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EXCAVATION AREA					
PT #	NORTHING	EASTING	PT #	NORTHING	EASTING
EXC-A	467165.23	2623207.75	EXC-G	467092.45	2623227.75
EXC-B	467163.62	2623227.75	EXC-H	467094.01	2623207.75
EXC-C	467101.52	2623227.75	EXC-I	467099.07	2623207.75
EXC-D	467099.18	2623257.96	EXC-J	467101.51	2623177.50
EXC-E	467095.19	2623257.65	EXC-K	467105.50	2623177.82
EXC-F	467097.51	2623227.75	EXC-L	467103.08	2623207.75

LEGEND:

HDPE	HIGH DENSITY POLYETHYLENE
HWY	HIGHWAY
PL	PROFILE LINE
PVC	POLYVINYL CHLORIDE
O.D.	OUTSIDE DIAMETER

20' (MAX) EXCAVATION

EXC-A

EXC-B

G

PL 0+75

TEMPORARY SEDIMENT PIPELINE (TO BE PLACED ON EXISTING GRADE)

20' (MAX) PIT EXCAVATION

9'

OHE

43' OF 51" O.D. CONCRETE CASING PIPE

PL 1+00

I

I'

DIRECTION OF TRAFFIC

LA 27/82 CENTERLINE

LA 27/82 PAVEMENT EDGE

ROADWAY EXCAVATION

18" MIN

PVC TO HDPE RESTRAINED JOINT (SEE DETAIL SHEET 46)

13.7'

81' (MAX) PIT EXCAVATION

H

H'

EXC-C

EXC-D

PL 1+25

EXC-L

EXC-K

EXC-J

EXC-I

EXC-H

EXC-F

EXC-G

EXC-E

W

HWY 0+00

HWY 0+25

HWY 0+50

HWY 0+75

HWY 1+00

HWY 1+20

10' PIT EXCAVATION

31' WATERLINE EXCAVATION

20' (MAX) EXCAVATION

30' WATERLINE EXCAVATION

FO

PVC TO HDPE RESTRAINED JOINT (SEE DETAIL SHEET 46)

EXISTING 10" WATERLINE TO BE RELOCATED

TEMPORARY SEDIMENT PIPELINE (TO BE PLACED ON EXISTING GRADE)

PL 1+50

G'

PLAN VIEW

N

0 5 10

GRAPHIC SCALE IN FT HORIZONTAL

12" PAVEMENT PATCH (ASPHALT) OR MATCH EXISTING *

EXISTING PAVEMENT

EXISTING BASE COURSE

EMBANKMENT (AS REQUIRED) *

EXISTING EMBANKMENT

12" MIN

18" MIN

NATURAL GROUND

51" O.D. CONCRETE CASING PIPE

BACKFILL MATERIAL *

BEDDING MATERIAL (6" MIN.) *

GEOTEXTILE FABRIC *

* SEE SPECIFICATIONS FOR DETAILS

PAVEMENT PATCH DETAIL I-I'

NOT TO SCALE

LEGEND:

FO	FIBER OPTIC LINE
W	WATER LINE
OHE	OVERHEAD ELECTRIC LINE
	ROADWAY EXCAVATION
	ACCESS PIT EXCAVATION
	EXISTING HIGHWAY
	SAND
	GRAVEL ROAD
	MARSH

REV.	DATE	DESCRIPTION	BY

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COASTAL PROTECTION AND RESTORATION AUTHORITY
450 LAUREL STREET
BATON ROUGE, LOUISIANA 70801

DRAWN BY: GK | DESIGNED BY: WT | APPROVED BY: GT

OYSTER BAYOU MARSH RESTORATION PROJECT

STATE PROJECT NUMBER: CS-59

FEDERAL PROJECT NUMBER: CS-59

LA 27/82 CROSSING PLAN VIEW AND PAVEMENT PATCH DETAIL

DATE: 06/02/15

SHEET 1 OF 14

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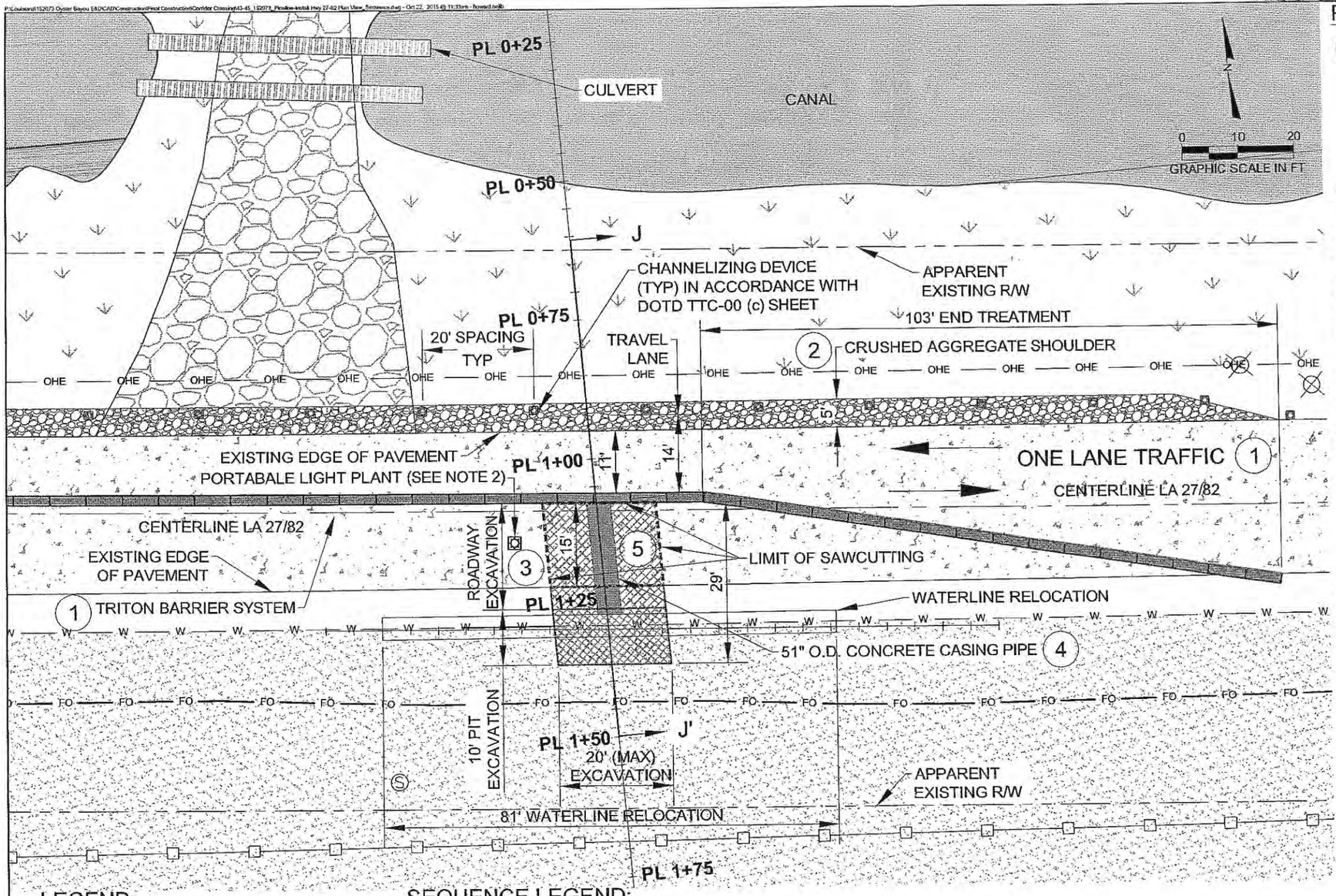

PHASE 1 (CASING PIPE INSTALLATION):

1. PLACEMENT OF TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH DOTD TTC-04 PLAN SHEET 55 AND INCLUDE:
   - TRITON BARRIERS
   - FLAGGERS
   - TEMPORARY SIGNAGE
   - PORTABLE LIGHT PLANTS
2. PLACEMENT OF 5' OF CRUSHED AGGREGATE AND GEOTEXTILE FABRIC ON THE WESTBOUND SHOULDER
3. BRACED TRENCH EXCAVATION MAINTAINING A 12' (MIN) TRAVEL LANE WIDTH
4. PLACEMENT OF CASING PIPE
5. BACKFILL EXCAVATED TRENCH AND PLACE ASPHALT PAVEMENT PATCHING. SEE "CROSSING DETAIL" ON SHEET 41 OF CONSTRUCTION DRAWINGS FOR TRENCH DETAIL. SEE TS-27 OF THE SPECIFICATIONS FOR PAVEMENT PATCH DETAILS.

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL (TTC) DEVICES SHALL BE USED IN ACCORDANCE WITH THE "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION, AND THE MUTCD, 2009 EDITION, AND SHALL MEET THE NCHRP REPORT 350 OR MASH REQUIREMENTS FOR TEST LEVEL 3 DEVICES. (SEE SHEETS 50-55)
2. DURING PHASE 1 OF PERMANENT CASING PIPE INSTALLATION, FLAGGERS SHALL BE USED (24/7). PORTABLE LIGHT PLANTS SHALL BE INSTALLED AT EACH FLAGGER STATION, AND IF NIGHT OPERATIONS ARE CONDUCTED, PORTABLE LIGHT PLANT SHALL BE USED AT THE WORK SITE.
3. ALL NIGHTTIME OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 105.20 OF "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION.
4. SEE SECTION J-J' ON SHEET 48 FOR PHASE 1 CROSS SECTION VIEW.
5. SEE TS-27 FOR TRAFFIC MAINTENANCE REQUIREMENTS.

LEGEND (ABBREVIATIONS):

DOTD	DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LOUISIANA)
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NCHRP	NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
R/W	RIGHT OF WAY
O.D.	OUTSIDE DIAMETER
TTC	TEMPORARY TRAFFIC CONTROL
TYP	TYPICAL
24/7	24 HOURS, 7 DAYS

LEGEND:

- FENCELINE
- RIGHT OF WAY LINE
- OHE — OVERHEAD ELECTRIC LINE
- W — WATERLINE
- FO — FIBER OPTIC LINE
- SANITARY SEWER MANHOLE
- POWER POLE
- EXISTING HIGHWAY
- SAND
- GRAVEL ROAD
- MARSH

SEQUENCE LEGEND:

- ROADWAY EXCAVATION
- ACCESS PIT EXCAVATION
- CRUSHED AGGREGATE
- LIMIT OF SAWCUTTING
- PORTABLE LIGHT PLANT
- CHANNELIZING DEVICE

PLAN VIEW

REV.	DATE	DESCRIPTION	BY

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COASTAL PROTECTION AND RESTORATION AUTHORITY
450 LAUREL STREET
BATON ROUGE, LOUISIANA 70801

DRAWN BY: GK | DESIGNED BY: WT

OYSTER BAYOU MARSH RESTORATION PROJECT

STATE PROJECT NUMBER: CS-59

FEDERAL PROJECT NUMBER: CS-59

APPROVED BY: GT

LA 27/82 PHASE 1 PLAN VIEW CASING PIPE INSTALLATION SEQUENCE OF CONSTRUCTION

DATE: 06/02/15

SHEET 2 OF 14

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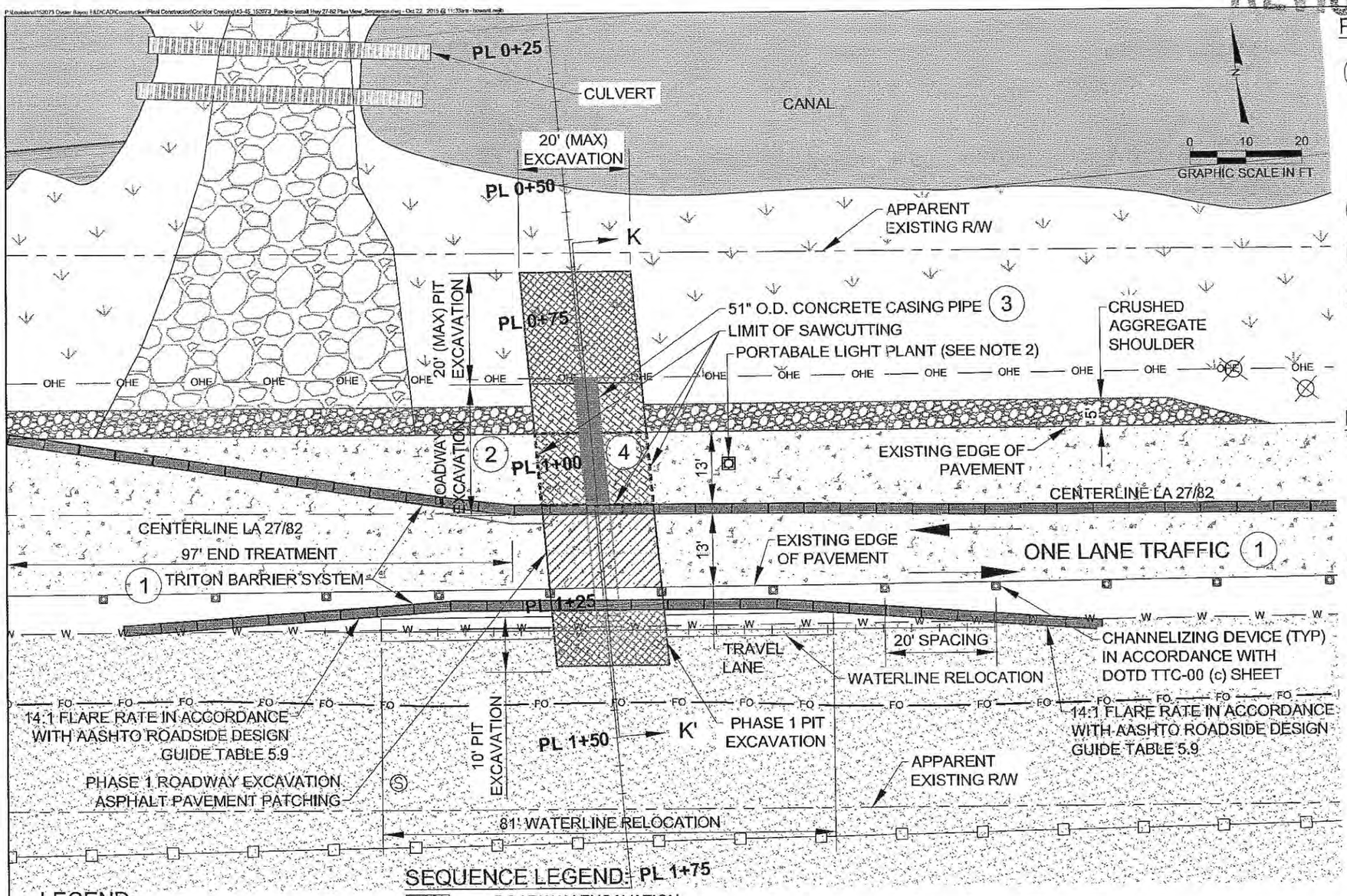

PHASE 2 (CASING PIPE INSTALLATION):

1. PLACEMENT OF TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH DOTD TTC-04 PLAN SHEET 55 AND INCLUDE:
   - TRITON BARRIERS
   - FLAGGERS
   - TEMPORARY SIGNAGE
   - PORTABLE LIGHT PLANTS
2. TRENCH EXCAVATION MAINTAINING A 12' (MIN) TRAVEL LANE WIDTH
3. PLACEMENT OF CASING PIPE
4. BACKFILL EXCAVATED TRENCH AND PLACE ASPHALT PAVEMENT PATCHING. SEE "CROSSING DETAIL" ON SHEET 41 OF CONSTRUCTION DRAWINGS FOR TRENCH DETAIL. SEE TS-27 OF THE SPECIFICATIONS FOR PAVEMENT PATCH DETAILS

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL (TTC) DEVICES SHALL BE USED IN ACCORDANCE WITH THE "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION, AND THE MUTCD, 2009 EDITION, AND SHALL MEET THE NCHRP REPORT 350 OR MASH REQUIREMENTS FOR TEST LEVEL 3 DEVICES. (SEE SHEETS 50-55
2. DURING PHASE 1 AND PHASE 2 OF PERMANENT CASING PIPE INSTALLATION, FLAGGERS SHALL BE USED (24/7). PORTABLE LIGHT PLANTS SHALL BE INSTALLED AT EACH FLAGGER STATION, AND IF NIGHT OPERATIONS ARE CONDUCTED, PORTABLE LIGHT PLANT SHALL BE USED AT THE WORK SITE.
3. ALL NIGHTTIME OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 105.20 OF "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION.
4. SEE SECTION K-K' ON SHEET 49 FOR PHASE 2 CROSS SECTION VIEW.
5. SEE TS-27 FOR TRAFFIC MAINTENANCE REQUIREMENTS.

LEGEND (ABBREVIATIONS):

DOTD	DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LOUISIANA)
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NCHRP	NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
R/W	RIGHT OF WAY
O.D.	OUTSIDE DIAMETER
TTC	TEMPORARY TRAFFIC CONTROL
TYP	TYPICAL
24/7	24 HOURS, 7 DAYS

LEGEND:

- FENCELINE
- RIGHT OF WAY LINE
- OHE — OVERHEAD ELECTRIC LINE
- W — W — WATERLINE
- FO — FO — FIBER OPTIC LINE
- SANITARY SEWER MANHOLE
- POWER POLE
- EXISTING HIGHWAY
- SAND
- GRAVEL ROAD
- MARSH

SEQUENCE LEGEND:

- ROADWAY EXCAVATION
- ACCESS PIT EXCAVATION
- PAVEMENT PATCH
- CRUSHED AGGREGATE
- LIMIT OF SAWCUTTING
- PORTABLE LIGHT PLANT
- CHANNELIZING DEVICE

PLAN VIEW

REV.	DATE	DESCRIPTION	BY

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COASTAL PROTECTION AND RESTORATION AUTHORITY
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BATON ROUGE, LOUISIANA 70801

DRAWN BY: GK | DESIGNED BY: WT

OYSTER BAYOU MARSH RESTORATION PROJECT

STATE PROJECT NUMBER: CS-59

FEDERAL PROJECT NUMBER: CS-59

APPROVED BY: GT

LA 27/82 PHASE 2 PLAN VIEW CASING PIPE INSTALLATION SEQUENCE OF CONSTRUCTION

DATE: 06/02/15

SHEET 3 OF 14

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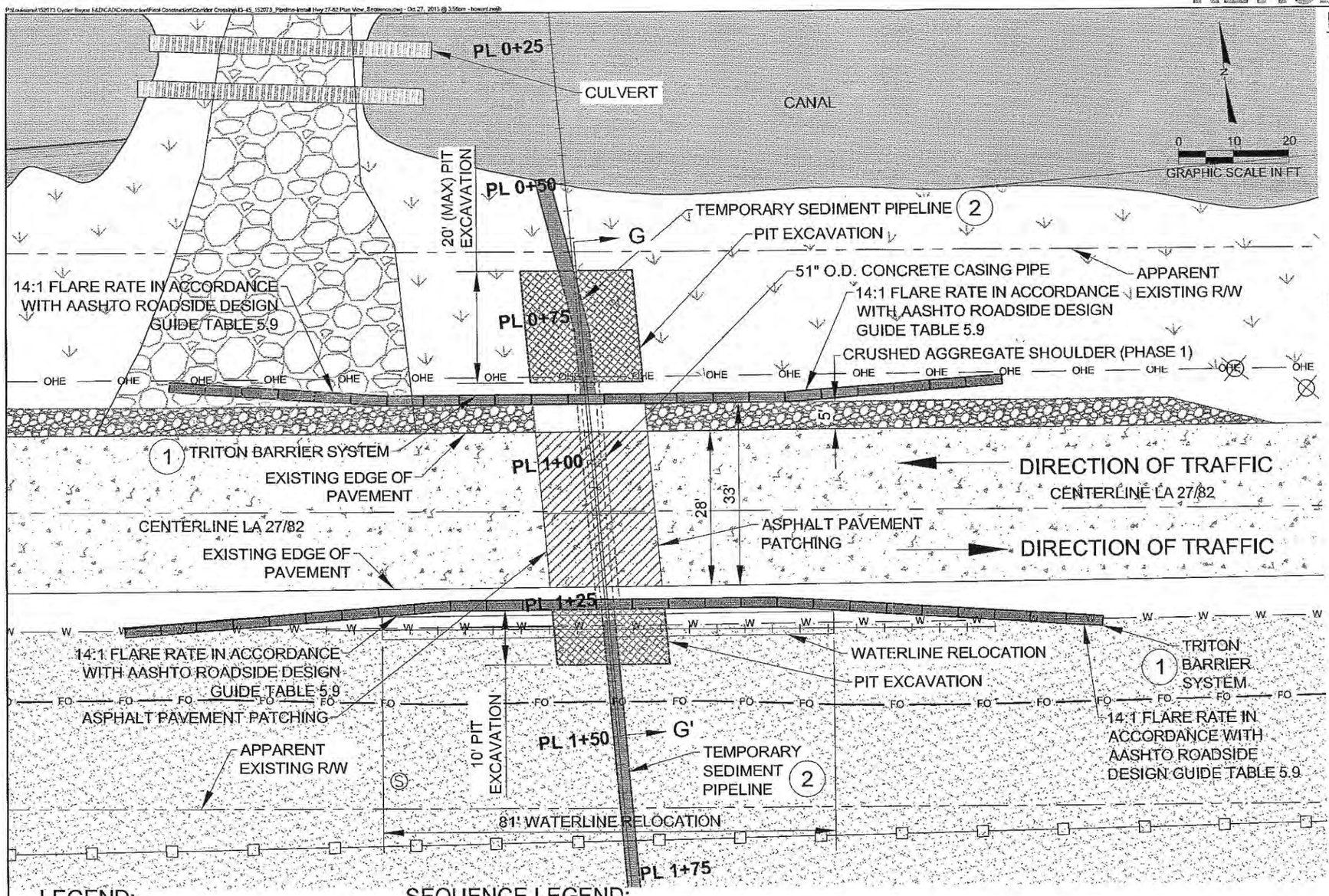

PHASE 3 (DREDGING OPERATIONS):

(1) PLACEMENT OF TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED AS SHOWN ON THE PLANS UNTIL THE MARSH FILL AREAS HAVE BEEN ACCEPTED, THE TEMPORARY SEDIMENT PIPELINE HAS BEEN REMOVED, AND THE ACCESS PITS HAVE BEEN BACKFILLED.
TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH DOTD TTC-04 PLAN SHEET 55 AND INCLUDE:

- TRITON BARRIERS
- TEMPORARY SIGNAGE

(2) FOLLOWING INSTALLATION, THE TEMPORARY SEDIMENT PIPELINE WILL BE LOCATED WITHIN THE CLEAR ZONE.

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL (TTC) DEVICES SHALL BE USED IN ACCORDANCE WITH THE "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION, AND THE MUTCD, 2009 EDITION, AND SHALL MEET THE NCHRP REPORT 350 OR MASH REQUIREMENTS FOR TEST LEVEL 3 DEVICES. (SEE SHEETS 50-55)
2. TRITON BARRIERS SHALL BE USED TO SHIELD FORMIDABLE OBSTACLES FROM PIPELINE AND EQUIPMENT WITHIN THE CLEAR ZONE AS SHOWN IN THE PLANS AND IN ACCORDANCE WITH THE "ROADSIDE DESIGN GUIDE" (AASHTO 4th EDITION, 2011) AND TS-27 OF THE SPECIFICATIONS.
3. SUFFICIENT SIGNAGE INDENTIFYING THE WORK AREA SHALL BE INSTALLED AND REMAIN THROUGHOUT THE DURATION OF THE PROJECT.
4. THE CONTACTOR SHALL BE LIABLE FOR ANY DAMAGE TO PIPELINE AND/OR EQUIPMENT BY FORMIDABLE OBSTACLES AND SHALL IMMEDIATELY REPAIR ANY DAMAGE TO THE SEDIMENT PIPELINE CAUSED BY SUCH.
5. SEE SECTION A-A' ON SHEET 46 FOR PHASE 3 CROSS SECTION VIEW.
6. FOLLOWING PLACEMENT OF PAVEMENT PATCH, THERMOPLASTIC PAVEMENT MARKINGS SHALL CONFORM TO THE "LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES", 2006 EDITION, SECTION 732.
7. SEE TS-27 FOR TRAFFIC MAINTENANCE REQUIREMENTS.
8. CONTRACTOR MAY WIDEN TURNOUT AT OIL FIELD ROAD AND HIGHWAY 27/82 AS NECESSSARY TO FACILITATE ACCESS TO THE PROJECT AREA. SEE TS-XX FOR DETAILS.

LEGEND (ABBREVIATIONS):

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
DOTD	DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LOUISIANA)
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NCHRP	NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
R/W	RIGHT OF WAY
O.D.	OUTSIDE DIAMETER
TTC	TEMPORARY TRAFFIC CONTROL

LEGEND:

- FENCELINE
- RIGHT OF WAY LINE
- OHE — OVERHEAD ELECTRIC LINE
- W — W — WATERLINE
- FO — FO — FIBER OPTIC LINE
- Ⓢ SANITARY SEWER MANHOLE
- POWER POLE
- EXISTING HIGHWAY
- SAND
- GRAVEL ROAD
- MARSH

SEQUENCE LEGEND:

- ACCESS PIT EXCAVATION
- PAVEMENT PATCH
- CRUSHED AGGREGATE

PLAN VIEW

REV.	DATE	DESCRIPTION	BY

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BATON ROUGE, LOUISIANA 70801

DRAWN BY: GK | DESIGNED BY: WT

OYSTER BAYOU MARSH RESTORATION PROJECT

STATE PROJECT NUMBER: CS-59

FEDERAL PROJECT NUMBER: CS-59

APPROVED BY: GT

LA 27/82
PHASE 3 PLAN VIEW
DREDGING OPERATIONS:
SEQUENCE OF CONSTRUCTION

DATE: 06/02/15

SHEET 4 OF 14

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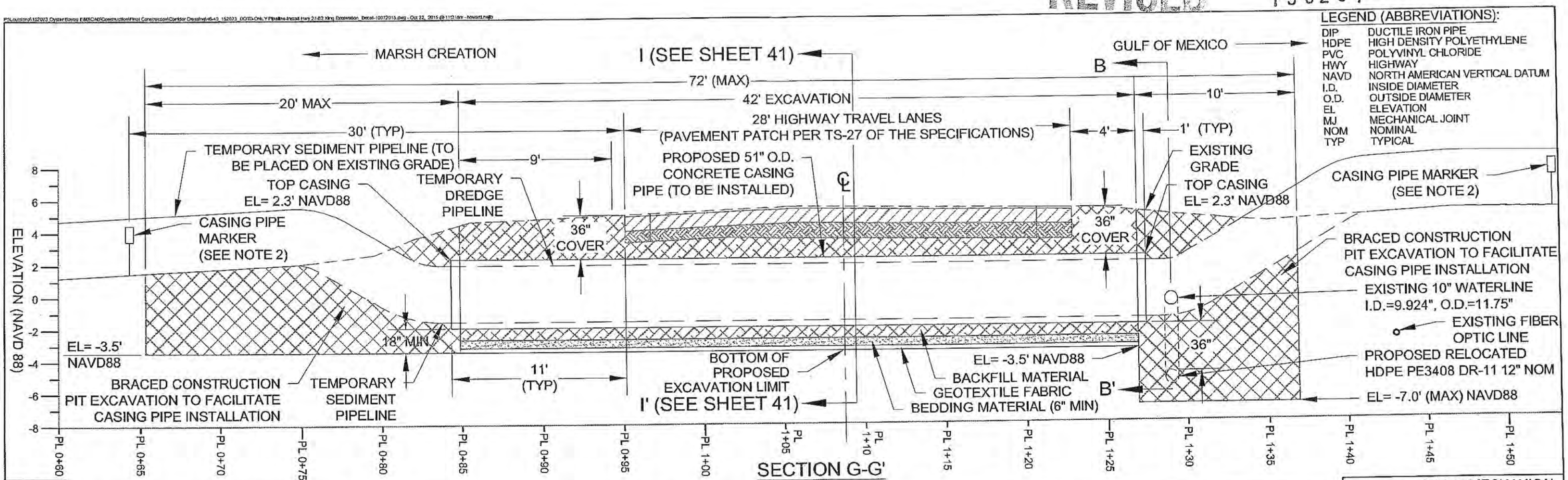


SECTION G-G'

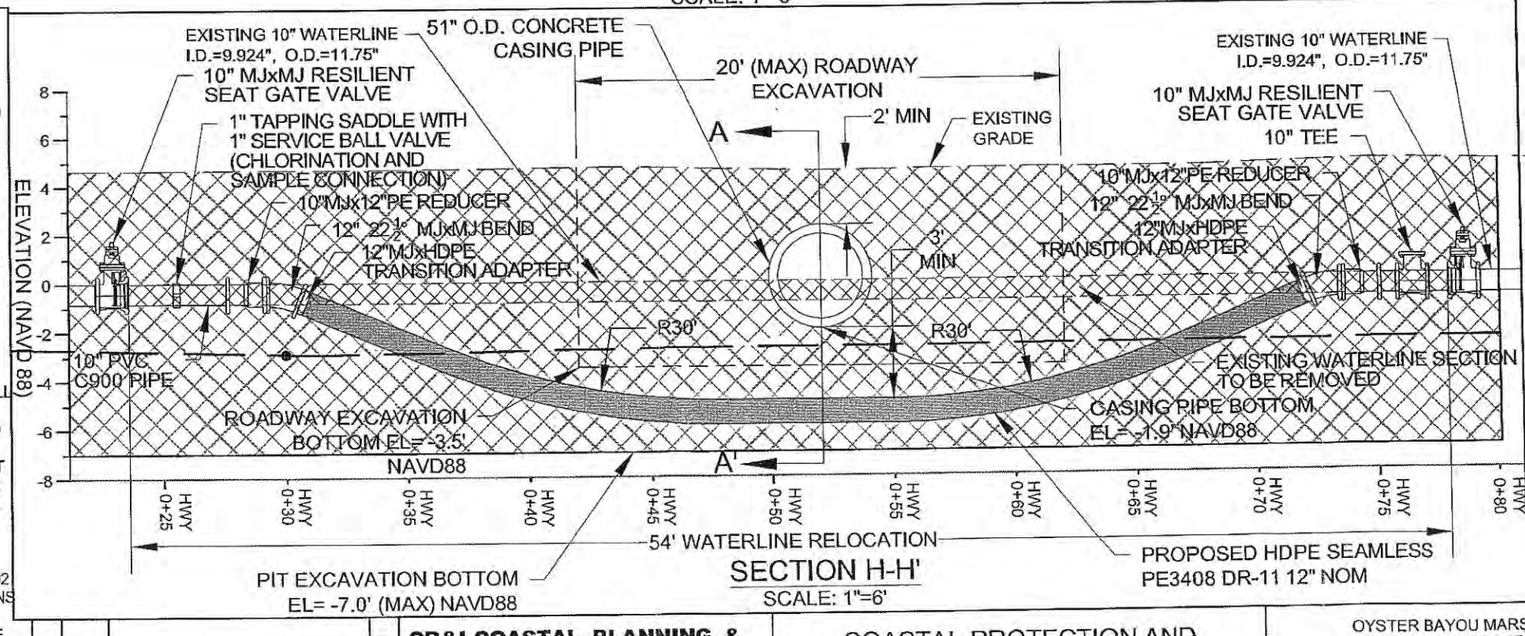
SCALE: 1"=6'

LEGEND (ABBREVIATIONS):

DIP	DUCTILE IRON PIPE
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
HWY	HIGHWAY
NAVD	NORTH AMERICAN VERTICAL DATUM
I.D.	INSIDE DIAMETER
O.D.	OUTSIDE DIAMETER
EL	ELEVATION
MJ	MECHANICAL JOINT
NOM	NOMINAL
TYP	TYPICAL

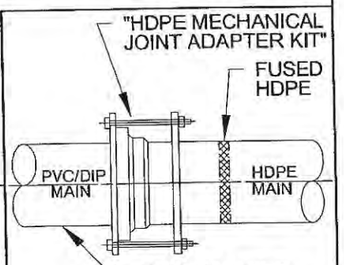
NOTES:

1. SEE TS-27 OF THE CONSTRUCTION SPECIFICATIONS FOR INFORMATION REGARDING SEDIMENT PIPELINE HIGHWAY CROSSING REQUIREMENTS.
2. SEE SHEET 56 FOR CASING PIPE MARKER CONSTRUCTION DETAILS.
3. EXISTING UTILITIES AND/OR PIPELINES NOT SHOWN COULD BE PRESENT IN THE VICINITY OF THE CONVEYANCE CORRIDOR CROSSING OF LA 27/82.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY EXISTING UTILITIES, STRUCTURES AND OTHER EXISTING FEATURES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MAY BE ATTRIBUTED TO FAILURE TO ACCURATELY LOCATE AND PRESERVE EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES.
5. EXISTING ELEVATIONS, UTILITIES, STRUCTURES, AND FEATURES, AS SHOWN, WERE TAKEN FROM LONNIE G. HARPER AND ASSOCIATES TOPOGRAPHIC AND MAGNETOMETER SURVEY, DATED MARCH 2015.
6. ONE LANE SHALL REMAIN OPEN AT ALL TIMES DURING CASING PIPE INSTALLATION. THE WEST BOUND LANE SHALL BE WIDENED USING CRUSHED AGGREGATE CONFORMING TO THE LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGES, 2006 EDITION, STANDARD SPECIFICATION 1003.04 (a). A TRITON BARRIER OR APPROVED EQUIVALENT SHALL BE INSTALLED ALONG THE CENTERLINE OF LA 27/82 TO SEPARATE VEHICULAR TRAFFIC FROM THE OPEN-CUT. TRAFFIC CONTROL SHALL BE CONDUCTED PER PLAN SHEETS 43-45, 48-49, AND 50-55.
7. SEE SPECIFICATIONS SECTION 203 FOR EXCAVATION, EMBANKMENT, AND GEOTEXTILE FABRIC. SEE SECTION 302 FOR CLASS II BASE COURSE. SEE SPECIFICATION SECTIONS 502 AND 510 FOR ASPHALTIC CONCRETE PATCHING. SEE SPECIFICATION SECTION 701 FOR CONCRETE CASING PIPE. SEE SPECIFICATION SECTION 726 FOR BEDDING MATERIAL. THESE SPECIFICATIONS ARE FROM "LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGES", 2006 EDITION FROM THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (DOTD) SPECIFICATIONS LOCATED IN APPENDIX VIII.
8. ALL JOINTS SHALL BE RESTRAINED.



SECTION H-H'

SCALE: 1"=6'



NOTES:

1. THE MJ ADAPTER KIT CONSISTS OF:
   - HDPE MJ ADAPTER WITH METAL INSERT
   - METAL GLAND
   - GASKET
   - ATTACHMENT BOLTS AND NUTS.

PVC TO HDPE RESTRAINED JOINT DETAIL

NOT TO SCALE

REV.	DATE	DESCRIPTION	BY

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450 LAUREL STREET
BATON ROUGE, LOUISIANA 70801

DRAWN BY: GK | DESIGNED BY: WT

OYSTER BAYOU MARSH RESTORATION PROJECT

STATE PROJECT NUMBER: CS-59

FEDERAL PROJECT NUMBER: CS-59

APPROVED BY: GT

LA 27/82 CROSSING OPEN CUT EXCAVATION SECTIONS G-G' AND H-H'

DATE: 06/02/15

REVISED

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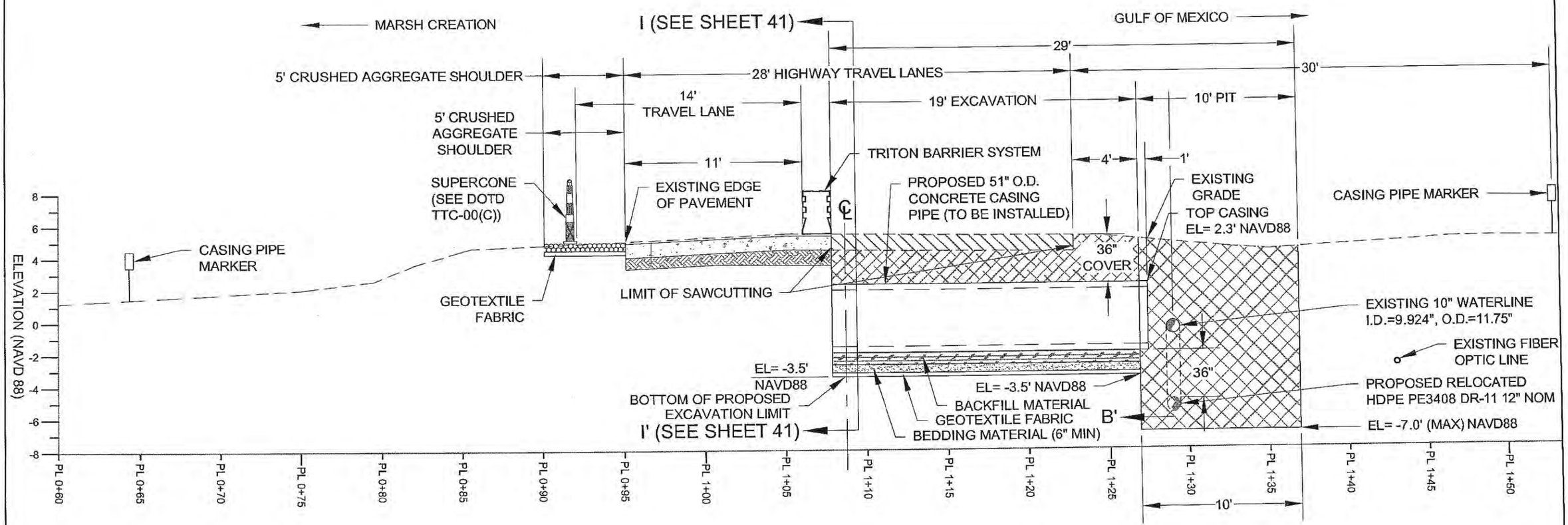

SECTION J-J'
SCALE: 1"=6'

LEGEND (MATERIAL)

- EXISTING PAVEMENT
- CRUSHED AGGREGATE
- PAVEMENT PATCH
- BEDDING MATERIAL
- BACKFILL MATERIAL
- ACCESS PIT EXCAVATION
- ROADWAY EXCAVATION
- EXISTING GRADE

LEGEND (ABBREVIATIONS):

DOTD	DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LOUISIANA)
EL	ELEVATION
HDPE	HIGH DENSITY POLYETHYLENE
HWY	HIGHWAY
NAVD	NORTH AMERICAN VERTICAL DATUM
NOM	NOMINAL
PL	PROFILE LINE
I.D.	INSIDE DIAMETER
O.D.	OUTSIDE DIAMETER

REV.	DATE	DESCRIPTION	BY

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OYSTER BAYOU MARSH RESTORATION PROJECT
STATE PROJECT NUMBER: CS-59
FEDERAL PROJECT NUMBER: CS-59
APPROVED BY: GT

LA 27/82 CROSSING
PHASE 1 SECTION J-J'
CASING PIPE INSTALLATION
DATE: 06/02/15
SHEET 6 OF 14

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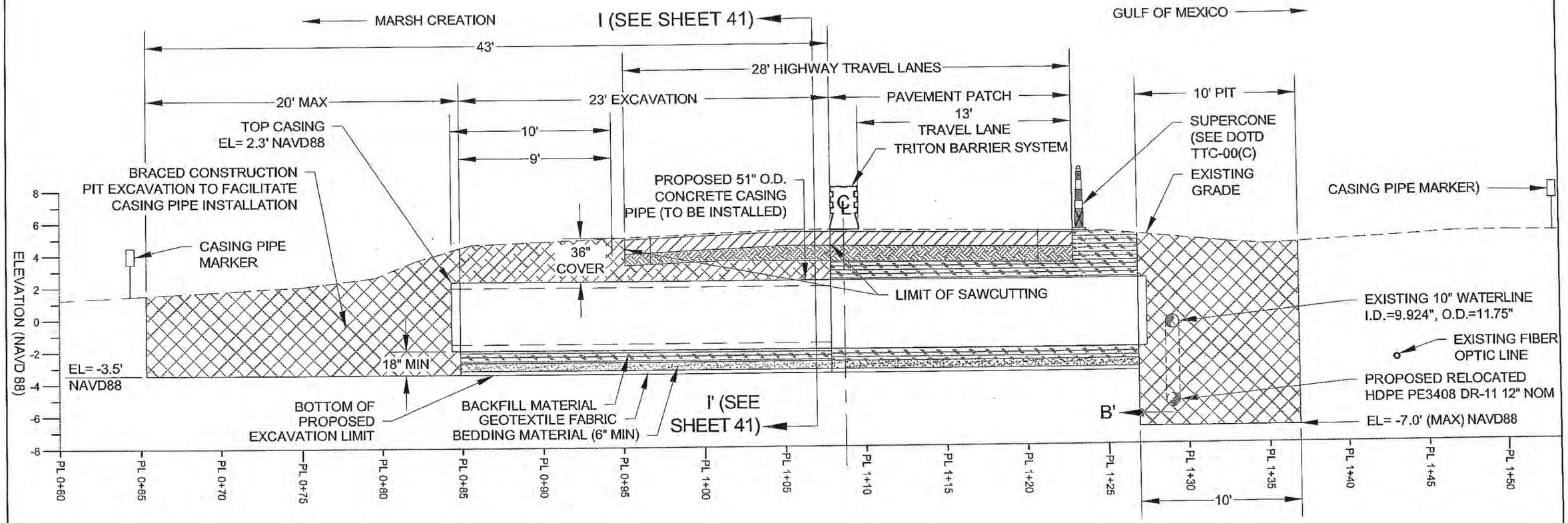

SECTION K-K'
SCALE: 1"=6'

LEGEND (MATERIAL)

- EXISTING PAVEMENT
- PAVEMENT PATCH
- BEDDING MATERIAL
- BACKFILL MATERIAL
- ACCESS PIT EXCAVATION
- ROADWAY EXCAVATION
- EXISTING GRADE

LEGEND (ABBREVIATIONS):

DOTD	DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LOUISIANA)
EL	ELEVATION
HDPE	HIGH DENSITY POLYETHYLENE
HWY	HIGHWAY
NAVD	NORTH AMERICAN VERTICAL DATUM
NOM	NOMINAL
PL	PROFILE LINE
I.D.	INSIDE DIAMETER
O.D.	OUTSIDE DIAMETER

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OYSTER BAYOU MARSH RESTORATION PROJECT

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LA 27/82 CROSSING
PHASE 2 SECTION K-K'
CASING PIPE INSTALLATION

DATE: 06/02/15

SHEET 7 OF 14

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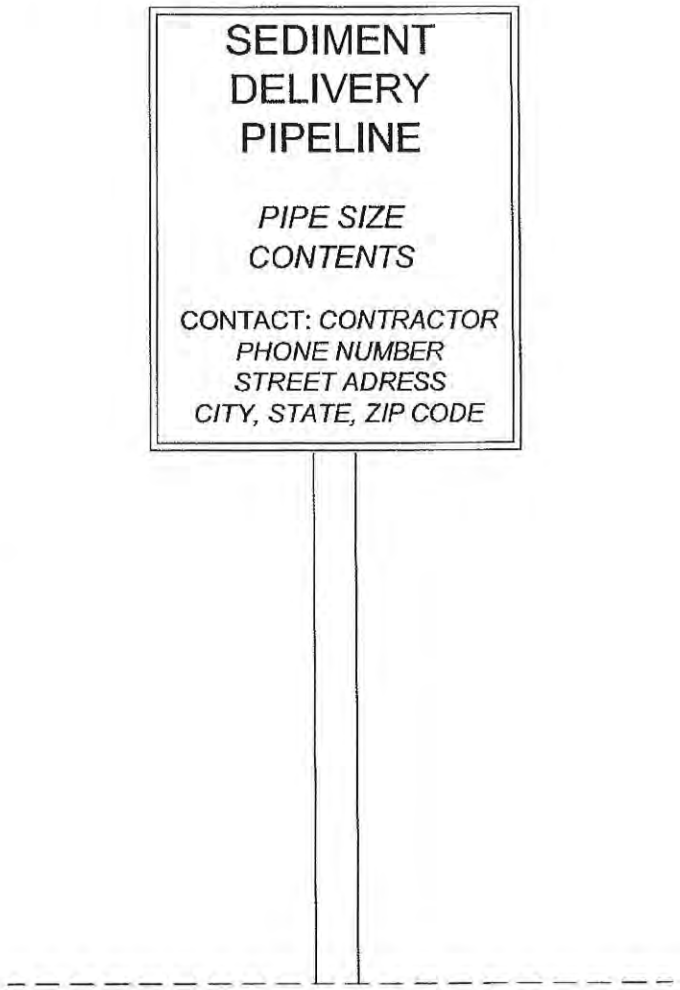
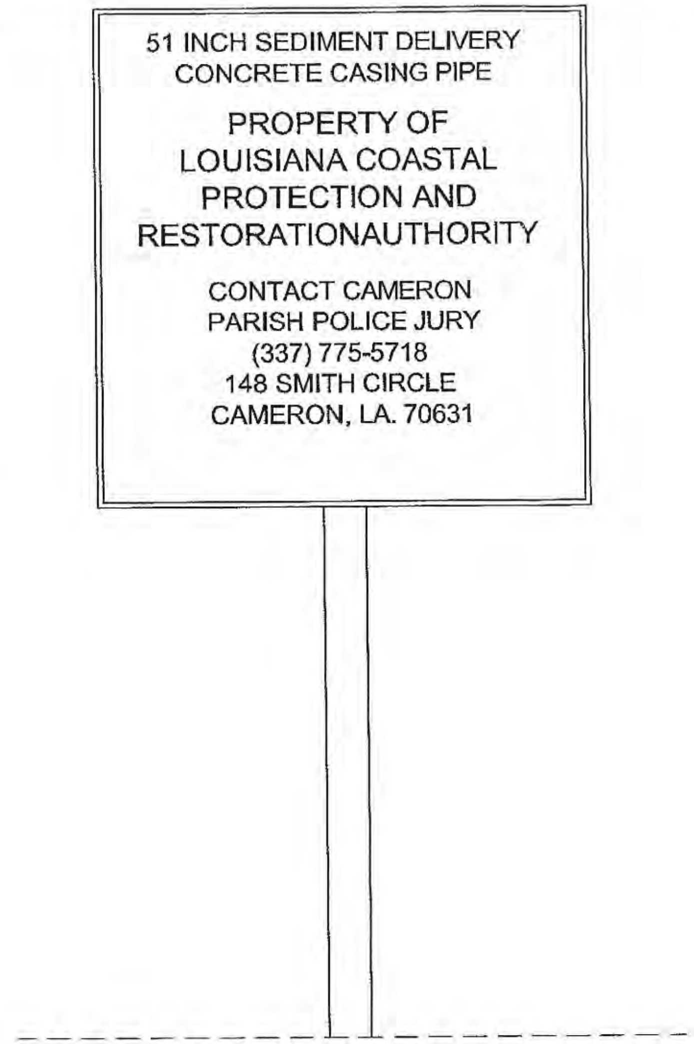
153267



TEMPORARY PIPELINE MARKER DETAIL
(NOT TO SCALE)

TEMPORARY PIPELINE MARKER NOTES:

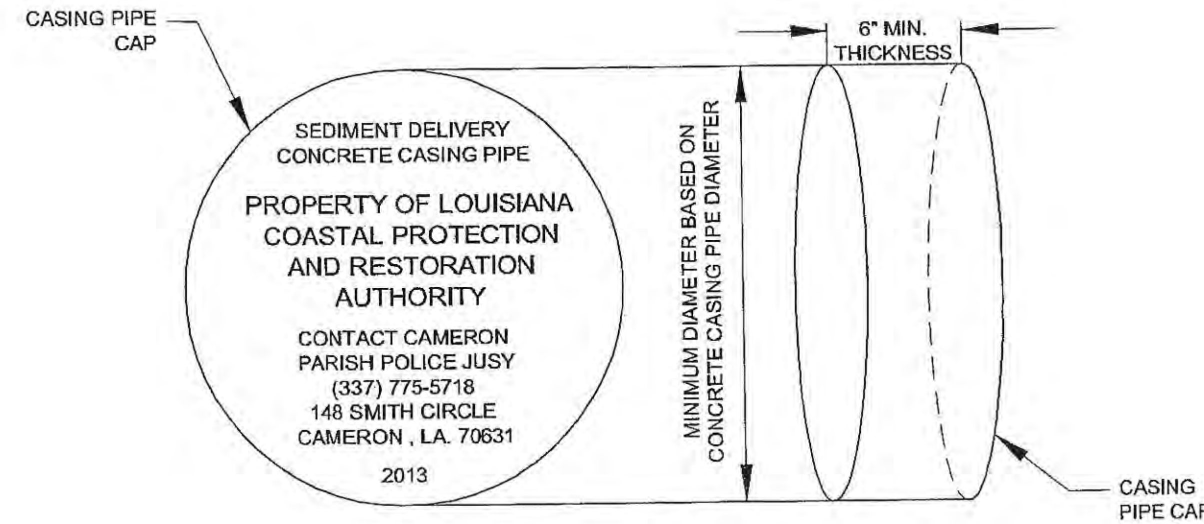
1. MARKERS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH LADOTD 2006 STANDARD SPECIFICATION 729.
2. PROPOSED DRAWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN THE WORK PLAN PRIOR TO CONSTRUCTION.
3. MARKERS SHALL BE PLACED PRIOR TO SEDIMENT PIPELINE INSTALLATION AND REMOVED FOLLOWING SEDIMENT PIPELINE REMOVAL.
4. SEE TS-27 FOR TEMPORARY PIPELINE MARKER DETAILS.



