogrid reinforcement system whereby the design requirements of the project are achieved.

1.05 DESIGN & PERFORMANCE

A. The design of the pavement shall be in accordance with the 1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures.

B. The Mechanically Stabilized Layer within the pavement structure shall have a thickness of 10.5 inches (267 mm) or as shown on the contract plans.

C. The design of the pavement shall be based on the following parameters:
1. Design traffic = 1000000 ESALs
2. Mechanically Stabilized Layer SN = 1.68

D. The MSL shall be incorporated into the pavement design by utilizing modified layer coefficients. Modified layer coefficients shall be calibrated and validated with the results of full scale laboratory, field and/or accelerated pavement testing where actual geogrids are tested in-soil and in representative conditions.

E. In-air index testing of geogrid properties, or explanations of performance based on in-air index testing of geogrid properties are not sufficient to understand the complex mechanisms involved in soil/geogrid interaction and/or the performance of MSLs. Therefore, no acceptance of alternates based on material property comparisons or explanations of performance based on in-air testing of geogrid properties will not be allowed.

F. Any submittal for an alternative MSL must be submitted at least 2 weeks in advance of the bid date and must be accompanied with the following:

1. A design signed and sealed by a professional engineer registered to practice in the country, state or province in which the project is located.
2. A written statement from the alternative MSL design engineer-of-record that the design is based on the AASHTO 1993 Pavement Design Guide and utilizes modified layer coefficient that have been properly calibrated and validated for the geogrid reinforcement utilized in the MSL in accordance with this Section.

1.06 SUBMITTALS

A. Submit representative geogrid product sample.

B. Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets the requirements of sub-part 2.02A of this Section.

C. Submit Manufacturer's installation instructions and general recommendations.

1.07 QUALITY ASSURANCE

A. Pre-Construction Conference - Prior to the start of construction of the MSL, the Contractor shall arrange a meeting at the site with the geogrid material supplier and, where applicable, the geogrid installer. The Owner and the Engineer shall be notified at least 3 days in advance of the time of the meeting. A representative of the geogrid supplier shall be available on an "as needed" basis during construction.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection

1. Prevent excessive mud, wet concrete, epoxy, or other deleterious materials from coming in contact with and affixing to the geogrid materials.
2. Store at temperatures above -20 degrees F (-29 degrees C).
3. Rolled materials may be laid flat or stood on end.
4. Geogrid materials should not be left directly exposed to sunlight for a period longer than the period recommended by the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. An approved source of geogrid is The Tensar Corporation, Morrow, GA or their designated representative.

2.02 MATERIALS

A. Structural Soil Reinforcement Geogrid – The geogrid component of the SAL shall be TriAx TX5 or TX7 and shall be integrally formed and produced from a punched sheet of polypropylene which is then oriented in three substantially equilateral directions so that the resulting ribs shall have a high degree of molecular orientation, which continues at least in part through the mass of the integral node.

B. The resulting geogrid structure shall have apertures that are triangular in shape, and shall have ribs with a depth-to-width ratio greater than 1.0.

C. The geogrid shall have the nominal characteristics shown in the table below, and shall be certified in writing by the manufacturer to be TX5 or TX7:

TX5

Properties	**Longitudinal**	**Diagonal**	**Transverse**	**General**
Rib pitch, mm (in)	40 (1.60)	40 (1.60)	-	
Mid-rib depth, mm (in)	-	1.3 (0.05)	1.2 (0.05)	
Mid-rib width, mm (in)	-	0.9 (0.04)	1.2 (0.05)	
Rib shape				rectangular
Aperture shape				triangular

PART 3 EXECUTION

3.01 EXAMINATION

A. The Contractor shall check the geogrid upon delivery to verify that the proper material has been received. The geogrid shall be inspected by the Contractor to be free of flaws or damage occurring during manufacturing, shipping, or handling.

3.02 PREPARATION

A. The subgrade soil shall be prepared as indicated on the construction drawings or as directed by the Engineer.

3.03 INSTALLATION

A. The SAL shall be constructed at the proper elevation and alignment as shown on the construction drawings.

B. The geogrid shall be installed in accordance with these plans and specifications and any installation guidelines provided by the manufacturer or as directed by the Engineer.

