

**PINELLAS COUNTY  
PUBLIC WORKS**



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**Standard Technical Specifications  
for Roadway and Related Construction  
2002**



These Pinellas County Public Works Standard Technical Specifications, 2002, are hereby approved for application on roadway and related construction contracts as referenced in the contract documents, and shall apply as noted and amended by said documents.

Approved,

A handwritten signature in black ink, appearing to read "J. Keith Wicks". The signature is fluid and cursive, with a large initial "J" and "W".

J. Keith Wicks, P.E.  
Director of Public Works  
Pinellas County, Florida

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# **SPECIFICATIONS FOR ROADWAY AND RELATED CONSTRUCTION**

1-0100

## **Measurement and Payment**

The items of work and the pay item numbers specified in the Schedule of Values contained in the Proposal are identified specifically with the corresponding primary Section numbers of the Technical Specifications, and are hereby incorporated by reference as extensions of the corresponding Technical Specifications.

The pay item descriptions shown in the Specifications, as, for example, Asphaltic Concrete or Concrete, Class II, shall be deemed to include all additional descriptive wording shown on the Plans or in the Schedule of Prices for the respective pay items.

The contract price shown for the various pay items in the Schedule of Values contained in the Proposal upon which award of the Contract is based shall constitute full compensation for all work and materials described and specified in the Specifications for the respective pay items.

## **Abbreviations and Definitions**

*Contingency* – A pay item included for usage as directed by the Engineer, and for usage under conditions or circumstances unforeseen at the time of contract.

*FDOT* – The Florida Department of Transportation.

*ID* – Inside diameter, or dimension.

*PCED* – The Pinellas County Engineering Department.

*Schedule of Values* – The Schedule of Values contained in the Proposal (Division W).

*Ton* – A weight of two thousand (2000) pounds.

*FDOT Specifications* – *FDOT Standard Specifications for Road and Bridge Construction, 2000*

# MOBILIZATION

101-0100

The work specified under this Section consists of the preparatory work and operations in mobilizing to begin work on the project, including but not limited to those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site(s), and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, sanitary and other facilities as required by these specifications, special provisions, and state and local laws and regulations.

The Contractor shall furnish, install, and maintain station boards on one side of the project for the duration of the project. The station boards shall be 48 inch long, 1" x 4" lumber, painted white with 3 inch black stenciled numbers. Station boards shall be removed by the Contractor upon written notice of the Engineer.

The cost of bonds and any required insurance, consideration for indemnification to the County and the Engineer, and any other preconstruction expenses necessary for the start of the work, excluding the cost of construction materials, shall also be included in this Section.

## **Basis of Payment**

The work and incidental costs specified as being covered under this Section shall be paid for at the contract lump sum price, for Mobilization, in accordance with the following schedule:

<b>Percent of Original Contract Amount Earned</b>	<b>Allowable Percent of the Lump Sum Price for Mobilization</b>
5	25
10	50
25	75
50	100

When more than one project (separate Project Fund Number) is included in the Contract, the above percentages shall apply separately to each of the projects which has a separate pay item for Mobilization.

# MAINTENANCE OF TRAFFIC

102-0100

The work specified under this Section consists of the maintaining of vehicular and pedestrian traffic within the limits of the project for the duration of the construction period, in accordance with the requirements of Section 102 of the *FDOT Specifications*, as amended herein and in accordance with the Plans.

The road shall be kept open to two-way traffic for the duration of the construction period, except that, DURING NON-PEAK TRAFFIC PERIODS, one lane of traffic will be permitted provided that flagmen are used and prior approval is obtained from the County. The Contractor will not be permitted to isolate residences or places of business. Access shall be provided to all residences and all places of business whenever construction interferes with the existing means of access.

The Contractor shall furnish, erect and maintain all necessary traffic control and safety devices, in accordance with the Plans and *FDOT Roadway and Traffic Design Standards*, applicable edition, and the *State of Florida Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility Operations for Streets and Highways on the State Maintained Systems*, applicable edition, and shall take all necessary precautions for the protection of the work and the safety of the public for the duration of the construction period.

The work specified under this Section shall include removal of pavement markings, installation of pavement striping, markings and reflective markers, and all materials and construction necessary to create temporary connections for street, driveways and pedestrian traffic.

The applicable edition of the documents referenced herein shall be that edition of the respective documents specified in the Plans.

## **Basis of Payment**

The work specified under this Section shall be paid for at the contract lump sum price for Maintenance of Traffic.