CASING PIPE MARKER DETAIL
(NOT TO SCALE)

CASING PIPE MARKER NOTES:

1. CASING PIPE MARKERS SHALL BE INSTALLED IN ACCORDANCE WITH LADOTD 2006 STANDARD SPECIFICATION 729.
2. PROPOSED DRAWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN THE WORK PLAN PRIOR TO CONSTRUCTION.
3. MARKERS SHALL BE REPLACED SUBSEQUENT TO BACKFILLING THE PIT AND PRIOR TO DEMOBILIZATION.
4. SEE TS-27 FOR CASING PIPE MARKER DETAILS.



CASING PIPE CAP DETAIL
(NOT TO SCALE)

CASING PIPE CAP NOTES:

1. CAPS SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS.
2. SEE TS-27 FOR CASING PIPE CAP DETAILS.

REV.	DATE	DESCRIPTION	BY

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DRAWN BY: GK | DESIGNED BY: WT

OYSTER BAYOU MARSH RESTORATION PROJECT
STATE PROJECT NUMBER: CS-59
FEDERAL PROJECT NUMBER: CS-59
APPROVED BY: GT

TEMPORARY PIPELINE MARKER AND CASING PIPE CAP / MARKER DETAIL
DATE: 4/8/15
SHEET 14 OF 14

153267

GENERAL PROVISIONS

- All temporary traffic control (TTC) devices used shall be in accordance with the Louisiana Standard Specifications for Roads and Bridges, the MUTCD, and shall meet the NCHRP Report 350 or MASH requirements for Test Level 3 devices where applicable.
- Materials used for TTC shall be in accordance with the Louisiana Standard Specifications for Roads and Bridges and, when applicable, the LADOTD QPL.
- No TTC shall be erected without the approval of the Engineer and until work is about to begin, unless they are covered.
- No lane closures, lane shifts, diversions, or detours shall occur without the approval of the Engineer.
- Responsibility is hereby placed upon the contractor for the installation, maintenance, and operation of all TTC devices called for in these plans or required by the Engineer for the protection of the traveling public as well as all LADOTD and construction personnel.
- The contractor shall also be responsible for the maintenance of all permanent signs, pavement markings, and traffic signals left in place as essential to the safe movement and guidance of traffic within the project limits unless noted in the plans.
- The DTOE shall serve as a technical advisor to the Engineer for all traffic control matters.
- The Chief Construction Engineer or his appointed designee shall approve all signs and situations not addressed in the plans based on the recommendations of the Project Engineer and the DTOE. All changes shall be noted in all project traffic control diaries.
- The Chief Construction Engineer or his appointed designee shall approve all design speeds of diversions or shifts if it differs from design plans, based on the recommendations of the Project Engineer and the DTOE.
- All temporary traffic control plans shall comply with the Transportation Management Plan.
- Any additional signs shown in the MUTCD and required by the Engineer shall be installed under Item 713-01-00100.
- Neither work activity nor storage of equipment, vehicles, TMAs, or materials shall occur within the buffer space.
- When a work area has been established on one side of the roadway only, there shall be no conflicting operations or parking on the opposite shoulder within 500 feet of the work area.
- A lighting plan shall be submitted to the Engineer 30 days prior to night work for approval. (See section 105.20 of the Louisiana Standard Specifications for Roads and Bridges.)
- Parking of vehicles or unattended equipment, or storage of materials, within the clear zone shall not be permitted unless protected by guard rail or barriers. If the clear zone is not defined on the plan sheets, the Engineer shall verify.
- Immediately upon removal of existing guard rail, the contractor shall install and maintain an NCHRP Report 350 or MASH approved device to protect the blunt end of the bridge or column until new guard rail is installed. After removal of the existing guard rail, new guard rail should be installed within seven (7) days. On non-NHS routes with shoulders less than 8 feet wide: If an NCHRP 350 Report Test Level 3 or MASH device is required but the field conditions of the roadway cannot support a Test Level 3 device, then a Test Level 2 device can be substituted in its place upon approval by the Engineer.
- All costs associated with crash devices are to be included in Item 713-01-00100.
- Sight distance should be considered when placing traffic control devices.
- On all mainline Interstate, a minimum of 1.5 feet of paved shoulder on the left and right side shall be maintained at all times.
- On Interstates, a minimum of 11 foot lanes shall be maintained. On all other roadways, a 10 foot minimum travel lane should be maintained where practical.
- TTC Standards are not drawn to scale.
- The contractor shall develop an internal traffic control plan approved by the Engineer prior to each phase.
- Truck restrictions such as (but not limited to) restricting lanes, oversize loads or times of travel, may be required for narrow lanes or other field conditions.

PAVEMENT MARKINGS (see QPL)

- All pavement markings within the limits of the project that are in conflict with the project signing or the required traffic movements shall be removed from the pavement by blast cleaning or grinding. (Existing striping shall not be painted over with black paint or covered with tape.)
- If special pavement markings are needed, they shall be reflectorized, removable, and accompanied by the proper signage.
- Temporary Raised Pavement Markers may be added to supplement temporary striping in areas of transition, in tapers, in diversions, and in other areas of need as shown in the plans or as directed by the Engineer.
- Materials and placement of temporary pavement markings shall conform to Section 713 of the Louisiana Standard Specifications for Roads and Bridges. If no pay item exists for temporary markings they shall be installed under item 713-01-00100.
- Temporary markings installed in the permanent configuration shall comply with LADOTD pavement marking standard plans, MUTCD, and/or the permanent striping plans.

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)

- PCMS shall be used on all Interstate Highways and on all other roadways (where space is available) with an ADT greater than 20,000.
- When used in advance of a lane closure or a lane shift, the PCMS should be placed on the right hand side of the road a minimum distance of 2 miles in advance of the taper for interstates and to be determined by the Engineer on other highways.
- For interstates and multi-lane highways, if vehicles are queuing beyond the 2 mile PCMS, an additional PCMS should be placed on the right hand side of the road approximately 5 miles in advance of the taper or at the end of the queue, whichever is greater.
- PCMS messages shall conform to FDSM V2.1.10 or shall be approved by the DTOE. Messages shall be no more than 3 lines and 2 screens.
- PCMS should be placed as far from the traveled lane as possible. They shall be shielded by guard rail or barriers. If this is not possible they shall be delineated with one drum at each corner.
- If the PCMS has to be placed on the shoulder then the contractor shall install a shoulder closure.
- When the PCMS is not displaying a work zone appropriate message pertaining to the ongoing construction project it shall be shielded by guard rail or barriers, or removed from the clear zone.

ABBREVIATIONS

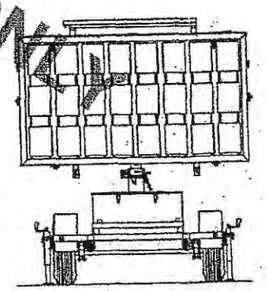
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
AGCI	Associated General Contractors of America
ANSI	American National Standards Institute
ATSSA	American Traffic Safety Services Association
B.O.P.	Beginning of Project
DTOE	District Traffic Operations Engineer
E.O.P.	End of Project
LADOTD	Louisiana Department of Transportation and Development
MASH	AASHTO Manual for Assessing Safety Hardware
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NHS	National Highway System
PCMS	Portable Changeable Message Sign
QPL	Qualified Products List
TMA	Truck Mounted Attenuator
TMC	Traffic Management Center
TTC	Temporary Traffic Control
TTC Standards	Temporary Traffic Control Standard Plans

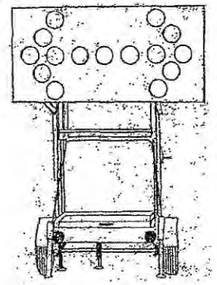
SPEED LIMITS

- The Engineer may approve a 10 mph drop in the speed limit for posted speeds of 45 mph or greater and for any construction, maintenance, or utility operation that requires one or more of the following:
  - (A) The condition of the traveled way is degraded due to milled surfaces or uneven travel lane lines greater than 1.5 inches.
  - (B) Work is in progress in the immediate vicinity of the travel way requiring lane closures or lane width reductions less than 11 feet.
  - (C) Workers present on the shoulder within 2 feet of the edge of the traveled way without barrier protection.
- The reduced speed zone shall only apply to those portions of the project limits affected. The Engineer may allow SPEED LIMIT WHEN FLASHING signs to supplement reduced speed zones.
- If the speed limit is reduced, speed limit signs shall be placed:
  - (A) beyond major intersections;
  - (B) at one mile intervals in rural areas;
  - (C) at half mile intervals in urban areas.
- At the end of the reduced speed zone, a speed limit sign displaying the original speed limit prior to construction shall be installed.
- For all other speed limit reductions not listed above the Project Engineer and the DTOE shall recommend the speed reduction to the Chief Construction Engineer or his appointed designee for approval.
- If the speed limit is reduced more than 10 mph, placement of the signs shall be re-evaluated according to the MUTCD.

FLASHING ARROW BOARDS

- All Flashing Arrow Boards shall be 4 feet by 8 feet and Type C.
- Flashing Arrow Boards should be placed on the shoulder. When there is no shoulder or median area, the arrow board shall be placed within the closed lane behind the channelizing devices and as close to the beginning of the taper as practical.
- Flashing arrow boards shall be delineated with retroreflective TTC devices.
- At no time shall the arrow board encroach in the traveled way. When Flashing Arrow Board signs are not being used, they shall be shielded by guard rail or barriers, or removed.
- Arrow boards shall only be used for lane reduction tapers and shall not be used for lane shifts.





ALL TTC STANDARDS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TTC STANDARDS.

FOR INFORMATIONAL PURPOSES ONLY

SHEET NUMBER 8

DESIGNED J. COLVIN
CHECKED P. ALLAIN
DETAILED M.D. ORDOGNE
CHECKED J. COLVIN
DATE SHEET 02/15/2013

FHWA | FEDERAL PROJECT | STATE PROJECT

REVISION DESCRIPTION | BY | DATE | APPROVED BY CHIEF ENGINEER

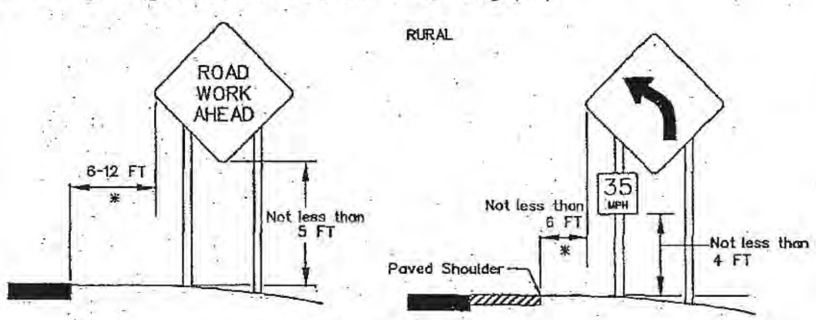
TEMPORARY TRAFFIC CONTROL GENERAL NOTES SHEET
TTC-00 (A)

TRAFFIC ENGINEERING

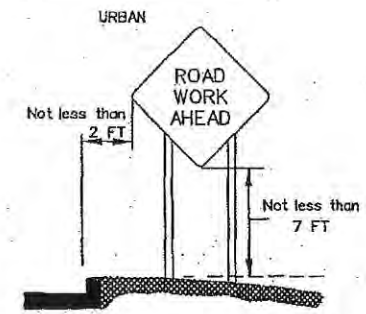
153267

SIGNS

- All signs used for temporary traffic control shall follow the plans, the LADOTD TTC Standards, and the MUTCD.
- Signs shown in the TTC illustrations are typical and may vary with each specific condition.
- One Type B High Intensity light shall be used to supplement the first sign (or pair of signs) that gives warning about a lane closure during nighttime operations (see QPL).
- Mesh rollup signs shall not be allowed on any project.
- Contractor shall use caution not to damage existing signs which remain in place. Any LADOTD signs damaged by work operations shall be replaced by the contractor under item 713-01-00100.
- All signs (permanent and temporary) shall be removed or completely covered with a strong, lightweight, opaque material when no longer applicable. (Burlap is not an acceptable material to cover signs).
- At no time shall signs warning against a particular operation be left in place once the operation has been completed or where the condition has been removed.
- Warning signs used for temporary traffic controls shall meet the following guidelines unless otherwise noted in the plans:
  - (A) size shall be 48 inches by 48 inches.
  - (B) see the Louisiana Standard Specifications for Roads and Bridges and the QPL for sheeting information.
  - (C) lateral distance of signs shall be a minimum of 6 feet from the edge of shoulder or edge of pavement if no shoulder exists, and 2 feet from the back of curb in urban areas (see diagram).
- When portable sign frames are not in use they shall be moved to an area inaccessible to traffic and not visible to the driver.
- Left side mounted signs will not be required for roadways with a center left turn lane and for undivided roadways.
- Vinyl roll up signs may be used if work zone is in place for 12 hours or less, there are no more than 2 lanes in each direction and if signs meet all size, color, retroreflectivity, and NCHRP 350 Report or MASH requirements.
- All signs shall be visible to the drivers (i.e. no obstructions such as on street parking or other traffic control devices shall block the sign).
- On divided highways, signs shall be placed on the right and the left as shown on the TTC standards.
- 1 foot portable sign stands may be used if the work zone is in place for 12 hours or less, the preconstruction posted speed is less than 45 mph and there are no more than 2 lanes in each direction.
- Sign posts:
  - -Signs measuring 10 square feet or less shall be mounted on 1 rigid post
  - -Signs over 10 square feet shall be mounted on 2 rigid posts
  - -Signs over 20 square feet shall be mounted on at least 3 rigid posts
- Rigid sign supports shall be driven to a minimum depth of 3 feet. (If splicing is required, see Allowable Lap Splice U-channel post.)
- For sign height, see the Rural and Urban diagrams:



* If lateral distance is not practical, the sign may be placed no less than 2 feet.

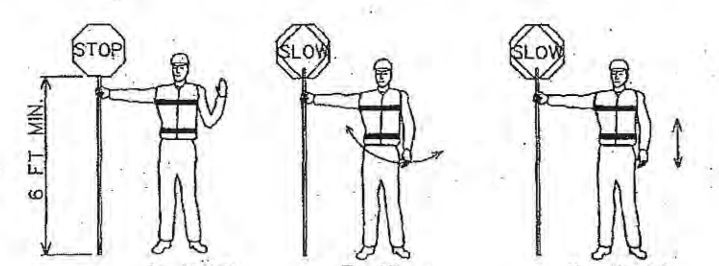


LANE CLOSURES

- All proposed lane, road, or shoulder closures shall be reviewed by the DTOE and approved by the Engineer.
- Two lane, two-way highways shall have a maximum work area of two miles; all other roadways shall have a four mile maximum work area.
- A queue analysis shall be performed prior to approval of lane closures on all Interstates according to EDSM VI.1.1.4.
- Closure plans and times shall be turned in to the Engineer for review according to the following:
  - (A) 5 working days minimum if traffic control plan has been approved or is contained in the plans.
  - (B) 10 working days minimum and a traffic control plan must be submitted for lane closures not addressed in the plans.
- Weekly updates to the DTOE, Project Engineer, the LADOTD TMC operator, and the regional TMC operator (if applicable) will be required for all ongoing lane closures to update the closure status.
- Daily updates to the DTOE, Project Engineer, and TMC operator (if applicable) will be required for all projects where active closures are in place.

FLAGGERS

- All flaggers shall be qualified.
- The contractor shall be responsible for training or assuring that all flaggers are qualified to perform flagging duties.
- A Qualified Flagger is one that has completed courses such as those offered by ATSSA, AGC, or other courses approved by the LADOTD Work Zone Task Force. The contractor shall be responsible for getting the flagger course approved.
- When utilized, a flagger shall use a minimum 18 inch octagonal shape sign on a minimum 6 foot stop/slow paddle and wear ANSI Class 2 Lime Green vest during day time operations and ANSI Class 3 Lime Green ensemble during night operations.
- In all flagging operations, the flagger must be visible from the flagger advance warning sign.
- Flaggers shall not be used on the Interstate.



To STOP Traffic | Traffic Proceed | To Alert & SLOW Traffic

Use of Hand Sign | Use of Hand Sign

REFERENCES

- The contractor shall be responsible for understanding all rules and requirements in the current edition of the following documents:

1) Louisiana Standard Specifications for Roads and Bridges. http://www.dotd.la.gov/highways/specifications/
2) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD). http://mutcd.fhwa.dot.gov/
3) LADOTD Qualified Products List (QPL) Manual. http://www.dotd.la.gov/highways/construction/lab/qpl/tableofcontents.shtml
4) LADOTD Engineering Directives and Standards Manual (EDSM) VI.1.1.4 - Queue Analysis for Interstate Lane Closures. http://webmail.dotd.la.gov/ppmemos.nsf
5) National Cooperative Highway Research Program (NCHRP) Report 350: "Guidelines for Work Zones Traffic Control Devices". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_350-a.pdf
6) NCHRP Report 475: "A Procedure for Assessing and Planning Nighttime Highway Construction and Maintenance". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_475.pdf
7) NCHRP Report 476: "Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_476.pdf
8) NCHRP Report 498: "Illumination Guidelines for Nighttime Highway Work". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_498.pdf
9) American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide.
10) American Traffic Safety Services Association (ATSSA) Quality Guidelines for Work Zone Traffic Control Devices and Features.
11) U.S. Department of Transportation Federal Highway Administration Traffic Control Handbook for Mobile Operations at Night. http://www.dot.state.il.us/blr/l023.pdf
12) LADOTD Engineering Directives and Standards Manual (EDSM) VI.2.1.10 - PCMS Approved Construction Message Policy. http://webmail.dotd.la.gov/ppmemos.nsf

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FOR INFORMATIONAL PURPOSES ONLY

SHEET NUMBER 9

DESIGNED J. COLVIN | CHECKED P. ALLAIN | DETAILED M.D.ORDOGNE | CHECKED J. COLVIN | DATE 02/13/2013

DATE 3-14-13

TEMPORARY TRAFFIC CONTROL
GENERAL NOTES SHEET
TTC-00 (B)

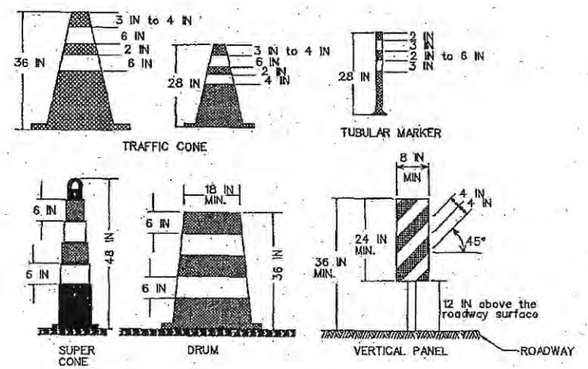
TRAFFIC ENGINEERING

153267

CHANNELIZING DEVICES

- The following devices may be used as channelizing devices: Tubular Markers, Vertical Panels, Cones, Drums, and Super Cones.
- 28 inch traffic cones are not allowed on:
  1) Interstates
  2) Highways with speeds greater than 40 mph.
- During nighttime operations 28 inch and 36 inch cones are not allowed.
- Retroreflective material pattern used on super cones shall match that used on drums.

- Tangent Areas:
  - A) Standard Spacing: See Standard Device Spacing and Buffer Space table.
  - B) Daylight Operations: Drums and super cones are spaced at standard spacing. All other devices are at ½ standard spacing.
  - C) Nighttime Operations: Drums and supercones at standard spacing are the only devices allowed.
- Taper Areas:
  - A) Standard Spacing: See Standard Device Spacing and Buffer Space table.
  - B) Daylight Operations: Drums are spaced at standard spacing. All other devices are ½ standard spacing.
  - C) Nighttime Operations: Drums (at standard spacing) are the only devices allowed.
- Type C steady burn lights shall be used on all channelizing devices in the taper as well as the first two devices in the tangent at night, (see the QPL).
- Typical channelizing device lateral placement (do not include when it is used as a divider for opposing directions of traffic) shall be 2 feet off the lane line in the closed lane or shoulder.
- Devices may be adjusted laterally to accomodate ongoing work in the immediate vicinity but must be returned to the closed lane after the work activity has moved.
- Channelizing devices on the lane line shall be of the same type.
- Channelizing devices in each taper shall be of the same type.



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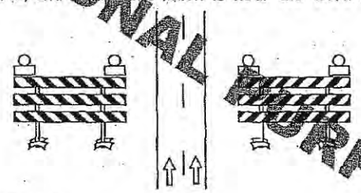
TYPE III BARRICADES

- Only Type III barricades shall be used.
- All barricades shall use Type 3 High Intensity Sheeting on both sides of the barricade.
- All barricades shall be a minimum of 8 feet in length and must meet NCHRP Report 350 or MASH requirements.
- When used for overnight closures, two Type B High Intensity lights shall supplement all barricades that are placed in a closed lane or that extend across a highway. Two Type A Low Intensity lights may be used in urban areas if approved by the Engineer (see QPL).
- When signs and lights are to be mounted to a barricade, they must meet NCHRP Report 350 or MASH requirements.
- A truck with a TMA may be substituted for a barricade when workers are present.
- Barricades shall be placed:
  - (A) at the beginning of a closed lane or shoulder and at 1,000 foot intervals where no active work is ongoing and the lane must remain closed. A minimum of 2 barricades shall be placed if the lane or shoulder closure is less than 2,000 feet. (One barricade shall be placed at the beginning of the lane closure after the buffer space and one shall be placed in the middle of the lane closure.)
  - (B) before each or group of unfilled holes or holes filled with temporary material.
  - (C) before uncured concrete.
  - (D) in each closed lane on each side of every intersection and crossover. (Do not block sight distance.)
  - (E) in front of piles of material (dirt, aggregate, broken concrete), culverts, and equipment which is near the work zone.



FOR INFORMATIONAL PURPOSES ONLY

TTC for DROP-OFFS

NON-INTERSTATE

Average Drop-off	> 45 MPH	≤ 45 MPH
≤ 3 IN	Low Shoulder Sign (Optional)	Low Shoulder Sign (Optional)
> 3 IN ≤ 6 IN	Shoulder Drop Off Sign & Edge Lines or Shoulder Drop Off Sign & Channelizing Device	Shoulder Drop Off Sign
> 6 IN ≤ 10 IN	No Shoulder Sign, Edge Lines & Vertical Panel	No Shoulder Sign & Channelizing Device
> 10 IN	Concrete Barrier & Edge Lines	No Shoulder Sign & Vertical Panel

INTERSTATE

Average Drop-off	
≤ 2 IN	Low Shoulder Sign (Optional)
> 2 IN ≤ 6 IN	Shoulder Drop Off Sign & Edge Lines or Shoulder Drop Off Sign & Channelizing Device
> 6 IN	Shoulder Drop Off Sign, Concrete Barrier & Edge Lines

- If a portable concrete barrier will be required then the deflection shall be considered in the design.
- For Interstate ramps, refer to non-Interstate drop offs.

STANDARD DEVICE SPACING AND BUFFER SPACE

SPEED LIMIT (prior to construction)	MERGING TAPER LENGTH (L) Lane Width (FT)				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
MPH	9	10	11	12	Along Taper	Along Tangent	FT
25	94	105	115	125	20	40	155
30	135	150	165	180	40	80	200
35	184	205	225	245	40	80	250
40	240	267	294	320	40	80	305
45	405	450	495	540	40	80	360
50	450	500	550	600	40	80	425
55	495	550	605	660	40	80	495
60	540	600	660	720	40	80	570
65	585	650	715	780	40	80	645
70	630	700	770	840	40	80	730

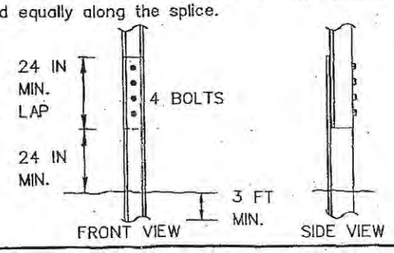
SPEED LIMIT (prior to construction)	SHIFTING TAPER LENGTH (1/2)(L) Lane Width (FT)				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
MPH	9	10	11	12	Along Taper	Along Tangent	FT
25	47	53	58	63	20	40	155
30	68	75	83	90	40	80	200
35	92	103	113	123	40	80	250
40	120	134	147	160	40	80	305
45	203	225	248	270	40	80	360
50	225	250	275	300	40	80	425
55	248	275	303	330	40	80	495
60	270	300	330	360	40	80	570
65	293	325	358	390	40	80	645
70	315	350	385	420	40	80	730

SPEED LIMIT (prior to construction)	SHOULDER TAPER LENGTH (1/3)(L) Lane Width (FT)				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
MPH	9	10	11	12	Along Taper	Along Tangent	FT
25	32	35	39	42	20	40	155
30	45	50	55	60	40	80	200
35	62	69	75	82	40	80	250
40	80	89	98	107	40	80	305
45	135	150	165	180	40	80	360
50	150	167	184	200	40	80	425
55	165	184	202	220	40	80	495
60	180	200	220	240	40	80	570
65	195	217	239	260	40	80	645
70	210	234	257	280	40	80	730

- All termination and flagger tapers are 100 feet per lane. (MIN. 6 channelizing devices per lane equally spaced 20 feet apart.)
- See TTC Standards for flagger taper.
- See MUTCD for taper formulas.

ALLOWABLE LAP SPLICE FOR U-CHANNEL POST

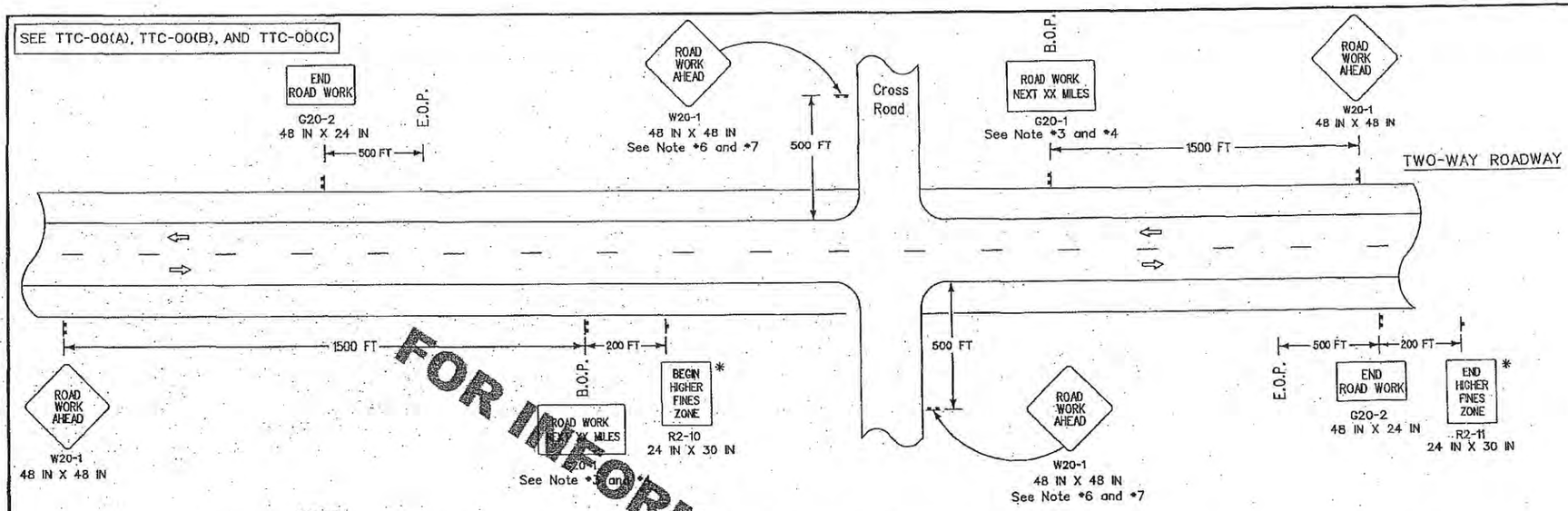
- U-Channel posts may be spliced where long lengths are required. The upper section shall overlap the lower section by at least 24 inches. The bottom edge of the upper section of the splice shall be a minimum of 24 inches above the ground. The spliced sections shall be secured with at least four 5/16 inch diameter hex bolts spaced equally along the splice.



SHEET NUMBER 10
DESIGNED L. COLVIN
CHECKED P. ALLAIN
DETAILED M.D.ORDOGNE
CHECKED L. COLVIN
PARISH
FEDERAL PROJECT
STATE PROJECT 027-13/201-3
REVISION DESCRIPTION
BY
DATE 3-12-13
DATE
APPROVED BY CHIEF ENGINEER
TEMPORARY TRAFFIC CONTROL GENERAL NOTES SHEET
TTC-00 (C)
TRAFFIC ENGINEERING

153267

SEE TTC-00(A), TTC-00(B), AND TTC-00(C)



*For divided roadways with speeds ≥ 50 mph use larger sign, 36 IN X 48 IN.

FOR INFORMATIONAL PURPOSES ONLY

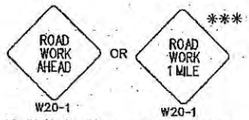
NOTES

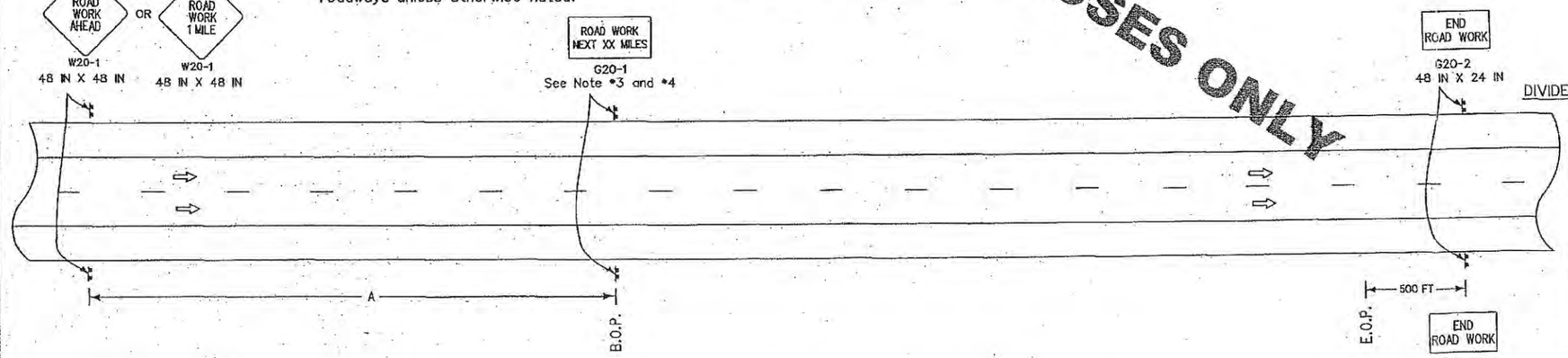
This sheet shall be used with the Temporary Traffic Control General Notes Sheets TTC-00(A), TTC-00(B), TTC-00(C), and other Temporary Traffic Control Sheets as appropriate.

1. This layout represents the minimum traffic controls required for placement of "Road Work Next XX Miles" and "End Road Work" signs.
2. This layout does not replace other TTC Standard Sheets, but is intended as a supplement to the required signing.
3. The "Road Work Next XX Miles" sign shall be required on all projects. The distance on the "Road Work Next XX Miles" sign shall be stated to the nearest whole mile. This sign shall be placed at the Beginning of Project (B.O.P.) limits.
4. The "Road Work Next XX Miles" sign shall be a minimum of 60 inches by 36 inches for all multi-lane roadways and a minimum of 48 inches by 24 inches for two-lane roadways unless otherwise noted.
5. The "End Road Work" sign shall be placed 500 feet past the End of Project (E.O.P.) limits.
6. If "Road Work Ahead" sign is used on a cross road to warn of road work on another route, then "End Road Work" sign is not required.
7. When projects are separated by less than 1 mile, they shall be signed as one project: this may require coordination.

LEGEND

- Traffic Sign
- Direction of Travel





*** Speed limit > 45 mph use "Road Work 1 Mile"
Speed limit ≤ 45 mph use "Road Work Ahead"

SPEED LIMIT (prior to construction)	SPACING 'A'
≤ 40 mph	1500 FT
45 mph	2640 FT
> 45 mph	5280 FT

- Sign spacing to be adjusted for Horizontal and Vertical curves.
- For work outside of the traveled way, see TTC-01 and TTC-02.

ALL TTC STANDARDS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TTC STANDARDS.

SHEET NUMBER 11

PARISH | FEDERAL PROJECT | STATE PROJECT

DESIGNED J. COLVIN
CHECKED P. ALLAIN
DETAILED M.D. ORDOGNE
CHECKED J. COLVIN
DATE 02/15/2013
SHEET

REVISION DESCRIPTION | BY | DATE: 3-13-15

APPROVED BY CHIEF ENGINEER: | DATE

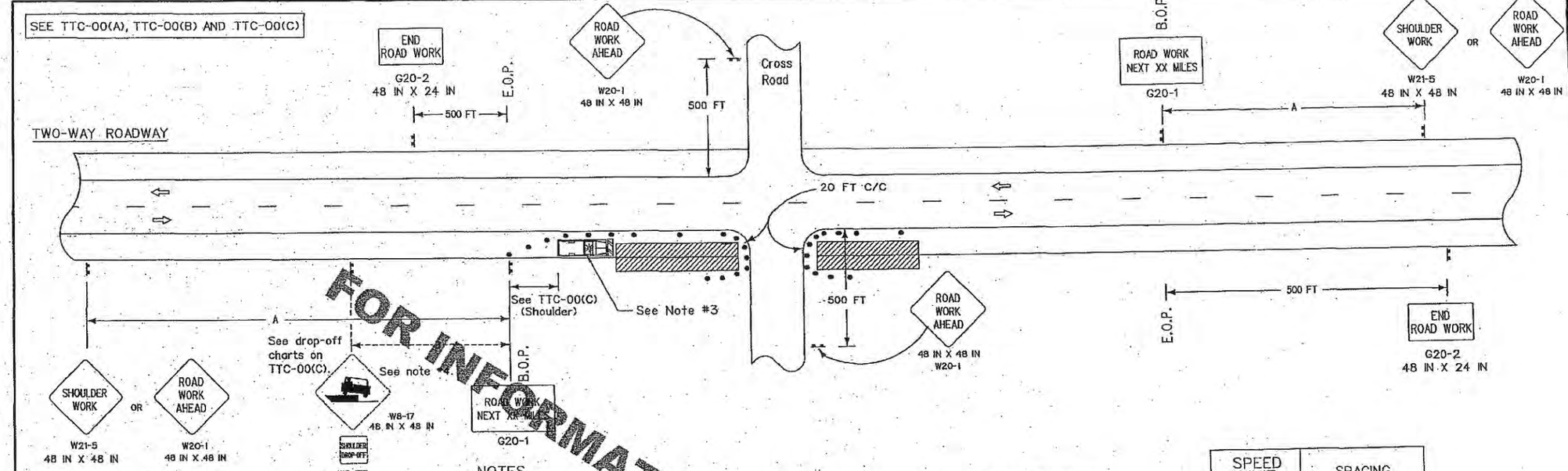
TEMPORARY TRAFFIC CONTROL
LAYOUT FOR PLACEMENT OF ROAD WORK NEXT XX MILES AND END ROAD WORK SIGNS

TTC-00 (D)

TRAFFIC ENGINEERING

153267

SEE TTC-00(A), TTC-00(B) AND TTC-00(C)



FOR INFORMATIONAL PURPOSES ONLY

NOTES

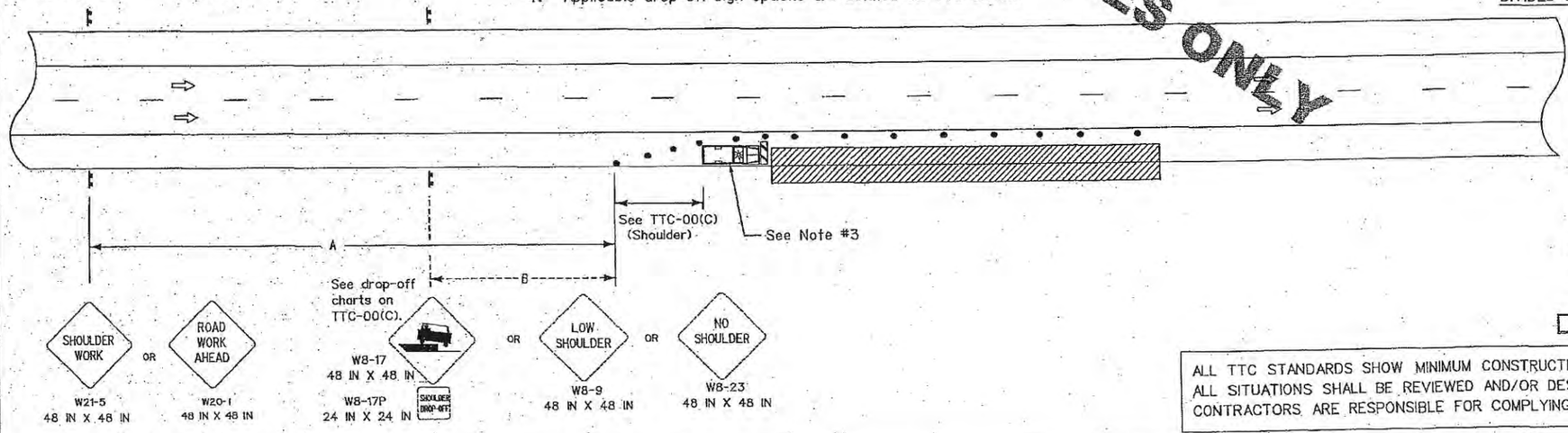
This sheet shall be used with the Temporary Traffic Control General Notes Sheets TTC-00(A), TTC-00(B) and TTC-00(C).

1. This layout represents the minimum traffic controls required for workers and equipment operating less than 15 feet from the traveled way for more than one hour. Less than one hour, see figure TA-4 of the MUTCD.
2. No signs or barricades are required for equipment operating or work in progress greater than 15 feet from the traveled way. (See TTC-00).
3. Work or equipment confined to a spot location (less than 200 feet) shall be marked by channelizing devices spaced at 25 feet or by a vehicle with an amber light visible to traffic. Work extending more than 200 feet of roadway length shall be marked with appropriate devices spaced as noted on TTC-00(C).
4. Applicable drop-off sign options are defined on TTC-00(C).

SPEED LIMIT (prior to construction)	SPACING	
	'A'	'B'
≤ 40 mph	500 FT	250 FT
45-50 mph	1000 FT	350 FT
≥ 55 mph	1500 FT	500 FT

- See TTC-00(C) for minimum taper length and maximum device spacing for shoulder closure tapers.
- If horizontal curve radius is less than 300 feet, devices spacing shall be 25 feet.

DIVIDED ROADWAY



LEGEND

- Traffic Sign
- Channelizing Devices
- Type III Barricades
- Work Area
- Direction of Travel
- Truck with Amber Light

ALL TTC STANDARDS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TTC STANDARDS.

SHEET NUMBER 12
PARISH
FEDERAL PROJECT
STATE PROJECT
DESIGNED J. COLVIN
CHECKED P. ALLAIN
DETAILED M.D. RODOGNE
CHECKED J. COLVIN
DATE 02/13/2015
SHEET
REVISION DESCRIPTION
BY
DATE 3/12/15
DATE
APPROVED BY CHIEF ENGINEER

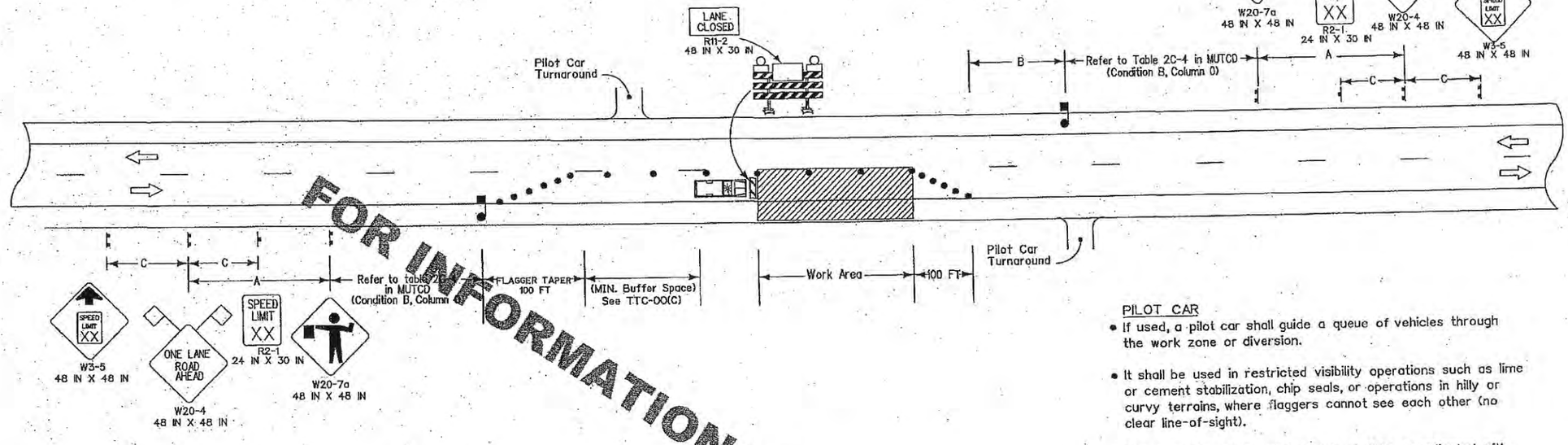
TEMPORARY TRAFFIC CONTROL LAYOUT FOR WORK LESS THAN 15 FEET FROM THE TRAVELED WAY

TTC-02

TRAFFIC ENGINEERING

153267

SEE TTC-00(A), TTC-00(B), TTC-00(C), AND TTC-00(D)



FOR INFORMATIONAL PURPOSES ONLY

NOTES

This sheet shall be used with the Temporary Traffic Control General Notes Sheets TTC-00(A), TTC-00(B), TTC-00(C) and TTC-00(D).

1. This layout represents the minimum traffic controls required for lane closures on two-lane roads with two-way traffic greater than 1600 feet from an intersection. For this type of closure either a flagger or a pilot car will be required. For advance signing see TTC-00(D).
2. To prevent vehicles from entering the work area against the flow of traffic, an additional flagger shall be stationed at each intersection, major driveway, railroad crossing, or crossing within the work area.
3. For projects in rural areas the distance between flaggers shall not exceed:
   (A) 2.5 miles for ADT<2,500
   (B) 2.0 miles for 2,500<ADT<5,000
   (C) 1.5 miles for ADT>5,000
4. The flagger station shall be near the beginning of the taper and shall have adequate sight distance to be visible to oncoming traffic. If sight distance cannot be achieved, the distance between flaggers may be extended for a short duration.
5. Visual or radio contact shall be required between flaggers at all times. The flagger shall be visible from the flagger sign.
6. If a pilot car is required then the contractor is not required to have channelizing devices in the tangent section.
7. If work zone is less than 1600 feet from an intersection see TTC-03.

SPEED LIMIT (prior to construction)	SPACING		
	'A'	'B'	'C'
≤ 40 mph	500 FT	250 FT	N/A
45-50 mph	1000 FT	360 FT	500 FT
≥ 55 mph	1500 FT	495 FT	800 FT

Sign spacing to be adjusted for Horizontal and Vertical curves.

ALL TTC STANDARDS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TTC STANDARDS.

PILOT CAR

- If used, a pilot car shall guide a queue of vehicles through the work zone or diversion.
- It shall be used in restricted visibility operations such as lime or cement stabilization, chip seals, or operations in hilly or curvy terrains, where flaggers cannot see each other (no clear line-of-sight).
- The operation of the pilot vehicle shall be coordinated with flagging operations or other controls at each end of the one-lane section and all major driveways and street intersections.
- The pilot car sign should be mounted 7 feet above roadway in a position visible to oncoming and following traffic.
- The pilot car shall have an amber beacon light.
- The sign mounted on the vehicle shall be two-sided.

PILOT CAR — G20-4, 36 IN X 18 IN (FRONT OF SIGN)

PILOT CAR FOLLOW ME — G20-4, 36 IN X 18 IN (BACK OF SIGN)

LEGEND

- Traffic Sign
- Flagger
- Channelizing Devices
- Type III Barricades
- Work Area
- Type B Light
- Direction of Travel
- Truck with Amber Light

SHEET NUMBER 13

PARISH

FEDERAL PROJECT

STATE PROJECT

DESIGNED J. COLVIN
CHECKED P. ALLAIN
DETAILED M.D. DRODGNE
CHECKED J. COLVIN
DATE 02/13/2013
SHEET

BY

REVISION DESCRIPTION

DATE: 2-13-13

APPROVED BY DOTD ENGINEER

TEMPORARY TRAFFIC CONTROL
LAYOUT FOR LANE CLOSURES ON TWO LANE ROADS WITH TWO-WAY TRAFFIC (FLAGGING OPERATIONS)

TTC-04

TRAFFIC ENGINEERING

153267

ATTACHMENT C

TS-25 LOUISIANA HIGHWAY 27/82 CROSSING

25.1 Scope: This Work consists of furnishing and assembling the materials needed to construct, layout, install, and survey one permanent concrete casing pipe via open-cut methods underneath LA 27/82 in accordance with these Plans and the Louisiana Standard Specifications for Roads and Bridges, 2006 edition, including Supplemental Specifications (hereinafter referred to as DOTD Specifications) or as directed by the Engineer.

25.2 Control of Work: Control of work shall be in accordance with these Plans and DOTD Specification Section 105.

25.3 Materials: The casing pipe shall be made of reinforced concrete drain pipe, in accordance with DOTD Specification Section 701, Culverts and Storm Drains. See Appendix VIII for DOTD Specifications. The casing pipe shall have a minimum inside diameter of 42" and a minimum wall thickness of 4.5".

Class II Base Course, Superpave Asphaltic Concrete Mixtures, Flowable Fill, and Bedding Material shall conform to DOTD Specification Sections 302, 502, 710, and 726, respectively. See Appendix VIII for DOTD Specifications.

Permanent pipeline markers shall be placed on each side of the highway as shown on the Plans to mark the crossing locations. Markers shall be placed prior to demobilization. The pipeline marker signs shall be made in accordance with DOTD Specification Section 729. See Appendix VIII for DOTD Specifications. A proposed drawing of the permanent markers shall be included in the Work Plan for approval by the Engineer.

25.4 Installation: Casing pipe installation shall conform to the Plans and DOTD Specification Section 701, as detailed in Appendix VIII of these Specifications.

The Contractor shall perform a survey to locate, probe, identify, and mark any utilities within the conveyance corridor limits in the vicinity of the proposed excavation and alignments for casing pipe installation operations and shall submit a proposed construction plan for open-cut installation of the permanent casing pipe in the Work Plan for approval by the Engineer.

If existing utility infrastructure is damaged by the Contractor during construction, the utilities shall be repaired immediately to pre-construction conditions by the Contractor at no cost to the Owner.

Sediment pipeline installation shall be performed in a way that will not interfere with or endanger the roadway surface and activity thereon, and minimize subsidence of the surface and utilities above and in the vicinity of the operations. The Contractor shall be responsible for all settlement resulting from operations and shall repair and restore damaged road surfaces or utilities to pre-construction conditions at no cost to the Owner. Trenches shall be excavated, and trench boxes shall be installed to prevent failure and loss of roadway base materials.

Pavement saw-cutting, excavation, backfilling, and pavement patch shall conform to the Plans and DOTD Specifications. Excavation and Embankment shall conform to DOTD Specification Section 203. Backfill shall consist of embankment material, flowable fill, and bedding material as shown in the plans and shall conform to DOTD Specification Sections 203, 710, and 726, respectively. Pavement patch shall conform to DOTD Specification Section 510, Asphaltic Concrete Pavement Patching, Widening, and Joint Repair. See Appendix VIII for DOTD Specifications.

Upon completion of the installation of the sediment pipeline, disturbed areas shall be seeded or protected from erosion. The area shall be restored to pre-construction conditions.

DOTD may require materials inspections and/or sampling prior to installation. This may include but is not limited to asphalt mix, embankment, concrete pipe, and flowable fill. Shop drawings shall be provided for DOTD approval prior to the Pre-Construction conference. Certificates of inspection shall be submitted prior to material installation.

25.5 Traffic Control: One lane shall remain open at all times during casing pipe installation. The westbound lane shall be widened using 5' of crushed aggregate conforming to DOTD Specification Subsection 1003.04(a) to provide minimum 12' travel lane width during installation of the casing pipe across the eastbound lane. Geotextile fabric shall be placed beneath the crushed aggregate conforming to DOTD Specification Section 1019. A triton barrier or approved equivalent shall be installed along the limit of excavation, as shown on the Plans, to separate vehicular traffic from the open-cut. Steady burning lights shall be installed on top of barriers to provide sufficient lighting at night. Traffic control shall be conducted per the Plans. Crossing construction sequencing shall conform with TS-26.

25.6 Nighttime Operations: Nighttime construction operations shall conform to DOTD Specification Subsection 105.20. Nighttime operations are defined as work performed after sunset and before sunrise. The contractor shall submit a lighting plan to the Engineer for approval 30 days prior to the start of night time operations.

25.7 Pavement Markings: Plastic pavement markings and raised pavement markers shall be restored over the newly placed pavement patch to pre-project layout in accordance with DOTD Specification Sections 731 and 732, provided in Appendix VIII.