C. The geogrid may be temporarily secured in place with ties, staples, pins, sand bags or backfill as required by fill properties, fill placement procedures or weather conditions or as directed by the Engineer.

3.04 GRANULAR FILL PLACEMENT OVER GEOGRID

A. Granular fill material shall be placed in lifts and compacted as directed under Section N/A and Section N/A. Granular fill material shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in the geogrid and/or movement of the geogrid.

B. A minimum loose fill thickness of 6 inches (150mm) is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid. When underlying substrate is trafficable with minimal rutting, rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 mph). Sudden braking and sharp turning movements shall be avoided.

3.05 INSPECTION

A. The Owner or Owner's representative may randomly inspect geogrid before, during and after (using test pits) installation.

B. Any damaged or defective geogrid (i.e. frayed coating, separated junctions, separated layers, tears, etc.) will be repaired/replaced in accordance with Section 3.06.

3.06 REPAIR

A. Any roll of geogrid damaged before, during and after installation shall be replaced by the Contractor at no additional cost to the Owner.

B. Proper replacement shall consist of replacing the affected area adding 3ft (1m) of geogrid beyond the limits of the affected area.

3.07 PROTECTION

A. Follow the Manufacturer's recommendations regarding protection from exposure to sunlight.

PART 4 BASIS OF PAYMENT – <u>ALL OPTIONS</u>

4.01 Unit of Measure

Stabilized Aggregate Layer shall be paid for by the square yard (square meter).

The unit price bid per square yard (square meter) shall include all materials, labor, equipment, storage, private lab testing, sampling, handling, excavation, disposal, tools, removal, placement, hauling, shaping, compacting, surveying, finishing to grade, curing, fees, permits, and proof-rolling the SAL including all appurtenances and incidentals necessary to complete the work. Test rolling and/or Proof rolling shall be considered incidental to the contract and will not be measured or paid for separately.

Payment will be made under:

PAY ITEM	PAY UNIT
Stabilized Aggregate Layer	Square Yard (Square Meter)

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

SECTION 02660

CONCRETE CURB AND GUTTER AND VALLEY 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 these 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 02614 - Portland Cement Concrete Paving, or Class "B" concrete conforming to the requirements of Section 03300 - Cast-In-Place Concrete.

C. Preformed 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 02210 - Subgrade Preparation,
2. Section 02601 - Flexible Base,
3. Section 02230 - Roadway Excavation, Borrow, and Embankment.

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 an 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 there will be no interference to the inspection of grade or alignment.

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 placing 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 02614 and Section 03300.

B. Compaction of the concrete placed in forms shall be by vibration or other acceptable methods.

C. Unless otherwise provided, the exposed surfaces of curbs and gutters shall be finished by belting or with wooden floats. 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. Sections shall be separate by open joints 1/8 inch wide except at expansion joints.

3.05 EXPANSION JOINTS

A. Expansion joints shall be formed at the intervals shown on the plans using a performed expansion joints filler having a thickness of 3/4 inch.

B. When the curb and gutter is constructed adjacent to or on concrete pavement, expansion joints, shall be located opposite or at expansion joints in the 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 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 back of the curb 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 and 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 an 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 from 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 plane 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. The loose filler in any joint shall be mortared in place and cured.

I. Excavation shall be as per Subsection 2.02 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 flowline of the gutter.

3. Valley gutter will be measured along the flowline 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 in place.

B. Foundation preparation by excavating or constructing embankment to the required sub-grade 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 * * * ***

SECTION 02780

FLAT WHEEL ROLLING

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 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 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, upon written permission from the ENGINEER, operate other compacting in the same period of time as the specified equipment. If the substituted compaction within the same period of time as would be expected of the specified equipment, as determined by the ENGINEER, 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 or embankment layer or the base course shall be sprinkled if directed and 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, but shall be considered incidental to the other items included in the contract.

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

SECTION 02782

PNEUMATIC TIRE ROLLING

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 45 psi tire pressure.

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 approved by 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 and 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. The pneumatic tire roller under working conditions shall have an effective rolling width of approximately 60 inches and shall be so designed that by ballast loading the total load be varied uniformly from 9,000 pounds or less to 18,000 pounds or more.

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 either 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 or less to 50,000 pounds or more.

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 either 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.