25.8 Truck Advisory: The Contractor shall submit notice of work at least two (2) weeks prior to casing pipe installation to the oversized truck permit section of DOTD headquarters in Baton Rouge to facilitate the issuance of a truck advisory.

25.9 Construction Window: As this work requires restricting access on a state Hurricane Evacuation Route, the installation shall be done outside of the peak of the Atlantic/Gulf hurricane season, or August to October 20th. Should a tropical system enter the Gulf during operations, both lanes shall be reopened as soon as practicable.

25.10 Casing Pipe Capping and Site Restoration: After the marsh fill has been accepted and the sediment pipeline has been removed from the casing pipe, each end of the casing pipe shall be capped. Caps shall be placed on each end of the casing pipe, shall not be water-tight, and shall be able to be removed to facilitate the placement of a temporary sediment pipeline for possible future projects. The Contractor shall provide the Owner and Engineer notice of the completion of installation of the caps 72 hours prior to backfilling of the construction pits to provide for inspection.

25.11 Casing Pipe Caps: Caps shall be constructed in accordance with the Plans. Casing pipe caps shall be included in Bid Item No. 14 "Concrete Pipe Caps" and shall include all materials, labor, tools, equipment, and incidentals required to install the casing pipe caps.

TS-26 ROADWAY CROSSING CONSTRUCTION SEQUENCE

The sediment pipeline casing pipe to be installed underneath LA 27/82 shall be installed in phases. All construction aspects of this installation shall conform to DOTD Specifications and TS-25 of these specifications.

26.1 Phase 1: Phase 1 consists of the closure of the eastbound lane of LA 27/82 and installation of one section of casing pipe as shown on the Plans. The westbound lane shall be widened using 5' of crushed aggregate to facilitate passing traffic during restricted lane width. The Contractor shall clear the existing grade of vegetation and topsoil prior to widening, place geotextile fabric and

crushed aggregate, and maintain the temporarily widened section so that it is suitable to facilitate travel throughout the installation. Temporary traffic control (TTC) shall be installed throughout the duration of the work. The eastbound section of casing pipe shall be installed via open highway cut as shown on the Plans. Trenches shall be excavated, and trench boxes shall be installed to prevent failure and loss of roadway base materials. The concrete casing pipe shall be installed, followed by a pavement patch conforming to requirements described in TS-25.4.

26.1.1 The dimensions of the open highway cut and trench excavation shall be in accordance with the Plans.

26.1.2 All temporary traffic control devices including flaggers, triton barriers, and temporary signage shall be in accordance with DOTD TTC-04 as shown on the Plans. Flagging operations shall continue 24 hours per day until two-way travel is reinstated in Phase 3. Flaggers shall have radio communication capabilities during flagging operations.

26.1.3 All temporary traffic control devices shall be used in accordance with DOTD Specification Section 713 and the MUTCD and shall meet the NCHRP Report 350 or MASH requirements for Test Level 3 devices as shown on the Plans.

26.1.4 Portable light plants shall be installed and operational overnight for the duration of the roadway crossing construction at the locations shown on the Plans, including two flagger stations.

26.1.5 48 inch Supercones shall be installed at the locations shown in the Plans and shall be lit at night in accordance with DOTD TTC-00(c).

26.2 Phase 2: Phase 2 consists of the closure of the westbound lane of LA 27/82 and encompasses the following work: temporary traffic control installation, open highway cut of the westbound lane, trench excavation, placement of the concrete casing pipe, backfilling of the trench, and asphalt pavement patching.

26.2.1 The dimensions of the open highway cut and trench excavation shall be in accordance with the Plans.

26.2.2 All temporary traffic control devices including flaggers, triton barriers, and temporary signage shall be in accordance with DOTD TTC-04 as shown on the Plans. Flagging operations shall continue 24 hours per day until two-way travel is reinstated in Phase 3. Flaggers shall have radio communication capabilities during flagging operations.

26.2.3 All temporary traffic control devices shall be used in accordance with DOTD Specification Section 713 and the MUTCD and shall meet the NCHRP Report 350 or MASH requirements for Test Level 3 devices as shown on the Plans.

26.2.4 Portable light plants shall be installed and operational overnight for the duration of the roadway crossing construction at the locations shown on the Plans, including two flagger stations.

26.2.5 48 inch Supercones shall be installed at the locations shown in the Plans and shall be lit at night in accordance with DOTD TTC-00 (c).

26.3 Sediment Pipeline Installation and Dredging Operation Phase (Phase 3): Temporary traffic control devices shall be installed and maintained as shown on the Plans until after the marsh fill areas have been accepted, the temporary sediment pipeline removed, and the access pits backfilled.

Following installation, the temporary sediment pipeline will be located within the Clear Zone. Triton barriers shall be used to shield formidable obstacles from pipeline and equipment within the Clear Zone as shown on the Plans and in accordance with the Roadside Design Guide (AASHTO 4th Edition, 2011). Sufficient signage identifying the work area shall be installed and remain throughout the duration of the project. The contractor shall be liable for any damage to pipeline and/or equipment by formidable obstacles and shall immediately repair any damage to the sediment pipeline caused by such.

26.3.1 All temporary traffic control devices including flaggers, triton barriers, and temporary signage shall be in accordance with DOTD TTC-04 as shown on the Plans.

26.3.2 All temporary traffic control (TTC) devices shall be used in accordance with DOTD Specifications and the MUTCD and shall meet the NCHRP Report 350 or MASH requirements for Test Level 3 devices as shown on the Plans.

APPENDIX VIII DOTD STANDARD SPECIFICATIONS

Section 105
Control of Work

105.01 AUTHORITY OF THE ENGINEER. The engineer, acting directly or through duly authorized representatives in accordance with Subsection 105.09, will decide all questions which arise as to quality and acceptability of materials furnished and work performed, rate of progress of the work, interpretation of plans and specifications, and acceptable fulfillment of the contract by the contractor.

The engineer will have the authority to suspend the work wholly or in part due to failure of the contractor to correct conditions unsafe for workmen or the general public; for failure to carry out provisions of the contract; for failure to carry out orders; for such periods as deemed necessary due to unsuitable weather; for conditions considered unsuitable for prosecution of the work; or for other conditions or reasons deemed to be in the public interest.

Orders to suspend the work will be in writing and will include the reasons for the suspension. The order to resume work will also be in writing.

The approval or acceptance by the engineer of submissions by the contractor will be subject to satisfactory installation and performance. Such approval shall not relieve the contractor of responsibility under the contract for successful completion of the work or responsibility for compliance with the terms and conditions of the contract.

The Chief Engineer has the authority to suspend the work if, at any time, the required policies of insurance become unsatisfactory to the Department, as to form or substance, or if a company that has issued any policies becomes unsatisfactory to the Department.

105.02 PLANS AND WORKING DRAWINGS. The contractor will be supplied a maximum of five sets of plans without charge. Additional copies will be furnished upon request at the appropriate charge for reproduction services. Reduced (half-sized) plans will be furnished unless full-sized plans are requested. Plans will show lines, grades, typical cross sections, location and details of structures, and a summary of pay items. Only general features will be shown for steel bridges. The contractor shall keep one set of plans available at the work site at all times.

Standard plans required for the work, but included only by reference, will be furnished free of charge to the contractor upon request.

Working drawings, unless included in the plans, shall be furnished by the

contractor and shall consist of detailed plans required to adequately control the work. They shall include stress sheets, shop drawings, erection plans, falsework plans, form drawings, cofferdam plans, bending diagrams for reinforcing steel, proposed location of construction joints or other supplementary plans or data required of the contractor. Working drawings will be approved by the engineer and such approval will not relieve the contractor of responsibility under the contract for successful completion of the work or responsibility for details shown on the working drawings to conform to the contract.

Type and size of drawings furnished shall conform to Subsection 801.03.

105.03 CONFORMITY WITH PLANS AND SPECIFICATIONS. All work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements of the contract.

When the engineer finds the materials furnished, work performed, or the finished product not in compliance with the contract but that reasonably acceptable work has been produced, the engineer will determine to what extent the work will be accepted and remain in place. If accepted, the engineer will document the basis of acceptance by change order and/or special agreement. The change order and/or special agreement will contain appropriate documentation for an adjustment in the contract price for the work or materials as necessary to support the engineer's determination. Reduced pay schedules will be used when such schedules are a part of the project specifications.

If the engineer finds the materials, work performed, or the finished product not in compliance with the contract and have resulted in an unsatisfactory or unacceptable product, the work or materials shall be removed and replaced or otherwise corrected by the contractor to the satisfaction of the engineer at no direct pay.

If due to the contractor's negligence or selected method of operation in performing the work, the engineer deems it necessary to make changes, the contractor will be liable for the additional design cost to the Department. The amount of such design cost will be the salary cost of design personnel plus 110 percent. The amount thus determined will be deducted from payments for the work.

105.04 COORDINATION AND PRECEDENCE OF CONTRACT DOCUMENTS. These specifications, the supplemental specifications, the plans, special provisions and supplementary documents are essential parts of the contract. A requirement occurring in one is as binding as though

occurring in all. They are intended to be complementary and to describe and provide for a complete work.

In case of discrepancy, the following order of precedence will apply:

1) Special Provisions
2) Plans
3) Supplemental Specifications
4) Standard Specifications
5) Standard Plans

Calculated dimensions will govern over scaled dimensions.

The contractor shall take no advantage of any error or omission in the plans or project specifications. If the contractor discovers such an error or omission, he shall immediately notify the engineer. The engineer will then make such corrections and interpretations as deemed necessary to fulfill the intent of the plans and project specifications.

105.05 COOPERATION BY CONTRACTOR. The contractor shall keep one complete set of plans and other contract documents available at the work site.

The contractor shall give the work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the engineer, inspectors and other contractors.

The contractor shall have on the work site at all times, as the contractor's agent, a competent representative capable of reading and understanding the plans and project specifications and experienced in the type of work being performed, who shall receive and execute directions from the engineer. At the preconstruction conference or upon request, the contractor shall furnish the engineer written notice of the name and home telephone number of the representative. The representative shall have authority to execute orders or directions of the engineer without delay and to promptly supply such materials, equipment, tools, labor and incidentals as required. The representative shall be furnished regardless of the amount of work sublet.

The contractor shall furnish the engineer written notice of the names of persons authorized to sign for him in matters pertaining to change orders, force account or extra work, contract time charges and other documents. No work shall commence on the project until the contractor has complied with this requirement. Such written notice shall also be furnished when a person so designated is removed and replaced.

105.06 COOPERATION WITH UTILITIES. The Department will notify all known utility companies, pipeline owners or other parties affected by the

work and endeavor to have the necessary adjustments of public or private utility fixtures, pipelines and other appurtenances within or adjacent to the limits of construction made as soon as possible.

Upon award of the contract, utility companies affected will be advised by the Department of the name and address of the contractor, approximate date work will begin and other pertinent information.

Except as hereinafter provided, and regardless of whether the utility is shown on the plans or referred to in the project specifications, all water lines, gas lines, wire lines, fiber optic cables, telephone lines, cable television lines, service connections, water and gas valve boxes, light standards, cableways, signals and other utility appurtenances within construction limits which prevent completion of the contractor's work will be relocated or adjusted by the owners at no expense to the contractor. The contract will indicate utility items to be relocated, adjusted or constructed by the contractor.

Where a utility crosses or otherwise occupies an area within construction limits of the project and the utility will not have the Department's required clearance when the work is completed, it shall be the Department's responsibility to arrange for necessary relocation to the required clearance. When the required clearance will exist when the work is completed, but relocation is considered necessary by the contractor for construction purposes, the contractor shall make arrangements with the owner for any relocation or adjustment necessary to the operations at no direct pay. In such cases, upon completion of the work and prior to final acceptance, the final location of the utility will be acceptable to the Department. Nothing herein shall be interpreted to mean that the Department waives its rights to control entrance onto, or location on, its right-of-way of any utility or appurtenance.

It is agreed that the contractor has considered in the bid all permanent and temporary utility appurtenances in their present or proposed relocated positions and that no additional compensation will be allowed for delays, inconvenience or damage sustained due to interference from the said utility appurtenances or the operation of moving them.

When the engineer determines that the contractor is experiencing significant delays in the controlling items of work because of delays by others in removing, relocating or adjusting utility appurtenances, contract time extensions will be considered for such delays in accordance with Subsection 108.07.

On the date stipulated in the Notice to Proceed, the contractor shall begin work in connection with fencing, clearing, grubbing, removal of structures and obstructions, and relocation and demolishing of other structures, and shall prosecute such work to completion to avoid delays in removal or adjustment

of utilities. The contractor shall cooperate with the utility companies to avoid delays in completion of work due to nonremoval or nonadjustment of utilities.

When the contractor's work involves excavating or underground demolition activity, the contractor is required to reach Louisiana One Call, prior to starting any work, by calling (225) 275-3700 or toll-free 1-800-272-3020, or by fax (225) 272-1967 in order to comply with the Louisiana Underground Utilities and Facilities Damage Prevention Law.

105.07 COOPERATION BETWEEN CONTRACTORS. The Department reserves the right to contract for and perform additional work on or near the work covered by the contract.

When separate contracts are let within, adjoining, or adjacent to the limits of the project, each contractor shall conduct the work not to hinder the progress of work by other contractors and shall cooperate with each other as directed.

The contractor shall arrange the work and shall place and dispose of materials being used not to interfere with the operation of other contractors within, adjoining, or adjacent to the limits of the project. The contractor shall acceptably join the work with that of other contractors and shall perform the work in proper sequence to that of the others and without causing disruption or delay to the schedule of project completion.

The contractor shall assume all liability, financial or otherwise, in connection with the contract and shall hold the Department harmless and indemnify the Department from all damages or claims that may arise because of inconvenience, delay, or loss experienced by the contractor or caused to other contractors due to the presence and operations of other contractors working within, adjoining or adjacent to the limits of the projects.

105.08 CONSTRUCTION STAKES, LINES AND GRADES. Unless otherwise provided for in the contract, the engineer will set construction stakes establishing lines and continuous profile grade in road work, and centerline and bench marks for bridge work, culvert work, protective and accessory structures and appurtenances as deemed necessary, and will furnish the contractor all necessary information relating to lines, slopes and grades. These stakes and marks shall constitute the field control by and in accordance with which the contractor shall establish other necessary controls and perform the work.

The contractor shall be responsible for preservation of all stakes and marks established by the engineer. When any construction stakes or marks have been carelessly or willfully destroyed or disturbed by the contractor, the cost

of replacing same will be charged to the contractor and will be deducted from payments for the work.

105.09 AUTHORITY AND DUTIES OF PROJECT ENGINEER. As the direct representative of the Chief Engineer, the Project Engineer has immediate charge of the Department's engineering details of the construction project. The Project Engineer is responsible for administration of the contract. The Project Engineer shall have authority to give directions pertaining to the work and for consideration of the public, to reject defective materials and equipment, and to suspend work in accordance with Subsection 105.01.

Except as permitted and instructed by the Chief Engineer, the Project Engineer is not authorized to alter or waive provisions of the contract, alter quantities, order extra and force account work, or accept any portion of the project. In no case will the Project Engineer perform any duties for or act as the representative of the contractor.

When the work is being done by force account, the contractor shall have the responsibility to supervise the work and provide a product meeting the requirements of the contract. The Project Engineer, however, shall have the authority to require the contractor to revise operations, including but not limited to, sequence and location of work; number, category and caliber of workers; number and type of equipment; and hours of work.

105.10 DUTIES OF THE INSPECTOR. Inspectors representing the Department are authorized to inspect all work. Such inspection extends to any part of the work and to preparation, fabrication or manufacture of materials to be used. The inspector is not authorized to alter or waive contract provisions. The inspector is not authorized to issue instructions contrary to the contract; however, the inspector will have authority to reject work or materials until any question can be referred to and decided by the engineer. In no case will the inspector perform any duties for, or act as the representative of the contractor.

105.11 INSPECTION OF WORK. All materials and each part or detail of the work shall be subject to inspection by the engineer. The engineer shall be allowed safe and convenient access to all parts of the work and shall be furnished with such information and assistance by the contractor as required to make a complete inspection. Such inspection will not relieve the contractor from the obligation to furnish acceptable materials or to perform all work in accordance with the contract.

If ordered by the engineer, the contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as

directed. After examination, the contractor shall restore said portions of the work to the standard required by the project specifications. Should the work thus exposed prove acceptable, the uncovering or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but, should the work so exposed prove unacceptable, the uncovering or removing, and the replacing of the covering or making good of the parts removed, will be at no direct pay.

Work done or materials used without supervision or inspection by an authorized Department representative, when the Department is not provided adequate notice or opportunity to provide inspection, may be ordered uncovered for examination and recovered, or removed and replaced, all at the contractor's expense.

When a unit of government or political subdivision or other public or private entity is to pay a portion of the cost of the work covered by the contract, its representatives shall have the right to inspect the work. Such inspection shall not make any unit of government, political subdivision or corporation a party to the contract and shall not interfere with the rights of either party thereunder.

105.12 INSPECTOR'S STAMP FOR SHIPMENT.

(a) Approval for Shipment: When materials requiring shop or plant inspection are ready for shipment, the Department's inspector shall affix the stamp of the Department. Each shipment piece, keg, box or bound pallet shall be marked by the inspector by direct stamping.

Application of the inspector's stamp implies that at the time of stamping it was the opinion of the inspector that the product was fabricated or manufactured from accepted materials by approved processes and painted, if required, in accordance with the contract. Application of the inspector's stamp for shipment does not imply that the products will not be rejected by the Department if subsequently found to be defective.

(b) Rejection: The inspector will reject material and workmanship that do not conform to the contract.

Stamping of products by Department representatives shall not preclude further testing and inspection by the Department.

Defective materials and workmanship, whenever discovered, will be rejected and shall be repaired or replaced at no direct pay. All repair procedures shall be approved.

(c) Shipment of Material Not Stamped: Materials and fabricated items subjected to shop inspection will not be accepted at the project site if they do not bear the inspector's stamp for shipment. If the products are not

stamped because they were not offered for shop inspection, or were shipped after rejection at the shop, the products shall be returned to the shop for inspection and correction as necessary.

In lieu of this requirement, the Department may allow inspection to be performed at the project site at the contractor's expense.

105.13 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. Work not conforming to the contract will be considered unacceptable, unless otherwise determined acceptable under the provisions in Subsection 105.03.

Unacceptable work found to exist prior to final acceptance of the work shall be removed and acceptably replaced.

No work shall be done without lines and grades having been given by the engineer, except that work which is specified as construction layout. No payment will be made for work done contrary to instructions of the engineer, work done beyond lines shown on the plans or as given, or extra work done without authority. Work so done may be ordered removed or replaced at the contractor's expense.

Upon failure of the contractor to comply with any order of the engineer made under the provisions of this Subsection, the engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs from payments for the work.

105.14 LOAD RESTRICTIONS. The contractor, subcontractors or suppliers shall observe legal load restrictions when hauling equipment or materials on public roads beyond project limits. A special permit does not decrease the contractor's liability for damage.

Except for specified equipment contractor shall obtain the engineer's written permission to exceed legal load limits within the project limits. Operating equipment or hauling loads that may damage structures, roadway, or any construction is prohibited.

105.15 MAINTENANCE DURING CONSTRUCTION. The contractor shall satisfactorily maintain the entire area within the right-of-way limits of the project, from the effective date of the Notice to Proceed until the date of final acceptance. This maintenance responsibility includes, but is not necessarily limited to, maintaining drainage, periodic mowing and removing of debris and remains, to the satisfaction of the engineer, as well as such striping, patching and shoulder maintenance which will provide safe and

convenient conditions at all times for the public. The contractor shall continuously and effectively satisfy his maintenance responsibilities with such equipment and forces as may be necessary to maintain a safe and satisfactory condition for the duration of the project.

The contractor shall maintain the roadway in a satisfactory condition to allow traffic to safely travel through the work zone at the posted speed limit.

Adjacent and parallel roadways within the project limits, not affected by construction shall not be the maintenance responsibility of the contractor.

105.16 FAILURE TO MAINTAIN ROADWAY OR STRUCTURE. If the contractor fails to comply with Subsections 104.03 and 105.15, the engineer will immediately notify the contractor in writing of such noncompliance. If the contractor fails to remedy the condition within 24 hours after receipt of the written notice, the Department will have the option to immediately remedy the condition with its own in-house forces or by another contractor, and the cost thereof will be deducted from payments for the work.

When the condition requires more immediate remedy due to hazard to life, health and property, the engineer will immediately remedy the condition as above and the costs thereof will be deducted from payments for the work.

105.17 ACCEPTANCE.

(a) Partial Acceptance: When the contractor satisfactorily completes a portion of the project that can be used advantageously for traffic or other use, the contractor may request the engineer to make final inspection of that portion. When the engineer finds upon inspection that the portion has been completed in compliance with the contract, the engineer may accept that portion as being completed and the contractor will be relieved of further responsibility for that portion and from further liability to the public.

Partial acceptance of a project will not be made until the portion being accepted has been completed in its entirety, including all safety devices, signs and striping. When partial acceptance is made, the terms of acceptance, including the responsibilities of all parties and any allowance of additional contract time, shall be set forth in a change order, mutually agreed to by the engineer and the contractor. Such partial acceptance shall not void or alter any terms of the contract, except as set forth in the change order.

(b) Final Acceptance: Upon notice from the contractor of presumptive completion of the entire project, the engineer will make an inspection. When the work provided for in the contract is found satisfactorily completed, that inspection will constitute the final inspection. The engineer will make final acceptance and notify the contractor in writing of this acceptance as of the

date of final inspection.

When the inspection discloses any work as being unsatisfactory, the engineer will give the contractor instructions for correction of same. The contractor shall immediately comply with such instructions. Upon correction of the work, another inspection will be made which will constitute final inspection provided the work has been satisfactorily completed. In such event, the engineer will notify the contractor in writing of this acceptance as of the date of final inspection.

105.18 CLAIMS FOR ADDITIONAL COMPENSATION. If the contractor deems additional compensation is due for work, material, delays, inefficiencies, disruptions or other additional costs/or expenses not covered in the contract or not ordered as extra work, the contractor shall notify the engineer in writing of his intention to make a claim for such additional compensation before beginning the work on which the claim is based or immediately upon encountering the conditions or effects which the contractor claims entitle him to additional compensation. Notification of claims shall conform to the requirements of EDSM III.1.1.28. If such notification is not given or the engineer is not afforded proper facilities by the contractor for keeping account of actual costs incurred by the contractor, the contractor hereby agrees and shall be deemed to waive any claim for such additional compensation. Such notice by the contractor and the fact that the engineer has kept account of the costs as aforesaid shall not be construed as proving or substantiating the validity of any claim. If the claim, after consideration by the Chief Engineer, or judicial determination, is found to be just, payment will be made as specified in Subsection 109.04 by force account or negotiated price. Nothing in this subsection shall be construed as establishing any claim contrary to Subsection 104.02.

105.19 VALUE ENGINEERING PROPOSALS. This provision is to share with the contractor only the cost savings generated on this contract as a result of a Value Engineering (VE) Proposal(s) offered by the contractor and approved by the Department. Any time savings resulting from a VE Proposal will be considered at the completion of the project as an incentive to the contractor, provided the contract contains an incentive clause for early completion of the work and the contractor has not met the incentive limit in the contract. A time only reduction will not be considered as a VE Proposal. The purpose is to encourage the use of the contractor's ingenuity and experience in arriving at alternative construction methods, which will reduce the overall construction cost. After award of the contract, the successful

bidder will be permitted to submit to the engineer, written VE Proposals, for modifying the plans, specifications, or other requirements of the contract for the purpose of reducing the total cost of construction. The VE Proposal shall not impair, in any manner, the essential functions and characteristics of the project, including but not limited to safety, service life, reliability, economy of operation, ease of maintenance, desired appearance, traffic flow during construction, or necessary standardized features.

The VE Proposal shall be specifically identified by the contractor as a cost reduction proposal. VE Proposals will be considered by the Department in the same manner as change orders.

The contractor has the option of submitting a conceptual VE Proposal to the Department for review prior to making formal submission. However, the contractor may submit the formal VE Proposal directly.

The conceptual VE Proposal shall provide the following minimum information:

(a) A description of the proposal.

(b) A listing of work items affected by the proposed change, including any change in contract time and/or traffic maintenance.

(c) An initial estimate of the net cost savings which the change is expected to generate, including elimination of any planned work.

The contractor may proceed to the formal VE Proposal upon the Department's approval of the conceptual VE Proposal. The Department is not obligated to approve the contractor's formal VE Proposal, even if the conceptual VE Proposal is initially considered acceptable.

As a minimum, the following information shall be submitted by the contractor with the formal VE Proposal.

(a) A statement that the proposal is submitted as a VE Proposal.

(b) A description of the difference between the existing contract requirements and the proposed change(s), and the comparative advantages and disadvantages of each, including effects on service life, economy of operations, ease of maintenance, desired appearance, necessary standardized features, reliability, traffic flow during construction, safety, and contract time.

(c) Any or all of the following submittals as required by the engineer showing proposed revisions relative to the original contract features and requirements: Plans, sketches, engineering calculations, specifications or stamped plans bearing the signature and seal of a professional engineer licensed to practice in the State of Louisiana.

(d) Detailed estimates of the cost to the Department for performing the work under the existing contract and under the VE Proposal, including a listing of contract items affected by the proposal, and quantity variations

attributable thereto with the related costs.

(e) An assessment of any effects that adoption of the VE Proposal could have on other costs to the Department, including future maintenance and operation.

(f) A statement of the latest time or date that any agreement adopting the VE Proposal must be executed in order to obtain the maximum cost reduction during the remainder of the contract and the reasoning for this time schedule. This date must allow the Department time for review and processing of a change order. Should the Department find insufficient time is available for review and processing, it may reject the VE Proposal on such basis. If the Department fails to respond to the VE Proposal by the date or time specified, the contractor shall consider the proposal rejected and shall have no claim against the Department.

(g) A statement of the effect that adoption of the VE Proposal will have on the time for completion of the contract.

(h) A description of any previous use or testing of the final VE Proposal on another Department project or elsewhere and the conditions and results therewith. If the final VE Proposal was previously submitted on another Department project, indicate the date, the project, and the action taken by the Department.

The provisions of this subsection shall not be construed to require the Department to consider any VE Proposal which may be submitted. The Department reserves the right to reject any and all VE Proposals. The bidder is cautioned not to base any bid prices on the anticipated approval of a VE Proposal and to recognize that the proposal may be rejected. In the event of rejection, the contractor will be required to complete the contract at the contract bid prices. Proposed changes in basic configuration and design of a bridge, hydraulic capacity of drainage facilities, typical roadway section, type or minimum thickness of pavements, or changes in grade or alignment which do not meet the geometric standards of the project as conceived, will not be considered as acceptable VE Proposals. Typically, changes in materials for roadway sections will also not be considered as acceptable VE proposals. Plan errors which are identified by the contractor and result in a cost reduction will not qualify as a VE proposal. If the Department is already considering certain revisions to the contract or has approved certain changes in the contract for general use, which are subsequently incorporated in a VE Proposal, the Department will reject the contractor's proposal and may proceed without obligation to the contractor. The Department will not be liable to the contractor for failure to act upon or accept any VE Proposal nor for any delays to the work attributable to any such proposal. The contractor

may withdraw, in whole or in part, any VE Proposal not accepted by the Department within the period specified in the proposal. The decision of the Department as to the acceptance or rejection of VE Proposals shall be final and shall not be subject to the provisions of Subsection 105.19.

The contractor will be notified in writing of the Department's decision to accept or reject each VE Proposal submitted under these provisions. If a VE Proposal is accepted, the necessary contract modifications will be implemented by execution of a change order, which will provide for equitable price adjustments giving the contractor and the Department equal shares in the resulting net savings. Until a VE Proposal is affected by such contract modification, the contractor shall perform the work in accordance with the terms of the existing contract.

The net cost savings to be shared shall be determined as the difference in costs between the original contract costs for the involved work items and the actual final costs to the Department occurring as a result of the proposed change. Only those work items directly affected by the change order will be considered in making the final determination of net cost savings. Subsequent change orders affecting the modified work items but not related to the VE Proposal, will be excluded from such determination. In reviewing the VE Proposal, the Department reserves the right to reject the proposal if, in its judgment, the proposed net cost savings do not represent a reasonable measure of the value of the work to be performed or deleted.

All costs incurred by the contractor in developing the VE Proposal shall be borne by the contractor. The change order implementing the necessary contract modifications shall include a pay item for and a lump sum estimate of the approximate net cost savings anticipated as a result of the VE Proposal, and a proportionate amount thereof shall be included in partial payment estimates as the work on the modified contract items is performed. The contractor's 50 percent share of the net cost savings shall constitute full compensation for implementing all changes pursuant to the agreement. Any time savings for early completion of the project resulting from the VE Proposal will be considered upon completion of the project as an incentive to the contractor provided the contract contains an incentive clause for early completion of the work and the contractor has not met the incentive limit in the contract.

The Department reserves the right to include in the agreement any conditions it deems appropriate for consideration, approval, and implementation of the VE Proposal. The Department also reserves the right to require the contractor to share in the Department's costs of investigating a VE Proposal submitted by the contractor as a condition of considering such

proposal. The Department will have the option to perform the investigation in-house or by consultants. When such a condition is imposed, the contractor shall indicate his acceptance in writing, and such acceptance shall constitute full authority for the Department to deduct amounts payable to the Department from any monies due or that may become due to the contractor under the contract.

The Department reserves the right to adopt a VE Proposal for general use when it determines that said proposal is suitable for application to other contracts. When an accepted VE Proposal is adopted for general use, only the contractor who first submitted such proposal will be eligible for compensation pursuant to this subsection, and in that case, only as to those contracts awarded to him prior to submission of the accepted proposal. VE Proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under these provisions if the identical or similar previously submitted proposals were not adopted for general application to other Department contracts. Subject to the provisions contained herein, the State or any other public agency shall have the right to use all or any part of any submitted VE Proposal without obligation or compensation of any kind to the contractor.

Any changed conditions arising as a result of the acceptance of a VE Proposal will not be considered as the basis for any claim for additional compensation.

105.20 NIGHTTIME CONSTRUCTION OPERATIONS.

(a) Description: This work consists of furnishing, installing, operating, maintaining, moving, and removing portable light towers and equipment-mounted fixtures for nighttime construction operations. Nighttime construction operations are defined as work performed after sunset and before sunrise.

(b) Equipment Requirements: Materials and equipment shall be in good operating condition and in compliance with applicable OSHA, NEC, and NEMA codes.

The contractor shall furnish, to the engineer, two light meters capable of measuring the level of illuminance. These light meters will be used by the engineer to check the adequacy of illumination throughout the nighttime construction operations. The light meters will become the property of the contractor after final acceptance.

Suitable brackets and hardware shall be provided to mount lighting fixtures on equipment and machinery. Mountings shall be designed so that light fixtures can be positioned as necessary to reduce glare and provide the

required illumination. Mounting brackets and fixtures shall not interfere with the equipment operator or any overhead structures and shall be securely connected to the fixtures to insure minimum vibration.

Equipment-mounted systems shall be attached to construction equipment to provide Level II and Level III illuminance. Equipment mounted lighting shall be designed and positioned to be operated independently of general illumination.

Portable systems may consist of ground-mounted, trailer-mounted, or equipment mounted light towers. Portable light towers shall be sturdy and free-standing without the aid of guy wires or bracing. Towers shall be capable of being moved as necessary to keep pace with the construction operation. Extreme caution shall be used when moving portable light towers in the vicinity of overhead utilities. Portable lighting systems shall be positioned to minimize the risk of being impacted by traffic on the roadway or by construction equipment.

Conventional vehicle headlights shall not be permitted as the sole means of illumination while working. All motorized vehicles shall be equipped with conventional vehicle headlights to permit safe movement in non-illuminated areas. Use of strobe lights on vehicles and equipment is prohibited. Use of flashing lights shall be kept to a minimum to prevent motorist distraction. Flashing lights shall not be used behind barrier protection systems.

Switches shall be provided to adequately control the various lights. All wiring shall be weatherproof and installed according to local, state, federal, and OSHA requirements. Ground fault circuit interrupters shall be provided for electrical outlets used for electrical tools and extension cords. The contractor shall provide sufficient fuel, spare lamps, generators and qualified personnel to ensure that all required lights operate continuously during nighttime construction operations. In the event of any failure of the lighting system, the construction operation shall be discontinued until the required level of illumination is restored. In residential areas, generator systems shall be selected to comply with local noise ordinances. A supply of emergency flares shall be maintained by the contractor for use in the event of emergency or unanticipated situations.

(c) Illumination Requirements: All operations that are performed during nighttime hours shall be properly illuminated to allow for the safe performance and inspection of the work.

Work area is defined as a minimum of 50 feet (15 m) ahead and behind the employee, where work is to be performed. A minimum of 5 foot-candles (54 lux) shall be maintained throughout the work area during nighttime construction operations, and during the setup and removal of lane or roadway

closures.

Lighting shall be adequate to meet the required level of illuminance and uniformity over the work area as follows:

(1) Level I (5 foot-candles, 54 lux): This level of illuminance shall be provided for all work areas of general construction operations, such as excavation and embankment; cleaning and sweeping; landscaping; planting and seeding. Stockpiles shall also be illuminated to Level I to enhance safety and improve work efficiency.

(2) Level II (10 foot-candles, 108 lux): This level of illuminance is required for areas on or around construction equipment such as that used for drainage installations, striping, base course construction, milling, asphalt paving operations, and concrete placement and removal. This level is necessary for safe operation of equipment and for obtaining an acceptable level of accuracy.

(3) Level III (20 foot-candles, 215 lux): This level of illuminance is required for tasks requiring a higher level of visual performance or for tasks with a higher level of difficulty. Such tasks include, pavement or structural crack filling, joint repair, joint cleaning, joint sealing, pavement patching and repairs, saw-cutting, installation of signal equipment or other electrical/mechanical equipment, and other tasks involving fine details or intricate parts and equipment.

(d) Glare Control: All lighting provided under this item shall be designed, installed, and operated to avoid glare interference with roadway traffic or discomfort for residences adjoining the roadway. The contractor shall locate, aim, and adjust the lights to provide the required level of illuminance and uniformity in the work area without the creation of objectionable glare. The engineer shall determine when glare exceeds acceptable levels, either for traffic or adjoining residences. The contractor shall provide shields, visors, or louvers on luminaries as necessary to reduce objectionable levels of glare.

At a minimum, the following requirements shall be met to avoid objectionable glare to oncoming traffic:

(1) Tower-mounted luminaries shall generally be aimed either parallel or perpendicular to the roadway.

(2) All luminaries shall be aimed such that the center of the beam axis is no greater than 60 degrees from the vertical.

(3) Luminous intensity of any luminary shall not exceed 20,000 candelas at an angle of 72 degrees from the vertical.

(e) Operational Requirements: Thirty days prior to the start of night time operations, the contractor shall submit a lighting plan to the

engineer for approval. The contractor shall select appropriate lighting systems and design a lighting plan to achieve the required illuminance levels.

The lighting plan shall include location of lights necessary for every aspect of work; description of light equipment to be used; description of power source; attachment and mounting details for lights to be attached to equipment; technical details pertaining to the lighting fixtures; details on hoods, louvers, shields, or other glare control methods; and lighting calculations confirming that the illumination requirements will be met by the layout plan.

Lighting inspection will include (1) light meter measurements to determine illumination levels, (2) subjective observation of the lighting setup to evaluate glare potential for drivers and workers, and (3) a physical check of the lighting equipment to ensure that it complies with the specification requirements included in the contractor's lighting plan.

Prior to the first night of operation, the engineer will check the adequacy of the installed lighting using a light meter. A summary of these measurements will be noted in the inspection records to provide a basis for comparing subsequent measurements. If the required illuminance levels are not met, the contractor shall make the necessary adjustments before any work proceeds.

Operational checks shall be made when construction phasing changes and lighting plan changes are required to accommodate different phases of construction. Periodic checks will be made throughout the duration of nighttime operations. If the required illuminance levels are not met, the contractor shall make the necessary adjustments to the lighting plan before work continues.

During construction operations, in the event of any failure of the lighting system, the operations shall be discontinued until the required level of illumination is restored.

Section 203
Excavation and Embankment

203.01 DESCRIPTION. This work consists of excavation, disposal, placement and compaction of materials for which provisions have not been made under other sections of these specifications. This work shall include excavation and embankment construction for roadways and other structures, excavation for ditches and channels, and other grading operations necessary for the work in accordance with these specifications and in conformity with the lines, grades, thicknesses and typical sections shown on the plans or established. When contaminated soils or underground tanks are encountered, handling shall be in accordance with Section 202.

Disposal of material shall be in accordance with Subsection 202.02.

The plans may include data regarding the boring and classification of existing materials. The Department does not guarantee that individual samples are representative of the entire project, and bidders are required to study, make interpretations and additional investigations, as necessary, at no direct pay.

The contractor shall comply with Subsection 107.09 for work in, over or adjacent to navigable waters and wetlands, and shall comply with Subsection 107.27 when cultural artifacts, historical sites or archaeological sites are encountered.

Quality assurance requirements shall be as specified in the latest edition of the Department's publication entitled "Application of Quality Assurance Specifications for Embankment and Base Course."

Excavated material may be used in accordance with Subsection 203.06.

Erosion control shall be in accordance with Section 204.

203.02 GENERAL EXCAVATION. General excavation consists of the excavation of materials, as required by the plans, except drainage excavation and structural excavation. General excavation also includes unsuitable material in accordance with Subsection 203.04.

203.03 DRAINAGE EXCAVATION. Drainage excavation includes the excavation for drainage beyond the limits of the roadway section. Drainage excavation also includes inlet and outlet ditches to structures or roadways; changes in or deepening of channels of streams, berm ditches,

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ditches parallel or adjacent to the roadway beyond the limits of the roadway section; and material excavated from areas under bridges.

203.04 UNSUITABLE MATERIAL. Unsuitable materials are soils containing significant amounts of debris or organic matter including stumps, roots, logs, and humus, or other materials which will decay or produce subsidence, including highly saturated soils, which the engineer determines are not satisfactory for use in the embankment or other construction purposes. Unsuitable materials shall be removed and disposed of as general excavation. Unsuitable materials determined to be environmentally sensitive shall be removed and disposed of in accordance with Subsection 202.05.

203.05 BORROW. Borrow is defined as soils required for construction of embankments or other portions of the work in excess of soils obtained from excavation. Borrow shall be obtained from an approved source and shall be used in accordance with Subsection 203.06. The contractor shall make arrangements for obtaining borrow at no direct pay.

Securing of an exclusive option by a contractor on borrow areas or materials for the work will be considered a violation of Louisiana law and will be a basis for rejection of bids or such other action the Department deems advisable.

The contractor shall notify the engineer in writing a minimum of 30 calendar days in advance of borrow operations so that samples may be taken and soil tests completed prior to beginning borrow operations.

Prior to requesting the borrow pit to be bored, the contractor shall furnish the Department a written agreement with the property owner to allow the Department access to the property. The written agreement shall also state that the contractor has agreed to purchase the borrow material from the property owner for this particular site if the material meets contract specifications. A separate agreement shall be obtained from each property owner through which access will be necessary.

Sites from which material has been removed shall, upon completion of the work, be left in an acceptable condition.

Unless otherwise authorized in writing, borrow pits, gravel pits and quarry sites shall be located at least 300 feet (90 m) from the right-of-way.

When sources of borrow are located adjacent to a stream or river listed on the National System of Wild and Scenic Rivers or the Louisiana Natural and Scenic Rivers System, borrow pits, and any stockpiled materials shall be located at least 300 feet (90 m) from the natural stream or river bank.

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The borrow pit and access shall be cleared to allow access for DOTD boring equipment. The borrow area shall be surveyed with a base line staked. Both the engineer and laboratory shall be furnished with a location plat and borrow pit plat. The contractor will not be permitted to begin borrow operations until materials are approved for use.

Sampling of soils from open excavations made by the contractor in lieu of borings will be allowed provided the open excavations display and allow sampling of each soil strata and the excavation is at no cost to the Department.

203.06 SOIL USAGE. The laboratory will test and classify soil in accordance with DOTD TR 423 from samples taken in the original location or from designated stockpiles. Soil shall be classified and approved prior to its being placed in embankments or other final positions on the project. Blending in the pit by approved methods to adjust percent silt or sand will be permitted. Soils which do not meet Liquid Limit or PI requirements shall not be blended to reduce Liquid Limit or PI. Soils may be treated with lime to reduce PI in accordance with Subsection 203.06(e).

Soil properties will be determined by the test methods shown in Table 203-1.

Table 203-1
Soil Properties

Property	Test Method
Plasticity Index (PI)	DOTD TR 428
Liquid Limit (LL)	DOTD TR 428
% Organic	DOTD TR 413
% Silt	DOTD TR 407
pH	DOTD TR 430

(a) Usable Soils: Usable soils shall have a maximum PI of 25 and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed.

(b) Selected Soils: Selected soils are natural soils with a maximum PI of 20, maximum Liquid Limit of 35, and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed. Soils to be used for in-place cement stabilization shall be in accordance with Subsection 302.02(a).

(c) Nonplastic Embankment: Nonplastic embankment shall be as specified in Subsection 203.09.

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(d) Headers: Headers are that portion of the embankment within 500 feet (150 m) of a bridge end. Headers shall be constructed for their full height with usable soils having a minimum PI of 11, a maximum PI of 25, and a maximum silt content of 65 percent. No lime treatment to the soil to meet the PI requirements will be permitted. Headers shall be compacted to 98 percent of maximum dry density in accordance with Subsection 203.07.

(e) Embankments other than Headers:

(1) Embankments shall be constructed with usable soils, except soil with a PI greater than 25 and less than 35 will be permitted when treated with a minimum of 6 percent lime, by volume, provided the organic content and silt requirements given in Heading (a) are met. If the contractor uses lime treatment, it will be at no direct pay. Lime treatment shall be Type E Treatment conforming to Section 304.

(2) The contractor may request in writing that usable soils for temporary detour roads have a PI not to exceed 45 and a maximum silt content of 75 percent provided:

a. This material will be removed and not become part of the permanent embankment.

b. The contractor agrees to take responsibility for any additional maintenance required.

(f) Plastic Soil for Slopes:

(1) Embankment Material: The outside layer of embankment (fill sections) will consist of a plastic soil blanket in accordance with Subsection 203.10. Sampling in the pit may be allowed if an identifiable strata can be isolated. Otherwise, sampling will be from dedicated stockpiles.

(2) Cut Slopes, PI Less than 10: When soils having a PI less than 10 exists on cut slopes, the contractor shall undercut 12 inches (300 mm) and place a plastic soil blanket conforming to Subsection 203.10.

(3) Cut Slopes, PI 10 or Greater: When soils having a PI of 10 or greater but with a pH less than 5.5, or greater than 8.5, exist on cut slopes, the contractor shall undercut and place a plastic soil blanket complying with Subsection 203.10. In lieu of furnishing a plastic soil blanket, the soil may be modified in place so that the pH of the soil complies with the requirements of Subsection 203.10, at the option of the engineer and concurrence of the contractor. In such case payment will be in accordance with existing items or Subsection 109.04, as applicable, not to exceed the cost of undercut and replacement.

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(g) Usable Soils for Slope Adjustments and Shoulder Widening: When the thickness of embankment material used for slope adjustment is less than 12 inches (300 mm), a plastic soil complying with Subsection 203.10 will be required. If the thickness is greater than 12 inches (300 mm), the contractor will be allowed to substitute plastic soil for usable soil, provided the widening is not directly below a paved shoulder.

203.07 GENERAL REQUIREMENTS. Excavation and embankment construction consists of constructing roadway embankments, including preparation of areas on which they are to be placed; constructing drainage excavation; backslope construction; constructing dikes, when required; placing and compacting approved material in areas where unusable material has been removed; placing and compacting embankment material in holes, pits and other depressions; and placing and compacting embankment materials for backfilling structures. Prior to beginning excavation, grading or embankment operations in an area, all necessary clearing and grubbing in that area shall have been completed. Prior to any embankment operations in an area, all corresponding roadside ditches shall be cut to facilitate drainage in that area. Embankment materials shall not be placed or spread on portland cement concrete or asphaltic concrete pavements. Pavement surfaces, edges and joints shall not be damaged during embankment operations.

Final excavation and embankment slope lines shall be uniform in appearance. Measurements shall be made as necessary to assure that the elevations at the top, bottom, and intermediate breaks in the slope are such that a minimum acceptable slope is achieved. The slopes shall be straight without valleys or humps, as determined by visual inspection. If an apparent discrepancy is discovered upon visual inspection, measurements shall be taken a minimum of every 10 feet (3.0 m) measured along the slope between theoretical break points in the embankment. When these measurements reveal slope variances by more than 0.03 ft/ft (0.03 m/m), too steep, or 0.15 ft/ft (0.15 m/m), too flat, the slopes shall be reworked by the contractor until these criteria have been met. The top of embankment shall not vary from the established grade by more than ±0.1 foot (0.030 m).

Embankment material shall be in accordance with Subsection 203.06 and shall be placed in uniform layers not exceeding 12 inches (300 mm) of uncompacted thickness. Each layer shall be placed for the full width of embankment, blended as necessary to obtain a uniform material, brought to a uniform moisture content, and compacted by approved methods to a minimum of 95.0 percent of maximum dry density before the next layer is

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placed. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and percent in-place density in accordance with DOTD TR 401. The density of the embankment shall be such that the density of the type of base course being constructed as given in Table 301-1 shall be met. The moisture content at the time of compaction, tested in accordance with DOTD TR 403, shall be within a range of ±2.0 percent of optimum moisture established in accordance with DOTD TR 415 or TR 418 or the lifts shall be reprocessed and recompacted until these requirements are met. Operations shall be conducted to prevent lamination between lifts. Laminations between lifts shall be corrected prior to placing additional lifts. Surfaces of excavated areas and embankments shall be smooth and uniform. Material outside construction limits shall not be disturbed.

Excavated material shall become the property of the contractor. Soils from excavation areas may be used when approved in embankments or other finished sections. Surplus or unusable excavated material shall be disposed of by the contractor in accordance with Subsection 202.02 or as provided in this Subsection.

Drainage excavation and rough grading shall be performed simultaneously, unless otherwise directed or permitted. Roots, stumps or other vegetative obstructions in sides and bottom of ditches and channel changes shall be cut to conform to required cross section and grade. Excavated material shall be placed sufficient to protect the integrity of the slope but in no case closer than 3 feet (1.0 m) from the edge of ditch.

When obliteration of old roadways is required, it shall include grading operations necessary to satisfactorily incorporate the old roadway into the new roadway and surroundings in order to provide a pleasing appearance and to allow drainage.

When preparing surface layers on which the embankment or base is to be placed, the engineer will require the contractor to attempt all normal earthwork construction methods before undercutting or modifying the soil with additives. Such construction methods may include, but are not limited to, the following and will be at no direct pay:

(a) Draining and drying of the surface until the material is within the limits of optimum moisture before compaction is attempted.

(b) Using lighter construction equipment for manipulating, disking, drying and compacting the material.

(c) Dumping successive loads of material in a uniformly distributed layer of a thickness necessary to support equipment while placing subsequent layers.

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(d) Rerouting heavy construction equipment around the area until the embankment can support the equipment without damage to foundation soils.

Unstable materials shall be removed by undercutting, unless otherwise directed, and backfilled to required section with usable soils as directed.

When undercutting is required, the contractor shall conduct the operations in such manner that the engineer can make necessary measurements before backfill is placed.

When excavation and embankment construction results in surface soils having a PI less than 10 or pH less than 5.5 or greater than 8.5, the contractor shall place a plastic soil blanket complying with Subsection 203.10.

The contractor shall be responsible for the stability of embankments until final acceptance. Construction activities, which may lead to subsequent embankment damage will not be permitted.

When embankments are constructed on a surface sloping more than 6:1 from the horizontal, the slope of the ground on which the embankment is to be placed shall be cut into steps, as directed, before fill is placed.

When a new roadway is to be constructed on an existing roadbed, and the surface of the existing roadbed is within 2 feet (0.6 m) of finished sub-grade, the existing roadbed shall be scarified full width to a depth of not less than 9 inches (230 mm) and recompacted in accordance with this subsection.

When an embankment is to be constructed to a height of less than 5 feet (1.5 m), heavy sod and objectionable vegetation shall be removed from the area on which the embankment is to be placed. The area shall be scarified to a depth of approximately 9 inches (230 mm). This area shall be recompacted to at least 95.0 percent of maximum dry density. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and percent in-place density in accordance with DOTD TR 401. When height of fill is 5 feet (1.5 m) or more, removal of sod will not be required but the area on which embankment is to be placed shall be disked to the satisfaction of the engineer and recompacted before construction of embankment.

When embankment material is to be deposited only on one side of abutments, wing walls, piers, or culvert head walls, the area immediately adjacent to the structure shall not be compacted to the extent that it will cause excessive pressure against the structure. Fill adjacent to the end bent of a bridge shall not be placed higher than the top of the substructure until the superstructure is in place. When the embankment is to be deposited on

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both sides of a concrete wall or similar structure, operations shall be conducted so that the embankment is always at approximately the same elevation on both sides of the structure. Backfilling of structures shall be performed in accordance with Section 802.

When embankments are constructed in lakes, streams, swamps or other unstable areas and unstable material cannot be removed or the area drained, the requirement for placing material in layers as outlined above may be waived. When this requirement is waived, the embankment shall be placed by end dump or other approved methods to an elevation where normal construction methods can begin. Embankments placed above this elevation shall be constructed in layers as specified above. When a wave of unsuitable material is forced up in front of the end dumping operation, it shall become the property of the contractor and be removed as necessary, and will not be allowed to be trapped and be incorporated in the embankment except as part of plastic soil for slopes.

203.08 CUT AREA PREPARATION. The top 12 inches (300 mm) shall be scarified and compacted to such density that the compaction requirements of the type base course being constructed given in Table 301-1 shall be met. Construction, compaction, and testing requirements shall be in accordance with Subsection 203.07.

When unstable soils are encountered, the engineer will determine the limits to be undercut. The contractor shall excavate to a stable foundation or to the depth required by the engineer and backfill to existing grade. Undercut shall be constructed and tested in accordance with Subsection 203.07.

When a stable foundation cannot be reached, the embankment materials shall be "bridged-in" and the remaining embankment constructed in accordance with Subsection 203.07 to existing grade.

203.09 NONPLASTIC EMBANKMENT.

(a) Materials: Nonplastic embankment material shall comply with Subsection 1003.09 or the following, unless otherwise specified on the plans.

(b) General Requirements: Unsuitable material defined in Subsection 203.04 shall not be entrapped in the embankment. The contractor shall remove any such material at no direct pay.

Surcharge materials shall remain on the embankment for at least the specified number of days after approval of the increment. Damage to embankment increments due to the contractor's operations shall be

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satisfactorily repaired by the contractor at no direct pay. The contractor will be permitted to remove excess surcharge materials after the surcharge period. Verification cross sections of the final embankment will be taken after removal of the surcharge. The Department will assume liability for subsidence after these cross sections are taken. After all embankment increments have been surcharged, excess surcharge material shall be satisfactorily disposed of in accordance with Section 202.02 at no direct pay.

Except for shell or stone embankments, the contractor shall furnish and place a plastic soil blanket complying with Subsection 203.10.

(c) Nonplastic Embankment Construction: Nonplastic embankments shall be constructed by mechanical methods.

Unless otherwise shown on the plans, material shall be placed in lifts not exceeding 15 inches (375 mm) uncompacted thickness after establishing a working table as directed. Each lift shall be compacted and tested in accordance with Subsection 203.07.

(d) Blended Calcium Sulfate Embankment Construction: Water shall be added or other suitable means shall be taken to prevent dust resulting from the transporting and placing of dry material. Blended embankment material shall be placed in lifts not exceeding 12 inches (300 mm) in thickness (loose) after establishing a working table as directed. Each lift shall be compacted to at least 95 percent of maximum dry density prior to placement of subsequent lifts. The maximum density shall be determined in accordance with DOTD TR 418 modified to include a drying temperature not to exceed 140°F (60°C). Field density testing shall be in accordance with Subsection 203.07 except that moisture content determinations for density corrections shall be determined by oven drying the material at 140°F (60°C) for a minimum of 24 hours. A forced draft type oven capable of maintaining this temperature shall be provided by the contractor. The contractor shall furnish and place a plastic soil blanket complying with Subsection 203.10.

Blended calcium sulfate shall not be placed within 10 feet (3.0 m) of metal drainage structures. The contractor will be allowed to substitute natural stone, flowable fill under Section 710, or other material in Subsection 1003.08 as approved by the Department.

203.10 PLASTIC SOIL BLANKET. Plastic soil blanket shall consist of soils having a minimum PI of 11, maximum PI of 35, a maximum silt content of 65 percent, and a pH not less than 5.5 or greater than 8.5, and a minimum organic content of 3 percent. The contractor will be allowed to

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blend organic materials to achieve the minimum 3 percent organic content. The plastic soil blanket shall support a satisfactory stand of grass in accordance with Sections 714 or 717. The minimum thickness of the soil blanket will be 12 inches (300 mm). Areas requiring a plastic soil blanket shall be approved prior to placement of the plastic soil blanket. After materials are placed and spread, lumps, stones, roots and other foreign matter shall be removed from the area. Soil blanket material shall be spread and rolled in a manner that leaves a uniform surface. Any remaining ridges or grooves, including cleat tracks from the dozer, will be parallel to the roadway during the period of time between placement and seeding.

Plastic soil blanket shall be placed in a timely manner to prevent erosion.

203.11 GEOTEXTILE FABRICS.

(a) General: This work consists of furnishing and placing geotextile fabric in accordance with these specifications and in conformance with the details shown on the plans.

(b) Materials: The geotextile fabric shall comply with Section 1019.

(c) Construction Requirements: Rolls of geotextile fabric shall be kept covered and protected from ultraviolet degradation at all times until use. Geotextile fabric that has been installed shall be covered with embankment within 7 calendar days. When ultraviolet damage occurs, the geotextile fabric shall be removed and replaced. The geotextile fabric shall be placed at the locations shown on the plans or as directed. Adjacent rolls of geotextile fabric will be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches (450 mm), or as specified in the plans, including the ends of the rolls. The top layer of the geotextile fabric shall be parallel with adjacent rolls and in the direction of embankment placement. When rolls are sewn, the contractor shall join adjacent rolls by sewing with polyester or kevlar thread. Field sewing shall employ the "J" seam or "Butterfly" seam with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-thread chain stitch. Factory seams other than specified may be submitted to the Materials and Testing Section for approval. Where the ground is covered with water or soil is saturated, sewing of the geotextile fabric will be required.

The geotextile fabric shall be placed as smooth as possible with no wrinkles or folds, except in curved road sections. For curved road sections, the geotextile fabric shall be folded to accommodate the curve. The fold

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shall be in the direction of construction and pinned or stapled. Ruts that occur during construction shall be filled and compacted prior to placement of geotextile fabric.

Damaged geotextile fabric shall be either removed and replaced with new geotextile fabric or covered with a second layer of geotextile fabric extending 2 feet (0.6 m) in each direction from the damaged area.

203.12 QUALITY CONTROL. The contractor shall locate, select, and place material conforming to specification requirements. The contractor shall control his processes, including performing tests and making adjustments as necessary, to result in a uniform quality product meeting all the requirements of the plans and specifications. Tests for in-place moisture content shall be performed by the contractor in accordance with DOTD TR 403, at a frequency that will ensure that the material is within the tolerances of optimum moisture. Tests for in-place density shall be performed by the contractor in accordance with DOTD TR 401 at a frequency that will ensure that the compactive effort is producing a uniform product that conforms to specification requirements. The contractor shall control placement and finishing to ensure conformance with the lines, grades, thickness, and typical cross-sections shown on the plans or established.

Sections will be inspected prior to acceptance testing. Obviously deficient areas shall be corrected prior to acceptance testing.

203.13 ACCEPTANCE. The Department will perform inspection, sampling, and testing for acceptance. Any area that is deficient will require correction whether identified by inspection or testing.

The embankment (with surcharge, if required) will be approved in increments of 1,000 feet (300 m), except terminal increments which may be less than 1,000 feet (300 m).

Maximum density for earthwork will be determined in accordance with DOTD TR 415 or DOTD TR 418; in-place density will be determined in accordance with DOTD TR 401.

203.14 MEASUREMENT.

(a) General: Unless otherwise specified, borrow material in accordance with 203.05 and plastic soil for slopes in accordance with 203.06(f) will be considered incidental to the embankment and will not be measured separately, but will be measured as embankment.

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Measurement of undercut will be from subgrade or original ground, whichever is lower.

No measurement will be made for excavation for culverts or culvert headwalls.

When the grade line of a pipe or box culvert is raised or lowered more than 2 feet (0.6 m) from the grade line shown on the plans or is relocated to a site requiring an equivalent change in excavation, payment will be increased or decreased accordingly at the rate of three times the contract unit price for General Excavation (or Embankment if General Excavation is not a contract pay item). The volume to be used in the increase or decrease will be a rectangular solid the length of the pipe or box culvert, the outside width of the pipe or box culvert plus 3 feet (1.0 m), and the average change in invert elevation minus 2 feet (0.6 m).

(b) General Excavation, Embankment and Nonplastic Embankment:

The measurement of quantities will be computed by the average end area method and will be that area bound by (1) the original ground line established by location (plan) cross sections (if accurate) or new original cross sections obtained by the contractor, and (2) the final theoretical pay line as shown on the plans, or established by the engineer, adjusted for field changes.

After clearing and grubbing operations, the contractor will take original cross sections for the entire length of the project. All original cross sections shall be taken in the presence of a designated DOTD employee. Cross sections shall be taken at sufficient intervals to accurately determine earthwork quantities, not to exceed 100 linear feet (30 lin m). The cross sections shall be taken in accordance with DOTD procedures, and results must be furnished to the Department in a format satisfactory to the engineer. The Department reserves the right to take additional cross sections as needed to verify the contractor's cross sections. In the event the cross sections do not verify, the contractor will investigate and reconcile any differences.

The original cross sections will be used to determine the accuracy of the location cross sections by using random sections not farther apart than 1000 linear feet (300 lin m) and centerline elevations at intervals of 100 linear feet (30 lin m). The location cross sections will be considered to be usable if the average of the differentials do not exceed ±0.3 foot (±0.1 m). For significant portions of the project with obvious errors between location and original cross sections, the contractor's original field cross sections will

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be used, and will not be part of the verification process. In all cases where location sections are unavailable, new originals are to be taken and used.

The final theoretical pay line shall be derived from the profile grade, typical section and ditch grades shown in the plans, along with approved plan changes and other field changes made by the engineer. No increase in quantities will be authorized for overbuilding unless directed by the engineer.

Pay lines for surcharged embankments will be the theoretical surcharge lines shown on the plans. No measurement will be made for removing and disposing of excess surcharge materials.

When payment is made for embankment in its final position, no additional quantity will be measured due to settlement, compaction, erosion or other cause.

Excavation and embankment for crossovers, turnouts, driveway approaches or other minor installations will not be included in the measurement.

A depth and width tolerance of ±1.5 feet (±0.5 m) will be allowed for excavation of unsuitable material. Overdepth and overwidth will be waived at no direct pay; however, no measurement for payment will be made for additional embankment material required to backfill areas beyond theoretical unsuitable material lines.

Measurement will be made by one or more of the following methods:

(1) Plan Quantity: The quantities of excavation and embankment will be those shown in the plans, provided the project is constructed essentially to the theoretical pay line.

When the plans have been revised or when disagreement exists between the contractor and the engineer as to the accuracy of the plan quantities for the entire project, or any substantial portion thereof, either party may require that quantities be revised. The party requesting the revision will be responsible for isolating and detailing the error in an easily understood format which may include cross sections, sketches, and computations. The revision will be verified and agreed to by the other party.

No payment will be made to the contractor to recompute new plan quantities.

(2) Final Field Cross Sections: When payment lines are not shown on the plans and cannot be established, in lieu of final theoretical pay lines, final field cross sections will be used to determine pay quantities for excavation and embankment.

(c) Drainage Excavation: After completion of excavation operations at each individual location, measurement will be made in

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accordance with Subsections 203.14(b)(1) or 203.14(b)(2). Elevations for underwater excavation will be determined in accordance with DOTD TR 426.

(d) Excavation and Embankment:

(1) Linear Measurement: When excavation or embankment is to be measured on a linear basis, the length will be measured along the centerline or the baseline used in the plans and includes performing the excavation, embankment and grading work necessary for construction of the project. It is the contractor's responsibility to determine quantities of earthwork necessary to complete this item.

(2) Lump Sum Measurement: When excavation and embankment is to be measured by the lump sum, this item includes performing the excavation, embankment, and grading work necessary for construction of the project. It is the contractor's responsibility to determine the correct quantities of earthwork required to complete this item. No adjustment in contract price will be made.

(e) Borrow (Vehicular Measurement): The material will be measured by the cubic yard (cu m) in approved hauling vehicles at the point of delivery in accordance with Subsection 109.01.

(f) Geotextile Fabric: Geotextile fabric will be measured by the square yard (sq m) of covered area in place.

203.15 PAYMENT. Payment for the accepted quantities will be made at the contract unit prices which includes furnishing the equipment, labor and materials necessary to complete the items.

Payment for roadway obliteration will be made under appropriate roadway removal and excavation items. Existing asphaltic pavement, 5 inches (125 mm) thick or less, will be paid for as general excavation. Removal of asphaltic pavement greater than 5 inches (125 mm) thick will be paid for under Section 202. Blading and shaping to drain will be considered incidental and will not be measured for pay. Excavation, other than blading and shaping, generally over 1 foot (0.3 m) in depth over a substantial area, will be paid as general excavation for the full depth of cut.

Payment for undercut will be as general excavation, and payment for required backfill will be made as embankment. In cases when undercut operations are separate from normal earthwork and separate records can be kept, undercut may be paid in accordance with Subsection 109.04 when requested by the contractor in advance, or if the project engineer has sufficient records, without an advance request.

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Plastic soil blanket will be included in the pay volume for the embankment.

No direct payment will be made for acquisition of borrow materials outside the right-of-way; acquisition of right-of-way and constructing haul roads; stockpiling and rehandling of materials; precautionary measures to protect private property and utilities; or furnishing necessary water and watering equipment.

Excavation for plastic soil blanket in cut sections, when required, will be made as general excavation and payment for the required plastic soil blanket will be made as embankment.

Payment will be made under:

Item No.	Pay Item	Pay Unit
203-01	General Excavation	Cubic Yard (Cu m)
203-02	Drainage Excavation	Cubic Yard (Cu m)
203-03	Embankment	Cubic Yard (Cu m)
203-04	Nonplastic Embankment	Cubic Yard (Cu m)
203-05	Excavation and Embankment	Lump Sum
203-06	Excavation and Embankment	Linear Foot (Lin m)
203-07	Borrow (Vehicular Measurement)	Cubic Yard (Cu m)
203-08	Geotextile Fabric	Square Yard (Sq m)

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Section 302
Class II Base Course

302.01 DESCRIPTION. This work consists of furnishing and placing Class II roadway and shoulder base course on a prepared surface in accordance with these specifications, in conformity with the lines, grades, thickness, and typical sections shown on the plans or established. The contractor shall control the selection, placement, mixing and compaction of materials so that the completed base course is uniform and conforms to plan dimensions and other acceptance requirements.

Quality assurance requirements shall be as specified in the latest edition of the Department's publication entitled "Application of Quality Assurance Specifications for Embankment and Base Course."

When not specified, any of the following types may be used.

(1) Soil Cement
(2) Cement Treated Sand-Clay-Gravel
(3) Stone or Crushed Slag
(4) Asphaltic Concrete Base Course on Embankment Layer
(5) Recycled Portland Cement Concrete

Unless approved in writing, the same base course material shall be used throughout the project.

With approval, concrete complying with Section 901 or asphaltic concrete base course complying with Section 502 may be used in lieu of the specified Class II Base Course material in areas inaccessible to mixing and compacting, in turnouts and crossovers, and in other isolated or irregular areas. Concrete shall be placed, consolidated, finished and cured as directed in accordance with Section 706.

In order to meet air quality standards, the contractor may be required to use central plant mixing of cement treated mixtures in dust sensitive areas at no direct pay. The contractor may use other types of Class II Base Course in dust sensitive areas at no direct pay. The Department will identify the dust sensitive areas in the plans.

302.02 MATERIALS. Materials shall comply with the following Sections or Subsections and requirements.

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Geotextile Fabric	203.11 & 1019
Asphaltic Concrete	502
Portland Cement Concrete	901
Portland Cement	1001.01
Portland-Pozzolan Cement	1001.02
Asphalt Materials	1002
Sand-Clay-Gravel	1003.01 & 1003.03(a)
Stone	1003.01 & 1003.03(b)
Recycled Portland Cement Concrete	1003.01 & 1003.03(c)
Crushed Slag	1003.01 & 1003.03(d)
Water	1018.01

(a) Soils for Soil Cement: Soils for soil cement base course shall consist of materials that will stabilize with cement in accordance with DOTD TR 432. Such materials are those soils classified as A-1-a, A-1-b, A-2-4, A-2-6, A-4 and A-6 in accordance with DOTD TR 423. Soil with a Liquid Limit greater than 35, a Plasticity Index (PI) greater than 15, or an organic content greater than 2 percent shall not be used. Liquid Limit and Plasticity Index will be determined in accordance with DOTD TR 428. Organic content will be determined in accordance with DOTD TR 413. Soil with over 79 percent sand or 60 percent silt when tested in accordance with DOTD TR 407 shall not be used. Soils may be blended to adjust the percentages of sand or silt to meet specification requirements; however, in-place blending will not be allowed. The District Laboratory Engineer will approve materials prior to blending and the final product. Soils that do not meet Liquid Limit or PI requirements shall not be blended or treated to reduce Liquid Limit or PI. Topsoil shall not be used. The contractor shall obtain the material to be stabilized from outside right-of-way limits except as provided in Subsection 106.02(c).

(b) Portland Cement: Portland cement shall be Type I or II. The quantity of cement used shall be supported by Certificate of Delivery.

(c) Portland-Pozzolan Cement: The cement shall be Type IP. The quantity of cement used shall be supported by Certificate of Delivery.

(d) Asphaltic Concrete Base Course: The material requirements for asphaltic concrete base course shall be as described in Section 502. The top half of the base thickness shall be asphaltic concrete and the remaining thickness shall be the same type and construction as the top layer of embankment.

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302.03 EQUIPMENT. Equipment shall be subject to approval prior to use. When in-place mixing is used, the equipment shall conform to Subsection 303.03. When central mixing is used, the equipment shall conform to Subsection 301.03(a). Compaction equipment shall conform to Subsection 301.03(a)(5).

302.04 GENERAL CONSTRUCTION REQUIREMENTS. Base course material shall be placed on a subgrade prepared in accordance with Sections 203, 304, 305 or 306 as specified. Asphaltic concrete base course shall be constructed in accordance with Section 502.

If an aggregate base course is to be placed on untreated or lime-treated soils, a Class D geotextile separator fabric will be required.

302.05 MIXING.

(a) Soil Cement: Soil shall be combined with cement and water by in-place mixing or in a central plant and shaped on the subgrade. When in-place mixing is done, the cement shall be spread and mixed prior to any additional water being added.

A minimum of 70 percent of the pulverized soil, as determined by DOTD TR 431, shall pass the No. 4 (4.75 mm) sieve after mixing. The optimum moisture of the mixture will be determined in accordance with DOTD TR 415 or TR 418. The percentage of moisture in the mixture, by dry weight, shall not vary from the optimum moisture by more than ±2.0 percent at the time of compaction when tested in accordance with DOTD TR 403.

(1) In-Place Mixing: After placement of soil and prior to mixing with cement, the soil shall be shaped to required section and compacted to at least 93.0 percent of maximum dry density at the required grade. Samples to determine optimum moisture, percent cement, and maximum dry density will be taken by the project engineer. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and in place density will be determined in accordance with DOTD TR 401.

The percentage of cement will be determined in accordance with DOTD TR 432 prior to mixing, from materials sampled in-place on the project. Water needed to bring the moisture content of the mixture within the tolerance shall be added and uniformly mixed with the materials. During the mixing process, water shall be added only through the spray bar of the in-place mixer which is adjusted to provide uniform coverage across the completed width of the roadway for the full depth of the base. Wet streaks or spots will not be allowed. Depending on the type of cement and soil to

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be used, normal testing time to determine required cement content may require 21 calendar days.

The method of cement distribution shall be such that the amount of cement used can be readily determined. The spread rate of cement shall be determined in accordance with DOTD TR 436.

When the moisture content is not within ±2.0 percent of optimum, operations shall be discontinued and will not be allowed to resume until the contractor demonstrates that moisture content is controlled within this tolerance. No more than one transport shall be placed and pulverized until moisture content is within ±2.0 percent of optimum.

(2) Central Plant Mixing: Mixing in a central mix plant shall conform to Section 301. When central plant mixing is used, a reduction of 1.0 percent in the volume of cement required will be permitted.

(b) Cement Treated Sand-Clay-Gravel: Sand-clay-gravel shall be combined with cement and water by in-place mixing or in a central plant and shaped on the subgrade.

Optimum moisture of the mixture will be determined in accordance with DOTD TR 415 or TR 418. The percentage of moisture in the mixture, by dry weight, shall not vary from optimum moisture by more than ±2.0 percent at the time of compaction when tested in accordance with DOTD TR 403.

(1) In-Place Mixing: In-place mixing shall conform to Heading (a)(1) except that the percentage of Types I or IB portland cement required will be 6 percent by volume. The cement content for Types II or I-P cement will be determined in accordance with DOTD TR 432.

When the moisture content is not within ±2.0 percent of optimum, operations will be discontinued and will not be allowed to resume until the contractor demonstrates that moisture content is controlled within this tolerance. No more than one cement transport shall be placed and pulverized until moisture content is within ±2.0 percent of optimum.

(2) Central Plant Mixing: Central plant mixing shall conform to Section 301 except that a reduction of 0.5 percent in the required volume of cement will be permitted.

(c) Stone, Crushed Slag, and Recycled Portland Cement Concrete: Stone, crushed slag, and recycled portland cement concrete base courses shall not segregate during construction. Water added to facilitate compaction shall not cause moisture damage to the subgrade layer.

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302.06 TRANSPORTING AND PLACING ON SUBGRADE. Transportation and spreading methods shall not damage the subgrade. The contractor shall place and spread sufficient base course material to obtain required width and compacted thickness within the tolerances set forth in Subsection 302.12. Subgrade material shall not contaminate the base course. Any contamination will require retesting and correction of deficiencies. Base course material shall not be placed, spread or mixed on portland cement concrete or asphaltic concrete pavements. Base course construction operations shall not damage adjacent pavement surfaces, edges and joints.

302.07 COMPACTING AND FINISHING.

(a) General: The finished base course shall have a smooth, uniform, closely knit surface, free from ridges, waves, laminations or loose material. The surface shall be thoroughly rolled and finished to grade. The cross-slope shall not vary by more than ±0.003 ft/ft (±3 mm/m). Density requirement shall be in accordance with Subsection 302.12.

(b) Soil Cement and Cement Treated Sand-Clay-Gravel: When central plant mixing is used, these materials shall be compacted and finished in accordance with Subsection 301.10, except that the automatic grade machine will not be required. When in-place mixing is used, these materials shall be compacted and finished in accordance with Subsection 303.06.

Compaction and finishing operations shall be completed within 3 hours after initial placement of cement on base course materials. Upon expiration of the 3-hour period after initial placement, only tight blading of the base course surface will be allowed. Bladed material shall not be drifted along the base, but shall be wasted. Stabilized material shall be utilized in the base course except for that small amount necessary for tight blading. Excessive blading to achieve plan depth will not be allowed. The contractor shall complete operations, including tight blading, before beginning the next day's operations. The finished base course shall have a smooth, uniform, closely knit surface, free from ridges, waves, laminations, or loose materials. No cement shall be spread within 2 hours of sunset, unless otherwise approved by the project engineer.

(c) Stone and Recycled Portland Cement Concrete: These materials shall be compacted using an approved sheepsfoot-type roller and finish-rolled with an approved pneumatic tire roller or a smooth steel wheel roller. The surface shall be kept uniformly moist during compaction and final finishing.

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(d) Asphaltic Concrete: Asphaltic concrete shall be compacted and finished in accordance with Section 502. The soil layer shall be compacted and finished in accordance with the top layer of embankment.

302.08 QUALITY CONTROL OF ROADWAY OPERATIONS. The contractor shall control the selection, placement, compaction, cement spread, mixing, moisture content, density, thickness, width, surface finish, cross-slope and grade to produce a completed base course that is uniform and conforms to plan dimensions and other acceptance requirements as provided herein. The contractor shall control his operations to prevent contamination, segregation, soft spots, wet spots, laminations and other deficiencies. The contractor shall be responsible for taking tests necessary to adequately control the work.

302.09 PROTECTION AND CURING.

(a) Soil Cement and Cement Treated Sand-Clay-Gravel: Upon completion of intermediate finishing, the base course shall immediately be protected against drying by applying an asphalt curing membrane in accordance with Section 506. Asphalt curing membrane shall be placed on the same day as treatment. Complete coverage of curing membrane shall be maintained from initial application until the placement of the next course. When traffic, including construction equipment, is allowed on the base course, at least the first lift of surfacing shall be placed within 30 calendar days unless otherwise directed.

(b) Stone, Recycled Portland Cement Concrete, and Soil Layer Under Asphaltic Concrete: The base course shall be covered with asphalt prime coat in accordance with Section 505 as soon as practical to avoid water infiltration due to rainfall. Complete coverage of asphalt prime coat shall be maintained from initial application until the placement of the next course.

302.10 MAINTENANCE OF BASE COURSE. The contractor shall protect the base course from damage from public traffic or the contractor's operations, and shall satisfactorily maintain the base course including the asphalt curing membrane or prime coat. Damaged base course shall be repaired by the contractor at no direct pay. When patching of the base course is required, in addition to removing damaged or unsound base course, the contractor shall remove a sufficient width and depth of base course to ensure satisfactory placement of patching material. The engineer will approve the type of patching material before use. Patching or other

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base course repair shall restore a uniform surface, shall conform to the requirements of the material being used, and shall be completed before paving operations begin. Failures detected during paving may be patched as detected.

When maintenance of traffic is not required, neither public traffic nor construction traffic shall be allowed on the completed base course during the 72-hour curing period. When maintenance of traffic is required, both public traffic and construction traffic shall be routed off the completed base course onto shoulders or other suitable areas during the 72-hour curing period, when conditions permit.

When traffic is permitted to use the completed base course subsequent to the 72-hour curing period and prior to construction of the surface course, the base shall be further protected by additional applications of asphalt curing membrane or prime coat as directed in accordance with Subsection 301.12 at no direct pay.

Prior to surface course construction, the contractor shall correct deficiencies, clean the base course surface, repair any damages caused by traffic, and apply and maintain additional asphalt curing membrane or prime coat as directed at no direct pay.

Any weak spots that develop shall be satisfactorily corrected and the base kept free from deficiencies and true to grade and cross section at no direct pay.

When the surfacing is asphaltic concrete the first lift of surfacing shall be placed within 30 calendar days.

302.11 WEATHER LIMITATIONS. Construction of base course will not be permitted when the subgrade or stockpiles are frozen, when raining, or, in the case of cement treated bases, when the ambient air temperature is below 35°F (2°C), or the temperature forecasted by the U.S. Weather Service is to be 25°F (-3°C) or less within the 24 hour period following placement.

302.12 ACCEPTANCE REQUIREMENTS. Soils and aggregates will be sampled for acceptance by the Department in accordance with the Materials Sampling Manual.

For central plant mixing, the cement content will be determined in accordance with Subsection 301.16. For in-place mixing, the cement content will be determined in accordance with Subsection 302.05.

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The moisture content of the soil cement or cement treated mixtures will be tested for conformance to optimum moisture content in accordance with DOTD TR 403.

The pulverization of the soil cement or cement treated mixtures will be tested in accordance with DOTD TR 431 and shall be at least 70 percent passing the No. 4 (4.75 mm) sieve.

Base course, except asphaltic concrete, will be checked for determining acceptance in increments of 1,000 linear feet (300 lin m) per roadway or 2,000 linear feet (600 lin m) per shoulder constructed separately. Asphaltic concrete will be accepted in accordance with Section 502.

(a) Density Requirements: Upon completion of compaction operations, base course density, except asphaltic concrete, will be determined in accordance with DOTD TR 401. The density requirements for asphaltic concrete base course will be determined in accordance with Section 502.

The density requirements for Class II Base Course materials shall be in accordance with Table 302-1 as follows.

Table 302-1
Class II Base Course Density

Base Course Type	Maximum Density Test Method	Percent of Maximum Density (Min.)
Soil Cement	DOTD TR 418	95.0
Cement Treated Sand-Clay-Gravel	DOTD TR 418	95.0
Stone, Crushed Slag, Recycled Portland Cement Concrete	DOTD TR 418	95.0
Treated Layer under Asphaltic Concrete	DOTD TR 418	95.0
Soil Layer Under Asphaltic Concrete	DOTD TR 418	95.0

(1) Soil Cement, Cement Treated Sand-Clay-Gravel, and Treated Layer Under Asphaltic Concrete: When the density test value for the section is below 95.0 percent, a payment adjustment will be applied in accordance with Table 302-2 as follows.

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Table 302-2
Density Acceptance and Payment Schedule

Density Test Value	Percent of Contract Unit Price
95.0 & Above	100
94.0 to 94.9	90
93.0 to 93.9	75
Below 93.0	50 or Remove[1]

[1]At the option of the Department after investigation.

(2) Stone, Crushed Slag, Recycled Portland Cement Concrete, and Soil Layer under Asphaltic Concrete Base Course: When any test value is less than the required density, compaction shall continue until the specified density is obtained.

(b) Thickness Requirements: The thickness of the completed base course will be determined in accordance with DOTD TR 602.

The completed base course shall not vary from plan thickness in excess of the tolerances in Table 302-3 below. Base course thickness deficiencies in excess of these tolerances shall be corrected as specified herein at no direct pay.

Table 302-3
Base Course Thickness Tolerance

(All Bases Except Asphaltic Concrete) Underthickness, Inches (mm)	(Stabilized & Treated Bases) Overthickness, Inches (mm)
3/4 (20)	1 1/2 (40)

Any failing area will be isolated for purposes of correction.

Asphaltic concrete base thickness will be determined in accordance with Section 502.

When central plant mixing is used, overthickness may be waived at no direct pay.

(1) Soil Cement, Cement Treated Sand-Clay-Gravel, and Treated Layer Under Asphaltic Concrete: When no grade adjustments are permitted, underthickness deficiencies in excess of tolerance shall be corrected by removing and replacing the full depth of base course in deficient areas with one of the following materials:

a. The same type of base course.
b. Asphaltic concrete complying with Section 502.
c. Concrete complying with Section 901.

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When grade adjustments are permitted, the contractor shall have the option of correcting thickness deficiencies by furnishing and placing a supplemental layer of asphaltic concrete complying with Section 502 for the full width of base course in lieu of removing and replacing deficient base course. When approved, corrections may be made by restabilizing the existing material in accordance with this section. Thickness of the supplemental layer of asphaltic concrete shall be in accordance with Table 302-4 as follows.

Table 302-4
Supplemental Asphaltic Concrete Layer Thickness

Underthickness, Inches (mm)	In-Place Mixing Overthickness, Inches (mm)	Minimum Thickness of Supplemental Asphaltic Concrete, Inches (mm)[1]
1 to 1 1/4 (30 to 35)	1 3/4 to 2 (45 to 50)	1 1/4 (35)
1 1/2 to 1 3/4 (40 to 45)	2 1/4 to 2 1/2 (60 to 65)	1 1/2 (40)
2 to 2 1/2 (50 to 65)	2 3/4 to 3 (70 to 80)	2 (50)
Over 2 1/2 (Over 65)	Over 3 (Over 80)	Remove and Replace[2]

[1] May be included in the subsequent lift
[2] At the option of the Department after investigation.

When reconstruction is the method of correction, the above tolerances shall apply.

(2) Stone, Crushed Slag, and Recycled Portland Cement Concrete: When grade adjustments are allowed, underthickness in excess of 3/4 inch (20 mm) shall be corrected to plan thickness by furnishing, placing, reworking, shaping, and compacting additional base course material as required. When no grade adjustments are allowed the material shall be removed and replaced at no direct pay.

(3) Asphaltic Concrete Base Course: When no grade adjustments are allowed, underthickness in excess of the tolerances given in Subsection 502.12 shall be corrected to plan thickness by removing and replacing the full depth of base course. When grade adjustments are allowed, underthickness in excess of the tolerances given in Subsection 502.12 shall be corrected to plan thickness by placing and compacting a 1 1/4 inch (35 mm) thick minimum supplemental layer of asphaltic concrete complying with Section 502 at no direct pay.

(c) Width Requirements: The width of the completed base course will be determined in accordance with DOTD TR 602. Roadway base course width shall not vary from plan width in excess of +6 inches (+150 mm). Shoulder base course width shall not vary from plan width in excess

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of +3 inches (+75 mm). No tolerances are provided for underwidths of shoulder or roadway bases. When the base course for both roadway and shoulders are constructed at the same time, the 6-inch (150 mm) tolerance will be applied. Base course width deficiencies in excess of the above tolerances shall be corrected as follows at the contractor's expense:

(1) Soil Cement, Cement Treated Sand-Clay-Gravel, and Asphaltic Concrete Base Course:

a. Overwidth: Overwidths of asphaltic concrete and treated base courses mixed in a central plant may be waived at no additional cost to the Department. When no grade adjustments are allowed, the full depth and width of base course in areas having overwidths in excess of the foregoing tolerances shall be removed and replaced to the plan width with one of the following materials:

1. The same type of base course.
2. Asphaltic concrete complying with Section 502.
3. Concrete complying with Section 901.

In lieu of removing and replacing the overwidth areas of base course, at the Department's option, any base course less than 12 inches (300 mm) overwidth will be allowed to remain in place at an adjusted payment of 90 percent of the contract unit price for the complete section. Overwidth in excess of 12 inches (300 mm) shall be removed and replaced as indicated above. When approved, corrections may be made by restabilizing the existing material in accordance with this subsection.

When grade adjustments are permitted, the contractor shall correct base course width deficiencies by removing and replacing as specified above, or by furnishing and placing a 1 1/4 inch (35 mm) thick supplemental layer of asphaltic concrete complying with Section 502 on the 1,000-foot (300 m) section for the full width of the base course.

b. Underwidth: Underwidths of base course in excess of the foregoing tolerances shall be corrected to plan width and thickness by furnishing and placing additional materials; however, the width of widening materials shall be not less than 12 inches (300 mm). When approved, corrections may be made by restabilizing the existing material in accordance with this section. Materials for widening deficient base course shall be either asphaltic concrete complying with Section 502 or concrete complying with Section 901, at the option of the contractor.

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(2) Sand-Clay-Gravel, Stone, Crushed Slag, and Recycled Portland Cement Concrete: Overwidths will be waived at no additional cost to the Department. Underwidths in excess of the foregoing tolerances shall be corrected to plan widths by furnishing, placing, reworking, shaping, and compacting additional base course material as required.

(d) Grade and Cross-slope: The finished grade shall be within ±1/2 inch (±15 mm) of the established grade. The cross-slope shall not vary by more than ±0.003 ft/ft (±3 mm/m).

(e) Correction of Deficiencies: The contractor shall correct deficiencies in surface finish, cross-slope, grade, contamination, segregation, soft spots, wet spots, laminations and other deficiencies at no direct pay. Deficiencies shall be corrected by removing and replacing or as directed.

302.13 MEASUREMENT. The quantities of base course for payment will be the design volumes or areas specified in the plans and adjustments thereto. Design quantities are based on the horizontal dimensions and compacted thickness of the completed base course shown on the plans. Design quantities will be adjusted if the engineer makes changes to adjust to field conditions, if plan errors are proven, or if design changes are necessary.

Geotextile fabric used beneath the base course will not be measured for payment.

302.14 PAYMENT. Payment for base course will be made at the contract unit price, adjusted as specified in Subsection 302.12 and the following provisions, which includes furnishing and placing required base course materials, portland cement, portland-pozzolan cement, water, asphaltic curing membrane and prime coat.

Any payment adjustment in asphaltic concrete shall be in accordance with Section 502 and shall apply to the cubic yard (cu m) total quantity of base course when payment is by cubic yard (cu m). For other materials, when payment adjustments are made for more than one deficiency, they shall be cumulative.

Payment for geotextile fabric will be included in the contract unit price for base course.

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302.14

Payment will be made under:

Item No.	Pay Item	Pay Unit
302-01	Class II Base Course	Cubic Yard (Cu m)
302-02	Class II Base Course ____in(mm)Thick	Square Yard (Sq m)

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Section 502
Superpave Asphaltic Concrete Mixtures

502.01 DESCRIPTION.

(a) General: These specifications are applicable to Superpave asphaltic concrete wearing, binder and base course mixtures of the plant mix type.

This work consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot in conformance with these specifications and in conformity with the lines, grades, thicknesses and typical sections shown on the plans or established. The mixture shall consist of aggregates and asphalt with additives combined in proportions which meet the requirements of this section. Equipment and processes shall conform to Section 503.

(b) Quality Assurance: Quality assurance requirements and design procedures shall be as specified herein elsewhere and in the latest edition of the Department's publication entitled "Application of Quality Assurance Specifications for Asphaltic Concrete Mixtures" which is hereby made a part of this contract by reference.

It is the intent of these specifications that the mixtures produced and placed meet the requirements for 100 percent payment. Work shall meet the requirements of this section and be subject to acceptance by the Department.

The contractor shall be responsible for and shall exercise quality control over materials and their assembly, design, processing, production, hauling, laydown and associated equipment. Quality control is defined as the constant monitoring of equipment, materials and processes to ensure that mixtures produced and placed are uniform, within control limits, and meet specification requirements. When these specifications are not being met and satisfactory control adjustments are not being made, operations shall be discontinued until proper adjustments and uniform operations are established. Control shall be accomplished by a program independent of the Department's testing and shall ensure that the requirements of the job mix are being achieved and that necessary adjustments provide the specified results.

The quality of mixtures will be evaluated during two phases, mixture produced at the plant, and mixture hauled, placed and compacted. Quality of both phases will be evaluated continuously as stated herein elsewhere.

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Plant quality control testing shall be conducted continuously throughout production independent of delivery points. Project site quality control testing shall be conducted on each project for the mix placed on that project.

When the plant is in operation, the contractor shall have a Certified Asphaltic Concrete Plant Technician at the plant or jobsite who is capable of designing asphaltic concrete mixes, conducting any test or analysis necessary to put the plant into operation and producing a mixture meeting specifications. Daily plant operations shall not begin unless the Certified Asphaltic Concrete Plant Technician is at the plant. The Asphaltic Concrete Plant Technician certification will be awarded by the Department upon satisfactory completion of the Department's requirements.

(c) Mixture Substitutions: Changes in design level will not be allowed on the roadway. Substitutions will be allowed for mixes without requiring a change order as follows. Wearing course [0.75 inch (19 mm)] may be substituted for binder course but not substituted for base course. Binder course [1 inch (25 mm)] may be substituted for base course. Wearing Course, 0.5 inch (12.5 mm) may be substituted for Incidental Paving, Level A. Shoulders may be any mixture type shown in Table 502-5 regardless of design level.

When any substitution is made, all specification requirements for the mixture used shall apply with the following exceptions. When wearing course is substituted for binder course, RAP will be allowed in accordance with binder course requirements in Table 502-5. The lift thickness placed shall be as specified in Subsection 502.08 and Table 502-5 for the mix type used.

502.02 MATERIALS. All materials must be sampled in accordance with the Materials Sampling Manual and shall be tested in accordance with the test procedures in Table 502-1. The contractor shall keep accurate records, including proof of deliveries of materials for use in asphaltic concrete mixtures. Copies of these records shall be furnished to the engineer upon request. Materials shall comply with the following Subsections:

Asphalt	1002
Silicone and Anti-Strip Additives	1002.02
Aggregates	1003.01 & 1003.06
Reclaimed Asphaltic Pavement (RAP)	1003.01 & 1003.06
Hydrated Lime	1018.03(a)
Mix Release Agent	1018.25

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Table 502-1
Test Procedures for Superpave Asphaltic Concrete

Description	Test Method
Specific Gravity and Density of Compressed Asphaltic Mixtures	DOTD TR 304
Theoretical Maximum Specific Gravity, G_{mm}	DOTD TR 327
Asphalt Cement Content, P_b	DOTD TR 323
Mechanical Analysis of Extracted Aggregate	DOTD TR 309
Moisture Content of Loose HMA	DOTD TR 319
Degree of Particle Coating (plant requirement)	DOTD TR 328
Moisture Sensitivity (Lottman) (Tensile Strength Ratio)	DOTD TR 322
Bulk Specific Gravity and Absorption	AASHTO T 84, T 85
Coarse Aggregate Angularity, % Crushed (Double Faced)	DOTD TR 306
Fine Aggregate Angularity	DOTD TR 121
Flat and Elongated Particles	ASTM D 4791
Sand Equivalent	DOTD TR 120
Mixture Conditioning (Aging) of HMA Mixtures	AASHTO R 30
Superpave Volumetric Mix Design	AASHTO M 323
Preparing Gyratory Samples	AASHTO T 312
Asphalt Cement Draindown	ASTM D 6390
Longitudinal Profile Using Automated Profilers	DOTD TR 644
Thickness and Width of Base and Subbase	DOTD TR 602

(a) Asphalt Cement: The asphalt cement grades used shall be as specified in Table 502-2 using the design traffic load levels shown on the plans.

If the asphalt cement does not comply with the requirements of Section 1002, mix production shall cease until proper asphalt material is supplied.

Table 502-2
Superpave Asphalt Cement Usage

Current Traffic Load Level	Mixture Type	Grade of Asphalt Cement
Level 1	Wearing Course	PG 70-22m
	Binder Course	PG 70-22m
	Base Course	PG 64-22
Level 2	Wearing Course	PG 76-22m
	Binder Course	PG 76-22m
Level A	Incidental Paving	PG 70-22m

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Base course mixtures containing 20 to 30 percent RAP shall use PG 58-28 asphalt cement.

When mixtures are used for bike paths, curbs, detour roads, driveways, guardrail widening, islands, joint repair, leveling, parking lots, patching, or widening, PG 64-22 asphalt cement may be used in lieu of the modified asphalts. Unless otherwise noted on the plans, PG 64-22 asphalt cement may also be used on shoulders in lieu of the modified asphalts.

PG 76-22m asphalt cement may be substituted for PG 70-22m or PG 64-22 asphalt cements at no increase in price. PG 70-22m asphalt cement may be substituted for PG 64-22 at no increase in price. When average daily traffic (ADT) is less than 2500, PG 70-22m Alternate asphalt cement may be substituted for PG 70-22m asphalt cement for Level 1 and Level A mixes at no increase in price.

(b) Additives:

(1) Silicone: Silicone additives, when needed, shall be dispersed into the asphalt cement by methods and in concentrations given in QPL 22.

(2) Anti-Strip (AS): An anti-strip additive shall be added at the minimum rate of 0.5 percent by weight (mass) of asphalt cement and thoroughly mixed in-line with the asphalt cement at the plant. Additional anti-strip shall be added up to 1.2 percent by weight (mass) of asphalt in accordance with Subsection 502.03.

When the amount of anti-strip additive is not in accordance with the approved job mix formula, production shall be discontinued until satisfactory adjustments are made.

(3) Hydrated Lime: Hydrated lime additive may be incorporated into all asphaltic concrete mixtures at the rate specified in the approved job mix formula. The minimum rate shall not be less than 1.5 percent by weight (mass) of the total mixture. Hydrated lime additive shall be added to and thoroughly mixed with aggregates in conformance with Subsection 503.05(c). Hydrated lime may be added as a mineral filler in accordance with Heading (c)(3).

(c) Aggregates: Aggregates shall meet the requirements of Table 502-5 and Section 1003.

(1) Friction Ratings: Friction ratings for aggregates shall be determined in accordance with Subsection 1003.06. The friction ratings and allowable usage of aggregates shall be as shown in Table 502-3. Friction rating requirements shall apply only to the final lift of the travel lane wearing course. Bike paths, curbs, driveways, guardrail widening, islands, joint repair, leveling, parking lots, patching, shoulders, widening and incidental paving uses, and roadway binder and base courses may use

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any combination of Friction Rating I, II, III, and IV aggregates, in combination with the allowable RAP percentages.

Table 502-3
Aggregate Friction Rating

Friction Rating	Allowable Usage
I	All mixtures
II	All mixtures
III	All mixtures, except travel lane wearing courses with plan ADT greater than 7000[1]
IV	All mixtures, except travel lane wearing courses[2]

(2) Reclaimed Asphaltic Pavement (RAP): Reclaimed asphaltic pavement shall be stockpiled separate from other materials at the plant and will be subject to approval prior to use. Such stockpiles shall be uniform and free of soil, debris, foreign matter and other contaminants. Reclaimed materials that cannot be broken down during mixing or that adversely affect paving operations shall be screened or crushed to pass a 2 inch (50 mm) sieve prior to use.

(3) Mineral Filler: Mineral filler complying with the requirements of Subsection 1003.06(a)(6) may be used in all mixtures.

(4) Natural Sand: Natural sand shall meet the requirements of Table 502-5 and Subsection 1003.06(a)(3).

502.03 DESIGN OF ASPHALTIC MIXTURES, JOB MIX FORMULA (JMF). The contractor shall design the mixtures for optimum asphalt content and comply with requirements of the Superpave Mix Design for the level of mixture in Table 502-5 in accordance with AASHTO M 323. The job mix formula shall include the recommended formula, extracted gradation, and supporting design data. The recommended formula shall be submitted for approval to the District Laboratory Engineer on a properly completed Superpave Asphaltic Concrete Job Mix Formula form with all supporting design data. No mixture shall be produced until the proposed job mix formula has been approved.

The contractor's proposed job mix formula shall indicate a single anti-strip additive rate which is 0.1 percent greater than the percentage which will yield a minimum Tensile Strength Ratio (TSR) of 80 percent up to a

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maximum of 1.2 percent anti-strip additive when tested in accordance with DOTD TR 322.

The job mix formula shall indicate a single rate of hydrated lime additive, when used. The job mix formula rate of hydrated lime additive shall not be less than 1.5 percent by weight (mass) of total mixture.

The job mix formula shall indicate the optimum mixing temperature. The job mix formula limits for mix temperature will be ±25°F (±14°C) from the optimum mixing temperature.

The job mix formula is to be inside the control points as detailed in Table 502-4. Blending of aggregates, i.e., gravel and stone, will be allowed provided the final composite mixture and final product meets or exceeds all specifications requirements.

The plant shall be operated to produce, on a continuing basis, a mixture uniformly conforming to the approved job mix formula. When this is not the case, the contractor shall make satisfactory adjustments or cease operations. The District Laboratory Engineer may permit the contractor to submit a new Asphaltic Concrete Job Mix Formula form for approval. The contractor shall submit a new job mix formula whenever a plant begins initial operations for the Department in a specific location or whenever a plant experiences a change in materials or source of materials. A new job mix formula will also be required whenever there are significant changes in equipment, such as the introduction of a new crusher, drum mixer, burner, etc.

When reclaimed asphaltic pavement (RAP) is used in a roadway mix, the quantity of RAP shall be designated in the job mix formula and meet the requirements of Table 502-5. The engineer may require the contractor to reduce the percentage of RAP to meet acceptance requirements.

When the contractor changes a source of RAP, the new mix design shall be submitted, validated and approved if the type of aggregate changes (e.g. gravel to limestone) or the source change causes a change in acceptance tolerances. If the contractor determines that the source change will not cause a change in acceptance tolerances, the contractor may elect to integrate the new RAP source into the existing approved mix design provided the contractor submits a revised job mix formula cover sheet which shows the new source of RAP and other changes. A new validation will not be required. If subsequent acceptance tests indicate that the mix is out of tolerance, a new design will be required and appropriate payment adjustments will apply.

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502.04 JOB MIX FORMULA VALIDATION. The first day's production or a maximum of 2000 tons (2000 Mg) of mix shall be used to validate a new JMF. The contractor and the Department, using the stratified random sampling approach, shall jointly take five (5) samples, one per validation sublot, during the validation lot. The contractor may elect to exclude test results representing the first 250 tons (250 Mg) from the validation analysis in order to make slight adjustments to the mix. The remaining validation lot, up to 1750 tons (1750 Mg), shall be divided into five (5) equal validation sublots and tested for validation analysis. If excluded from validation, the 250 tons (250 Mg) will be paid in accordance with Table 502-9.

Minimum testing shall include one theoretical maximum specific gravity (G_{mm}), one gyratory specimen compacted to N_{design}, one gyratory specimen compacted to N_{max}, and one oven extraction. As approved by the district laboratory engineer, the contractor and the Department shall jointly analyze the test results for the following parameters:

(1) Extracted Gradation
(2) Percent Extracted Asphalt Cement
(3) Percent Crushed Aggregate, (from cold feed blends)
(4) Theoretical Maximum Specific Gravity (G_{mm}) (aged for one hour)

The following parameters apply to samples aged for one hour in an oven at gyratory compaction temperature and compacted to N_{design}.

(5) Bulk Specific Gravity (G_{mb}) at N_{design}
(6) Percent G_{mm} at $N_{initial}$
(7) Percent Air Voids, VMA and VFA

The following parameters apply to samples aged for one hour in an oven at gyratory compaction temperature and compacted to N_{max}

(8) Bulk Specific Gravity (G_{mb}) at N_{max} measured and estimated
(9) Percent G_{mm} at N_{max} and Corrected percent G_{mm} at N_{design}
(10) Slope of the Gyratory Compaction Curve

The mean, standard deviation, Quality Index and percent within limits (PWL) of the test results shall be calculated in accordance with Subsection 502.13, Quality Level Analysis. The test data will be used to validate the JMF.

A JMF is considered validated if the following parameters are 90 percent within limits of the JMF and meet the specifications requirements.

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(1) Extracted Gradations for the No. 8 and No. 200 (2.36 mm and 75 μm) sieves

(2) Theoretical Maximum Specific Gravity (G_{mm})

(3) Percent G_{mm} at $N_{initial}$

(4) Percent Air Voids at N_{design}

Additionally, the average of all validation tests for the other parameters shall be within the specifications limits.

Should the JMF validate on all but one parameter, the contractor may make adjustments and repeat the validation testing using the next day's production or a maximum of 2000 tons (2000 Mg). Should the JMF fail to validate on more than one parameter, the JMF will be considered non-valid, and the contractor will be required to submit a new JMF for approval. Upon validation of the JMF, the validation averages will be used for JMF target values. Payment for validation lots will be in accordance with acceptance pay parameters, except that five cores shall be obtained to determine density pay. After validating the JMF for mix properties, the contractor, witnessed by the Department, shall sample the next day's production and perform validation testing at the plant for DOTD TR 322 and AASHTO T 312 specimens. When the validation results are less than 80 percent, no further production for that job mix formula or any proposed job mix formula substituted for that mix type will be accepted on any DOTD project having DOTD TR 322 requirements until a passing plant-produced Tensile Strength Ratio (TSR) value is verified by the Department. A previously validated and approved JMF may be produced in lieu of the disapproved JMF.

Validation is not required for mixture designs used solely for bike paths, crossovers, curbs, driveways, guardrail widening, islands, joint repair, leveling, parking lots, patching, shoulders, turnouts, widening, and miscellaneous handwork, but the mixture must meet specifications requirements.

502.05 PLANT QUALITY CONTROL. For quality control purposes, the contractor shall obtain a minimum of two (2) samples of mixture from each sublot using a stratified random sampling approach. Test results for theoretical maximum specific gravity (G_{mm}) and measured bulk specific gravity (G_{mb}) at N_{max} and percent G_{mm} at $N_{initial}$, on samples of each sublot shall be reported. Control charts may be requested by the engineer if mixture problems develop. Quality control gyratory samples may be aged or unaged at the contractor's option, but the method chosen shall be used consistently throughout the project. If aged samples are used, report the

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measured G_{mb} at N_{max}. If unaged samples are used, report the estimated G_{mb} at N_{max}. One loose mix sample shall be taken from each sublot after placement of the mix in the truck. The mix shall be tested by the contractor at the plant for aggregate gradation, asphalt content and percent crushed aggregate. The mix shall be tested in accordance with DOTD TR 309, TR 323 and TR 306. The lot average and standard deviation shall be determined for aggregate gradation and asphalt content. The percent within limits (PWL) shall be determined on the Nos. 8 and 200 (2.36 mm and 75 μm) sieves and for G_{mm}. Corrective action shall be taken if these parameters fall below 90 PWL. For each lot, the contractor shall report all quality control data to the DOTD Certified Plant Technician. The full range of gradation mix tolerances will be allowed even if they fall outside the control points. The District Laboratory Engineer may require re-validation of the mix when the average of the Quality Control data indicates non-compliance with the specified limits or tolerances.

The moisture content of the final mixture shall be minimized and uniformly controlled to ensure that placement and density requirements are met. The percent moisture in loose mix shall be reported once per lot and shall not exceed 0.3 percent by weight (mass) when tested in accordance with DOTD TR 319.

502.06 PLANT ACCEPTANCE. All Department inspection procedures, including sampling and testing, form the basis for acceptance of the asphaltic concrete. Sampling and testing shall be accomplished following a stratified sampling plan in accordance with the Materials Sampling Manual and specified test procedures. Times and locations shall be established by the engineer.

The Department will take samples or perform tests as outlined in these specifications, to ensure that the asphaltic concrete conforms to Department standards, which include job mix limits, typical sections, material properties, and surface deviations. Plant acceptance tests will be performed for VFA and air voids in the specimen compacted to N_{design} to determine the acceptability of the asphaltic concrete at the plant unless directed otherwise by the engineer. If the average VFA for 5 samples is outside the specifications limits, satisfactory adjustments must be made or production shall be discontinued. The plant acceptance tests for air voids shall be subject to payment adjustments and sampling and testing in accordance with the requirements specified herein.

Testing for percent air voids will be conducted by the Department. Test results of mixture specimens compacted to N_{design} shall comply with Table

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502-5 when tested in accordance with AASHTO T 312 and DOTD TR 304. One sample will be taken from each of five (5) sublots. The data will be used to determine if the lot is outside acceptance limits shown in Table 502-5. If the lot is outside the acceptance limits, an adjustment in unit price for the lot will be made in accordance with Tables 502-7 or 502-9.

Acceptance testing for air voids will be conducted on the total lot quantity.

502.07 ROADWAY OPERATIONS.

(a) Weather Limitations: Asphaltic concrete mixtures shall not be applied on a wet surface or when the ambient temperature is below 50°F (10°C) for wearing courses and 40°F (5°C) for base and binder courses, except that material in transit, or a maximum of 50 tons (45 Mg) in a surge bin or silo used as a surge bin at the time plant operation is discontinued may be placed; however, mixture placed shall perform satisfactorily and meet specification requirements. Inclement weather will be sufficient reason to terminate or not begin production.

When base course materials are placed in plan thicknesses of 2 3/4 inches (70 mm) or greater, these temperature limitations shall not apply provided all other specification requirements are met. When a wearing course is substituted for a binder course mixture the temperature limitation for binder course shall apply.

(b) Surface Preparation: The surface to be covered shall be approved prior to placing mixtures. The contractor shall maintain the surface until it is covered.

(1) Cleaning: The surface to be covered shall be swept clean of dust, dirt, caked clay, caked material, vegetation, and loose material by revolving brooms or other mechanical sweepers supplemented with hand equipment as directed. When mixtures are to be placed on portland cement concrete pavement or overlaid portland cement concrete, the contractor shall remove excess joint filler from the surface by an approved burning method. The contractor shall remove any existing raised pavement markers prior to asphaltic concrete overlay operations.

When brooming does not adequately clean the surface, the contractor shall wash the surface with water in addition to brooming to clean the surface.

When liquid asphalt is exposed to traffic for more than 1 calendar day, becomes contaminated, or degrades due to inclement weather, the liquid asphalt shall be reapplied at the initial recommended rate at no direct pay.

(2) Applying Liquid Asphalt Materials:

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a. Existing Pavement Surfaces: Before constructing each course, an approved asphalt tack coat shall be applied in accordance with Section 504. The contractor shall protect the tack coat and spot patch as required.

b. Raw Aggregate Base Course and Raw Embankment Surfaces: The contractor shall apply an approved asphalt prime coat to unprimed surfaces, or protect in-place prime coat and spot patch as required with asphalt prime coat, in accordance with Section 505.

c. Cement and Lime Stabilized or Treated Embankment and Base Course Surfaces: The contractor shall apply an approved asphalt curing membrane when none is in place, or protect the in-place curing membrane and spot patch, as required, with asphalt material in accordance with Section 506.

d. Other Surfaces: Contact surfaces of curbs, gutters, manholes, edges of longitudinal and transverse joints, and other structures shall be covered with a uniform coating of an approved asphalt tack coat complying with Section 504 before placing asphaltic mixtures.

(c) Joint Construction:

(1) Longitudinal Joints: Longitudinal joints shall be constructed by setting the screed to allow approximately 25 percent fluff and also overlapping the paver approximately 2 inches (50 mm) onto the adjacent pass. Prior to rolling, the overlapped mix shall be pushed back to the uncompacted side, without scattering loose material over the uncompacted mat, to form a vertical edge above the joint. The vertical edge shall then be compacted by rolling to form a smooth, sealed joint. Longitudinal joints in one layer shall offset those in the layer below by a minimum of 3 inches (75 mm); however, the joint in the top layer shall be offset 3 inches (75 mm) to 6 inches (150 mm) from the centerline of pavement when the roadway comprises two lanes of width, or offset 3 inches (75 mm) to 6 inches (150 mm) from lane lines when the roadway is more than two lanes. The narrow strip shall be constructed first.

Where adjacent paving strips are to be placed, the longitudinal edge joint of the existing strip shall be tacked.

(2) Transverse Joints: Transverse joints shall be butt joints formed by cutting back on the previously placed mixture to expose the full depth of the lift. An approved 10 foot (3.0 m) static straightedge shall be used to identify the location at which the previously placed mixture is to be cut back to maintain no greater than a 1/8 inch (3 mm) deviation in grade. The cut face of the previously placed mat shall be lightly tacked before fresh material is placed. The screed shall rest on shims that are

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approximately 25 percent of plan thickness placed on the compacted mat. Transverse joints shall be formed by an adequate crew. Transverse joints shall be checked by the engineer for surface tolerance using a stringline extended from a point 10 feet (3 m) before the joint to a point approximately 40 feet (12 m) beyond the joint. Any deviation in grade from the stringline in excess of 3/16 inch (5 mm) for roadway wearing courses and 1/4 inch (6 mm) for other courses shall be immediately corrected prior to the paving operation continuing beyond 100 feet (30 m) of the transverse joint. Additionally, the transverse joint shall meet the surface tolerance requirements of Table 502-4. The contractor shall make necessary corrections to the joint before continuing placement operations.

Transverse joints in succeeding lifts shall be offset at least 3 feet (1.0 m).

502.08 HAULING, PAVING AND FINISHING. Mixtures shall be transported from the plant and delivered to the paver at a temperature no cooler than 25°F (14°C) below the lower limit of the approved job mix formula. The temperature of the mix going through the paver shall not be cooler than 250°F (120°C).

No loads shall be sent out so late in the day that completion of spreading and compaction of the mixture cannot be completed during daylight, unless artificial lighting has been approved.

When segregation occurs, haul trucks shall be loaded with a minimum of three drops of mix, the last of which shall be in the middle.

Each course of asphaltic mixture shall be placed in accordance with the specified lift thickness. When no lift thickness is specified, or when substitute mixtures are utilized as specified in Subsection 502.01(c), mixtures shall be placed in accordance with Table 502-5

With the engineer's approval, motor patrols may be used to fill isolated depressions in the initial layer, provided this construction does not result in unsatisfactory subsequent lifts.

(a) Coordination of Production: The contractor shall coordinate and manage plant production, transportation of mix and placement operations to achieve a high quality pavement and shall have sufficient hauling vehicles to ensure continuous plant and roadway operations. The engineer will order a halt to operations when sufficient hauling vehicles are not available.

On final wearing course construction under traffic with pavement layers of 2 inches (50 mm) compacted thickness or less, the contractor will be permitted to pave one travel lane for a full day. The contractor shall pave

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the adjacent travel lane the next work day. When the adjacent travel lane is not paved the next calendar day and the longitudinal joint is exposed to traffic for more than 3 calendar days, and it has been determined that the subsequent roadway edge is not true to line and grade as previously constructed, the entire length of exposed longitudinal joint shall be cut back to plan thickness to a vertical edge and heavily tacked. When pavement layers are greater than 2 inches (50 mm) compacted thickness, the contractor shall place approximately 1/2 of each day's production in one lane and the remainder in the adjacent lane.

Pavement shall be protected from traffic until it has sufficiently hardened to the extent the surface is not damaged.

(b) Paving Operations: When placing the final two lifts of asphaltic concrete on the roadway travel lanes, a material transfer vehicle (MTV), as described in Subsection 503.15, will be required to deliver mixtures from the hauling equipment to the paving equipment, and to prevent segregation of the asphaltic concrete hot mix. The MTV is required regardless of ADT. All mixtures shall flow through the paver hopper. Mixtures dropped in front of the paver shall be either lifted into the hopper or rejected and cast aside. Delivery of material to the paver shall be at a uniform rate and in an amount within the capacity of paving and compacting equipment. The paver speed and number of trucks shall be adjusted to have one truck waiting in addition to the one at the paver in order to maintain continuous paving operations. The height of material in front of the screed shall remain uniform.

During mixture transfer, the paver shall not be jarred or moved out of alignment. The level of mix in the paver hopper shall not drop so low as to expose the hopper feed slats.

Pavers shall be designed and operated to place mixtures to required line, grade and surface tolerance without resorting to hand finishing.

Longitudinal joints and edges shall be constructed along lines established. Stringlines or other forms of longitudinal control shall be placed by the contractor for the paver to follow. The paver shall be positioned and operated to closely follow the established line. Irregularities in alignment shall be corrected by trimming or filling directly behind the paver.

After each load of material has been placed, the texture of the unrolled surface shall be checked to determine its uniformity. The adjustment of screed, tamping bars, feed screws, hopper feed, etc., shall be checked frequently and adjusted as required to assure uniform spreading of the mix to proper line and grade and adequate compaction. When segregation of

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materials or other deficiencies occur, paving operations shall be suspended until the cause is determined and corrected.

Surface irregularities shall be corrected directly behind the paver. Excess material forming high spots shall be removed. Indented areas shall be filled and finished smooth. Hand placement in accordance with Heading (c) for surface repair will be permitted. Material shall not be cast over the surface.

When a screed control device malfunctions during binder or wearing course operations, paving operations shall be immediately discontinued and shall not be resumed until the screed malfunction has been remedied. Material in transit may be placed. Material placed shall perform satisfactorily and meet specification requirements. Any cost overrun resulting from placing material without the automatic screed control device shall be borne by the contractor.

When paving and finishing operations are interrupted so that the mixture remaining in trucks, paver, paver hopper or on the pavement cools to such extent that it cannot be placed, finished or compacted to the same degree of smoothness and with the same texture and density as the uncooled mixture, the cooled mixture shall be removed and replaced at no direct pay.

When additional mix is required to increase superelevation in curves, the use of automatic slope control will be optional with the contractor.

The traveling reference plane method of construction will be required for airport runways unless designated otherwise on the plans. Unless the erected stringline is required or directed, the 30-foot (minimum) traveling reference plane method of construction shall be used for roadway travel lanes. The following requirements shall apply for mechanical pavers:

(1) Traveling Reference Plane: The traveling reference plane method shall be approved before use. After the initial paving strip of each lift is finished and compacted, adjacent paving strips shall be placed to the grade of the initial paving strip using the traveling reference plane or shoe device to control grade and a slope control device to control cross slope.

On multilane pavements, the initial paving strip and the sequence of lane construction will be subject to approval.

When both outside edges of the paving strip being placed are flush with previously placed material, the slope control device shall not be used. A grade sensor is required for each side of the paver.

In superelevated curves, the cross slope shall be changed from that specified for tangents to that specified for superelevation in gradual increments while the paver is in motion so a smooth transition in grade is

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obtained. This change in cross slope shall be accomplished within the transition distance specified.

This is the minimum acceptable method and the contractor must meet or exceed current surface tolerance specifications.

(2) Erected Stringline: The erected stringline method shall be used as directed by the engineer. This method may be used on the first lift of asphalt when the underlying new or reconstructed bases do not have grade control requirements. Pavers for roadway travel lanes shall be equipped with automatic screed and slope control devices when used with an erected stringline.

An erected stringline shall consist of a piano wire or approved equal stretched between stakes set at no greater than 25 foot (7.5 m) intervals tensioned between supports so that there is less than 1/8 inch (3 mm) variance between supports when the sensor is in place. The stringline elevation will be verified by the Department using standard surveying practices.

If required, the initial paving strip of the first lift shall be constructed using an erected stringline referenced to established grade. When permitted, mixtures required to level isolated depressions may be placed without automatic screed control. Subsequent lifts may be constructed by use of the traveling reference plane, provided surface and grade tolerances are met on the previous lift.

Only one grade sensor and the slope control device are necessary for roadways with a normal crown on tangent alignment. Superelevated curves will require the use of two grade sensors and two erected stringlines to obtain proper grade and slope; however, when the automatic screed control device is equipped with a dial or other device which can be conveniently used to change the cross slope in small increments, superelevated curves may be constructed using this device and one erected stringline.

After the initial paving strip of the first lift is finished and compacted, adjacent paving strips shall be laid using an approved traveling reference plane.

(3) Without Automatic Screed Control: When permitted, pavers without automatic screed control may be used for pavement patching, pavement widening, paved drives and turnouts.

(c) Hand Placement: When the use of mechanical finishing equipment is not practical, the mix may be placed and finished by hand to the satisfaction of the engineer. No casting will be allowed including casting the mixture from the truck to the grade. During paving operations

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material shall be thoroughly loosened and uniformly distributed. Material that has formed into lumps and does not break down readily will be rejected. The surface shall be checked before rolling and irregularities corrected.

502.09 COMPACTION.

(a) General: After placement, mixtures shall be uniformly compacted, by rolling while still hot, to at least the density specified in Table 502-4. If continuous roller operation is discontinued, rollers shall be removed to cooler areas of the mat, where they will not leave surface indentations. The use of steel wheel rollers which result in excessive crushing of aggregate will not be permitted.

The rolling pattern established by the contractor shall be conducted by experienced operators in consistent sequences and by uniform methods that will obtain specified density and smoothness. Individual roller passes shall uniformly overlap preceding passes to ensure complete coverage of the paving area. The speed and operation of rollers shall not displace, tear or crack the mat. Nonvibrating steel wheel rollers shall be operated with drive wheels toward the paver. Any operations causing displacement, tearing or cracking of the mat shall be immediately corrected.

Equipment which leaves tracks or indented areas which cannot be corrected in normal operations or fails to produce a satisfactory surface shall not be used. Operation of equipment resulting in accumulation of material and subsequent shedding of accumulated material into the mixture or onto the mat will not be permitted.

To prevent adhesion of mixture, wheels of steel wheel rollers shall be kept properly moistened, but excess water will not be permitted.

Pneumatic tire rollers shall be operated so that tires will retain adequate heat to prevent mix from adhering to tires. The pneumatic tire roller shall be operated at a contact pressure which will result in a uniform, tightly knit surface. The pneumatic tire roller shall be kept approximately 6 inches (150 mm) from unsupported edges of the paving strip; however, when an adjacent paving strip is down, the roller shall overlap the adjacent paving strip approximately 6 inches (150 mm).

Vibratory rollers may be used provided they do not impair the stability of the pavement structure or underlying layers. Vibratory rollers shall not be used on the first lift of asphaltic concrete placed over the asphalt treated drainage blanket. When mix is placed on newly constructed cement or lime stabilized or treated layers, vibratory rollers shall not be used for at least 7 days after such stabilization or treatment.

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It is the responsibility of the contractor to determine the number, size, and type of rollers to sufficiently compact the mixture to the specified density and surface smoothness. The rolling equipment shall be capable of maintaining the pace of the paver and shall conform to Subsection 503.17.

The surface of mixtures after compaction shall be smooth and true to cross slope and grade within the tolerances specified. Mixtures that become loose, broken, contaminated or otherwise defective shall be removed and replaced with fresh hot mixture compacted to conform with the surrounding mixture.

Excessive rippling of the mat surface will not be accepted. Ripples are small bumps in the pavement surface which usually appear in groups in a frequent and regular manner. There shall be no more than 12 ripples or peaks in any 100-foot (30 m) section. Rippling indicates a problem with the paving operation or mix that requires immediate corrective action by the contractor; otherwise operations shall cease. Unacceptable areas shall be corrected at no direct pay. A profilograph trace may be required to define these areas.

(b) Rolling: After rolling, newly finished pavements shall have a uniform, tightly knit surface free of cracks, tears, roller marks or other deficiencies. Deficiencies shall be corrected at no direct pay and the contractor shall adjust operations to correct the problem. This may require the contractor to adjust the mix or furnish additional or different equipment.

(c) Hand Compaction: Along forms, curbs, headers, walls and at other places inaccessible to rollers, mixture shall be uniformly compacted to the satisfaction of the engineer with approved hand tampers or mechanical tampers, conforming to Subsection 503.18.

502.10 ROADWAY QUALITY CONTROL.

(a) Density: The contractor shall constantly monitor equipment, materials, and processes to ensure that density requirements are met.

(b) Surface Tolerance: The contractor shall constantly monitor equipment, materials, and processes to ensure that surface tolerance requirements are met. The contractor shall test the pavement during the first work day following placement, but in no case any later than 7 calendar days.

Surface tolerance testing will be required on wearing and binder courses for roadway travel lanes. It will be required on the wearing course only for shoulders, parking areas and airport runways and taxiways. For surface

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tolerance purposes, the wearing course is defined as the final lift placed. The binder course is defined as the last lift placed prior to the final lift.

Other lifts on which additional asphaltic concrete is to be placed shall be finished so that succeeding courses will meet the requirements of this subsection. Base courses on which portland cement concrete pavement is to be placed shall be finished so that the portland cement concrete pavement will meet the requirements of Section 601.

(1) Equipment: The contractor shall furnish an approved 10 foot (3.0 m) metal static straightedge for quality control and acceptance testing for transverse, cross slope and grade

The contractor shall also furnish a DOTD certified inertial profiler, for quality control and acceptance, to measure both wheelpaths simultaneously with laser or infrared height sensing equipment. Inertial profilers shall be capable of testing the finished surface in the longitudinal direction for conformance to the surface tolerance requirements listed in this subsection. Longitudinal surface profile shall be measured in inches per mile (mm per km) in accordance with DOTD TR 644 and reported as the International Roughness Index (IRI).

The Department will evaluate and verify the accuracy of the inertial profiler annually using static and dynamic tests in accordance with DOTD TR 644. Approved profilers will have a DOTD decal indicating the date of profiler verification and profiler system parameter settings. These settings shall be verified by the inspector before the first day of binder course paving and randomly thereafter.

For each project, a Department representative will observe the daily set up procedure and pre-operation tests, which shall be performed by the contractor in accordance with the manufacturer's procedures and DOTD TR 644. A copy of the manufacturer's setup procedure, pre-operation procedures, and operating procedure for measuring surface tolerance shall be available at all times during measurement.

(2) Transverse, Cross Slope and Grade:

a. Transverse: The contractor shall monitor and test the roadway for conformance to the requirements of Table 502-4. For turnouts, crossovers, detour roads, parking areas, and roadway or shoulder sections less than 500 feet (150 mm) in length, the wearing course shall be tested and the surface deviations shall not exceed 1/2 inch (15 mm). Areas with surface deviations in excess of specification limits shall be isolated and corrected by the contractor in accordance with Heading (4). The contractor shall control the transverse surface finish.

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b. Cross Slope: When the plans require the section to be constructed to a specified cross slope, the contractor shall take measurements at selected locations, using a stringline, slope board or other comparable method. The contractor shall control the cross slope so that the values shown in Table 502-4 are not exceeded for each lane constructed. The contractor shall make corrections in accordance with Heading (4) of this subsection.

c. Grade: When the plans require the pavement to be constructed to a grade, the contractor shall perform tests for conformance at selected locations, using a stringline or other comparable method. The contractor shall control grade variations so that the tolerances shown in Table 502-4 are not exceeded. Grade tolerances shall apply to only one longitudinal line, such as the centerline or outside edge of pavement. The contractor shall make corrections in accordance with Heading (4) of this subsection.

(3) Longitudinal: The contractor shall report an average IRI number in inches per mile (mm per km) and shall measure and report the average IRI value for each wheelpath on every 0.05-mile (0.08 km) segment of highway. Isolated rough areas will not be allowed. Any 0.05-mile (0.08 km) individual wheelpath segment measurement of the binder and wearing courses shall meet the requirements of Table 502-8B. The contractor shall make corrections in accordance with Heading (4) of this subsection.

(4) Correction of Deficient Areas: The contractor shall correct areas not meeting Table 502-8B requirements for individual wheelpath measurements in a 0.05-mile (0.08 km) segment.

a. Deficiencies in Wearing Course: The contractor shall correct deficiencies in the final wearing course by diamond grinding and applying a light tack coat, removing and replacing, or furnishing and placing a supplemental layer of wearing course mixture at least 1 1/2 inches (40 mm) compacted thickness for the full width of the roadway meeting specification requirements at no direct pay. If the supplemental layer does not meet specification requirements to the satisfaction of the engineer, the contractor shall remove and replace or correct it by other methods approved by the engineer.

b. Deficiencies in Binder Courses: The contractor shall correct deficiencies in binder course, transverse, cross slope, and grade measurements to meet specification requirements at no direct pay. Corrections shall be made before subsequent courses are constructed.

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c. Deficiencies in Shoulder Transverse, Cross Slope and Grade: The contractor shall correct deficiencies in these areas by grinding at the project engineer's direction.

502.11 ROADWAY ACCEPTANCE. Acceptance testing for pavement density, surface tolerance and dimensional tolerances will be conducted on that portion of the lot placed on each contract.

Hot mix exhibiting deficiencies before placement such as segregation, contamination, lumps, nonuniform coating, excessive temperature variations or other deficiencies, apparent on visual inspection, shall not be placed.

Hot mix exhibiting deficiencies, such as segregation, contamination, alignment deviations, variations in surface texture and appearance or other deficiencies, apparent on visual inspection, will not be accepted and shall be satisfactorily corrected and/or replaced at no direct pay. Poor construction practices such as handwork, improper truck exchanges, improper joint construction, or other deficiencies, apparent on visual inspection, will not be accepted.

(a) Density: Acceptance testing for pavement density will be conducted by the Department. Three pavement samples for each mix use shall be obtained from each sublot within 24 hours after placement. When this falls on a day the contractor is not working, sampling shall be done within 3 calendar days. Sampling shall be performed using the random number tables shown in DOTD S605. If there are different mix uses within the same sublot, i.e. shoulder and roadway, then an additional core may be taken to ensure that there is at least one core per mix use. The density requirement for each lot will be as shown in Table 502-4 determined in accordance with DOTD TR 304. Payment will be made in accordance with Table 502-7B using the total number of cores for the lot in accordance with Subsection 502.13. Payment for small quantity lots will be made in accordance with Table 502-9.

When the sampling location determined by random sampling falls within areas that are to be replaced or within 1 foot (0.3 m) of the unsupported pavement edge, another random sampling location will be used.

Samples shall be cores approximately 4 inches (100 mm) or 6 inches (150 mm) in diameter taken by an approved core drill. The contractor shall furnish samples cut from the completed work. The removed pavement shall be replaced with hot or cold mixture and refinished during the work day coring is performed. No additional compensation will be allowed for

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furnishing test samples and replacing the areas with new pavement. Samples shall be taken by the contractor in the presence of the engineer's representative from areas selected by the Department in accordance with this subsection. Cores less than 1 3/8 inches (35 mm) thick shall not be used as pavement samples for payment determination.

Cores shall be transported to the plant in approved transport containers. Transportation containers will be sealed, signed, and dated by the inspector using an approved method. The individually wrapped core will also be sealed, signed, and dated by the inspector using an approved method. Any evidence of tampering with the core wrappings, sticker, or of opening the container or friction top can will result in the cores being rejected. Additional pavement samples will be required.

(b) Surface Tolerance: The contractor shall measure the top two lifts of the roadway travel lanes. Final acceptance will be based on the last measurement taken on the final wearing course of the travel lanes. Measurement of the center two lanes will be required for airports. The contractor shall test the pavement during the first work day following placement, but in no case any later than 7 calendar days.

(1) Equipment: For longitudinal surface tolerance testing, equipment and daily set-up and pre-operation procedures shall be in accordance with Subsection 502.10(b)(1). For transverse, cross slope and grade testing, the contractor shall furnish a 10-foot metal static straightedge for Department use.

(2) Transverse, Cross Slope and Grade: The Department will test the surface of the binder and wearing courses at selected locations for conformance to the surface tolerance requirements of Subsection 502.10(b)(2) and Table 502-4, which shall not be exceeded. The contractor shall make corrections as directed in accordance with Subsection 502.10(b)(4).

(3) Longitudinal Surface Tolerance:

a. Acceptance: The contractor shall report an average IRI number in inches per mile (mm per km) and shall measure and report the average IRI value for each wheelpath on every 0.05-mile (0.08 km) segment of highway. The IRI values for the inside and outside wheelpaths shall be averaged and reported as the segment average and the mean of each segment average shall be reported as the sublot average. The individual wheelpath IRI values shall conform to the requirements of Table 502-8B. The average sublot values shall conform to the requirements listed in Tables 502-8A. A DOTD inspector will be present for the final test run

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and will immediately receive a copy of the IRI results via USB flash drive. The contractor shall provide the engineer a copy of the IRI report. Acceptance of each sublot will be in accordance with Tables 502-8A and 502-8B, based on the IRI profile report. The Department may elect to perform and utilize independent ride quality test results for acceptance at any time.

b. Exceptions and Exclusions:

1. Excluded Areas: The Department will review the profile report obtained for each binder and wearing course on a sublot basis. In special cases or extenuating circumstances, the engineer may isolate or exclude sections of the profile. These special cases or extenuating circumstances may be curb and gutter sections that require the adjustment of cross-slope in order to maintain adequate drainage, manholes, catch basins, valve and junction boxes, street intersections, or other structures located in the roadway which cause abrupt deviations in the profile. This specification exclusion will not be used to simply isolate sections of road that are in poor condition when the project is let.

2. Secondary Areas: Ramps less than 1500 feet (460 m), tapers, shoulders and medians, or sections of pavement surfaces as directed by the engineer such as 300 feet (90 m) from bridge ends, will not be included in the ride quality index for payment purposes, but shall have a maximum IRI average of 110 or less in a sublot.

502.12 DIMENSIONAL REQUIREMENTS. Mixtures that are specified for payment on a cubic yard (cu m) or square yard (sq m) basis shall conform to the following dimensional requirements. Overthickness and overwidth will be accepted at no direct pay.

(a) Thickness: Thickness of mixtures will be determined in accordance with DOTD TR 602. Underthickness shall not exceed 1/4 inch (6 mm).

When grade adjustments are permitted for all mixtures except the final wearing course, areas with underthickness in excess of 1/4 inch (6 mm) shall be corrected to plan thickness at no direct pay by furnishing and placing additional mixture in accordance with Subsection 502.10(b)(4)b. For the final wearing course, areas with underthickness in excess of 1/4 inch (6 mm) shall be corrected to plan thickness at no direct pay by furnishing and placing a supplemental layer of wearing course mixture meeting specification requirements in accordance with Subsection 502.10(b)(4)a over the entire area for the full width of the roadway when grade adjustments are permitted.

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When grade adjustments do not permit, the deficient underthickness area shall be removed and replaced at no direct pay.

(b) Width: The width of completed courses will be determined in accordance with DOTD TR 602. Underwidths shall be corrected by furnishing and placing additional mixture to a minimum width of 1 foot (0.3 m) and plan thickness at no direct pay.

502.13 QUALITY LEVEL ANALYSIS. The Quality Level Analysis is a statistical quality control/quality acceptance (QC/QA) method for validating Job Mix Formulas (JMF), contractors quality control, project acceptance and payment for all Superpave asphaltic concrete.

The mean $(\overline{X})$ is the average of a set of numbers. To determine the mean add the numbers (X_i) in the set and divide by the number of numbers (n) in the set.

$$\text{Mean} = \overline{X} = \frac{X_1 + X_2 + X_3 + \ldots + X_n}{n} = \frac{\sum_{i=1}^{n} X_i}{n}$$

The standard deviation of a set of numbers measures the spread of the numbers in the set or the deviation from the mean. Calculate the standard deviation according to the following formula:

$$\text{Standard Deviation} = s = \sqrt{\frac{(X_1 - \overline{X})^2 + (X_2 - \overline{X})^2 + \ldots + (X_i - \overline{X})^2}{n-1}}$$

$$= \sqrt{\frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{n-1}}$$

A Quality Index is calculated using both the upper and lower specification limits (if applicable). The Quality Index calculated using the upper or higher specification limit is called the Upper Quality Index (Q_U). The Quality Index calculated using the lower specification limit is called the Lower Quality Index (Q_L).

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To determine each Quality Index, the specification limits are added or subtracted from the mean of the test results and the result is divided by the standard deviation as shown below.

$$\text{Upper Quality Index} = Q_U = \frac{USL - \overline{X}}{s} \qquad \text{Lower Quality Index} = Q_L = \frac{\overline{X} - LSL}{s}$$

Where: USL = upper specification limit
LSL = lower specification limit

Table 502-6 is used to convert the Quality Index into the PWL value. A PWL is calculated for each Quality Index (upper and lower) and combined for a total PWL calculated in accordance with the formula:

$$PWL = PWL_L + PWL_U - 100$$

where: PWL_L = lower percent within limits
PWL_U = upper percent within limits

In using Table 502-6, the appropriate columns corresponding to the number of test results must be used.

If a specification requirement does not have both an upper and lower limit only one Quality Index and PWL, upper or lower as appropriate, is calculated and the other PWL is equal to 100 in the total PWL calculation.

502.14 LOT SIZES. A lot is a segment of continuous production of asphaltic concrete mixture from the same job mix formula produced for the Department at an individual plant. A standard lot size is 5,000 tons (5000 Mg). A standard sublot size is 1,000 tons (1000 Mg). Additional adjustments may be made to the standard lot or sublot size as specified in this subsection. The final sublot, at the end of a project lot, may be increased up to 150 percent to accommodate hauling unit capacity.

With good historical performance, and when agreed upon by the engineer and contractor, the lot size may be increased up to 10,000 tons, with corresponding sublot size up to 2000 tons (2000 Mg). Twenty-four hour per day plant production usually necessitates such an increase.

The engineer or contractor may decrease the size of an individual lot for any of the following conditions:

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(1) The interval between continuous production exceeds 7 calendar days.

(2) A new job mix formula is accepted.

(3) The final lot is less than 5,000 tons (5000 Mg).

(4) The total project quantity is less than 5000 tons (5000 Mg).

(5) A payment adjustment will be applied to the portion of the lot already produced, provided adjustments have been made to bring the asphaltic concrete into compliance with specifications.

For lots with 3000 tons or greater, PWL calculations will be required in accordance with Table 502-6 and Table 502-7.

Lots with less than 3000 tons (3000 Mg) of mix are paid as Small Quantity Lots. Only standard 1000 ton (1000 Mg) sublots will be allowed when determining pay for Small Quantity Lots. Each 1000 ton (1000 Mg) sublot, or less, as applicable, will be paid individually in accordance with Table 502-9.

Any mixtures used for bike paths, crossovers, curbs, driveways, guardrail widening, islands, joint repair, leveling, parking lots, shoulders, turnouts, patching, widening, and miscellaneous handwork will be paid as a Small Quantity Lot, and separately in 1000 ton sublots, or portions thereof, in accordance with this subsection and Table 502-9.

Pavement density and surface tolerance requirements will not be applied for short irregular sections, such as curbs, driveways, guardrail widening, islands, joint repair, leveling, and turnouts; however, hot mix shall be placed to provide a neat, uniform appearance and shall be compacted by satisfactory methods.

For projects, or separate locations within a project, requiring less than 250 tons (250 Mg), the job mix formula, materials, and plant and paving operations shall be satisfactory to the engineer. Sampling and testing requirements may be modified by the engineer and the payment adjustment for deviations waived.

502.15 MEASUREMENT. Asphalt tack coat, prime coat or curing membrane will not be measured for payment.

(a) Weight Measurement: Asphaltic concrete will be measured by the ton of 2,000 pounds (megagrams) from printed weights as provided in Section 503. Stamped printer tickets will be issued for each truckload of material delivered. Material lost, wasted, rejected or applied contrary to specifications will not be measured for payment.

Estimated quantities of asphaltic concrete shown on the plans are based on 110 lb/sq yd/inch (2.35 kg/sq m/mm) thickness. The measured quantity

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of asphaltic mixtures will be multiplied by the following adjustment factor to obtain the pay quantity.

Theoretical Maximum Specific Gravity, (G_{mm}) (DOTD TR 327)	Adjustment Factor
2.340 - 2.360	1.02
2.361 - 2.399	1.01
2.400 - 2.540	1.00
2.541 - 2.570	0.99
2.571 - 2.590	0.98

The adjustment factor for mixtures with theoretical maximum specific gravities less than 2.340 or more than 2.590 will be determined by the following formulas:

Theoretical maximum specific gravity less than 2.340:

$$F = \frac{2.400}{S}$$

Theoretical maximum specific gravity more than 2.590:

$$F = \frac{2.540}{S}$$

where,

F = quantity adjustment factor

S = theoretical maximum specific gravity of mixture from approved job mix formula

(b) Volume or Area Measurement: The quantities for payment will be the design quantities specified in the plans and adjustments thereto. Design quantities will be adjusted when the engineer makes changes to adjust to field conditions or when design changes are necessary. Design quantities are based on the horizontal dimensions and compacted thickness of the completed course shown on the plans.

(c) Surface Tolerance Incentive Measurement: At the completion of construction of the wearing course travel lanes, the contractor, in the presence of a DOTD representative, shall measure a continuous profile from the start station to the end station of the construction project for the purpose of determining qualification for

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incentive pay under Subsection 502.16(e). Bridges and 300 feet (90 m) on each end of the bridge will be excluded from measurements for surface tolerance incentive pay.

502.16 PAYMENT.

(a) General: Payment for asphaltic concrete will include furnishing all required materials, producing the mixtures, preparing the surfaces on which the mixtures are placed, hauling the mixtures to the work site, and placing and compacting the mixtures.

Payment for asphaltic concrete will be made at the contract unit price on a lot basis as defined in Subsection 502.14. When the mix does not meet requirements in the areas listed in this subsection, the Payment Adjustment Schedule shown in Tables 502-7, 502-8 or 502-9 will be applied. Production of mix that is not eligible for 100 percent payment will not be allowed on a continuous basis. When test results demonstrate that payment adjustments are necessary, satisfactory adjustments shall be made, or production shall be discontinued.

(b) Wearing Course Mixes: For wearing course travel lanes, adjustments in contract price for plant and roadway deficiencies or incentives will be based on the average of the percent payments for plant air voids, roadway density, and surface tolerance. For all other wearing course applications, payment adjustment will be based on the average of the percent payments for plant air voids and roadway density.

(c) Base, Binder and Shoulder Mixes: For base and binder courses for travel lanes and all shoulder mixes, adjustments in contract price for plant and roadway deficiencies or incentives will be based on the average of the percent payments for plant air voids and roadway density.

Final adjustments in unit price will be as described in Tables 502-7 and 502-9.

(d) Erected Stringline: When the use of an erected stringline is not specified, but directed by the engineer, an additional payment of $500 per contract plus $0.25 per linear foot ($0.75 per lin m) will be made for mixtures placed by the erected stringline method. When the use of an erected stringline is specified, no additional payment will be made.

(e) Longitudinal Surface Tolerance Incentive Pay: For Category A projects and in accordance with Table 502-8A, a surface tolerance incentive payment equal to 5 percent of the contract unit price for the theoretical travel lane quantity of the wearing course item will be paid if the contractor achieves a project average IRI of 45 or less as measured at the completion of the project. No lot of wearing course on the project shall

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be less than 100 percent for surface tolerance. Only Category A projects are eligible for incentive pay. Any grinding except within 300 feet (90 m) of a bridge end will cause the roadway to be ineligible for surface tolerance incentive pay.

Payment will be made under:

Item No.	Pay Item	Pay Unit
502-01	Superpave Asphaltic Concrete	Ton (Mg)
502-02	Superpave Asphaltic Concrete	Cubic Yard (Cu m)
502-03	Superpave Asphaltic Concrete, (in (mm) Thick)	Square Yard (Sq m)

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Table 502-4
Superpave Requirements

A. REQUIREMENTS FOR EXTRACTED ASPHALT CEMENT AND AGGREGATE GRADATION					
U.S. (Metric) Sieve % Passing	1/2 inch (12.5 mm) Nominal	3/4 inch (19 mm) Nominal	1 inch (25 mm) Nominal	1.5 inch (37.5 mm) Nominal	Mix Tolerance[1]
2 inch (50 mm)	---	---	---	100	±4
1 1/2 inch (37.5 mm)	---	---	100	90-100	±4
1 inch (25 mm)	---	100	90-100	89 Max.	±4
3/4 inch (19 mm)	100	90-100	89 Max	---	±4
1/2 inch (12.5 mm)	90-100	89 Max	---	---	±4
3/8 inch (9.5 mm)	89 Max.	---	---	---	±4
No. 4 (4.75 mm)	---	---	---	---	±4
No. 8 (2.36 mm)	34-58	29-49	23-45	19-41	±3
No. 16 (1.18 mm)	---	---	---	---	±2
No. 30 (600 µm)	---	---	---	---	±2
No. 50 (300 µm)	---	---	---	---	±2
No 100 (150 µm)	---	---	---	---	±2
No. 200 (75 µm)	4.0-10.0	3.0-8.0	2.0-7.0	1.0-6.0	±0.7
Extracted Asphalt, %	---	---	---	---	±0.2
Mix Temperature	---	---	---	---	±25°F (±14°C)

B. PAVEMENT REQUIREMENTS			
Density, Min. % of Theoretical Maximum Specific Gravity, DOTD TR 327			
Travel Lane Wearing, Binder and Base Courses	92.0		
Shoulders, Bike Paths, and Parking Lots	89.0		
Patching, Widening and Crossovers	91.0		
Surface Tolerance Variation, inches (mm)[2]	Transverse[3]	Cross Slope[3]	Grade[4]
Roadway Travel Lane Wearing Courses	1/8 (3)	3/8 (10)	1/2 (15)
Binder Courses	1/4 (6)	1/2 (15)	1/2 (15)
Shoulder Wearing Course	3/16 (5)	3/4 (20)	3/4 (20)

[1]Job Mix Formula based on validated mix design.
[2]For longitudinal surface tolerance requirements, see Subsection 502.10(d).
[3]Based on 10 feet (3.0 mm).
[4]Applicable only when grade is specified.

Table 502-5
Superpave General Criteria

Nominal Max., Size Agg.	0.5 inch (12.5 mm)			0.75 inch (19 mm)			1.0 inch (25 mm)			1.5 inch (37.5 mm)
Type of Mix	Incidental Paving[1]	Wearing Course		Wearing Course	Binder Course		Binder Course		Base Course	Base Course
Level[2]	A	1	2	2	1	2	1	2	1	1
Asphalt Binder	Table 502-2									
Friction Rating[2]	Table 502-3									
Coarse Agg. Angularity, + No. 4 (4.75 mm)	55	75	95	95	75	95	75	95	75	75
Fine Agg. Angularity, Min. % - No. 4 (4.75 mm)	40	40	45	45	40	45	40	45	40	40
Flat and Elongated Particles, % Max. (5:1) + No. 4 (4.75 mm)	10									
Sand Equivalent, Min. % (Fine Agg.), - No. 4 (4.75 mm)	40	40	45	45	40	45	40	45	40	40
Natural Sand Max. % of New Agg.	N/A	15	15	15	15	15	15	15	15	25
RAP, Max. % of Mix[3]	20	15	15	15	20	20	20	20	30	30
	Compacted Mix Volumetrics [4]									
VMA, Min. %	13	13	13	12	12	12	11	11	11	10
Air Voids, %[5]	2.5-4.5									
VFA, %[5]	68-78									
$N_{initial}$ 90% max.[6] (Gyrations)	7	7	8	8	7	8	7	8	7	7
N_{design} 96.5±1 % (Gyrations)	75	75	100	100	75	100	75	100	75	75
N_{max} 98 % max. (Gyrations)	115	115	160	160	115	160	115	160	115	115
Moisture Sensitivity, TSR Min.	80									
Dust/Effective Asphalt Ratio, %	0.6 – 1.6									
Lift Thickness, inch (mm)	2.0- (50-)	1.5–2.0 (45-50)		2.0–3.0 (50-75)			2.5–4.0 (65-100)		2.5+ (65+)	4.0+ (100+)

[1]May be used for airports, bike paths, crossovers, curbs, driveways, guardrail widening, islands, joint repair, leveling, parking lots, shoulders, turnouts, and other incidental items approved by the engineer. (May also be used for mixtures specified as Marshall Type 3.)
[2]Mixtures designated as Level 1F and 2F shall meet the requirements for Level 1 and 2, respectively. Additionally, Level 1F and 2F shall meet the friction rating requirements in Table 502-3 for travel lane wearing courses with ADT > 7000.
[3]Maximum 20 % Rap will be allowed in all shoulder wearing course mixtures. RAP will not be allowed for airports.
[4]Air voids, VMA, VFA, % G_{mm} @ $N_{initial}$, and % G_{mm} @ N_{design} are determined on samples compacted to N_{design}; The parameter of % G_{mm} @ N_{max} is determined on a sample compacted to N_{max}.
[5]Air voids design target is 3.5%, VFA target is 73%.
[6]For Level 1 mixtures, $N_{initial}$ shall be 91.0 % max. For Level A mixes, $N_{initial}$ shall be 92.0 % max.

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Table 502-6
Quality Index Values for Estimating Percent Within Limits

PWL	n = 3	n = 4	n = 5 - 6	n = 7 - 9	n = 10 - 12	n = 13 - 15
99	1.16	1.47	1.68	1.89	2.04	2.14
98	1.15	1.44	1.61	1.77	1.86	1.93
97	1.15	1.41	1.55	1.67	1.74	1.80
96	1.15	1.38	1.49	1.59	1.64	1.69
95	1.14	1.35	1.45	1.52	1.56	1.59
94	1.13	1.32	1.40	1.46	1.49	1.51
93	1.12	1.29	1.36	1.40	1.43	1.44
92	1.11	1.26	1.31	1.35	1.37	1.38
91	1.10	1.23	1.27	1.30	1.32	1.32
90	1.09	1.20	1.23	1.25	1.26	1.27
89	1.08	1.17	1.20	1.21	1.21	1.22
88	1.07	1.14	1.16	1.17	1.17	1.17
87	1.06	1.11	1.12	1.12	1.13	1.13
86	1.05	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.05	1.04	1.04
84	1.02	1.02	1.02	1.01	1.00	1.00
83	1.00	0.99	0.98	0.97	0.96	0.96
82	0.98	0.96	0.95	0.94	0.93	0.92
81	0.96	0.93	0.92	0.90	0.89	0.89
80	0.94	0.90	0.88	0.87	0.85	0.85
79	0.92	0.87	0.85	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.79	0.78
77	0.87	0.81	0.79	0.77	0.76	0.75
76	0.84	0.78	0.76	0.74	0.72	0.72
75	0.82	0.75	0.73	0.71	0.69	0.69
74	0.79	0.72	0.70	0.67	0.66	0.66
73	0.77	0.69	0.67	0.64	0.63	0.62
72	0.74	0.66	0.64	0.61	0.60	0.59
71	0.71	0.63	0.60	0.58	0.57	0.56
70	0.68	0.60	0.58	0.55	0.54	0.54
69	0.65	0.57	0.55	0.53	0.51	0.51
68	0.62	0.54	0.52	0.50	0.48	0.48
67	0.59	0.51	0.49	0.47	0.46	0.45
66	0.56	0.48	0.46	0.44	0.43	0.42
65	0.53	0.45	0.43	0.41	0.40	0.40
64	0.49	0.42	0.40	0.38	0.37	0.37
63	0.46	0.39	0.37	0.35	0.35	0.34
62	0.43	0.36	0.34	0.33	0.32	0.31
61	0.39	0.33	0.31	0.30	0.30	0.29
60	0.36	0.30	0.28	0.27	0.26	0.26
59	0.32	0.27	0.25	0.24	0.24	0.23
58	0.29	0.24	0.23	0.21	0.21	0.21
57	0.25	0.21	0.20	0.19	0.18	0.18
56	0.22	0.18	0.17	0.16	0.16	0.15
55	0.18	0.15	0.14	0.13	0.13	0.13
54	0.14	0.12	0.11	0.11	0.10	0.10
53	0.11	0.09	0.08	0.08	0.08	0.08
52	0.07	0.06	0.06	0.05	0.05	0.05
51	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00

Note 1: For negative values of Q_u or Q_L. PWL_U or PWL_L is equal to 100 minus the tabular PWL_U or PWL_L.
Note 2: If the value of Q_U or Q_L does not correspond exactly to a value in the table, use the next higher value.

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Table 502-7
Payment Adjustments for Superpave

Payment adjustments will be based on specification limits.

A) PLANT ACCEPTANCE

Air Voids: The percent within limits (PWL) will be calculated for air voids for each lot and reported to the nearest whole number. Payment for plant acceptance will be in accordance with Table 502-7A.

Table 502-7A
Payment Adjustment Schedule for Plant Acceptance

Air Voids PWL	Percent Payment
100	103
88-99	100
71-87	98
51-70	90
21-50	80
≤20	50 or Remove[1]

[1]At the option of the Department after investigation.

B) ROADWAY DENSITY

The percent within limits (PWL) will be calculated for pavement density for each lot and reported to the nearest whole number. Payment for roadway density will be in accordance with Table 502-7B.

Table 502-7B
Payment Adjustment Schedule for Roadway Density

Roadway Density PWL	Percent Payment
98-100	105
89-97	100
79-88	98
61-78	90
31-60	80
≤30	50 or Remove[1]

[1]At the option of the Department after investigation.

C) SURFACE TOLERANCE (Final Wearing Course Travel Lanes Only)

Payment adjustments for surface tolerance for the final wearing course travel lanes will be based on the International Roughness Index (IRI) in accordance with Table 502-8A and Subsections 502.15 and 502.16. Percent payments will be determined for each sublot and averaged to determine payment for the lot.

TOTAL PAYMENT

The percent payment for the wearing course travel lanes will be the average of the percent payments for plant acceptance, roadway density, and surface tolerance for each lot. Incentive payment for surface tolerance will be in accordance with Subsection 502.16(e) and paid separately.

The percent payment for all other mix types will be the average percent payments for plant acceptance and roadway density for each lot.

All calculations for percent payment will be rounded to the nearest one (1) percent.

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Table 502-8A
Payment Adjustment Schedules for Longitudinal Surface Tolerance, Maximum International Roughness Index, inches per mile (mm per km)

Percent of Contract Unit Price (by Sublot)[1]	103%[2]	100%	90%	80%	50% or Remove[3]
Category A All Interstates, Multi-Lift New Construction and Overlays of More than two Lifts	<55 (<870)	<65 (<1030)	65-75 (1030-1180)	NA	>75 (>1180)
Category B One or Two Lift Overlays Over Cold Planed Surfaces, and Two-Lift Overlays Over Existing Surfaces[4]	<65 (<1030)	<75 (<1180)	75-89 (1180-1400)	NA	>89 (>1400)
Category C Single-Lift Overlays Over Existing Surfaces[4]	<75 (<1180)	<85 (<1340)	85-95 (1340-1500)	>95-110 (>1500-1740)	>110 (>1740)
Longitudinal Surface Tolerance Incentive Pay, Final Completion, Average of All Travel Lanes[5]	≤45 (≤710)				

[1]Or portion of sublot placed on the project.
[2]Maximum payment for sublots with exception areas, exclusions or grinding is 100 percent, unless the excluded area is a bridge end.
[3]At the option of the engineer.
[4] Existing surfaces include reconstructed bases without profile grade control.
[5]Only Category A projects are eligible for incentive. However, any grinding except within 300 feet (90 m) of a bridge end will cause the roadway to be ineligible for surface tolerance incentive pay.

Table 502-8B
Individual Wheelpath Deficient Area Limits
Maximum International Roughness Index, inches per mile (mm per km)

Any 0.05 Mile (0.08 km) Segment	Wearing Course	Binder Course
Category A	89 (1400)	130 (2050)
Category B	99 (1560)	150 (2370)
Category C	110 (1740)	N/A

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Table 502-9
Payment Adjustment Schedule for Small Quantities of Superpave[1]

Parameter[2]	Percent of Contract Unit Price/Sublot		
	100	95	50 or Remove[3]
% Air Voids	2.5-4.5	1.5-2.4 or 4.6-5.5	<1.5 or >5.5
Average Roadway Density, % G_{mm}	≥ Lower limit	-0.1 to -0.9 below lower limit	-1.0 below Lower limit

[1]See Subsection 502.14.
[2]For plant acceptance, use one sample for percent air voids to determine pay. For roadway acceptance, use the average of three cores to determine density and pay. Determine surface tolerance in accordance with Table 502-8A. The total percent payment for small quantities of Superpave mixtures will be the average of the percent payments for plant acceptance (air voids), roadway acceptance (density) and surface tolerance.
[3]At the option of the engineer.

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Section 510
Asphaltic Concrete Pavement Patching, Widening and Joint Repair

510.01 DESCRIPTION. This work consists of patching, widening and joint repair of existing asphaltic concrete pavements in accordance with these specifications and in conformity with the lines, grades and typical sections shown on the plans or as directed. Asphaltic concrete shall be used for patching, widening, and joint repair.

510.02 MATERIALS. Asphaltic concrete for patching and widening may be any type mixtures listed in Section 502, except that 1/2 inch (12.5 mm) nominal maximum size mixtures shall not be used. Asphaltic concrete for joint repair shall be Superpave Asphaltic Concrete (Level A) complying with Section 502. Asphalt tack coat shall comply with Section 504.

510.03 EQUIPMENT. Equipment furnished shall meet the specification requirements for the types of material used.

510.04 GENERAL CONSTRUCTION REQUIREMENTS. The contractor shall remove existing surfacing and base materials and perform all required excavation for patching and widening. When through traffic is maintained, the contractor shall complete the replacement of pavement, place the widening material, or fill and compact open areas or trenches at the end of each day's operations.

Excavation and compaction of the subgrade shall be in accordance with the plans or as directed. The subgrade shall be compacted uniformly.

Existing surfacing and excess excavation shall be disposed of beyond the right-of-way in accordance with Section 202.

For joint repair, contact surfaces of existing pavement shall be cleaned and a thin, uniform asphalt tack coat applied prior to placing asphaltic mixture in the joint.

Patching and widening with asphaltic concrete shall conform to Section 502, except that priming of the subgrade will not be required. Contact surfaces of pavement shall be cleaned and a uniform coat of asphalt tack coat applied before placement of asphaltic concrete. Patches shall not be overlayed for a minimum of 5 calendar days.

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Spreading, finishing and compaction of asphaltic concrete shall leave the surface smooth and level with, or slightly above, the edge of existing pavement. To provide lateral support, the contractor will be permitted to construct temporary berms of excavated material against the outside edge of widening strips prior to rolling.

510.05 MEASUREMENT.

(a) Patching: Patching of pavement will be measured by the square yard (sq m) of existing pavement designated to be removed and replaced. Removal of existing surfacing and base course, tack coat, and required excavation will not be measured for payment.

(b) Widening: The quantities of widening for payment will be the design areas as specified on the plans and adjustments thereto. Design quantities will be adjusted if the engineer makes changes to adjust to field conditions, if plan errors are proven, or if design changes are made. Design quantities are based on the horizontal dimensions shown on the plans. Required excavation, removal of existing pavement and base course, asphaltic tack coat and disposal of removed material will not be measured for payment. No measurement for payment will be made for widening placed outside the dimensions shown on the plans or established by the engineer.

(c) Joint Repair: Joint repair will be measured by the ton (Mg) of asphaltic concrete used to fill the joint. Measurement will be made in accordance with Subsection 502.15.

510.06 PAYMENT.

(a) Patching: Payment for pavement patching will be made at the contract unit prices per square yard (sq m), subject to the following provisions:

Payment adjustments for deficiencies in asphaltic concrete and asphalt materials will be applied to 1/2 the contract unit price for pavement patching.

When the engineer orders additional thickness of patching in excess of plan thickness, payment for the additional thickness will be made as follows. The value per inch (mm) thickness will be determined by dividing the contract unit price per square yard (sq m) by the plan thickness. Thickness of patches will be measured from the surface that exists at the time of patching. Payment for the additional thickness will be made at 50 percent of the value per inch (mm) thus determined.

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When the engineer approves of an underthickness of patching less than plan thickness, a deduction in payment will be made. This deduction per inch (mm) of underthickness will be made at 50 percent of the value per inch (mm). The value per inch (mm) will be calculated by dividing the contract unit price per square yard (sq m) by the plan thickness.

Any patching that develops or is required between the time of initial patching operations and the placement of the first lift of asphaltic concrete will be paid for at the contract unit price. Any patching required due to base failure after placement of the first lift of asphaltic concrete will be paid for at twice the contract unit price.

Asphaltic concrete will be subject to the payment adjustment provisions of Section 502.

(b) Widening: Payment for pavement widening will be made at the contract unit prices per square yard (sq m). Overwidths will be accepted at no additional pay. Underwidth shall be corrected by furnishing and placing additional asphaltic concrete to a minimum width of 1 foot (0.3 m) and plan thickness at no direct pay.

(c) Joint Repair: Payment for pavement joint repair will be made at the contract unit price per ton (Mg), subject to the following provisions:

Asphaltic concrete for joint repair will be subject to the payment adjustment provisions of Section 502 except for surface tolerance and density; however, payment adjustments will be applied to 1/3 the contract unit price for joint repair. The Materials and Testing Section will provide the payment adjustment percentage for properties of asphalt material.

Payment will be made under:

Item No.	Pay Item	Pay Unit
510-01	Pavement Patching	Square Yard (Sq m)
510-02	Pavement Widening	Square Yard (Sq m)
510-03	Pavement Joint Repair	Ton (Mg)

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Section 701
Culverts and Storm Drains

701.01 DESCRIPTION. This work consists of furnishing, installing, and cleaning pipe, pipe arch, storm drains and sewers, also referred to as culverts or conduit, in accordance with these specifications and in conformity with lines and grades shown on the plans or established.

701.02 MATERIALS. Materials shall comply with the following Sections and Subsections:

Usable Soil	203.06(a)
Selected Soil	203.06(b)
Plastic Soil Blanket	203.10
Flowable Fill	710
Mortar	702.02
Portland Cement Concrete	901
Stone	1003.03(b)
Recycled Portland Cement Concrete	1003.03(c)
Granular Material	1003.07
Bedding Material	1003.08
Concrete Sewer Pipe	1006.02
Reinforced Concrete Pipe	1006.03
Reinforced Concrete Pipe Arch	1006.04
Gasket Materials	1006.06
Plastic Pipe	1006.07
Split Plastic Coupling Bands	1006.07(d)(4)
Plastic Yard Drain Pipe	1006.09
Bituminous Coated Corrugated Steel Pipe and Pipe Arch	1007.02
Structural Plate for Pipe, Pipe Arch and Arch	1007.04
Corrugated Aluminum Pipe and Pipe Arch	1007.05
Coupling Bands	1007.09
Reinforcing Steel	1009
Geotextile Fabric	1019

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(a) Side Drain Pipe or Side Drain Pipe Arch: When the item for Side Drain Pipe or Side Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, corrugated metal pipe or corrugated metal pipe arch, or plastic pipe, unless otherwise specified.

(b) Cross Drain Pipe or Cross Drain Pipe Arch: When the item for Cross Drain Pipe or Cross Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, corrugated metal pipe or corrugated metal pipe arch, or plastic pipe, unless otherwise specified.

(c) Storm Drain Pipe or Storm Drain Pipe Arch: When the item for Storm Drain Pipe or Storm Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, or plastic pipe, unless otherwise specified.

(d) Yard Drain Pipe: When the item for Yard Drain Pipe is included in the contract, the contractor has the option of furnishing concrete sewer pipe, plastic yard drain pipe or plastic pipe in accordance with Section 1006 unless otherwise specified.

(e) Material Type Abbreviations:

(1) Reinforced Concrete Pipe:

RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch

(2) Corrugated Metal Pipe:

CAP	Corrugated Aluminum Pipe
CAPA	Corrugated Aluminum Pipe Arch
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CSP	Corrugated Steel Pipe
CSPA	Corrugated Steel Pipe Arch
BCCSP	Bituminous Coated Corrugated Steel Pipe
BCCSPA	Bituminous Coated Corrugated Steel Pipe Arch

(3) Plastic Pipe:

PP	Plastic Pipe
PVCP	Polyvinyl Chloride Pipe
RPVCP	Ribbed Polyvinyl Chloride Pipe
CPEPDW	Corrugated Polyethylene Pipe Double Wall

(f) Joint Type Abbreviations:

T1	Type 1 Joint
T2	Type 2 Joint
T3	Type 3 Joint

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(g) Quality Assurance for Pipe: Manufacturing plants will be periodically inspected for compliance with specified manufacturing methods, and material samples will be randomly obtained for laboratory testing for verification of manufacturing lots. Materials approved at the manufacturing plant will be subject to visual acceptance inspections at the jobsite or point of delivery.

701.03 EXCAVATION. The bottom of the trench shall be excavated to a minimum width of 18 inches (450 mm) on each side for all pipe. Surplus material or excavated material that does not conform to the requirements of Subsection 203.06(a) shall be satisfactorily disposed of in accordance with Subsection 202.02.

701.04 FORMING PIPE BED. When rock is encountered, it shall be removed below grade and replaced with material complying with Subsection 203.06. This replacement material shall be compacted to at least the density of the surrounding soil. The compacted earth cushion shall have a thickness under the pipe of at least 1/2 inch per foot (40 mm/m) of fill height over the top of the pipe with a minimum thickness of 8 inches (200 mm).

When pipe is not laid in a trench, a uniformly firm bed shall be made as specified for the bottom of a trench.

When bedding material is specified, additional excavation shall be performed below established grade and bedding material placed.

When a suitable foundation cannot be obtained, unstable soil below established grade shall be removed and replaced with granular material or bedding material constructed in accordance with Section 726. When stone or recycled portland cement concrete is used as backfill, unstable soil below established grade shall be removed and replaced with bedding material constructed in accordance with Section 726.

701.05 LAYING PIPE. Pipe laying shall begin at the downstream end of the line. The pipe shall be in contact with the foundation throughout its length. Bell or groove ends of pipe and outside circumferential laps of riveted metal pipe shall be placed facing upstream. Riveted seam metal pipe shall be placed with longitudinal laps at sides. Pipes in each continuous line shall have the same wall thickness. Metal pipes provided with lifting lugs shall be handled only by these lugs.

After pipe has been laid and before backfill is placed, the engineer will inspect the pipe for alignment, grade, integrity of joints, and coating damage.

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701.06 JOINING PIPE.

(a) Joint Usage:

(1) Type 1 (T1) joints shall be used for side drains under drives and similar installations.

(2) Type 2 (T2) joints shall be used for cross drains under roadways, including turnouts.

(3) Type 3 (T3) joints shall be used for closed storm drain systems, flumes and siphons.

(b) Concrete Pipe: Concrete pipe may be either bell and spigot, or tongue and groove. The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are flush and even.

An approved mechanical pipe puller shall be used for joining pipes over 36 inches (900 mm) in diameter. For pipe 36 inches (900 mm) or less in diameter, any approved method for joining pipe may be used which does not damage the pipe.

Joints shall comply with Subsection 1006.05, and shall be sealed with gasket material installed in accordance with the manufacturer's recommendations.

Types 2 and 3 joints shall be wrapped with geotextile fabric for a minimum of 12 inches (300 mm) on each side of joint for pipe 36 inches (900 mm) or less in diameter and a minimum of 18 inches (450 mm) on each side of the joint for pipe greater than 36 inches (900 mm) in diameter. Ends of the fabric shall be lapped at least 10 inches (250 mm). The edges and ends of fabric shall be suitably secured for the entire circumference of the pipe.

(c) Metal Pipe: Metal pipe shall be firmly joined by coupling bands. Bands shall be centered over the joint.

For Type 1 joints, approved gasket material shall be placed in one corrugation recess on each side of the joint at the coupling band and on each band connection in such manner to prevent leakage.

When Type 2 or 3 joints are specified, joining of metal pipe sections shall conform to the following provisions:

(1) General: Band joints shall be sealed with gasket material. Gasket material shall be placed in accordance with the plan details. The joint shall be wrapped with geotextile fabric for a minimum of 12 inches (300 mm) on each side of the connecting band for pipe diameters 36 inches (900 mm) or less and a minimum of 18 inches (450 mm) on each side of the connecting band for pipe diameters greater than 36 inches (900 mm). Ends of fabric shall be lapped at least 10 inches (250 mm). The edges and ends of fabric shall be suitably secured for the entire circumference of the pipe.

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(2) Circular Section: Connecting bands shall be of an approved design and shall be installed in accordance with plan details.

(3) Arch Section: Connecting bands shall be a minimum of 12 inches (300 mm) wide for pipe arch less than 36 inches (900 mm) round equivalent diameter, and a minimum of 21 inches (525 mm) wide for 36 inches (900 mm) round equivalent diameter pipe arch and greater. Bands shall be connected at the ends by approved angle or strap connections. Connecting bands used for 36 inches (900 mm) round equivalent diameter pipe arch and above shall be 2-piece bands.

(d) Plastic Pipe: Joints for plastic pipe shall be either bell and spigot or split coupling bands.

Types 2 and 3 joints shall be wrapped with geotextile fabric for a minimum of 12 inches (300 mm) on each side of the joint for pipes 36 inches (900 mm) or less in diameter and for a minimum of 18 inches (450 mm) on each side of the joint for pipes greater than 36 inches (900 mm) in diameter. The ends of the fabric shall be lapped at least 10 inches (250 mm). The edges and ends of the fabric shall be suitably secured for the entire circumference of the pipe.

(1) Bell and Spigot Type Joint System: The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are reasonably flush and even.

An approved mechanical pipe puller shall be used for joining pipes over 36 inches (900 mm) in diameter. For pipe 36 inches (900 mm) or less in diameter, any approved method for joining pipe may be used which does not damage the pipe.

Joints shall be approved and shall be sealed with a gasket system utilizing gasket material complying with Subsection 1006.06(a).

(2) Split Coupling Type Joint System: Split coupling bands shall comply with all dimensional and material requirements of Subsection 1006.07. The bands shall be centered over the joint. The split coupling band shall be secured to the pipe with a minimum of five stainless steel or other approved corrosion resistant bands.

Joints shall be approved and shall be sealed with gasket material. Gasket material shall be placed in the first two corrugation recesses on each side of the pipe connections. Gasket material shall also be placed on each band connection to prevent leakage. When flexible plastic gasket material is used it shall be a minimum of 1/2 inch (13 mm) in size. The bands shall be tightened to create overlap of the band and shall adequately compress the gasket material.

(e) Connections: Approved connections shall be used when joining new pipes to existing pipes. When concrete collars are required in order to

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extend the ends of existing pipes that have been damaged or to join different types or sizes of pipes, the concrete collars shall be constructed in accordance with plan details, the applicable requirements of Section 901, and as directed.

701.07 RELAYING PIPE. If specified or directed, existing pipes shall be removed and suitable sections relaid as specified for new pipes.

701.08 BACKFILLING.

(a) General: Prior to backfilling, pipes found to be damaged or out of alignment or grade shall be removed and reinstalled, or replaced.

Type A backfill material shall be stone, recycled portland cement concrete, or flowable fill.

Type B backfill material shall be stone, recycled portland cement concrete, flowable fill, selected soils, or granular material.

When Type A backfill material is used, geotextile fabric shall be placed in accordance with plan details prior to placing backfill material. Care shall be taken to prevent damage to geotextile fabric during placement of backfill material.

Adjacent rolls of fabric shall be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches (450 mm), including the ends of the rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of backfill materials placement. When rolls are sewn, the contractor shall join adjacent rolls by sewing with polyester, or Kevlar thread. Field sewing shall employ the "J" seam or "Butterfly" seam with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified shall be submitted to the Materials and Testing Section for approval.

Damaged fabric shall be either removed and replaced with new fabric or covered with a second layer of fabric extending 2 feet (0.6 m) in each direction from the damaged area.

(b) Backfill Applications:

(1) Paved Areas: Cross drains and side drains in paved areas subject to traffic loads such as roadway travel lanes, shoulders, and turnouts shall be backfilled with Type A material. Type B backfill material shall be used in all other paved areas including driveways, detour roads and similar installations. Selected soils will not be allowed as backfill material. Placement and compaction shall be as specified in Heading (c) below.

(2) Nonpaved Areas: Pipe backfill material, except for plastic pipe, shall be Type B backfill material placed by approved methods and compacted

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to the density of surrounding soil. Plastic pipe shall be backfilled with granular material or Type A backfill Material.

(c) Placement and Compaction: When corrugated metal pipe is used, the backfill material shall be tested and shall have a resistivity greater than 1500 ohm-cm and a pH greater than 5 when tested in accordance with DOTD TR 429 and DOTD TR 430 respectively.

If the top of pipe is even with or below the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to an elevation of 12 inches (300 mm) above the top of pipe [or to subgrade if less than 12 inches (300 mm)] or to natural ground elevation, whichever is greater.

When the top of the pipe is above the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to 12 inches (300 mm) above the top of pipe or to subgrade if less than 12 inches (300 mm). Material in the trench and above the top of the trench for a distance on each side of the pipe equal to the horizontal outside diameter for corrugated metal or plastic pipe and 18 inches (450 mm) for concrete pipe, and to 12 inches (300 mm) above the top of pipe or to subgrade if less than 12 inches (300 mm) shall be backfill material.

The embankment shall be constructed to a minimum of 24 inches (600 mm) over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, installations with less than 24 inches (600 mm) of cover over the top of the pipe shall be constructed after heavy hauling is completed over the pipe location. After completion of hauling operations, the contractor shall remove excess cover material. Pipe damaged by hauling and backfilling operations shall be removed and reinstalled, or replaced, at no direct pay.

(1) Backfill Methods:

a. General: Compaction by flooding will not be allowed.

b. Selected Soils: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418 in layers not exceeding 8 inches (200 mm) compacted thickness. Backfill material shall be thoroughly compacted under the haunches of the pipe. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer.

c. Granular Material: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Backfill material shall be thoroughly compacted under the haunches of the pipe and then compacted in layers not exceeding 12 inches (300 mm) compacted thickness. Each layer shall be compacted by approved methods to

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at least 95 percent of maximum dry density prior to placement of a subsequent layer. Exposed slopes at the pipe ends shall be covered by at least 12 inches (300 mm) compacted thickness of plastic soil blanket.

d. Flowable Fill: Flowable fill shall be in accordance with Section 710.

e. Stone or Recycled Portland Cement Concrete: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Backfill material shall be thoroughly compacted under the pipe haunches and then compacted in layers not exceeding 8 inches (200 mm) compacted thickness. With approval of the engineer, layer thickness may be increased to 12 inches (300 mm) with verification of satisfactory installation and performance. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer. The contractor shall control placement operations so as not to damage protective coatings on metal pipes. The contractor shall repair damaged coatings at no additional pay.

(2) Density Requirements: Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and in-place density determined in accordance with DOTD TR 401.

701.09 INSPECTION OF PIPES. After completion of embankment and prior to roadway surfacing, the engineer shall inspect pipes for proper alignment and integrity of joints. Any misaligned pipe or defective joints shall be corrected by the contractor at no direct pay.

(a) Plastic Pipe: Installed plastic pipe shall be tested to ensure that vertical deflections do not exceed 5.0 percent. Maximum allowable deflections shall be governed by the mandrel requirements stated herein.

Deflection tests shall be performed no sooner than 30 calendar days after installation and compaction of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

For pipe 36 inches (900 mm) and less in diameter, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. The mandrel shall be approved by the engineer prior to use. Use of an unapproved mandrel or a mandrel altered or modified after approval will invalidate the test. If the mandrel fails to pass, the pipe is overdeflected.

Unless otherwise permitted, overdeflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed and replaced with new pipe. Any pipe subjected to any method or

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process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be removed and replaced with new pipe.

The mandrel shall be a rigid, nonadjustable, odd-numbered legged (minimum 9 legs) mandrel having a length not less than its nominal diameter or 24 inches (600 mm), whichever is less. The minimum diameter at any point shall be 5.0 percent less than the base inside diameter of the pipe being tested. The mandrel shall be fabricated of steel, aluminum or other approved material fitted with pulling rings at each end. The nominal pipe size and outside diameter of the mandrel shall be stamped or engraved on some segment other than a runner. A suitable carrying case shall be furnished.

For pipe larger than 36 inches (900 mm) in diameter, deflection shall be determined by a method approved by the engineer. If a mandrel is selected, the minimum diameter, length, and other requirements shall conform to the above requirements.

Mandrel testing shall be conducted by the contractor in the presence of the engineer. Mandrel testing shall be at no direct pay.

(b) Metal Pipe: If the inside diameter of metal pipe or rise dimension of metal pipe arch deflects more than 5.0 percent from original dimensions, they shall be removed and reinstalled, unless they do not rebound or are damaged. Pipe or pipe arch which are damaged or do not rebound shall be removed and replaced at no direct pay. Measurement of deflection will be made by the engineer away from rerolled ends.

701.10 CLEANING PIPES.

(a) Existing Pipes: Pipes designated to be cleaned shall be cleaned of soil, debris and other materials to the invert of the pipe. Designated pipes shall be cleaned by approved methods that will not damage the pipes. Any damage caused by the contractor's operations shall be satisfactorily repaired at no direct pay.

Removed soil, debris and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

(b) Contractor Installed Pipes: Prior to final acceptance, pipes shall be cleaned of all debris and soil to the invert of the pipe at no direct pay.

Removed soil, debris and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

701.11 STUBBING AND PLUGGING PIPES. When it is required that pipes be plugged, such plugs shall be constructed of Class R concrete complying with Section 901. Thickness of plug and method of construction shall be as directed.

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When new pipes are to be stubbed into new or existing pipes or other structures, the connection shall be made with approved mortar complying with Subsection 702.02.

701.12 MEASUREMENT. Pipe, both new and relaid, will be measured in linear feet (lin m) as follows unless stated otherwise.

(a) Pipe not confined by fixed structures will be measured by the number of joints at the nominal length of each joint.

(b) Pipe confined by fixed structures will be measured along the pipe between the termini of pipe in structure walls.

(c) Pipe confined by a fixed structure on one end and unconfined at the other end will be measured along the pipe from the terminus of pipe in the structure wall to the unconfined end of pipe.

(d) Fabricating of pipe tees, elbows and other fittings will be measured per each fitting. The length of pipe in such fittings will be included in the pay length measurement of pipes of which they form a part.

(e) Excavation required for installation of pipes will not be measured for payment, except as otherwise specified in Subsection 203.14.

(f) Furnishing and placing backfill material for pipes will not be measured for payment. Backfill material needed to complete backfill above natural ground and around pipes that extend above natural ground will be measured and payment will be made under applicable earthwork items. When specified, flowable fill will be measured and paid for in accordance with Section 710.

(g) Plugging and stubbing of pipes will not be measured for payment.

(h) Cleaning existing pipes will be measured by the length of pipe cleaned and accepted.

(i) Concrete collars will be measured per each.

701.13 PAYMENT.

(a) Payment for pipe will be made at the contract unit price per linear foot (lin m) of the types and sizes specified.

When plastic pipe is specified on the plans or elected to be used by the contractor, payment will be made at the contract unit price per linear foot (lin m) of the types and sizes specified in accordance with the payment schedule of Table 701-1.

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Table 701-1
Payment Schedule for Plastic Pipe

Percent Payment	Stage of Completeness
75	After placement and backfill has been completed
25	After the pipe has met vertical deflection requirements in accordance with Subsection 701.09(a)

(b) Payment for fabricating pipe tees, elbows and other fittings will be made at the contract unit price per each fitting.

(c) When unstable conditions are encountered, the additional excavation will not be measured for payment; however, the additional materials furnished and placed for the pipe foundation will be measured and paid for as follows:

(1) Granular Materials: Payment will be made under the embankment item. The net section volume of the materials will be multiplied by 3 to determine the pay volume. When the contract does not include a pay item for embankment, payment will be made in accordance with Subsection 104.02.

(2) Bedding Material: Measurement and payment will be made in accordance with Section 726. When the contract does not include a pay item for bedding material, payment will be made in accordance with Subsection 104.02.

(d) Payment for cleaning existing pipes will be made at the contract unit price per linear foot (lin m).

(e) Payment for concrete collars will be made at the contract unit price per each.

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701.13

Payment will be made under:

Item No.	Pay Item	Pay Unit
701-01	Cross Drain Pipe (Size & Type)	Linear Foot (Lin m)
701-02	Cross Drain Pipe Arch (Size & Type)	Linear Foot (Lin m)
701-03	Storm Drain Pipe (Size & Type)	Linear Foot (Lin m)
701-04	Storm Drain Pipe Arch (Size & Type)	Linear Foot (Lin m)
701-05	Side Drain Pipe (Size)	Linear Foot (Lin m)
701-06	Side Drain Pipe Arch (Size)	Linear Foot (Lin m)
701-07	Yard Drain Pipe (Size)	Linear Foot (Lin m)
701-08	Relaying Pipe	Linear Foot (Lin m)
701-09	Fabricating Pipe Fittings	Each
701-10	Reinforced Concrete Pipe (Extension)	Linear Foot (Lin m)
701-11	Reinforced Concrete Pipe Arch (Extension)	Linear Foot (Lin m)
701-12	Corrugated Metal Pipe (Extension)	Linear Foot (Lin m)
701-13	Corrugated Metal Pipe Arch (Extension)	Linear Foot (Lin m)
701-14	Cleaning Existing Pipes	Linear Foot (Lin m)
701-15	Concrete Collar	Each
701-16	Plastic Pipe (Extension)	Linear Foot (Lin m)

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Section 710
Flowable Fill

710.01 DESCRIPTION. This work consists of furnishing, placing, and consolidating a controlled low strength flowable fill as an alternative to compacted soil. Applications for this material include, but are not limited to, general backfilling of drainage structures, entrenchments across pavements, encasements, beddings, void filling and other uses as shown on the plans or as approved by the engineer. The flowable fill shall be a cementitious mixture of portland cement, fly ash (depending on application and mix design), fine aggregate, water, entrained air, and appropriate admixtures for the particular application.

710.02 MATERIALS. Materials shall comply with the following Sections and Subsections.

Portland Cement	1001.01
Fine Aggregate	1003.02
Admixtures	1011.02
Water	1018.01
Fly Ash	1018.15

Flowable fill shall be designed and proportioned in accordance with Table 710-1. Trial batching will be required for excavatable and non-excavatable mixes to ensure appropriate job mix consistency and adherence to Table 710-1 properties.

Table 710-1
Flowable Fill Mix Design[1]

Material	Excavatable	Non-Excavatable
Portland Cement	75-100 lb/cu yd (45-60 kg/cu m)	75-150 lb/cu yd (45-90 kg/cu m)
Fly Ash	0-150 lb/cu yd (0-90 kg/cu m)	150-600 lb/cu yd (90-355 kg/cu m)
Water[2]	-	-
Air[3]	10-35%	5-20%
Concrete Sand	Proportioned to yield 1 cu yd (1 cu m)	Proportioned to yield 1 cu yd (1 cu m)
Unit Weight (wet)[3]	90-110 lb/cu ft (1440-1760 kg/cu m)	100-125 lb/cu ft (1600-2000 kg/cu m)
28-Day Compressive Strength[3]	Maximum 100 psi (0.7 MPa)	Minimum 125 psi (0.9 MPa)

[1]Mix designs shall yield 1.0 cubic yard (1.0 cu m) absolute volume.
[2]Mix designs shall produce a consistency that will result in a flowable self-leveling product at the time of placement and conform to the requirements of Subsection 710.02.
[3]The requirements for percent air, compressive strength and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements.

710.03 CONSTRUCTION REQUIREMENTS. Before placement, temporary enddams or soil berms shall be provided as directed by the engineer to confine the flowable fill. Flowable fill shall be placed to the lines and grades shown on the plans or as directed. Where flotation or misalignment may occur due to hydrostatic pressure, the contractor shall assure correct alignment and placement of the encased structure by using straps, soil anchors, or other approved means of restraint. Flowable fill shall be protected from freezing for 36 hours after placement. Flowable fill shall be placed by chute, pumping or other methods approved by the engineer. Due to flowable fill's liquid condition, hydrostatic pressure on adjacent structures shall be taken into account on deep fills where multiple lifts may be required. While in a liquid state, flowable fill in deep excavations is in a quick condition and shall be protected until hardening occurs. Flowable fill will not require field sampling or testing other than the approved trial batch mix design, unless otherwise directed by the project engineer.

710.04 MEASUREMENT. Flowable fill will be measured by the cubic yard (cu m) by batch tickets as adjusted by the project engineer.

710.05 PAYMENT. Payment for flowable fill will be made at the contract unit price per cubic yard (cu m).

Payment will be made under:

Item No.	Pay Item	Pay Unit
710-01	Flowable Fill	Cubic Yard (Cu m)

Section 713
Temporary Traffic Control

713.01 DESCRIPTION. This work consists of furnishing, installing, maintaining, and removing temporary construction barricades, precast concrete barriers, lights, signals, pavement markings and signs; providing flaggers; and complying with all other requirements regarding the protection of the work, workers and safety of the public. Unless otherwise noted in the plans or special provisions this work also includes traffic control management in compliance with the contract documents and the Manual on Uniform Traffic Control Devices (MUTCD), including the installation, inspection, maintenance, and removal of all traffic control devices on the project. Signs, barricades, barriers, channelizing devices, pavement markings, etc., shall comply with plan details, the MUTCD and these specifications.

Signs, barricades, barriers, channelizing devices, pavement markings and arrangements thereof, as shown on the plans, are minimum requirements. Appropriate signs for special conditions shall be furnished and installed as directed. Requirements for proper signs, barricades, barriers, channelizing devices, or other safety precautions promulgated by the contractor's insurers are not negated by these specifications. These specifications shall not be construed to relieve the contractor of responsibilities for the safety of the public, for liability in connection therewith, or compliance with State and local laws or ordinances.

The contractor shall assign one or more authorized Traffic Control Supervisors (TCS) to provide traffic control management for the project. If more than one TCS is assigned, then a weekly schedule identifying who will be in charge of providing traffic control management on a daily basis shall be submitted to the engineer. The TCS shall have a set of all contract documents relating to traffic control or traffic staging and a current copy of the MUTCD and a current copy of Louisiana Work Zone Traffic Control Details readily available at all times.

If the contractor utilizes a subcontractor to provide traffic control management, the subcontractor's TCS shall meet all the requirements set forth herein.

The contractor may assign one or more Traffic Control Technicians (TCT) to assist the TCS in inspection and maintenance of Traffic Control Devices.

713.02 MATERIALS. Materials for temporary signs, barricades, barriers and related devices shall comply with the following Sections and Subsections:

Portland Cement Concrete	901
Reinforcing Steel	1009
Backing Material	1015.04(b)
Reflective Sheeting	1015.05
Temporary Pavement Markings	1015.08
Raised Pavement Markers & Adhesive	1015.09
Thermoplastic Pavement Markings	1015.10
Traffic Paint	1015.12
Barricade Warning Lights	1018.12

(a) Temporary Pavement Markings: Temporary pavement markings shall be a minimum of 4 inches (100 mm) wide.

(b) Reflective Sheeting: Reflective sheeting requirements for temporary signs, barricades, channelizing devices, drums and cones shall comply with the following:

(1) Temporary Signs and Barricades: On the mainline of freeways and expressways, the initial advanced warning construction sign shall be fabricated using ASTM D 4956 Type X (Fluorescent Orange) reflective sheeting. Reflective sheeting for all other temporary signs and barricades shall comply with the requirements of ASTM D 4956, Type III.

(2) Vertical Panels: Reflective sheeting for vertical panels used to channelize or divide traffic shall meet the requirements of ASTM D 4956, Type III.

(3) Drums: Reflective sheeting for drums shall be a minimum of 6 inches (150 mm) wide and shall meet the requirements of ASTM D 4956, Type III, and the Supplementary Requirement S2 for Reboundable Sheeting as specified in Subsection 1015.05.

(4) Cone Collars: Reflective sheeting for traffic cone collars shall meet the requirements of ASTM D 4956, Type VI.

713.03 FABRICATION. Fabrication of temporary signs, barricades and related devices shall conform to Subsection 729.04. Fabrication of precast concrete barriers shall conform to Section 805.

713.04 TEMPORARY SIGNS AND BARRICADES.

(a) General: Temporary signs, barricades and related devices will be required when the contractor's work is in progress on portions of the work covered by the Notice to Proceed or when operations are suspended. During such times that temporary signs, barricades and related devices are not in place, appropriate existing regulatory signs shall be maintained by the contractor.

Construction work shall not begin until signs, barricades and other traffic control devices have been erected and approved.

When signs to be furnished and erected by the contractor are in place and approved, the contractor's Traffic Control Supervisor (TCS) shall remove or cover any standard signs that are in conflict with temporary signs.

When placing signs, the contractor shall coordinate with the engineer in removing Departmental signs, so that appropriate signs are in place at all times.

Signing shall remain in place and be maintained by the contractor, supplemented by additional signs as required, throughout the period of work. When previously used signs are to be erected on a project, the engineer will inspect and approve these signs before erection. The engineer will require any sign with reduced reflectivity or excessive color fading to be removed from the work zone. In case of a dispute over a rejected used sign, the Department at its discretion, may take such measurements or review reflectivity and color data obtained by the contractor to determine if the sign meets minimum standards for new materials. Signs that do not meet the minimum standards for new materials shall be replaced by the contractor at no direct pay.

Rejected signs will be marked "NOT FOR USE ON STATE PROJECTS" on the back of the sign.

Signs placed by the contractor shall be removed according to the Traffic Control Plan. It will be the responsibility of the Department to see that all permanent highway signs are in place upon completion and acceptance of the project.

On projects where the surface course is constructed with asphaltic concrete or portland cement concrete, permanent striping and raised pavement markers (when required) shall be completed prior to removal of barricades.

Signs, barricades and related devices furnished and placed by the contractor shall, upon removal, remain the contractor's property.

(b) Advance Warning Area: When specified, advance warning arrow panels for temporary traffic control shall be provided at locations shown on the plans or as directed. Panels shall be one of the specified types

complying with the Department's MUTCD. If no type is specified, Type C panels shall be furnished.

(c) Construction Zone: In areas of the construction zone all traffic control devices used shall be in accordance with Temporary Traffic Control Standard Detail TC-00.

713.05 TEMPORARY PRECAST CONCRETE BARRIERS. Barrier units will be furnished by the contractor unless specified otherwise. Each barrier unit shall be 15-feet (4.6 m) in length.

When the barrier units are furnished by the Department the units will be furnished at no cost to the contractor. The contractor shall load the barrier units at the location specified, deliver the units to the construction site and place them as required.

The contractor shall relocate barrier units as required during construction.

Connecting pins and plastic reflectors shall be furnished by the contractor at no additional cost to the Department. Reflectors shall have 7.0 square inches (4,500 sq mm) minimum reflective area, and be installed a maximum of 15 feet (4.6 m) apart (each side) in accordance with the manufacturer's recommendations. Damaged pins or reflectors shall be replaced as directed by the engineer.

After completion of the work, barrier units shall become the property of the Department and shall be removed and transported by the contractor to the location specified and unloaded as directed. All costs of loading, transporting and unloading the barrier units shall be included in the price bid on this item.

Barrier units damaged shall be satisfactorily repaired or replaced at no direct pay.

713.06 PAVEMENT MARKINGS. Color, width and type of temporary pavement markings shall be in accordance with Table 713-1 and the MUTCD. Temporary pavement markings shall be in place at the end of each day's operation.

Temporary striping tape shall be applied by approved methods to the satisfaction of the engineer. Thermoplastic Pavement Markings shall be applied in accordance with Subsection 732.03. Painted Traffic Striping shall be applied in accordance with Section 737.

Table 713-1
Temporary Pavement Markings[1,2]

		Two-lane Highways	Undivided Multilane Highways	Divided Multilane Highways
SHORT TERM	ADT<1500; or ADT>1500 and time<3 days	Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers; with "Do Not Pass" and "Pass With Care" signs as required		
	ADT>1500; Time>3 days and<2 weeks	Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers with no passing zone markings		
	All ADT's with time <2 weeks		Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers; double yellow centerline	Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers
	All ADT's with time >2 weeks	Standard lane lines, no-passing zone markings, legends and symbols and when pavement width is 22 feet (6.7 m) or greater, edge lines	Standard lane lines, centerlines, edge lines, and legends and symbols	Standard lane lines, centerlines, edge lines, and legends and symbols.

[1]No-passing zones shall be delineated as indicated whenever a project is open to traffic.
[2]On all Asphaltic Surface Treatments that are open to traffic and used as a final wearing course or as an interlayer, temporary pavement markings (tabs) on 20-foot (6 m) centers shall be used, in lieu of the 4-foot (1.2 m) tape, on 40-foot (12 m) centers.

(a) Short-term Pavement Markings: Short-term pavement markings will be required on any pavement surface under traffic.

Centerlines on two-lane highways and lane lines on multilane highways shall be temporary striping tape a minimum of 4 feet (1.2 m) long on a maximum of 40-foot (12 m) centers. When short-term pavement markings require no-passing zone markings or double yellow centerlines on undivided multilane highways, they shall be any of the temporary pavement markings listed in Subsection 713.02.

Removal of short-term pavement markings will only be required on the final surface.

(b) Long-term Pavement Markings: Long-term pavement markings will be required on any surface which is not covered by an additional surface

in 2 weeks or less. Long-term pavement markings shall include, but are not limited to, standard lane and centerline markings (i.e., 10-foot (3 m) stripes on a maximum of 40-foot (12 m) centers), edgelines, no passing zone markings on 2-lane highways, stop bars, and legend and symbol markings as shown on the permanent pavement marking details. Layout work for exact location of markings will only be required on the final surface.

These markings shall consist of any of the pavement markings listed in Subsection 713.02.

Long-term markings do not include the installation of raised pavement markings.

(c) Final Surface: On the final surface (portland cement concrete pavement or asphaltic concrete pavement), temporary markings shall be placed with sufficient accuracy to avoid conflict with permanent striping where possible. Temporary pavement markings on the final surface shall be any of the pavement markings listed in Subsection 713.02.

Placing permanent markings over traffic paint will be acceptable on final surfaces provided the temporary markings have been placed in the final configuration (proper final layout) and the painted lines are not flaking or showing signs of deterioration.

The removal of temporary pavement markings, if required, shall be in accordance with the requirements for the type of permanent marking being used. There shall be no objectionable staining of pavement surface as a result of the removal procedure.

(d) Temporary Reflectorized Raised Pavement Markings: When required, temporary reflectorized raised pavement markings shall be installed in accordance with Section 731.

(e) Pavement Markings for Asphaltic Surface Treatment: The type of markings shall be in accordance with Table 713-1. Short-term temporary pavement markings shall be in place at the end of each day's operation. Long-term temporary pavement markings shall be in place as soon as practical after expiration of the 4 day maintenance period following the asphaltic surface treatment operation. On the final wearing course, permanent markings shall be placed two weeks following completion of the long-term temporary pavement markings.

When used on the final wearing course, painted traffic striping shall be in accordance with Section 737.

Centerlines on two-lane highways and lane lines on multilane highways shall be temporary raised markers in accordance with Subsection 1015.08(c). "No-passing zone" markings shall be any of the temporary pavement markings listed in Subsection 713.02.

The temporary raised pavement markers shall be installed in accordance with the manufacturers' recommendations or as directed by the engineer. The temporary raised markers shall be flexible reflective tabs placed at 20-foot (6 m) intervals on the centerline of the roadway. The markers shall be installed so that the reflective faces of the markers are perpendicular to a line parallel to the roadway centerline.

If directed by the engineer, the temporary raised pavement markers shall be removed after permanent striping has been accomplished. Damage to the pavement surface shall be repaired at no direct pay.

713.07 PORTABLE WORK ZONE TRAFFIC CONTROL DEVICES.

All Category I, II, and III portable work zone traffic control devices, as described below, shall be crashworthy as determined by evaluations through the National Cooperative Highway Research Program (NCHRP) 350 for Test Level 3 (TL-3).

(a) Category I Devices: Category I devices are low-mass, single-piece traffic cones, tubular markers, single-piece drums and flexible delineators and are, by definition, considered crashworthy devices meeting NCHRP Report 350 TL-3 criteria. Drum and light combinations with Type A or C warning lights and fastener hardware consisting of vandal resistant 1/2 inch (13 mm) diameter cadmium plated steel bolts and nuts used with 1 1/2 inch (38 mm) diameter by 3/4 inch (19 mm) cup washers are included as Category I devices. In lieu of testing for crashworthiness, acceptance of Category I devices for compliance with NCHRP 350 will be allowed based on self-certification by the supplier. The supplier shall certify that the product is crashworthy in accordance with the evaluation criteria of NCHRP 350. This certification may be a one-page affidavit signed by the supplier, with supporting documentation kept on file to be furnished if requested.

(b) Category II Devices: Category II devices include other low mass traffic control devices such as portable barricades either with or without lights and or signs, portable sign stands, portable vertical panel assemblies, and drums with lights not meeting the drum and light combination requirements for Category I. Individual crash testing is required for Category II devices. FHWA letters of approval shall serve as verification that these devices comply with the crash testing requirements of NCHRP Report 350 TL-3. The contractor shall provide the engineer a listing of all the Category II devices to be used on the project prior to installation including a reference to the FHWA Work Zone letter number for each device. The contractor shall also certify that each device has been crash tested and meets the NCHRP 350 requirements.

(c) Category III Devices: Category III devices include massive devices such as concrete barriers, water filled barriers and portable attenuators. Individual crash testing is required for Category III devices. FHWA letters of approval shall serve as verification that these devices comply with the crash testing requirements of NCHRP Report 350 TL-3. The contractor shall provide the engineer a listing of all the Category III devices to be used on the project prior to installation including a reference to the FHWA Work Zone letter number for each device. The contractor shall also certify that each device has been crash tested and meets the NCHRP 350 requirements.

713.08 TRAFFIC CONTROL MANAGEMENT.

(a) Authorization: Prior to commencing work requiring traffic control management, the contractor shall submit to the engineer proof of the Traffic Control Supervisor's (TCS) and Traffic Control Technician's (TCT) current authorizations.

The Department will accept the TCS authorization of other approved agencies or firms only if all of the following minimum TCS requirements are met:

(1) Successful completion of a work zone traffic control supervisor course approved by the Department.

(2) Passing a written examination on the work zone traffic control supervisor course.

(3) A minimum of one year full-time field experience, verified by the agency or firm, in work zone traffic control. This experience may be verified by the Department at its discretion.

The Department will accept the TCT authorization of other approved agencies or firms only if all of the following minimum requirements are met.

(1) Successful completion of a work zone traffic control technician course approved by the Department.

(2) Passing a written examination on the work zone traffic control technician course.

(b) Traffic Control Supervisor (TCS) Duties: The TCS's responsibility shall be traffic control management, and the TCS shall be available to the engineer to address traffic control management issues as needed. The following is a listing of the TCS's primary duties:

(1) The TCS shall personally provide traffic control management and supervision services at the project site. The TCS may have other assigned duties, but shall be readily available at all times to perform TCS duties as required in the contract. A minimum of one TCT shall be required on site

during working hours.

(2) The TCS shall be responsible for observing and evaluating both the day and night time performance of all traffic control devices installed on the project, in accordance with the Traffic Control Plan (TCP), to ensure that the devices are performing effectively as planned for both safety and traffic operations. This shall be done upon the initial installation of the devices and when any modifications and/or changes are made, in addition to the inspection of traffic control required in Heading (e).

(3) The TCS shall be responsible for revisions requested by the contractor to the traffic control plan established in the contract and shall submit the new traffic control plan in accordance with Heading (c).

(4) The TCS shall be responsible for the training of flagging personnel. This training will ensure that all flagging done on the project is in compliance with the MUTCD Part VI and Louisiana Work Zone Traffic Control Details.

(5) The TCS shall coordinate all traffic control operations for the duration of the contract, including those of subcontractors, utility companies, and suppliers, to ensure that all traffic control is in place and fully operational prior to the commencement of any work. The Department recognizes that the contractor does not have direct control over the traffic control operations of the utility companies. The coordination provided by the TCS when dealing with utility companies is specifically for the purpose of coordinating concurrent utility traffic control with any other construction traffic control to avoid conflicts.

(6) The TCS shall coordinate, in writing, all project activities with the appropriate law enforcement, fire control agencies, and other appropriate public agencies as determined at the pre-construction conference by the engineer. The TCS shall also invite the above agencies to the pre-construction conference.

(7) The TCS shall prepare and submit statements concerning road closures, delays, and other project activities to the news media on a weekly basis or more often as needed. News releases shall be submitted to the engineer for review and approval prior to the contractor's submittal to the news media.

(8) The TCS shall be responsible for notifying the engineer, or designee, immediately of all vehicular accidents and/or incidents related to the project traffic control. The time and date of notification shall be documented in the traffic control diary. The TCS shall also monitor and document queues that occur as necessary.

(9) The TCS assigned to the project shall attend the pre-construction

conference and all project meetings.

(10) The TCS shall be responsible for the maintenance, cleanliness, replacement and removal of traffic control devices of the existing traffic control plan during working and non-working hours.

(c) Traffic Control Plan Revisions: Requests for revision in the traffic control plan must be made in writing to the engineer a minimum of 14 calendar days in advance of the needed revision. If the requested revision falls within the scope of the existing contract drawings, the engineer may approve the revision. If the engineer determines that the requested revision is outside the scope of the contract drawings, the contractor will be required to submit a change order. The change order drawings shall conform to the following:

(1) Letter size original contract drawings --The change order drawings shall be submitted on high quality white 8 1/2 x 11 inch letter size paper. The drawings may be hand drafted or computer drafted and arranged in landscape format on the page. The text and drawings must be legible after reproduction on standard reproduction equipment. Left, bottom and right hand margins shall be at least 1/2 inch and the top margin shall be 1 inch.

(2) Full size original contract drawings -- The change order drawings shall be submitted on high-quality, 4-mil, double-matte film using a plotting or reproduction process that fuses the graphics to ensure durability. Repeated handling and friction due to stacking of plans shall not smear, flake or rub off the graphics. Improper plotter settings and plotter wear may cause inconsistent durability of the drawings. The contractor shall test samples of the submitted drawings for durability. Advance samples of matte films may be submitted for approval; however, the contract plans will be tested separately. Failures will result in rejection of the submittal. Drawing sizes shall be in accordance with Subsection 801.03(a).

Lettering on change order drawings shall be of adequate size to facilitate a 50 percent reduction of plans. Additions or changes shall be made with a permanent type of waterproof ink made for this purpose. If revised cross sections are required, the cross-sections shall be plotted on standard plate cross-section sheets. The ground line, centerline elevation, and station numbers, as a minimum, shall be drawn in ink; the remaining information may be in pencil.

Regardless of size, all change order drawings and documents required shall be identified with the DOTD project title and project number. All plans and calculations shall be signed and sealed by a professional civil engineer currently registered to practice in Louisiana.

All plans submitted by the contractor shall conform to these specifications

and standards. The DOTD Chief Engineer may reject any plans not conforming to these standards.

Revisions to the TCP that are determined to be outside the scope of the original contract drawings must be approved by the DOTD District Traffic Engineering Division prior to implementation of the requested revision. In some cases on high traffic routes or high priority projects, the revisions must be approved by the HQ Traffic Operations Engineer.

(d) Traffic Control Diary: The TCS shall maintain a project traffic control diary in a bound book. The contractor shall obtain a sufficient number of the diaries from the Louisiana Associated General Contractors (LAGC). The TCS shall keep the traffic control diary current on a daily basis, and shall sign each daily entry. Entries shall be made in ink in a standard format furnished by the engineer, and there shall be no erasures or white-outs. Incorrect entries shall be struck out and then replaced with the correct entry. Photographs and videotapes may be used to supplement the written text.

The traffic control diary shall be available at all times for inspection by the engineer; and the diary shall be reviewed with the engineer on a weekly basis and a copy submitted to the engineer on a monthly basis. Failure to submit the monthly copy of the diary to the engineer shall result in the withholding of the next partial payment until the past due copies of the diary are submitted. The traffic control diary shall become the property of the Department at the completion of the project.

(e) Inspection of Traffic Control: The TCS shall be responsible for the inspection of all traffic control devices every calendar day that traffic control devices are in use. This inspection may be delegated to the TCT. The "Quality Guidelines for Work Zone Traffic Control Devices" standard by the American Traffic Safety Services Association (ATSSA) shall be used to evaluate the condition of the traffic control devices to determine if acceptable for use. The TCS shall provide for the immediate repair, cleaning, or replacement of any traffic control devices not functioning as required to ensure the safety of the motorist and construction personnel and/or not meeting the ATSSA standard.

Inspection of the traffic control devices shall be conducted by the TCS at the beginning and end of each workday, and as scheduled or directed by the engineer during the workday. The traffic control devices shall be inspected by the TCS on weekends, holidays, or other non-work days at least once per day. Traffic control devices shall be inspected by the TCS at least once a week during nighttime periods and the same night after any modifications or changes have been made in the traffic control devices.

(f) Failure to Comply: The engineer may suspend all or part of the

contractor's operation(s) for failure to comply with the approved "Traffic Control Plan" or failure to correct unsafe traffic conditions within a reasonable period of time after such notification is given to the contractor in writing.

In the event that the contractor does not take appropriate action to bring the deficient traffic control into compliance with the approved traffic control plan or to correct the unsafe traffic conditions, the Department may proceed with the corrective action using its own forces, and such costs will be deducted from payments owed to the contractor.

If the contractor's operations are suspended, the normal assessment of contract time will not cease for the period required to correct these unsafe conditions and traffic control deficiencies. The contractor shall not be relieved of the responsibility to provide traffic control safety to the traveling public when a project is under full or partial project suspension. When a project is under suspension due to the contractor's failure to comply with this section, or when the contract is under stipulated damages, the contractor shall continue to provide traffic control management and no additional measurement or payment will be made. If suspensions or partial suspensions are requested by the contractor, the additional traffic control management costs will be at the contractor's expense.

(g) Engineer Modifications: The provisions included in the plans and specifications for handling and controlling traffic during construction may be changed by the engineer, with the approval of the DOTD District Traffic Operations Engineer, due to actual field conditions encountered. Such changes will be made by written instruction to the contractor and shall be considered an amendment to the plans and specifications as of the date of change.

713.09 MEASUREMENT.

(a) Temporary Signs and Barricades: When the contract does not include a pay item for "Temporary Signs and Barricades," the providing of temporary construction signs, barricades and related devices will not be measured for payment. When a pay item for "Temporary Signs and Barricades" is included in the contract, the furnishing, erecting, maintaining and subsequent removing of temporary construction signs, barricades and related devices will be measured on a lump sum basis.

Advance warning arrow panels will not be measured for separate payment, but will be included in the contract lump sum price for Temporary Signs and Barricades.

(b) Temporary Pavement Markings: When the contract does not include an item for "Temporary Pavement Markings," provision of these markings will not be measured for payment.

When the contract includes an item for "Temporary Pavement Markings", these markings acceptably furnished, placed, maintained and subsequently removed will be measured by the linear foot (lin m), or by the mile (km) as specified.

When measurement is made by the linear foot (lin m) of striping, measurement will be made for the material placed. Gaps will be excluded.

When measurement is made by the mile (km) of single strip per roadway per application, no deduction will be made for the standard design gaps in broken line striping; however, deductions will be made for the length of other gaps or omitted sections.

Temporary pavement legends and symbols will be measured per each legend or symbol.

Temporary reflectorized raised pavement markers will be measured by counting the number of markers furnished, placed and accepted. Removal of raised pavement markers will not be measured for payment.

(c) Temporary Precast Concrete Barriers: When the contract does not include a pay item for Temporary Precast Concrete Barriers, the provision of these barriers will not be measured for payment. When the contract includes a pay item for Temporary Precast Concrete Barriers, the barriers will be measured per each unit installed, which includes construction, delivery, placement and removal from the job site one time. Further movements of barriers for subsequent construction phases will be measured per movement of each barrier.

(d) Traffic Control Management: Traffic control management will not be measured for payment.

713.10 PAYMENT. Payment for temporary construction signs, barricades and related devices will be at the contract lump sum price in accordance with the payment schedule of Table 713-2.

Table 713-2
Payment Schedule
Temporary Signs, Barricades and Related Devices

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Temporary Signs and Barricades
Initial Erection	40
25	60
50	80
75	95
100	100

Payment for temporary pavement markings will be made at the respective contract unit prices. Payment for temporary precast concrete barriers will be made at the contract unit price per each. The concrete in temporary precast barriers furnished by the contractor will be identified by lots and shall be subject to pay adjustments in accordance with Table 901-5 and Note 1 therein. Size, sampling, and testing of each concrete lot shall be in accordance with the Materials Sampling Manual.

Payment for movement of temporary concrete barriers will be made per movement of each barrier.

Payment will be made under:

Item No.	Pay Item	Pay Unit
713-01	Temporary Signs and Barricades	Lump Sum
713-02	Temporary Pavement Markings (__inch (__mm) Width)	Linear Foot (Lin m)
713-03	Temporary Pavement Markings (Broken Line)(__inch (__mm) Width) (__foot (__m) Length)	Mile (km)
713-04	Temporary Pavement Markings (Solid Line) (__inch (__mm) Width)	Mile (km)
713-05	Temporary Pavement Legends and Symbols (Type)	Each
713-06	Temporary Reflectorized Raised Pavement Markers	Each
713-07	Temporary Precast Concrete Barrier (Contractor Furnished)	Each
713-08	Temporary Precast Concrete Barrier (Department Furnished)	Each
713-09	Temporary Portable Barrier (Type)	Each
713-10	Temporary Precast Concrete Barrier Movement	Each

Section 720
Erosion Control Systems

720.01 DESCRIPTION. This work consists of furnishing and placing erosion control systems in accordance with plan requirements for use as soil retention blankets on slopes or as flexible channel liners in ditches.

720.02 MATERIALS.

(a) General: Erosion control systems shall comply with Subsection 1018.23. The manufacturer's installation plan and hardware (staples, stakes, etc.) are considered part of the system and shall be the same as that used during the evaluation for source approval.

The type of erosion control system to be used shall be shown on the plans. The contractor shall have the option of substituting a higher grade system for a lower grade system within the same application (slope protection or flexible channel liners) at no additional cost to the Department.

(b) Acceptance: Pretested lots of erosion control systems shall be accepted based on a Certificate of Delivery showing DOTD Lot Numbers and laboratory numbers representing the pretested material, including hardware. Erosion control systems that are not accompanied by a Certificate of Delivery shall be sampled in accordance with DOTD S 613 at the rate of 1/200 rolls for rolled type materials (or mats) or 1/200 bags for mulch systems per manufacture's lot. The sample size shall consist of not less than 3 square yards (sq m) of rolled (or mat) material or one 50 lb (20 kg) bag of mulch. Installation hardware, additives such as tackifiers, and any other component of the system not covered above shall be sampled at the rate of one item/type/size or one quart (L) per manufacturer's lot in accordance with DOTD S601. All samples shall be submitted to the Materials and Testing Section. A copy of the approved installation plan shall accompany each shipment to the project.

(c) Packaging: Materials shall be packaged in such a way as to maintain the quality of the product throughout handling. Each package shall be identified with the manufacturer's name, product name, and manufacturer's lot number. Each package that is represented by a Certificate of Delivery shall also be identified by the DOTD Lot Number corresponding to that shown on the Certificate of Delivery.

720.03 EQUIPMENT. Equipment necessary to satisfactorily perform the

work shall be furnished and maintained by the contractor. Equipment for hydraulically applying fiber mulch shall be equipped to eject the thoroughly wet mulch material at a uniform rate equal to the manufacturer's recommendations or as designated by the plans to provide the mulch coverage specified.

720.04 CONSTRUCTION REQUIREMENTS. Erosion control systems shall be installed in accordance with the approved installation plan, no later than 48 hours after completion of seeding or sodding operations. All staples shall be installed flush to the ground and shall penetrate all layers of overlapped or adjacent rows.

(a) Slope Protection: Slopes shall be constructed to the required grade, fertilized, and seeded prior to application of erosion control systems. At the time of coverage, the area to be covered shall be free of ruts, clods, stones, roots or other foreign matter that will prevent close contact of the blanket with the soil. Rolled products or mats with netting only on one side are to be placed with the netting exposed and the fibers in contact with the soil.

(b) Flexible Channel Liners: Channels shall be prepared in accordance with Heading (a). Flexible channel liners shall be placed beginning at the downstream end.

720.05 MAINTENANCE. The contractor shall maintain the areas on which erosion control systems have been placed until final acceptance of the project. This shall consist of the repair of damage by erosion, wind, fire or other cause. Such areas are to be repaired to reestablish the condition that existed prior to placing the erosion control systems and may include fertilizing, seeding, mulching or sodding as required at no direct pay.

720.06 MEASUREMENT. Erosion control systems, including hardware, will be measured by the square yard (sq m) of surface area covered.

720.07 PAYMENT. Payment for erosion control systems will be made at the contract unit price and includes all materials, labor, equipment and other incidentals necessary to complete the work. Required burial of ends and edges, overlaps and hardware will not be measured for payment.

Payment will be made under:

Item No.	Pay Item	Pay Unit
720-01	Erosion Control System (Type)	Square Yard (Sq m)

Section 726
Bedding Material

726.01 DESCRIPTION. This work consists of furnishing and placing aggregate bedding material on geotextile fabric for drainage structures.

726.02 MATERIALS. Materials shall comply with the following Subsections:

Plastic Soil Blanket	203.10
Bedding Material	1003.01 & 1003.08
Geotextile Fabric	1019.01

Bedding materials shall be properly proportioned and mixed prior to being placed in the foundation.

726.03 PLACEMENT OF BEDDING. Geotextile fabric shall be placed in accordance with plan details prior to placing bedding material. Care shall be taken to prevent damage to geotextile fabric during placement of bedding material. Materials shall be placed, shaped and uniformly compacted to the satisfaction of the engineer.

Adjacent rolls of fabric will be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches (450 mm) , including the ends of the rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of bedding materials placement. When rolls are sewn, the contractor shall join adjacent rolls by sewing with polyester, or kevlar thread. Field sewing shall employ the "J" seam or "Butterfly" seam with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified may be submitted to the Materials and Testing Section for approval. When the ground is covered with water or supersaturated soil, sewing of the fabric will be required.

Damaged fabric shall be either removed and replaced with new fabric or covered with a second layer of fabric extending 2 feet (0.6 m) in each direction from the damaged area.

Excavation below the established grade of the structure for placement of bedding material shall be used or disposed of in accordance with Section 203.

A plastic soil blanket in accordance with Subsection 203.10 shall be placed

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at structure ends when bedding material is exposed.

726.04 MEASUREMENT. Bedding material, including plastic soil material, completed and accepted, will be measured by the cubic yard (cu m) (net section). The length and width will be measured horizontally to the theoretical points established by the plans for bedding material. The depth will be as shown on the plans or established by the engineer.

Geotextile fabric will not be measured for payment.

Necessary excavation and disposal of excess excavated materials will not be measured for payment.

726.05 PAYMENT. Payment for bedding material will be made at the contract unit price under:

Item No.	Pay Item	Pay Unit
726-01	Bedding Material	Cubic Yard (Cu m)

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Section 729
Traffic Signs and Devices

729.01 DESCRIPTION. This work consists of furnishing and installing traffic signs, dead end road installations, markers and delineators, with accessories, posts and overhead spans of specified materials, sizes, shapes, weights and designs.

In general, the work and materials shall comply with the MUTCD as modified by these specifications or as shown on the plans.

Signs shall be fabricated in an approved plant.

The term "legend" shall mean border strip, letters, numerals and symbols which convey the message on signs.

729.02 MATERIALS. Materials shall be new stock conforming to the following:

(a) Sign and Marker Sheeting: Sheeting material for sign panels, delineators, barricades and other markers shall comply with Section 1015. All permanent signs shall meet the requirements of ASTM D 4956, Type III, except as follows:

Reflective sheeting for the permanent signs of Table 729-1 shall meet the requirements of ASTM D 4956, Type IX.

Table 729-1
Permanent Signs for Use With Type IX Reflective Sheeting

Sign	MUTCD Number
Stop	R1-1
Yield	R1-2
4-Way	R1-3
All Way	R1-4
Do Not Enter	R5-1
Wrong Way	R5-1a
Chevrons	W1-8
No Passing Zone Pennants	W14-3
Type 3 Object Marker	OM-3 (Right & Left)
Type 2 Object Marker	-------
Guardrail End Decals	-------

(b) Ferrous Metal: Ferrous metals shall comply with Subsection

1015.02(a). Reinforcing steel shall comply with Section 1009. Ferrous metal, except reinforcing steel, shall be galvanized in accordance with Section 811.

(c) Aluminum: Aluminum alloys for structural members shall comply with Subsection 1015.02(b). Aluminum sign panels shall comply with Subsection 1015.04(a).

(d) Fittings: Structural bolts, nuts, washers and miscellaneous hardware shall comply with Subsection 1015.02.

(e) Guard Rail: Guard rail materials for dead end road installations shall comply with Section 1010.

(f) Timber: Treated piling and timber for barricades in dead end road installations shall comply with Section 1014.

(g) Concrete: Concrete shall be Class M complying with Section 901.

(h) Flexible Sign Posts: Flexible posts for small signs, markers and delineators shall comply with Subsection 1015.03.

(i) Silk Screen Paste: Silk screen paste shall be as recommended by the sheeting manufacturer.

(j) U-Channel Posts: U-channel posts shall comply with Subsection 1015.02(a)(3).

729.03 GENERAL REQUIREMENTS.

(a) Sign Face Fabrication: Signs of Types A, B, D and E, overhead signs and sign face overlay panels shall be fabricated in accordance with the MUTCD, the "Standard Highway Signs" booklet, and the signing detail sheets of the plans.

The contractor shall furnish shop drawings of sign faces for Types D and E, overhead signs and sign overlay panels and for any non-standard sign faces of Types A and B not provided by the Department. Approval of shop drawings shall be obtained before sign face fabrication is begun.

(b) Sign Mountings Fabrication: The contractor shall have the option of furnishing either steel or aluminum sign supports for both post mountings and overhead mountings and either rigid steel or flexible posts for small signs, markers and delineators. Before beginning work, the contractor shall notify the engineer in writing of signing materials he proposes to furnish. The same signing materials shall be used throughout the project.

Fabrication of sign mountings shall conform to Section 807. The contractor shall furnish fabrication and erection drawings of all sign mountings in accordance with Subsection 801.03 with the exception of standard roadside installations. Fabrication and erection drawings will be approved only after approval of sign face shop drawings. Neither fabrication of sign mountings nor construction of sign footings will be allowed before

drawings are approved and distributed.

An approved damper is required for each aluminum truss. Dampers shall be installed during truss fabrication and shall remain in place.

Structure mounted delineator and milepost assemblies shall be installed in accordance with plan details.

Welding shall comply with Section 815.

(c) Material Sampling and Certification: Material sampling and certification for sign faces, sign mountings and U-channel posts shall be in accordance with the Materials Sampling Manual.

729.04 FABRICATION OF SIGN PANELS AND MARKERS.

(a) General: The completed product shall have a surface free of cracks, blisters, blemishes, and wrinkles.

Metal fabrication including shearing, cutting and punching of holes shall be completed prior to surface treatment of metal and application of sheeting. Metal panels shall be cut to size and shape and shall be free of buckles, warps, dents, cockles, burrs and defects resulting from fabrication. Surface of sign panels shall be flat.

Splice plates joining sign panels shall not extend behind horizontal sills. Flat aluminum panels shall be a nominal 0.080 inch (2 mm) thick. Extruded aluminum panels shall be 12 inches (300 mm) wide and have a nominal face thickness of 0.125 inches (3 mm).

(b) Surface Treatment: Surface treatment shall be as specified herein or in accordance with approved recommendations of the reflective sheeting manufacturer.

(1) Degreasing:

a. Vapor Degreasing: Panels shall be immersed in a saturated vapor of organic solvent. Trademark printing shall be removed with lacquer thinner or a controlled alkaline cleaning system.

b. Alkaline Degreasing: Panels shall be immersed in a tank containing alkaline solutions, controlled and titrated to the solution manufacturer's specifications. Immersion time shall depend upon amount of contaminants present and thickness of metal.

(2) Etching:

a. Acid Etch: The panels shall be etched in a 6 to 8 percent phosphoric acid solution at 100°F (38°C). The panels shall then be rinsed thoroughly with running cold water followed by hot water tank rinse.

b. Alkaline Etch: Etch precleaned aluminum surface in an alkaline etching material controlled by titration, using time, temperature and concentration specified by solution manufacturer. Rinse thoroughly. Remove

smut with an acidic, chromium compound solution specified by solution manufacturer and thoroughly rinse.

(3) Drying Panels: Panels shall be dried with a forced hot air drier. Panels shall be handled with clean canvas gloves or by other approved methods between cleaning and etching operations and sheeting application. Cleaned panels shall be protected from grease, oil or other contaminants prior to application of reflective sheeting.

(c) Sheeting Application: Application of reflective sheeting shall be in accordance with the approved written recommendations of the sheeting manufacturer. Sheeting shall be applied to sign faces in an orientation that will result in optimum retroreflectance, or as directed by the engineer.

Reflective sheeting shall be applied with no horizontal splices. Reflective sheeting applied directly to extruded panels shall have no more than two vertical splices per sign, with no more than one vertical splice per individual panel. When splices are used in this manner, only those that occur during, and as a part of , the manufacturing process will be allowed. Fabricated splices will not be allowed.

ASTM D 4956 Type IX reflective sheeting shall be applied with an orientation determined by the engineer to obtain the optimum entrance angle performance. Fabricated vertical splices in ASTM D 4956 Type IX reflective sheeting will be allowed only when the horizontal dimension of the sign face or attached shield is in excess of the maximum manufactured width of the sheeting. Fabricated vertical splices in ASTM D 4956 Type IX reflective sheeting will also be allowed when the specified orientation will create excessive sheeting waste.

Sign faces comprised of two or more pieces of reflective sheeting shall be carefully matched for color at the time of sign fabrication to provide uniform appearance and brilliance, both day and night. Alternate, successive width sections of either sheeting or panels shall be reversed and consecutive to ensure that corresponding edges of reflective sheeting lay adjacent on the finished sign. Reflective sheeting splices and sign edges shall be sealed in accordance with the manufacturer's recommendations. Legend shall be of the shape, size, dimension, and stroke specified in the MUTCD and sign face shop drawings.

Legend shall be applied by one of the following methods:

(1) Direct Applied: Legend shall be an adhesive coated reflective sheeting as specified in Subsection 1015.05. Legend shall be applied in such manner as to provide a wrinkle-free surface.

(2) Demountable: Legend shall be an adhesive coated reflective sheeting as specified in Subsection 1015.05, permanently adhered to a 0.032-

inch (0.8 mm) thick flat aluminum backing, except that route marker shields shall be 0.080-inch (2.0 mm) thick aluminum. Aluminum shall be treated in accordance with Heading (b). Legend shall be attached to sign face in such manner as to provide a smooth, flat surface. Sign fabrication rivets that prohibit such application shall be removed and replaced through legend, or legend may be raised by approved spacers. Legend shall show clean cut, uniform width of stroke and have essentially a plane surface.

(3) Screened: Legend shall be applied to sign faces by an approved screening process in accordance with the reflective sheeting manufacturer's recommendations. Screen pastes shall be compatible with reflective sheeting and shall not reduce reflectivity of sheeting less than the values shown in Subsection 1015.05(c). Completed screen surface shall be uniform in color, have sharp edges, be free of bubbles and blemishes, streaks or livered areas, and show good workmanship.

(4) Overlay Film: Legend shall be applied to the sign faces by an approved transparent electronic cuttable overlay film that is compatible with the reflective sheeting to which it is applied. Application shall be in accordance with the recommendations of the manufacturer(s) of both the film and the reflective sheeting. Areas covered by film shall have sharp edges, be free of bubbles and blemishes and show good workmanship. This material shall be in accordance with Subsection 1015.07(c). Direct or reversed application will be permitted.

(d) Screening Process: Screening of sign faces shall be in accordance with Subsection 1015.07(b). Screening shall be by direct or reverse silk screen methods accomplished in the manner specified by the sheeting manufacturer. Screening on sheeting may be accomplished either before or after application of sheeting to panels.

(e) Packaging: Before being packed, signs shall be allowed to stand for at least 12 hours after completion of screening. Signs shall be slipsheeted and packed in such manner as to ensure their arrival at their destination in an undamaged condition. Packaged signs shall not be permitted to become wet during storage or shipment.

729.05 CONSTRUCTION REQUIREMENTS. When removal of existing signs is required, the contractor's sign removal operations shall be coordinated as directed with new sign construction to provide for adequate signing to be in place at all times.

(a) Sign Location: Sign support locations will be as shown on the plans or as directed. Sign locations, after initial staking by the contractor, must be approved by the engineer. Sign locations which are obviously

improper because of topography, existing appurtenances or other conflicting conditions will be adjusted to the closest desirable location. The contractor shall then determine elevations for post length determinations at the established sign support location. The contractor shall be responsible for orientation, elevation, offset and leveling of signs.

(b) Sign Positioning:

(1) Overhead Signs: Signs shall be constructed so that the top edge of the sign face is tilted towards oncoming traffic 3 degrees (approximately 1:20) from vertical and at right angles to the road, unless otherwise directed.

(2) Road Edge Signs: Road edge signs shall be constructed with sign faces vertical. Sign faces located less than 30 feet (9 m) from the edge of travel lane shall be placed at a 93 degree angle from the center of the travel lane. Sign faces located 30 feet (9 m) or more from the edge of the travel lane shall be placed at an 87 degree angle from the center of the travel lane. Where the lanes divide or are on curves or grades, sign faces shall be oriented to be most effective both day and night and avoid specular reflection.

(3) Delineator, Object Marker and Milepost Assemblies: These assemblies shall be placed at least 24 inches (600 mm) beyond the outer edge of roadway shoulder, 24 inches (600 mm) beyond the face of curb, or in the line of guard rail.

(4) Vertical and Horizontal Clearances: Vertical and horizontal clearances shall be in accordance with the MUTCD and/or shall be as shown on the plans.

(c) Sign Overlay Panels: When specified, existing signs shall be completely overlaid with new sign panels placed over the existing sign face. No partially overlaid signs shall be allowed to remain exposed overnight. Only one overlay shall be placed on a sign. When an overlay is to be placed on an existing overlaid sign, the previous overlay shall be removed prior to placement of the new overlay. Overlay panels shall conform to Section 729.04. Raised legends shall be removed from the existing sign face prior to placing the overlay panel. The size of the overlay panel shall not exceed the size of existing sign panel by more than 3 inches (75 mm) on any side. Overlay panels shall be attached to the existing sign with rivets complying with Subsection 1015.02. Rivets shall be placed on 12-inch (300 mm) centers (maximum) along the perimeter of panel and at panel splices, and on 24-inch (600 mm) centers (maximum) both vertically and horizontally in interior portions of each panel. Rivets shall be centered horizontally on panels less than 24-inch (600 mm) wide. A 4 by 4-inch (100 mm by 100 mm) shim with a nominal 0.080-inch (2.0 mm) thick aluminum plate shall be placed between existing panel and overlay panel at interior rivet locations. Shims cut from

salvaged sign panels may be used. The existing sign panels shall be kept reasonably flat during installation of the overlay panels. Splice arrangement for overlay panels shall conform to the requirements for traffic sign blanks.

(d) Excavation and Backfill: The contractor shall perform excavation for sign installation to levels and dimensions shown on the plans, or as directed. Excavation and backfill shall be performed in accordance with Section 802.

(e) Footings: Foundation piles, concrete, reinforcing steel and anchor bolt assemblies shall comply with Sections 804, 805, 806 and 807.

Posts for ground mounted delineator, object marker and milepost assemblies may be driven; no footings will be required.

(f) Bolt Tensioning: Slip plates for breakaway sign posts shall be assembled in the shop with high strength bolts tightened at a minimum bolt tension in accordance with Subsection 807.21. After field installation, high strength bolts in the breakaway base connection shall be tightened to the specified minimum bolt tension. The bolt tension in both the slip plate connection and the breakaway base connection will be checked by the engineer. Bolt tensioning shall be corrected as required.

(g) Cleaning and Clearing: Prior to erection, sign faces shall be cleaned to allow adequate visibility of the sign. Any clearing or tree trimming required to provide for full sign visibility shall be in accordance with the plans or as directed. Trimming of trees of significant local interest shall be performed by a licensed arborist.

(h) U-Channel Posts: U-channel posts for ground mounted small signs, markers and delineators shall be driven vertically to a minimum depth of 3 feet (1 m) below natural ground using a suitable protective driving cap.

U-channel posts may be spliced where long lengths are required. The upper section shall overlap the lower section by at least 24 inches (600 mm). The bottom edge of the upper section of the splice shall be a minimum of 24 inches (600 mm) above the ground. The spliced sections shall be secured with at least four 5/16 inch (8 mm) diameter hex head bolts spaced equally along the splice.

Splicing of U-channel posts will not be allowed when break-away footings are required.

729.06 DEAD END ROAD INSTALLATIONS. Dead end road installations shall be of the specified type and located as shown on the plans. Timber barricade type installations shall be constructed in accordance with Section 812 and the following requirements. Timber piling shall be set in full depth holes and backfilled as directed or driven to required depth. Steel posts

for other type installations shall be driven with a suitable protective cap. Piles and posts shall be vertical. Guard rail shall be constructed in accordance with Section 704.

729.07 ACCEPTANCE OF SIGNS. After the installation of signs is complete, the engineer or an authorized representative shall perform a daytime and nighttime inspection of the signs, sign faces, mounts, installations, hardware and matters relating to the requirements of this section.

After this inspection the engineer and the Department's Sign Inspection Team shall inspect for color match and for conformance to applicable plans, standards and project specifications.

Color match, uniformity and spacing of legend, specular glare, and sign type and design will be inspected for conformance to plans and specifications. When specular reflection is apparent on any sign, its positioning shall be adjusted by the contractor to eliminate this condition. Signs shall be clean at the time of inspection. Reflective sheeting shall be free of cuts, scratches, breaks or other defects which might allow moisture to infiltrate and damage reflective cells. Nonstandard or otherwise unacceptable signs and traffic control devices shall be replaced or repaired as directed. The contractor will be required to correct damage that is discovered at the time of the sign inspection. When the damage was obviously caused by vandalism, the contractor will be paid for corrective work in accordance with Subsection 109.04.

In lieu of removing and replacing new sign faces that have been rejected, sign overlay panels complying with Subsection 729.05(c) may be used to correct the deficiencies at no direct pay.

729.08 MEASUREMENT.

(a) Sign Faces and Overlay Panels: Quantities for payment will be the design areas in square feet (sq m) of sign faces as specified on the plans and adjustments thereto. Design quantities will be adjusted if the engineer makes changes to adjust to field conditions, if plan errors are proven, or if design changes are made. Material used in blanks and backing incidental to the sign face will not be measured for payment. In determining the area of sign faces, no deductions are made for corner radii or mounting holes. The area of octagonal signs and Interstate shields is computed as the area of its smallest rectangle or square. The area of triangular signs is computed as the area of the triangle.

(b) Post Mountings: Post sign mountings, including breakaway supports, will be measured per each post.

(c) Overhead Mountings: Overhead sign mountings will be measured per each structure.

(d) Delineator, Object Marker and Milepost Assemblies: Delineator, object marker and milepost assemblies will be measured per each assembly.

(e) Dead End Road Installations: Dead end road installations will be measured per each installation.

(f) Footings: Concrete footings for overhead sign mountings will be measured per each footing. Footings and aprons for post sign mountings will not be measured for payment.

(g) U-Channel Posts: U-channel posts will be measured per each unit installed when not part of an assembly.

(h) Clearing or Tree Trimming: Any clearing or tree trimming required by this section which is not provided for elsewhere in the contract will be included in the contract unit price for signs.

729.09 PAYMENT.

(a) Sign Faces and Overlay Panels: Payment for sign faces and overlay panels will be made at the contract unit price per square foot (sq m), which includes furnishing, fabricating and constructing the signs and furnishing necessary attaching devices.

(b) Post Mountings: Payment for post sign mountings will be made at the contract unit price per each, which includes furnishing, fabricating and constructing the support complete, ready for affixing signs, and includes required excavation, concrete and reinforcement for footings and aprons, and the sign mounting. Payment for sign layout will be made in accordance with Section 740.

(c) Overhead Mountings: Payment for overhead sign mountings, including bridge fascia mountings, will be made at the contract unit price per each, which includes furnishing, fabricating and erecting the structure complete, ready for affixing signs, and the sign mounting.

(d) Delineator, Object Marker and Milepost Assemblies: Payment for delineator, object marker and milepost assemblies will be made at the contract unit prices per each, which includes posts.

(e) Dead End Road Installations: Payment for dead end road installations will be made at the contract unit price per each, which includes piling, posts, barricades, sign materials, reflectors, and any required guard rail.

(f) Footings: Payment for footings for overhead sign mountings will be made at the contract unit price per each, which includes excavation, piling, concrete, reinforcing steel, anchor bolt assemblies and backfill. The concrete

in footings will be identified by lots and shall be subject to pay adjustments in accordance with Table 901-6 and Note 1 therein. Size, sampling, and testing of each concrete lot shall be in accordance with the Materials Sampling Manual.

(g) U-Channel Posts: Payment for U-channel posts will be made at the contract unit price per each which shall include all labor, equipment, tools, materials, and incidentals necessary to complete the work, including splicing of posts, and when required removing and remounting of existing signs, and mounting of new signs.

Payment will be made under:

729.09

Item No.	Pay Item	Pay Unit
729-01	Sign (Type A)	Square Foot (Sq m)
729-02	Sign (Type B)	Square Foot (Sq m)
729-03	Sign (Type C)	Square Foot (Sq m)
729-04	Sign (Type D)	Square Foot (Sq m)
729-05	Sign (Type E)	Square Foot (Sq m)
729-06	Sign (Overhead Mounted)	Square Foot (Sq m)
729-07	Sign (Overlay Panel)	Square Foot (Sq m)
729-08	Mounting (_____Size Post)	Each
729-09	Mounting (Overhead Truss) (Ground Mounted)	Each
729-10	Mounting (Overhead Truss) (Structure Mounted)	Each
729-11	Mounting (Overhead Cantilever) (Ground Mounted)	Each
729-12	Mounting (Overhead Cantilever) (Structure Mounted)	Each
729-13	Mounting (Bridge Fascia Mounted)	Each
729-14	Delineator Assembly (Ground Mounted)	Each
729-15	Delineator Assembly (Structure Mounted)	Each
729-16	Object Marker Assembly	Each
729-17	Milepost Assembly (Ground Mounted)	Each
729-18	Milepost Assembly (Structure Mounted)	Each
729-19	Dead End Road Installations (Type)	Each
729-20	Footings for Overhead Mounting (Type)	Each
729-21	U-Channel Post	Each

Section 1003
Aggregates

1003.01 GENERAL. Aggregates shall be environmentally acceptable for the intended use and shall be from an approved source. For a source to be approved, each sample shall comply with the requirements specified below and in the appropriate subsection. In addition to the test methods given in each subsection, the following methods shall be used in testing aggregates.

Property	Test Method
Deleterious Materials	DOTD TR 119
Unit Weight	AASHTO T 19
Specific Gravity & Absorption of Fine Aggregate	AASHTO T 84
Specific Gravity and Absorption of Coarse Aggregate	AASHTO T 85
Polish Value	AASHTO T 278 and T 279
Amount of Material Finer than the No. 200 Sieve (75 μm)	DOTD TR 112
Sieve Analysis (Gradation)	DOTD TR 113
Liquid Limit and Plasticity Index	DOTD TR 428

(a) Source Approval:

(1) The soundness loss of recycled portland cement concrete and aggregates listed in QPL 2 shall not exceed 15 percent when subjected to 5 cycles of the magnesium sulfate soundness test in accordance with AASHTO T 104. For recycled portland cement concrete produced from stockpiles that contain raw material that can be verified as portland cement concrete obtained exclusively from DOTD pavements or structures, the soundness testing requirement may be waived by the Materials Engineer Administrator.

(2) Coarse aggregate listed in QPL 2, and recycled portland cement concrete, except lightweight aggregate, shall show an abrasion loss of not more than 40 percent when tested in accordance with AASHTO T 96.

Lightweight aggregate shall be expanded clay or expanded shale and shall show an abrasion loss of not more than 40 percent when tested in accordance with DOTD TR 111.

Section 731
Raised Pavement Markers

731.01 DESCRIPTION. This work consists of furnishing and placing raised pavement markers in accordance with plan details.

The contractor will be responsible for field layout and alignment of raised pavement markers. Existing pavement striping shall generally be used as a guide in determining raised marker locations. The Department will make every effort to replace obliterated striping prior to installation of raised pavement markers; however, if no striping exists at the time of raised marker installation, the contractor shall determine raised pavement marker locations in accordance with plan details or as directed.

731.02 MATERIALS.

(a) Markers: Markers shall comply with Subsection 1015.09. The same product shall be used throughout the project. Markers shall be the specified class, type, color, size and shape.

(b) Adhesive: Markers shall be placed with bituminous adhesive on asphaltic surfaces and epoxy adhesive on portland cement concrete surfaces.

(1) Epoxy Adhesive: Epoxy adhesive shall be Type V epoxy resin system complying with Subsection 1017.02. Epoxy components shall be mixed in equal parts by volume. Adhesive shall be mechanically mixed and dispensed, unless hand methods are permitted.

(2) Bituminous Adhesive: Bituminous Adhesive shall comply with Subsection 1015.09(c)(2).

731.03 CONSTRUCTION REQUIREMENTS.

(a) Weather Limitations: Markers shall not be applied when there is moisture on the surface.

(1) Epoxy Adhesive: When a normal set adhesive is used, application of markers will not be permitted at ambient air temperatures less than 50°F (10°C). When a rapid set adhesive is used, application of markers will be permitted at ambient air temperatures between 35°F (2°C) and 50°F (10°C), provided adhesive is adequately heated to obtain proper viscosity for mixing and application, and provided adhesive is identified as a rapid set type on container labels and Certificates of Delivery.

(2) Bituminous Adhesive: Markers shall be applied when the ambient air temperature is 50°F (10°C) or greater.

(b) Cleaning of Surfaces: Surfaces on which markers are to be applied shall be cleaned of all materials that may reduce the bond of adhesive. Surfaces shall be cleaned by blast cleaning or other approved methods which do not damage the surface; however, blast cleaning equipment shall be provided with positive cutoff controls. Surfaces shall be maintained in a clean dry condition until placement of markers.

(c) Application of Markers: Surfaces on which markers are to be placed shall be blown dry immediately prior to marker placement. Markers shall be applied to surfaces with adhesive in accordance with the manufacturer's recommendations.

(1) Epoxy Adhesive: Mixed adhesive shall have a uniformly grey color with no streaks of either black or white on the surface or within mixed adhesive. Voids in a cured undisturbed sample approximately 1/16 inch (2 mm) thick from the extrusion nozzle shall not exceed 4 percent by volume. Machine mixer and applicator shall be capable of accurately and uniformly proportioning the two components in a 1 to 1 ratio within 5 percent by volume of each component (i.e., within 47.5 to 52.5 percent for each component). Periodic checks of proportioning equipment shall be made to determine the actual ratio of components. This shall be done by placing containers in front of the mixing chamber and measuring the actual volume of each component. Equipment shall be arranged so it is possible to bypass the mixer to perform these periodic checks. Temperature of adhesive shall be maintained between 70°F (21°C) and 110°F (43°C) before mixing. The temperature shall be adjusted to prevent excessive flow of epoxy from the marker when installed. The area of the epoxy adhesive bed shall be equal to the bottom area of marker. Adhesive shall be applied in sufficient quantity to cause excess adhesive to be forced out around the perimeter of the marker. Voids in markers with an open grid pattern on bottom shall be filled with adhesive immediately prior to placement.

(2) Bituminous Adhesive: The adhesive shall be heated and melted in either thermostatically controlled double boiler type units utilizing heat transfer oil or thermostatically controlled electric heating pots. The melter/applicator unit shall be suited for both melting and pumping application through heated applicator hoses. The adhesive shall be heated to between 375°F and 425°F (190°C and 220°C) and applied directly to the pavement surface from the melter/applicator by either pumping or pouring. The area of the bituminous adhesive bed shall be a minimum of 6 inches (150 mm) in diameter. Markers shall be applied to the adhesive within 10 seconds. The marker shall be placed in the adhesive bed by applying downward pressure until the marker is firmly seated. Adhesive on exposed surfaces of

markers shall be immediately removed with soft rags moistened with mineral spirits or kerosene. Markers shall be protected against impact until the adhesive has hardened. The adhesive may be reheated and reused; however, the pot life at application temperatures shall not be exceeded.

731.04 MEASUREMENT. Raised pavement markers will be measured by counting the number of markers furnished, placed, and accepted.

731.05 PAYMENT. Payment for field layout and alignment of raised pavement markers will be in accordance with Section 740. Payment for raised pavement markers will be made at the contract unit prices per each under:

Item No.	Pay Item	Pay Unit
731-01	Nonreflectorized Raised Pavement Markers	Each
731-02	Reflectorized Raised Pavement Markers	Each

Section 732
Plastic Pavement Markings

732.01 DESCRIPTION. This work consists of furnishing and placing reflective pavement markings of hot applied thermoplastic or preformed (cold or hot applied) plastic at the locations shown on the plans or as directed. This work shall be in compliance with the MUTCD, plan details and these specifications. Plastic pavement markings include stripes, gore markings, lines, legends and symbols.

732.02 MATERIALS.

(a) Thermoplastic Markings: Thermoplastic marking material shall be a plastic compound reflectorized by internal and external application of glass beads, complying with Subsections 1015.10 and 1015.13. Width and color of markings shall be as specified.

Thermoplastic material shall be delivered in containers of sufficient strength to permit normal handling during shipment and transportation without loss of material. Approved heat-degradable containers that can be placed in heating kettles along with the plastic material will be permitted. Each container shall be clearly marked to indicate color of material, process batch number, name of manufacturer and date of manufacture.

(b) Preformed Plastic Markings: Preformed plastic markings shall comply with Subsection 1015.11.

(c) Surface Primer: A single component surface primer or two component epoxy primer sealer shall be provided by the contractor for the appropriate application in accordance with Subsection 732.03(e). The primer shall form a continuous film that dries rapidly and adheres to the pavement. The primer material shall not discolor or cause any noticeable change in the appearance of the pavement outside of the finished pavement marking. A sample of the primer shall be submitted with the recommended method of application to the engineer and to the manufacturer of the thermoplastic marking material. Written approval shall be obtained from the engineer and the manufacturer before applying the primer.

(d) Glass Beads: Glass beads used for drop-on application to molten plastic shall be shipped in moisture resistant sacks (containers). The sacks shall be strong enough to permit handling without damage. Sacks shall be sufficiently water-resistant so that beads will not become wet or caked in transit.

Glass beads for standard (flat) thermoplastic markings shall be in accordance with Subsection 1015.13.

732.03 CONSTRUCTION REQUIREMENTS FOR PLASTIC PAVEMENT MARKING MATERIAL.

(a) Equipment for Standard (Flat) Thermoplastic Marking Material: The application equipment shall consist of an extrusion die or a ribbon gun that simultaneously deposits and shapes lines at a thickness of 90 mils (2.3 mm) or greater on the pavement surface. Finished markings shall be continuous and uniform in shape, and have clear and sharp dimensions. Applicators shall be capable of producing various widths of traffic markings. Applicators shall produce sharply defined lines and provide means for cleanly cutting off stripe ends and applying broken lines. The ribbon extrusion die or shaping die shall not be more than 2 inches (50 mm) above the roadway surface during application. A spray application will only be allowed when applying 40 mil (1.0 mm) thermoplastic.

The application equipment shall provide continuous mixing and agitation of material. Thermoplastic conveying equipment components located between the main material reservoir and discharge mechanism shall be free from material accumulation and clogging. Parts of application equipment in contact with the material shall be easily accessible for cleaning and maintaining. Mixing and conveying equipment shall maintain material at the application temperature.

Glass beads shall be applied to the molten surface of completed stripes by either a single drop or a double drop application depending on the thickness of the thermoplastic striping as shown in Table 1015-13. The first (large) bead drop shall be applied by a gravity bead dispenser attached to the striping machine in such a manner that beads are dispensed simultaneously with the thermoplastic material at a controlled rate of flow on installed lines. The second (small) bead drop shall be applied immediately after the first bead drop by a gravity bead dispenser attached to the striping machine.

Applicators and kettles shall be equipped and arranged to comply with requirements of the National Board of Fire Underwriters. Applicators shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. Applicator equipment shall consist of a motorized mobile unit capable of installing traffic stripes either left or right of the applicating unit so that only one lane of traffic will be occupied during installation.

(b) Weather Limitations: Application of markings will not be permitted when there is excessive pavement moisture or when the surface

temperature or ambient temperature is below 50°F (10°C). The pavement shall be considered excessively moist when it is visibly wet or when a 1 square foot (0.1 sq m) piece of polyethylene film condenses moisture after being placed on the pavement surface for 15 minutes.

(c) Cleaning of Surfaces: Surfaces on which markings are to be applied shall be cleaned of materials that may reduce adhesion of the thermoplastic marking materials to the pavement. Cleaning shall be done by blast cleaning or grinding. Surfaces shall be kept clean until placement of markings.

(d) Removal of Existing Markings: Existing thermoplastic markings that are not flaking or peeling will not require removal prior to placement of 40 mil (1.0 mm) thick thermoplastic. Existing thermoplastic markings, regardless of condition, shall be removed prior to placement of 90 mil (2.3 mm) thick or greater thermoplastic except on asphalt pavements.

When thermoplastic markings replace existing painted markings, the existing painted markings will not require removal prior to applying new thermoplastic markings, provided the existing painted markings are not flaking or peeling.

When preformed plastic markings (tape) replace any existing markings, the existing markings shall be removed prior to applying the preformed plastic markings.

Removal of markings shall be accomplished by methods that will not damage the pavement or bridge deck. Removal shall be to such extent that 75 percent of the pavement surface or bridge deck under the markings is exposed. After the markings are removed, compressed air or a power blower shall be used to blow clean the pavement surface of residue and debris resulting from the removal. At the end of each day's operations the engineer may direct that temporary pavement markings complying with Section 713 be used in areas where existing markings have been removed and new markings not placed. Temporary pavement markings shall be satisfactorily removed prior to resuming thermoplastic marking operations.

All markings made in error or not conforming to the traffic operation in use shall be removed by either an abrasion or burning process to the satisfaction of the engineer. Markings shall not be obliterated by painting with asphalt binder or other material.

(e) Application of Surface Primer: A single component surface primer will be required prior to placement of preformed plastic markings over an existing painted stripe, over old bleached asphalt, on portland cement concrete surfaces, or all surfaces when ambient temperatures are below 70°F (20°C) unless otherwise directed by the engineer. A two component epoxy

primer sealer will be required prior to placement of thermoplastic materials on portland cement concrete surfaces or all surfaces when ambient temperatures are below 70°F (20°C) unless otherwise directed by the engineer.

(f) Application of Markings: Material shall be installed in specified widths from 4 inches to 24 inches (100 mm to 600 mm). Finished lines shall have well defined edges and be free of waviness. Measurements shall be taken as an average through any 36-inch (900 mm) section of line. Longitudinal lines shall be offset approximately 2 inches (50 mm) from longitudinal joints. A tolerance of +1/2 inch and -1/8 inch (+13 mm and -3 mm) from the specified width will be allowed, provided the variation is gradual. Segments shall square off at each end without mist or drip. Transverse variations from the control device up to 1 inch (25 mm) will be allowed provided the variation does not increase or decrease at the rate of more than 1/2 inch in 25 feet (15 mm in 10.0 m). Lines not meeting these tolerances shall be removed and replaced at no direct pay.

(1) Thermoplastic Markings: Thickness of material, not including drop-on beads, shall be not less than 90 mils (2.3 mm) for lane lines, edge lines and gore markings and not less than 125 mils (3.2 mm) for crosswalks, stop lines, and word and symbol markings.

Thermoplastic material at 90 mil (2.3 mm) thickness or greater shall be applied by extrusion at 390°F to 450°F (200°C to 230°C). Thermoplastic material at 40 mil (1.0 mm) thickness shall be applied by spray at 410°F to 450°F (210°C to 230°C). Immediately after application of the markings, glass beads for a single drop application shall be applied at a minimum rate of 230 pounds per mile (65 kg/km) for a 4-inch (100 mm) solid line stripe. Glass beads for a double drop application shall be applied at a minimum rate of 211 pounds per mile (60 kg/km) for each drop on a 4-inch (100 mm) solid line. Material shall not scorch or discolor when kept at this temperature range for 4 hours.

(2) Preformed Plastic Markings: Plastic tape shall be applied by removing release paper and applying adequate pressure to ensure proper adhesion. Other preformed heat-applied material shall be applied in accordance with the manufacturers' recommendation. Material not adhering properly shall be satisfactorily corrected at no direct pay.

(g) Field Testing of Roadway Markings: The Department will field test the pavement markings in accordance with Subsections 1015.10 and 1015.11 and Table 732-1. Failure to meet these requirements will require the contractor to replace the portion of the material shown to be out of specifications as directed by the engineer.

(h) Corrective Work: Any line found to be defective shall be restriped

or replaced as directed by the engineer. The corrective work shall also be subject to these requirements. The contractor shall replace the pavement marking material at no cost to the Department.

(i) Guarantee: The contractor shall provide the Department with a guarantee stating that if the pavement marking fails to comply with the stated performance requirements, the contractor shall take the remedial action required. Replacement striping shall carry the unexpired guarantee of the striping it replaces.

732.04 MEASUREMENT.

(a) Plastic Pavement Striping: Plastic striping will be measured by the linear foot (lin m) or mile (km), as specified. When a bid item is not included for gore markings, the Department will measure the quantity by converting the actual length and width of line installed to an equivalent length of the normal width line on that section of roadway.

(1) Linear Foot (Lin m): Measurement will be made by the linear foot (lin m) of striping, exclusive of gaps.

(2) Mile (km): Measurement will be made by the mile (km) of single stripe. No deduction will be made for standard 30-foot (9 m) design gaps in broken-line striping; however, deductions will be made for the length of other gaps or omitted sections.

(b) Plastic Pavement Legends and Symbols: Plastic legends and symbols will be measured per each legend or symbol. Symbols shall include all letters, lines, bars or markings necessary to convey the message at each location.

(c) Removal of Existing Markings: Removal of existing pavement markings for undivided highways will be measured by the linear mile (km) of full roadway width including shoulders. For divided highways, the full roadway width including shoulders and ramps will be measured separately for each direction of travel. Removal of pavement markings will include removal of lane lines, edge lines, gore markings, legends, symbols, and raised pavement markers.

732.05 PAYMENT. Payment for the completed and accepted quantities of plastic pavement markings and removal of existing markings will be made at the contract unit prices under:

Payment will be made under:

Item No.	Pay Item	Pay Unit
732-01	Plastic Pavement Striping (__inch (__mm) Width)	Linear Foot (Lin m)
732-02	Plastic Pavement Striping (Solid Line) (__inch (__mm) Width)	Mile (km)
732-03	Plastic Pavement Striping (Broken Line) (__inch (__mm) Width)	Mile (km)
732-04	Plastic Pavement Legends and Symbols (Type)	Each
732-05	Removal of Existing Markings	Mile (km)

Table 732-1
Field Testing of Plastic Pavement Markings

Length of Roadway	Number of Random Test Segments	Length of Test Segments
Less than 1 mile (1.5 km)	3 segments per line type	250 feet (75 m)
1 mile (1.5 km) to 9 miles (14.5 km)	3 segments per line type	1000 feet (300 m)
Greater than 9 miles (15 km)	1 segment per every 3 miles (4.8 km) per line type	1000 feet (300 m)

Measurements

1. Test segments will be selected randomly by the engineer unless night reviews or other knowledge supersedes a random selection process.
2. Each line type will be measured separately.
3. Measurements will be taken on dry, clean roadways.
4. Data will be collected in direction of traffic flow.
5. A minimum of 10 readings will be taken in each test segment line type.
6. On broken lines (skip striping), no more than two readings will be taken per stripe, with readings 20 inches (0.5 m) from ends of marking.
7. For solid lines, the test segment will be divided into ten locations of 100 feet (30 m) each; readings will be spaced a minimum of 25 feet (7.5 m) and a maximum of 150 feet (45 m) apart.
8. The Department may take additional readings or test segments.
9. Acceptance will be based on the average of the readings for each test segment for each line type.
10. Failure of the average reading for any segment to meet the specified minimum values will require replacement.
11. Limits of replacement will be determined by the engineer.

(3) Recycled portland cement concrete shall be from dedicated stockpiles produced by an approved concrete crushing operation. The District Laboratory Engineer will inspect and evaluate crushing operations before production of material intended for DOTD projects begins. After being crushed, recycled portland cement concrete shall be reasonably free of asphaltic concrete overlay material, reinforcing steel, joint material, and other debris, but may contain a minimal amount of other base course materials resulting from normal construction methods. Stockpiles produced from raw material verified as portland cement concrete obtained exclusively from DOTD pavements or structures shall be kept separate from other stockpiles. After processing, recycled portland cement concrete shall comply with the requirements specified in the appropriate subsections. Once a stockpile has been sampled for approval, no other material shall be added without prior approval.

(4) Reclaimed asphaltic pavement shall be cold planed in accordance with Section 509 or crushed. Reclaimed asphaltic pavement shall be approved either at the time of removal from the roadway or in stockpiles. Stockpiled materials shall be uniform and reasonably free of lightweight aggregate, debris, soil, and other foreign matter.

(5) Aggregates for use in portland cement concrete will be tested for alkali reactivity properties in accordance with ASTM C 289. Carbonate rocks for use in portland cement concrete will also be subjected to X-Ray diffraction analysis to determine the presence of potentially reactive components. Aggregates categorized as innocuous by both procedures will not be restricted. Aggregates categorized as potentially deleterious by either of these procedures may be used with combinations of cement and Class F fly ash meeting the requirements of Section 1001 and Subsection 1018.15, respectively. Aggregates categorized as potentially deleterious by either of these procedures will not be allowed with combinations of cement and Class C fly ash. The restriction regarding the use of Class C fly ash will be noted in QPL 2, and will remain in effect until aggregates from the source have been subjected to additional testing and evaluation, and they have been determined by the Materials Engineer Administrator to be innocuous with respect to alkali reactivity. This evaluation shall include one or more of the following procedures as directed by the Materials Engineer Administrator: ASTM C227, ASTM C295, ASTM C586, ASTM C1105, and ASTM C1260. The performance history of the aggregate type, and the source in particular, will be considered in determining the source's potential for detrimental expansion and the procedures used in the evaluation.

(6) Fine aggregate for portland cement concrete that produces a color darker than the Organic Color No. 3 when tested in accordance with AASHTO T 21, will be subjected to the mortar strength test in accordance with AASHTO T 71. The minimum compressive strength shall be at least 95 percent of the referenced mortar compressive strength.

(b) Acceptance Testing: Acceptance of aggregates shall be based on compliance with the requirements shown in the following subsections provided the aggregates consistently comply with the requirements for source approval in Heading (a).

1003.02 AGGREGATES FOR PORTLAND CEMENT CONCRETE AND MORTAR. All aggregates for use in portland cement concrete shall comply with the requirements of Subsection 1003.01. Aggregates for use in Types B and D pavement concrete shall also conform to the requirements of Subsection 1003.02(c).

(a) Fine Aggregate: Sand shall be a natural silica sand from a source listed in QPL 2. The percentages of deleterious materials shall not exceed the following values:

Property	Percent, Max.
Coal and Lignite	0.25
Clay Lumps	0.05
Clay Lumps and Friable Particles	3.00

Fine aggregate for all portland cement concrete except Types B and D pavements shall conform to the following gradations:

Concrete Sand

U.S. Sieve	Metric Sieve	Percent Passing
3/8 inch	9.5 mm	100
No. 4	4.75 mm	95-100
No. 16	1.18 mm	45-90
No. 50	300 µm	7-30
No. 100	150 µm	0-7
No. 200	75 µm	0-3

Mortar Sand

U.S. Sieve	Metric Sieve	Percent Passing
No. 4	4.75 mm	100
No. 8	2.36 mm	95-100
No. 100	150 µm	0-25
No. 200	75 µm	0-10

(b) Coarse Aggregate: Coarse aggregates used in portland cement concrete for bridge decks shall have a Friction Rating of I, II, or III as defined in Subsection 1003.06(a). The maximum amounts by weight (mass) of deleterious materials for coarse aggregate shall be as follows:

Property	Percent, Max.
Clay Lumps	0.05
Total Clay Lumps and Friable Particles	3.0
Iron Ore	2.0[1]
Coal and Lignite	1.0[1]
Flat and Elongated Particles (5:1) ASTM D 4791	15.0
Wood (Wet)	0.05
Total Clay Lumps and Friable Particles, Iron Ore, Coal and Lignite, and Wood	5.0

[1]Aggregate used in railings shall be free from coal, lignite and iron ore.

(1) Uncrushed Coarse Aggregate: Uncrushed coarse aggregate for all portland cement concrete except Types B and D pavements shall comply with Table 1003-1.

Table 1003-1
Portland Cement Concrete Aggregates

Percent Passing						
U.S. Sieve	Metric Sieve	Grade A (Size 57)	Grade B (Size 467)	Grade D (Size 357)	Grade F ---	Grade P (Size 67)
2 1/2 inch	63 mm	---	---	100	---	---
2 inch	50 mm	---	100	90-100	---	---
1 1/2 inch	37.5 mm	100	85-100	---	---	---
1 inch	25.0 mm	90-100	---	35-70	---	100
3/4 inch	19.0 mm	---	35-70	---	100	80-100
1/2 inch	12.5 mm	25-60	---	10-30	90-100	---
3/8 inch	9.5 mm	---	10-30	---	---	20-55
No. 4	4.75 mm	0-10	0-5	0-5	15-60	0-10
No. 8	2.36 mm	0-5	---	---	0-15	0-5
No. 16	1.18 mm	---	---	---	0-5	---
No. 200	75 µm	0-1	0-1	0-1	0-1	0-1

(2) Crushed Coarse Aggregate: Crushed coarse aggregate for all portland cement concrete except Types B and D pavements shall comply with the uncrushed coarse aggregate gradations except that when the material finer than the No. 200 (75 µm) sieve consists of the dust fraction from crushing, essentially free of clay, this percentage shall be 0-2 percent. When the total material passing the No. 200 (75 µm) sieve from the coarse and fine aggregates does not exceed 5 percent, the percent passing the No. 200 (75 µm) sieve from the crushed coarse aggregate may be increased to 3 percent.

(3) Lightweight Coarse Aggregate: Lightweight coarse aggregates shall conform to the following gradation for Grade Y (Size No. 7) aggregate:

U.S. Sieve	Metric Sieve	Percent Passing
3/4 inch	19.0 mm	100
1/2 inch	12.5 mm	90-100
3/8 inch	9.5 mm	40-80
No. 4	4.75 mm	0-15
No. 8	2.36 mm	0-5

The unit weight (mass) (AASHTO T 19) of lightweight coarse aggregate shall not exceed 55 pounds per cubic foot (880 kg/cu m), dry

loose measurement. If the unit weight (mass) of any shipment of lightweight coarse aggregate differs by more than 10 percent from that of the sample submitted for acceptance tests, the shipment may be rejected.

(c) Aggregates for Types B and D Pavements: For the combined aggregates for the proposed portland cement concrete pavement mix, the percent retained based on the dry weight (mass) of the total aggregates shall meet the requirements of Table 1003-1A for the type of pavement specified in the plans. Additionally, the sum of the percents retained on any two adjacent sieves so designated in the table shall be at least 13 percent of the total combined aggregates. The maximum amounts by weight (mass) of deleterious materials for the total aggregate shall be the same as shown in Subsection 1003.02(b).

Table 1003-1A
Aggregates for Types B and D Pavements

U.S. Sieve	Metric Sieve	Percent Retained of Total Combined Aggregates	
		Pavement Type	
		Type B	Type D
2 1/2 inch	63 mm	0	0
2 inch	50 mm	0	0-20
1 1/2 inch	37.5 mm	0-20	0-20
1 inch	25.0 mm	0-20	5-20
3/4 inch	19.0 mm	5-20	5-20
1/2 inch	12.5 mm	5-20	5-20
3/8 inch	9.5 mm	5-20	5-20
No. 4	4.75 mm	5-20	5-20
No. 8	2.36 mm	5-20	5-20
No. 16	1.18 mm	5-20	5-20
No. 30	600 µm	5-20	5-20
No. 50	300 µm	0-20	0-20
No. 100	150 µm	0-20	0-20
No. 200	75 µm	0-5	0-5
Note: For the sieves in the shaded areas, the sum of any two adjacent sieves shall be a minimum of 13 percent of the total combined aggregates.			

Each type of aggregate to be used in the proposed mixture shall be sampled and tested individually. The percent of total combined aggregates retained shall be determined mathematically based on the proportions of the combined aggregate blend. All gradation calculations shall be based on percent of dry weight (mass).

1003.03 BASE COURSE AGGREGATES. Aggregates for base course shall comply with the requirements of Subsection 1003.01.

(a) Sand-Clay-Gravel: This aggregate shall be composed of a uniform mixture of sand, clay, and siliceous gravel, stone or recycled portland cement concrete.

The mixture, as determined by visual inspection, shall be reasonably free from foreign matter. The mixture shall comply with the following gradation:

U.S. Sieve	Metric Sieve	(Cement Treated or Stabilized) Percent Passing
1 1/2 inch	37.5 mm	95-100
No. 4	4.75 mm	40-65
No. 40	425 µm	20-50
No. 200	75 µm	10-25

Material passing the No. 40 (425 µm) sieve shall comply with the following requirements:

	Cement Treated or Stabilized
Liquid Limit (Max.)	35
Plasticity Index (Max.)	12

Stone and recycled portland cement concrete in the mixture shall comply with Subsection 1003.01.

(b) Stone: This material shall consist of 100 percent stone and shall comply with the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	100
1 inch	25.0 mm	90-100
3/4 inch	19.0 mm	70-100
No. 4	4.75 mm	35-65
No. 40	425 µm	12-32
No. 200	75 µm	5-12

To facilitate meeting these gradation requirements, a calcium carbonate additive approved by the Materials and Testing Section may be added to the stone. The additive shall be thoroughly blended with the stone by approved methods prior to placement on the project. When tested according to DOTD TR 428, the fraction passing the No. 40 (425 µm) sieve, including any additive, shall have a liquid limit no greater than 25, and a plasticity index of no greater than 4.

(c) Recycled Portland Cement Concrete: Recycled portland cement concrete shall be crushed portland cement concrete. After being crushed, recycled portland cement concrete may contain a minimal amount of other base course materials resulting from normal construction methods and shall conform to the following gradation.

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	100
1 inch	25.0 mm	90-100
3/4 inch	19.0 mm	70-100
No. 4	4.75 mm	35-65
No. 40	425 µm	12-32
No. 200	75 µm	0-8

The fraction of recycled portland cement concrete passing the No. 40 (425 µm) sieve shall be non-plastic.

(d) Crushed Slag: The material shall be 100 percent slag and shall comply with the gradation requirements of Heading (b).

1003.04 AGGREGATES FOR SURFACE COURSE. Aggregates for surface course shall comply with the requirements of Subsection 1003.01.

(a) Stone: This material shall consist of 100 percent stone and shall comply with the following gradations:

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	100
3/4 inch	19.0 mm	50-100
No. 4	4.75 mm	35-65
No. 40	425 µm	10-32
No. 200	75 µm	3-15

The fraction of stone passing the No. 40 (425 μm) sieve shall comply with the following requirements.

Liquid Limit (Max.)	25
Plasticity Index (Max.)	4

(b) Sand-Clay-Gravel: This material shall be a mixture of sand, clay, and siliceous gravel, stone or recycled portland cement concrete. The mixture shall be reasonably free from foreign matter as determined by visual inspection.

The mixture, prior to treatment shall comply with the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	95-100
No. 4	4.75 mm	40-65
No. 40	425 μm	---
No. 200	75 μm	10-25

The fraction passing the No. 40 (425 μm) sieve shall comply with the following requirements:

	Lime Treated
Liquid Limit (Max.)	40
Plasticity Index	4-15

Stone and recycled portland cement concrete in the mixture shall comply with Subsection 1003.01.

(c) Recycled Portland Cement Concrete: Recycled portland cement concrete shall be crushed portland cement concrete and will be permitted in combination with other approved stone for surface courses. After being crushed the recycled portland cement concrete or a combination of stone and recycled portland cement concrete shall comply with the following gradation.

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	100
3/4 inch	19.0 mm	50-100
No. 4	4.75 mm	35-65
No. 40	425 μm	10-32
No. 200	75 μm	3-15

(d) Reclaimed Asphaltic Pavement (RAP): Reclaimed asphaltic pavement material shall comply with Subsection 1003.01 and the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
2 1/2 inch	63 mm	100
No. 4	4.75 mm	35-75

(e) Crushed Slag: This material shall be 100 percent crushed slag and shall comply with the gradation requirements of Heading (a). The fraction of crushed slag passing the No. 40 (425 μm) sieve shall be non-plastic.

1003.05 AGGREGATES FOR ASPHALTIC SURFACE TREATMENT.

Aggregates for asphaltic surface treatment shall comply with Subsection 1003.01 and shall be either crushed gravel, crushed stone, crushed slag or lightweight aggregate and shall be assigned a Friction Rating in accordance with Subsection 1003.06(a). Aggregates shall comply with the gradation requirements in Table 1003-2.

Crushed gravel Size 1 and Size 2 shall have 60 percent minimum crushed retained on the No. 4 (4.75 mm) sieve. Crushed gravel Size 3 shall have 75 percent crushed retained on the No. 4 (4.75 mm) sieve. The percent crushed shall be determined in accordance with DOTD TR 306.

The maximum amounts of deleterious materials shall be as follows:

Property	Percent, Max.
Clay Lumps	0.05
Total Clay Lumps and Friable Particles	3.0
Iron Ore	2.0
Glassy Particles in Slag	10.0
Flat and Elongated Particles (5:1)(ASTM D 4791)	10.0
Coal and Lignite	1.0
Wood (Wet)	0.05
Total Clay Lumps and Friable Particles, Iron Ore, Coal and Lignite, and Wood	5.0

Table 1003-2
Asphaltic Surface Treatment Aggregates Percent Passing

		Size 1		Size 2	Size 3
U. S. Sieve	Metric Sieve	Slag or Stone Aggregate (Size No. 5)	Crushed Gravel[2] or Lightweight Aggregate	All Aggregate (Size No. 7)	All Aggregate (Size No. 8)
1 1/2 inch	37.5 mm	100	100	---	---
1 inch	25.0 mm	90-100	95-100	---	---
3/4 inch	19.0 mm	20-55	60-90	100	---
1/2 inch	12.5 mm	0-10	---	90-100	100
3/8 inch	9.5 mm	0-5	0-15	40- 80	85-100
No. 4	4.75 mm	---	0-5	0-15	10-40
No. 8	2.36 mm	---	---	0-5	0-10
No. 16	1.18 µm	---	---	---	0-5
No. 200	75 µm[1]	0-1	0-1	0-1	0-1

[1]The percentage passing the No. 200 (75 µm) sieve shall be 0 - 2 percent for crushed aggregates when the materials finer than the No. 200 (75 µm) sieve consist of dust fraction from crushing and handling, essentially free of clay.
[2]Uncrushed gravel may be used for Size 1 aggregate if more than one application of Asphaltic Surface Treatment is required.

1003.06 AGGREGATES FOR ASPHALTIC MIXTURES.

(a) Asphaltic Concrete: Aggregates shall comply with the requirements of Subsection 1003.01 except that reclaimed asphaltic pavement and recycled portland cement concrete are not required to be from sources listed on QPL 2 but shall be from approved sources. Coarse aggregates shall be defined as all material retained on or above the No. 4 (4.75 mm) sieve. Fine aggregate shall be defined as all material passing the No. 4 (4.75 mm) sieve.

(1) Gravel, Stone, and Crushed Slag: These aggregates shall comply with Subsection 1003.05 for deleterious substances and shall be assigned a Friction Rating as shown in Table 1003-3 and indicated in QPL 2.

Table 1003-3
Aggregate Friction Rating

Friction Rating	Description
I	Aggregates that have a Polish Value of greater than 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
II	Aggregates that have a Polish Value of 35 to 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
III	Aggregates that have a Polish Value of 30 to 34 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
IV	Aggregates with a Polish Value of 20 to 29.

(2) Fine Aggregate: Fine aggregates shall comply with the requirements of asphaltic mixtures. Aggregates shall also comply with the specification requirements for angularity and sand equivalent as shown in Section 502, Table 502-5.

a. Fine Aggregate Angularity: Fine aggregate angularity (FAA) shall be determined in accordance with DOTD TR 121. The fine aggregate angularity of the composite mixture shall be determined by calculating the weighted average based on aggregate proportions passing the No. 4 (4.75 mm) sieve and the individual FAA values reported on the job mix formula. When individual aggregate sources do not have sufficient quantities of any of the required sieve sizes, a composite sample shall be tested for the proposed blend.

b. Sand Equivalent: Sand equivalent shall be determined in accordance with DOTD TR120. The sand equivalent requirements shall apply to individual natural sand sources only and do not apply to manufactured fines and fines produced from crushing operations.

(3) Natural Sand: Natural sand shall be coarse sand or a combination of coarse sand and fine sand which is used in the asphaltic concrete mixture. Natural sand shall consist of clean, hard, durable,

siliceous grains graded from coarse to fine and shall be reasonably free from vegetative matter or other deleterious materials.

The sand shall be nonplastic and no clay balls or clay lumps shall be incorporated into the asphaltic mixture. The gradation shall have a maximum of 25 percent passing the No. 200 (75 μm) sieve. Clay lumps shall not exceed 1.00 percent by weight (mass) when sampled from the stockpile and tested in accordance with DOTD TR 119.

The sand equivalent of the portion of the natural sand in the mixture passing the No. 4 (4.75 mm) sieve shall be as shown in Section 502, Table 502-5 when tested in accordance with DOTD TR120.

(4) Recycled Portland Cement Concrete: Recycled portland cement concrete source shall meet the requirements of Subsection 1003.02(b)(2). The maximum amount of deleterious materials shall comply with Subsection 1003.05.

Recycled portland cement concrete may be used only when specified in the plans or by special provisions.

(5) Reclaimed Asphaltic Pavement (RAP): Reclaimed asphaltic pavement shall comply with Subsection 1003.01.

(6) Mineral Filler: Mineral filler shall be an approved product listed on QPL 10 and shall consist of limestone dust, pulverized hydrated lime, portland cement, or cement stack dust. Mineral dust collected in bag houses or by other dust collectors at asphaltic concrete plants is not classified as mineral filler. Cement stack dust shall consist of material collected from waste rotary kiln gases discharged through a collector of a cement plant. Mineral filler shall comply with the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
No. 30	600 μm	100
No. 80	180 μm	95-100
No. 200	75 μm	70-100
No. 270	53 μm	60-100

Mixtures of aggregate, filler and asphalt, in proportions to meet the requirements of mixes being used, shall have an index of retained Marshall Stability (DOTD TR 313) of at least 85 percent, and a maximum of 1.0 percent volumetric swell (DOTD TR 313).

(7) Expanded Clay Coarse Aggregate: Expanded clay coarse aggregate shall consist of angular fragments of uniform density free from

an excess of foreign matter. These aggregates shall comply with Subsection 1003.05 for deleterious materials.

(b) Stone Matrix Asphalt (SMA): All aggregate sources shall be approved and listed on QPL 2. Aggregates shall be composed of clean and durable crushed stone. The combined aggregates shall be in accordance with the design gradation requirements in Table 508-1.

(1) Coarse Aggregate: Fifty percent (50%) of the coarse aggregate shall meet Class I friction requirements and the remainder shall meet Class I, II, or III friction requirements. Alternately, 100 percent of the coarse aggregate shall meet Class II friction requirements. At a 3 to 1 ratio in accordance with ASTM D 4791, the flat and elongated particle limit shall be 25 percent maximum by weight (mass). In addition, at a 5 to 1 ratio, the flat and elongated particle limit shall be 5 percent maximum.

(2) Fine Aggregate: Fine aggregate shall consist of 100 percent crushed manufactured sand. The Fine Aggregate Angularity, FAA, of each source shall be measured and the calculated fine aggregate blend shall be 45 percent minimum when tested in accordance with DOTD TR 121 (mineral filler excluded).

1003.07 GRANULAR MATERIAL. Granular material shall be non-plastic and siliceous material, and shall comply with Subsection 1003.01 and the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
1/2 inch	12.5 mm	100
No. 10	2.00 mm	75-100
No. 200	75 μm	0-10

1003.08 BEDDING MATERIAL. Bedding materials shall consist of stone, recycled portland cement concrete, or a mixture of either recycled portland cement concrete, gravel, crushed slag, or stone with granular material complying with Subsection 1003.01.

(a) Stone or Recycled Portland Cement Concrete: Stone or recycled portland cement concrete shall comply with Subsection 1003.04.

(b) Sand-Aggregate: The sand-aggregate material shall be a natural or artificial mixture of sand and gravel, crushed slag, recycled portland cement concrete, or other approved aggregate listed in this subsection. Material passing the No. 40 (425 μm) sieve shall be nonplastic. The

mixture shall be free of foreign matter as determined by visual inspection and shall comply with the following gradation prior to placement.

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	95-100
No. 4	4.75 mm	30-50
No. 10	2.00 mm	20-45
No. 200	75 µm	0-10

(c) Mixtures: Recycled portland cement concrete, gravel, stone, or crushed slag shall be mixed with 35±5 percent granular material by volume. The mixture shall be verified by proof of material deliveries.

(1) Gravel: Gravel shall comply with the following gradation.

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	95-100
No. 4	4.75 mm	0-15
No. 200	75 µm	0-2

(2) Recycled Portland Cement Concrete, Crushed Slag, or Stone: Recycled portland cement concrete, crushed slag or stone shall conform to the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
1 1/2 inch	37.5 mm	95-100
3/4 inch	19.0 mm	40-85
No. 4	4.75 mm	0-15

(3) Granular Material: Granular Material shall comply with Subsection 1003.07.

1003.09 NONPLASTIC EMBANKMENT. Nonplastic embankment materials shall be an approved sand, stone, or blended calcium sulfate. The maximum organic content shall be 4.0 percent.

(a) Sand: Sand embankment shall consist of nonplastic material with at least 75 percent passing the No. 4 (4.75 mm) sieve and containing not more than 15 percent passing the No. 200 (75 µm) sieve when tested in accordance with DOTD TR 112 and DOTD TR 113.

(b) Stone: Stone shall be coarse stone listed on QPL 2 with a dry rodded unit weight (mass) of no greater than 95 pounds per cubic foot (1520 kg/cu m) when tested in accordance with AASHTO T19. Stone shall comply with the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
2 inch	50 mm	100
1 1/2 inch	37.5 mm	85 - 100
3/4 inch	19.0 mm	35 - 88
No. 4	4.75 mm	0 - 10

(c) Blended Calcium Sulfate: Blended calcium sulfate embankment material shall consist of calcium sulfate, from a source approved by the Materials and Testing Section, blended with an approved aggregate. The source shall have a quality control program approved by the Materials and Testing Section. The source shall have been given environmental clearance by the Department of Environmental Quality for the intended use, and written evidence of such environmental clearance shall be on file at the Materials and Testing Section. DOTD monitoring for compliance with environmental regulations will be limited to the pH testing listed below. The blended material shall be non-plastic and reasonably free from organic and foreign matter. The pH shall be a minimum of 5.0 when tested in accordance with DOTD TR 430. Should the source of the aggregate that is blended with the calcium sulfate change, re-evaluation will be required. The blended embankment material shall consist of 25 to 75 percent passing the No. 4 (4.75 mm) sieve when tested in accordance with DOTD TR 113 modified to include a drying temperature not to exceed 140°F (60°C).

1003.10 AGGREGATE FOR SUBGRADE LAYER. Aggregate for subgrade layers shall consist of either stone, crushed slag, recycled portland cement concrete, or blended calcium sulfate complying with Subsection 1003.01 and the following.

(a) Stone, Crushed Slag, or Recycled Portland Cement Concrete: Stone, crushed slag, or recycled portland cement concrete shall comply with Subsection 1003.03.

(b) Blended Calcium Sulfate: Blended calcium sulfate shall comply with Subsection 1003.09 except that when tested in accordance with DOTD TR 113, modified to include a maximum drying temperature

of 140°F (60°C), blended calcium sulfate shall comply with the following gradation.

U.S. Sieve	Metric Sieve	Percent Passing
1 inch	25.0 mm	90-100
3/4 inch	19.0 mm	70-100
No. 4	4.75 mm	25-75
No. 200	75 µm	0-25

Section 1019
Geotextile Fabric and Geocomposite Systems

1019.01 GEOTEXTILE FABRIC.

(a) General Requirements: The geotextile fabric shall be composed of at least 85 percent by weight (mass) of polyolefins, polyesters, or polyamides. The geotextile fabric shall be resistant to chemical attack, rot and mildew and shall have no tears or defects which adversely alter its physical properties. When required, the geotextile fabric shall contain stabilizers and/or inhibitors added to the base material to make filaments resistant to deterioration due to ultraviolet and heat exposure. Edges of geotextile fabric shall be finished to prevent the outer yarn from pulling away from the fabric. Fibers of other composition may be woven into the geotextile fabric for reinforcing purposes. Durability of these fibers shall be equivalent to that of the geotextile fabric.

Geotextile fabric rolls shall be furnished with an opaque, waterproof wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged with the manufacturer's name, date of manufacture, batch number, name of product.

Unless otherwise specified on the plans or in the project specifications, the geotextile fabric shall be an approved product in QPL 61.

(b) Detailed Requirements: The geotextile fabric shall comply with the requirements in Table 1019-1 and shall be utilized as follows unless otherwise specified:

Use	Classes
(1) Drainage:	
Underdrains	A, B, C or D
Pipe and Precast Manhole Joints	A, B, C or D
Weep Holes	A, B, C or D
Bedding Fabric	B, C, or D
Approach Slabs	B, C, or D
Fabric for Geocomposite Drainage Systems[1]	B, C, or D
(2) Stabilization:	
Bulkheads	C or D
Flexible Revetments	C or D

Rip Rap	D
Railroad Crossings	D
Base Course	D
Subgrade Layer	D
Soil Stabilization	C, D, or S

(3) Paving Fabric[2]: B or C (modified)

(4) Silt Fencing:

Wire Supported	F
Self Supported	G

[1]Refer to Subsection 1019.02 for additional requirements.
[2]Refer to Subsection 1019.03 for additional requirements.

Table 1019-1
Geotextile Fabrics

Property	Test Method	Requirements Classes						
		A	B	C	D	S	F	G
AOS, Metric Sieve,µm, Max.	ASTM D 4751	300	300	300	212	600	850	850
Grab Tensile, N, Min.	ASTM D 4632	330	400	580	800	800	400	400
% Elongation @ Failure, Min.	ASTM D 4632	---	---	50	50	---	---	---
% Elongation @ 200 N, Max.	ASTM D 4632	---	---	---	---	---	---	50
Burst Strength, N, Min.	ASTM D 3787	440	620	930	1290	1390	---	---
Puncture, N, Min.	ASTM D 4833	110	130	180	330	330	---	---
Trapezoid Tear Strength, N, Min.	ASTM D 4533	110	130	180	220	220	---	---
Permittivity, $Sec.^{-1}$, Min.	ASTM D 4491	1.0	1.0	1.0	1.0	0.2	0.01	0.01
Grab Tensile Strength Retained after weathering 150 h, UVA lamps, %, Min	ASTM D 4632 ASTM G 154	70	70	70	70	70	---	---
Grab Tensile Strength Retained after weathering 500 h, UVA lamps, %, Min	ASTM D 4632 ASTM G 154	---	---	---	---	---	70	70

1019.02 GEOCOMPOSITE DRAINAGE SYSTEMS. The geocomposite fabric drain shall consist of a nonwoven geotextile fabric and a core as specified below with the geotextile completely enveloping the core. Fittings shall be as recommended by the manufacturer. The geotextile fabric shall be sufficiently secured to the core to prevent separation of the geotextile fabric and intrusion of the backfill material during installation. The geocomposite drainage system shall be an approved product listed in QPL 62.

(a) Geotextile Fabric: The fabric shall meet the requirements for Class B, C, or D geotextile fabric of Subsection 1019.01 with the following modifications:

Property	Test Method	Requirements
Elongation, %, Min.	ASTM D 4632	20
Sewn Seam Strength (Fabric to Fabric), kN/m width, Min.	ASTM D 4437	2600

(b) Cores for Wall Drains (Single Sided): The core shall be a flexible, solid-backed, rectangular design made of a polyolefin material not sensitive to moisture. The geocomposite design shall allow drainage of water from one side only. The core shall consist of supports having a minimum height of 5/16 inch (8 mm) upon which the fabric shall be securely fastened. The cross section open area of the core which will allow the passage of water shall be a minimum of 40 percent.

The core shall meet the following requirements:

Property	Test Method	Requirements
Compressive Strength, kPa @ 20% Max. deflection, Min.	ASTM D 1621	380

1019.03 PAVING FABRIC. In addition to the specifications for Class B or C geotextile fabric of Subsection 1019.01, the paving fabric shall also comply with the following requirements:

Property	Test Method	Requirements
Asphalt Retention, L/sq m	AASHTO M 288	0.9
Change in Area at 135°C, %, Max.	AASHTO M 288	15.0

APPENDIX IX PREVAILING WAGE DETERMINATION SCHEDULE

General Decision Number: LA100015 03/12/2010 LA15

Superseded General Decision Number: LA20080015

State: Louisiana

Construction Type: Heavy Dredging

Counties: Louisiana Statewide.

DREDGING PROJECTS ALONG THE GULF COAST AREA INCLUDING THE MISSISSIPPI RIVER AND ITS TRIBUTARIES TO THE OHIO RIVER

Modification Number	Publication Date
0	03/12/2010

* SULA1994-001 04/01/1994

	Rates	Fringes
Derrick Operator	$ 7.25	
Dozer Operator	$ 7.25	
Dredge 16" and Over		
Deckhand	$ 7.25	
Dredge tender operator	$ 7.25	
Fireman	$ 7.25	
First assistant engineer	$ 7.25	
Leverman	$ 7.25	
Oiler	$ 7.25	
Second assistant engineer	$ 7.25	
Shoreman	$ 7.25	
Third assistant engineer	$ 7.25	
Truck driver	$ 7.25	
Welder	$ 7.25	
Dredge Under 16"		
Deckhand	$ 7.25	
Dredge tender operator	$ 7.25	
Leverman	$ 7.25	
Oiler	$ 7.25	
Welder	$ 7.25	
Hydraulic Dredging		
First cook	$ 7.25	
Handyman	$ 7.25	
Janitor, cabin person	$ 7.25	

Second cook..... $ 7.25

Marsh Buggy Dragline, Oiler..... $ 7.25

Marsh Buggy Dragline, Operator... $ 7.25

Self-Propelled Hopper Dredge,
Drag Tender..... $ 9.70 3.45+a

FOOTNOTE: Fourteen paid vacation days and eight paid holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day & Christmas Day provided the employee has one year of service.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

APPENDIX X FIELD ADJUSTMENT REPORT

Field Adjustment Report	Field Adjustment Number:	
Contractor:	Date:	

Oyster Bayou Marsh Restoration Project (CS-59)

Specification and/or Drawing Number:	Reference (Shop Drawing):

Description of Work Affected:

Reason for Adjustment:

** THIS FIELD ADJUSTMENT SHALL NOT RESULT IN A CHANGE IN CONTRACT PRICE OR THE TIME FOR COMPLETION **

Recommended By:			***CONTRACTOR Agreement:***	***CPRA Agreement:***
	Signature	Date	Agreed (Y/N):	Approved (Y/N):
CPRA			Signature/Title/Date:	Signature/Title/Date:
Engineer				
Contractor				

APPENDIX XI REQUEST FOR INTERPRETATION

Request for Interpretation	Request for Interpretation Number:	
Contractor:	Date:	
Oyster Bayou Marsh Restoration Project (CS-59)		
Specification and/or Drawing Number:	**Reference (Shop Drawing):**	

Request:

Response:

Recommended By:			***CONTRACTOR Agreement:***	***CPRA Agreement:***
	Signature	Date	Agreed (Y/N):	Approved (Y/N):
CPRA Engineer			Signature/Title/Date:	Signature/Title/Date:

APPENDIX XII LAND RIGHTS APPENDIX


Exhibit A
Oyster Bayou Marsh Creation & Terracing Project CS-0059, Cameron Parish, LA
T14S-R11W
T15S-R11W
T14S-R10W
T15S-R10W
T14S-R9W
T15S-R9W
Calcasieu River
Apache Louisiana Minerals Inc. et al
Devall Enterprises Inc.
Westlands Corp.
Tower Land Company Inc.
Westlands Corp, et al
LA 27/LA 82
C.F. Henry Properties, LLC
Ardoin Limited Partnership
Norma Jean Rogers Blake, et al
Raymond Rice, Jr. & John C. Allare
Gulf of Mexico
Marsh Creation Area
Terrace Field
Pipeline Corridor
Borrow Area
Roads
Township/Range
Section Lines
Owner
Apache Louisiana Minerals Inc. et al
Ardoin Limited Partnership
C.F. Henry Properties, LLC
Devall Enterprises Inc.
Mathilde Stream et al
Norma Jean Rogers Blake, et al
Raymond Rice, Jr. & John C. Allare
Tower Land Company Inc.
Westlands Corp.
Westlands Corp. et al
State of Louisiana
All project features are graphical representations only, are subject to change, and may not reflect true location or dimension
CPRA
1:55,000
Kilometers
0 0.375 0.75 1.5
Miles
0 0.375 0.75 1.5
N
Source: Coastal Protection and Restoration Authority of Louisiana
Imagery: 2013 NAIP DOQQ
Map Date: October 23, 2014
//2015040011

LANDOWNERS:

Tract 1:

WESTLANDS CORPORATION
Attn: W.W. Rucks, III
110 Oil Center Drive
Lafayette, LA 70503

KELLY ANN LITTLE NORRIS
6805 Boyance Road
New Iberia LA 70560

KARLYN LITTLE MYERS
6619 Boyance Road
New Iberia, LA 70560

JOHN KIRBY LITTLE
812 Hickory Hill Court
Orlando, FL 32828

J. LAWTON COMPANY, L.L.C.
Attn: Jack E. Lawton, Jr.
1409 Kirkman Street
Lake Charles, LA 70601

CAROLYN RUSH BUNCH
408 Kelly Plantation Drive, Unit 910
Destin, FL 32541

ELIZABETH TAYLOR RUSH'S CHILDREN AND GRANDCHILDREN TRUST
Attn: Carolyn Rush Bunch, Trustee
2999 Bay Villa Court
Miramar Beach, FL 32550

CAROLYN RUSH BUNCH SPENDTHRIFT TRUST
Attn: Wayne P. Bunch, Trustee
408 Kelly Plantation Drive, Unit 910
Destin, FL 32541

KATHRYN B. HOUSE
1513 Alvin Street
Lake Charles, LA 70601

KERRY ARTHUR HOUSE
P.O. Box 12261
Lake Charles, LA 70601

MARION COFFIN BROOKE WORTH
15 Underhill Road
Locust Valley, NY 11560

MKS PROPERTIES, L.L.C.
Attn: Harold H. Stream, III
2417 Shell Beach Drive
Lake Charles, LA 70601

TOWER LAND COMPANY L.L.C.
Attn: William T. Drost
641 Prien Lake Road
Lake Charles, LA 70601

ARLEEN EVELYN GOODE
3448 Lake Street
Lake Charles, LA 70605

MARK D. GOODE
903 Village Court
Lake Charles, LA 70605

SHARON L. THOMAS
3448 Lake Street
Lake Charles, LA 70605

DEBRA K. DOTY
3448 Lake Street
Lake Charles, LA 70605

DOROTHY SWANSON BROOKE
1 Pierrepoint Street, Apt. 7-A
Brooklyn, NY 11201-3302

MARGARET RUCKS LABORDE
109 N. Lemans
Lafayette, LA 70503

CLIFFE E. LABORDE, III
128 Nickerson Parkway
Lafayette, LA 70501

W.W. RUCKS, III
P.O. Box 51524
Lafayette, LA 70505

GEORGE W. STOKES
P.O. Box 51546
Lafayette, LA 70505

LYNETTE STOKES CLARKE
P.O. Box 64
Bunkie, LA 71322

LINDA LOUISE WEST
2795 West Highway 90
Sulphur, LA 70663

MARION LANE WEST
12515 Stoney Creek Drive
Pearland, TX 77584

CRAIG E. VINCENT
1090 Russell Lane
Hackberry, LA 70645

CHARLENE VINCENT EBERSOLE
7434 Hwy 1133
Sulphur, LA 70665

SHANNA VINCENT GILBERT
212 Frasier
Lake Charles, LA 70605

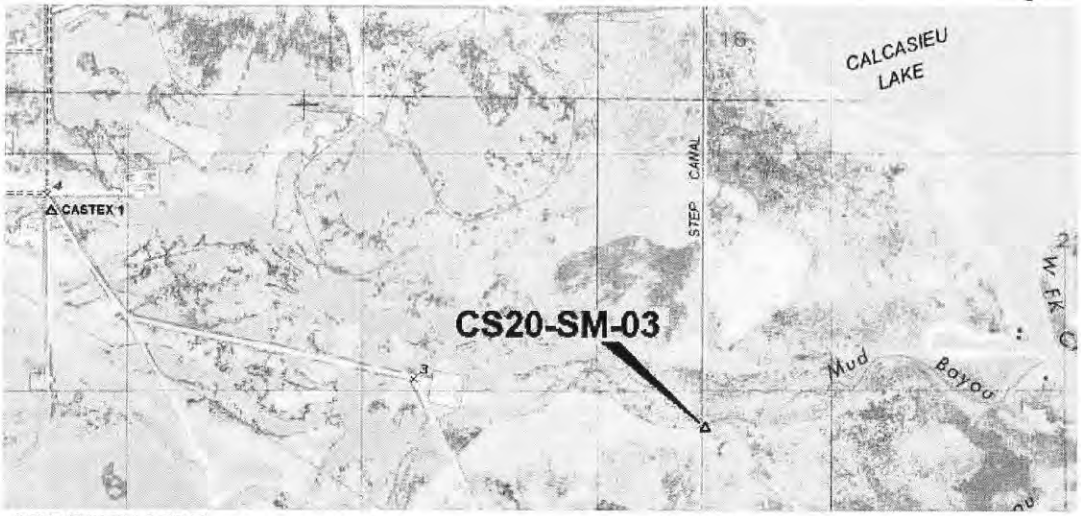
LILLIAN LOUISE GOODE KENT
464 Stillmeadow Drive
Richardson, TX 75081

JANET J. JEANES
P.O. Box 2007
Brenham, TX 77834

Tract 2:

THE ARDOIN LIMITED PARTNERSHIP
Attn: Jan Louise Fontenot
4400 W. Prien Lake Road
Lake Charles, LA 70605

APPENDIX XIII SURVEY MONUMENTS



VICINITY MAP Scale: 1" = 2000' Reproduced from USC&GS "HOLLY BEACH" Quadrangle

Station Name: CS20-SM-03

Monument Location: From the drawbridge in Hackberry, La., proceed south on State Highway 27 for 15.9 miles to a limestone field road on left. Turn left on the field road and proceed easterly for approximately 2.5 miles to a limestone field road, thence north on the limestone field road to a boat launch at Step Canal. Thence proceed in Step Canal, by boat, easterly for approximately 1.7 miles and southerly for 1 mile to a flood control structure at the Mud Bayou crossing and the monument on the left. The monument is located south of the flood control structure.

Monument Description: NGS Style Floating Sleeve Monument; datum point set on 9/16" stainless steel rods driven 64 feet to refusal, set in sand filled 6" PVC pipe with access cover and set in concrete 12 inches above ground.

Stamping: "MUD BAYOU"

Date: February 2002

Monument Established By: John Chance Land Surveys, Inc.

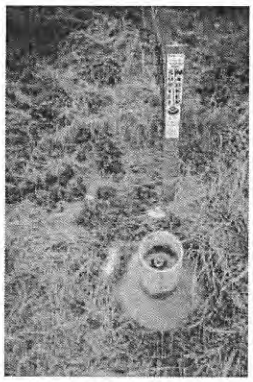
For: *Louisiana Department of Natural Resources, CRD*

Adjusted NAD 83 (1992) Geodetic Position
Lat. 29° 49' 17.016104" N
Long. 93° 23' 56.574856" W

Adjusted NAD 1983 Datum LSZ (1702) Ft
N= 486,444.90
E= 2,625,833.15

Adjusted NAVD88 Height
Elevation = 4.15 feet / 1.264m

Ellipsoid Height = -25.543m
Geoid99 Height = -26.806m



Adjusted Position Established by John Chance Land Surveys, Inc. for Louisiana Department of Natural Resources, CRD

APPENDIX XIV U.S. COAST GUARD NOTICE OF INTENT TO DREDGE INFORMATION REQUIREMENTS

8TH COAST GUARD DISTRICT MARINE INFORMATION SECTION OF THE AIDS TO NAVIGATION BRANCH. (504) 671-2327

FAX: (504) 671-2137
E-MAIL: d8marineinfo@uscg.mil

SECTOR OFFICES:

MOBILE: (251) 441-5999
NEW ORLEANS: (504) 365-2200
GLAVESTON: (713) 678-9055
CORPUS CHRISTI: (361) 939-6393

UPPER MISSISSPPI: (314) 269-2610
LOWER MISSISSIPPI: (866) 777-2784
OHIO VALLEY: (502) 779-5422

TIME LINE: PROVIDE THE REQUESTED INFORMATION IDEALLY 7 TO 10 DAYS PRIOR TO THE ACTIVITY.

INFORMATION REQUESTED:
ANY DREDGING OR OTHER OPERATIONAL ACTIVITY THAT IMPACTS THE SAFE NAVIGATION ON FEDERAL WATERWAYS.

1. DATES (INCLUSIVE) OF OPERATION.
2. HOURS OF OPERATION (24 HOURS/DAYLIGHT HOURS ONLY).
3. NAMES OF THE INVOLVED VESSEL(S).
4. WORKING AND STANDBY FREQUENCIES.
5. SPECIFIC LOCATION (MILE MARKER/BANK).
6. ANY SPECIFIC INSTRUCTIONS OR CONCERNS THAT WOULD BE PERTINENT TO THE MARINER.

NOTE: WE CAN ONLY PROVIDE INFORMATION. WE CANNOT DIRECT THE MOVEMENTS OF VESSELS. WE URGE THE MARINER TO ADHERE TO THE REQUESTED ACTIONS.

ACTION: THE COAST GUARD WILL ISSUE A BROADCAST NOTICE TO MARINERS AND/OR INCLUDE THE INFORMATION INTO THE APPROPRIATE LOCAL NOTICE TO MARINERS.

IF THE SITUATION DICTATES (LAST MINUTE CHANGES OR NOTIFICATION), A CALL TO MY OFFICE AND THE BROADCAST NOTICE TO MARINERS CAN BE ISSUED/CHANGED/MODIFIED.

APPENDIX XV LOUISIANA ADMINISTRATIVE CODE – TITLE 51

PROVIDED ELECTRONICALLY at the following link:

ftp://ftp.coastal.la.gov/CS-59%20Oyster%20Bayou%20Marsh%20Creation/Construction%20Documents/

APPENDIX XVI WATERLINE RELOCATION DETAILS

MECHANICAL JOINT RESTRAINT

1100 **MEGALUG®**

INSTALLED VIEW PRODUCT VIEW

MEGALUG® Mechanical Joint Restraint

The Series 1100 MEGALUG® Mechanical Joint Restraints effectively and economically restrain mechanical joints above or below ground, for practcally any application including valves, hydrants, and pipe. It can also be used on steel pipe and cast iron pipe when joining to mechanical appurtenances, see product brochure for more details on these pipes.

Available in sizes 3 inch through 48 inch.

PRODUCT BROCHURE

SAMPLE SPECIFICATION

CAD FILE

PRODUCT VIDEO

INSTALLATION VIDEO

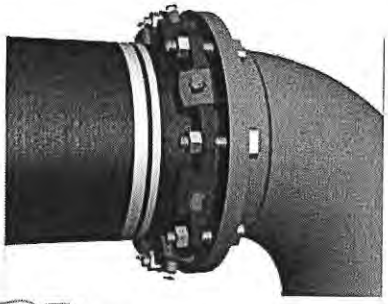
PIPE & DOZER VIDEO

RELATED DOCUMENTS

COLLECT AS PACKAGE

TECHNICAL PAPERS

MECHANICAL JOINT RESTRAINT



INSTALLED VIEW PRODUCT VIEW

1100 **MEGALUG®**

MEGALUG® Mechanical Joint Restraint

The Series 1100 MEGALUG® Mechanical Joint Restraints effectively and economically restrain mechanical joints above or below ground, for practcally any application including valves, hydrants, and pipe. It can also be used on steel pipe and cast iron pipe when joining to mechanical appurtenances, see product brochure for more details on these pipes.

Available in sizes 3 inch through 48 inch.

PRODUCT BROCHURE

SAMPLE SPECIFICATION

CAD FILE

PRODUCT VIDEO

INSTALLATION VIDEO

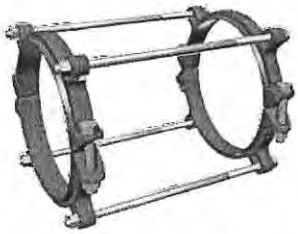
PIPE & DOZER VIDEO

RELATED DOCUMENTS

COLLECT AS PACKAGE

TECHNICAL PAPERS

PUSH ON PIPE JOINTS



INSTALLED VIEW PRODUCT VIEW

1600 **Split Serrated Restraint Harness**

Restraint Harness for AWWA C900 PVC Pipe Joints

The Series 1600 is a split serrated restraint harness for restraining C900 PVC Pipe Joints. It's comprised of one split serrated restraint ring that goes on the plain end or spigot end and a split non-serrated ring that goes on behind the bell. They are fastened into a harness by an array of thrust rods.

Available in sizes 4 inch through 12 inch.

PRODUCT BROCHURE

SAMPLE SPECIFICATION

CAD FILE

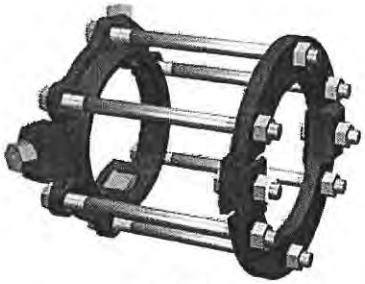
INSTALLATION VIDEO

RELATED DOCUMENTS

COLLECT AS PACKAGE

TECHNICAL PAPERS

PUSH ON PIPE JOINTS



INSTALLED VIEW PRODUCT VIEW

1700 **MEGALUG®** Harness

Restraint Harness for Ductile Iron Push On Pipe

The Restraint Harness consists of one Series 1100 MEGALUG Restraint and one split bell back up ring.

Available in sizes 4 inch through 48 inch.

PRODUCT BROCHURE

SAMPLE SPECIFICATION

INSTALLATION VIDEO

RELATED DOCUMENTS

COLLECT AS PACKAGE

TECHNICAL PAPERS

APPENDIX XVII DHH PERMIT

Bobby Jindal
GOVERNOR

Kathy H. Kliebert
SECRETARY

State of Louisiana

Department of Health and Hospitals
Office of Public Health

October 8, 2015

Attn: CB&I
Ms. Whitney C. Thompson, P.E.
4171 Essen Lane
Baton Rouge, LA 70809

Coastal Protection and Restoration Authority
Ms. Vida Carver, P.E.
P.O. Box 44027
Baton Rouge, LA 70804

Cameron Parish Waterworks Dist. 10
Mr. Mark Young
6246 Gulf Beach Hwy
Johnson Bayou, LA 70631

Re: Cameron Parish Waterworks Dist. 10, PWS ID# LA 1023005
- Oyster Bayou Marsh Restoration Project (CS-59) *(Proposed Waterline Relocation at LA Highway 27/82), lower approximately 60' section of 10" water line by 3'*

Cameron Parish
P-15-05-023-007

Dear Applicant:

Plans and specifications of the above named project have been reviewed and found to be in substantial conformity with applicable provisions of the Sanitary Code.

This permit refers to the sanitary features of the design only, and is not to be taken as an approval of structural details, except insofar as they may affect sanitation.

This permit is given with the stipulation that the distribution system and its improvements, will be owned, operated, and maintained by Cameron Parish Waterworks Dist. 10, (PWS1023005), 6246 Gulf Beach Hwy, Johnson Bayou, LA 70631.

The plans and specifications are being sent to the Cameron Parish Health Unit.

This permit is automatically canceled if construction of the project has not been started within two (2) years after the date of this letter.

After construction is completed, the responsible party for the design of the project shall submit a Confirmation Letter to this office certifying that the project was constructed in accordance with the plans and specifications approved by this office. As of February 1, 2007 this Confirmation Letter shall be required prior to occupancy.

If construction commences before a permit is granted, a Notice of Violation will be issued for the project. A letter of "no objection" will not be issued on any pre-constructed project unless the project fully complies with the requirements of the Sanitary Code.

In the event that it is determined at some point in the future that a design error escaped our detection during our review of these plans and specifications, that oversight shall not relieve you, the applicant, of the responsibility for complete compliance with the applicable requirements of the Louisiana Administrative Code [particularly, LAC 51 (Public Health Sanitary Code) and LAC 48 (Public Health – General), specifically including correcting the violations inadvertently overlooked.

At the direction of the State Health Officer,

Sincerely,

Steven R. Joubert, P.E.
Region V Engineering

cc: Jennifer Kihlken, P.E., District III Engineer
Dane Thibodeaux, Region V Sanitarian Director
Ryan King, Cameron Parish Sanitarian Manager

APPENDIX XVIII LDWF PERMIT

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

FILL MATERIAL LICENSE

LICENSE NO: WLF201624

In consideration of a royalty paid to the Department by the applicant, this license for the removal of fill material from water bottoms of the State of Louisiana is issued to:

Licensee Name and Address: CPRA/Vida Carver
P.O. Box 44027
Baton Rouge, LA 70804

License Site Location: South of Oyster Lake, Lat. 29°46'38", Long. 93°24'14", Cameron Parish

Project Description: Dredge 2,654,100 cubic yards of fill material and/or fill sand to create ~605 acres of saline marsh & 17,550ft. of earthen terraces for the CS-0059 Oyster Bayou Marsh Creation & Terracing Project

The rights and privileges shall begin on the 15th day of February 2016 and expires on the 31st day of December 2016. In the event that licensee reach the amount applied for prior the December 31st, 2016 the license will expire at that time.

The use of the fill material authorized for removal by this license is subject to the following restrictions:

1. *The Department of Wildlife and Fisheries shall be notified prior to removal of the material and again be notified upon completion of the project.*
2. *All provisions of the Fill Material License shall be adhered to.*
3. *This Certificate shall be posted in a conspicuous place at the project site during the activities authorized.*

Jimmy L. Anthony, Assistant Secretary