The lump sum MOT shall be paid on a pro-rated monthly amount based on the contract time.

Unless specified for under a separate pay item, the lump sum item shall include all costs for Maintenance of Traffic shown in the Plans, including, but not limited to, the following temporary items:

Temporary Traffic Barricades

Temporary Pavement for Maintenance of Vehicular Traffic (Install & Remove)

Temporary Pavement for Maintenance of Pedestrian Traffic (Install & Remove)

## **MAINTENANCE OF TRAFFIC, CONTINUED**

102-0100

Temporary Pavement Markings, Pavement Striping and Reflective Markers

Temporary Traffic Control Signals

Temporary Curb (Includes Paint & Delineators)

Panels Arrow Advance

Temporary Vehicle Impact Attenuators

Temporary Variable Message Signs

Flagmen

Off Duty Law Enforcement Officer

Temporary Drainage

Commercial Materials for Driveway Maintenance

Temporary Concrete Barrier Wall (Including Mounted Lights-Type C Steady Burn)

# MAINTENANCE OF TRAFFIC

(Itemized)

102-1000

The work specified under this Section consists of the maintaining of vehicular and pedestrian traffic within the limits of the project for the duration of the construction period, in accordance with the requirements of Section 102 of the *FDOT Specifications*, as amended herein.

The road shall be kept open to two-way traffic for the duration of the construction period, except that, during non-peak traffic periods, one lane of traffic will be permitted provided that flagmen are used and prior approval is obtained from the County. The Contractor will not be permitted to isolate residences or places of business. Access shall be provided to all residences and all places of business whenever construction interferes with the existing means of access.

The Contractor shall furnish, erect and maintain all necessary traffic control and safety devices, in accordance with the Plans and *FDOT Roadway and Traffic Design Standards*, applicable edition, and the *State of Florida Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility Operations for Streets and Highways on the State Maintained Systems*, applicable edition, and shall take all necessary precautions for the protection of the work and the safety of the public for the duration of the construction period.

The work specified under this Section shall include all work shown in the Plans including, but not limited to, removal of existing pavement markings, installation and removal of pavement striping, markings and reflective markers, and all materials and construction necessary to create temporary connections for street, driveways and pedestrian traffic. The pay item for "Maintenance of Traffic – Lump Sum" shall include all work necessary for maintenance of vehicular traffic and pedestrian traffic, unless otherwise specified to be paid for under other items of work. Payment for pavement markings to be used during maintenance of traffic shall be paid for under Sections 706-710 of these specifications.

The applicable edition of the documents referenced herein shall be that edition of the respective documents specified in the Plans.

## **Basis of Payment**

The work specified under this Section shall be paid for in accordance with the following individual pay items:

Maintenance of Traffic (lump sum)

The lump sum MOT shall be paid on a pro-rated monthly amount based on the contract time.

Off Duty Law Enforcement Officer (per man hour)

Traffic Control Signal (Temporary) (per day)

## **MAINTENANCE OF TRAFFIC, CONTINUED**

(Itemized)

102-1000

Asphalt Curb (Temporary) (per linear feet) (includes paint & delineators)

Commercial Materials for Driveway Maintenance (per Cubic Yard)

Concrete Barrier Wall (Temporary) (per linear foot) Note: The pay item for Concrete Barrier Wall (Temporary) shall include Mounted Lights – Type C Steady Burn.

Panels Arrow Advance Warning (per day)

Vehicle Impact Attenuator (Temporary) (per day)

Variable Message Sign (Temporary) (per day)

Asphalt pavement (Temporary) (install & remove) (per square yard)

Asphalt pavement (Temporary) for pedestrian (install & remove) (per square yard)

# WATER FOR DUST CONTROL

102-5000

The work specified under this Section consists of the furnishing and application of Water on the construction area including but not limited to sub-grade, unsurfaced base, or other unsurfaced traveled ways, in order to control dust resulting from construction operations. The locations and frequency of application shall be as directed by the Engineer.

The pay item for Water for Dust Control is included in the project as a contingent item.

## **Basis of Payment**

The work specified under this Section shall be paid for at the contract unit price per thousand gallons of Water for Dust Control.

# **PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION**

The work specified under this Section shall consist of the furnishing and application of measures required to control erosion on the project and in areas where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects of public or private property adjacent to the project right of way and damage to work on the project. These measures will consist of construction and maintenance of temporary erosion control features including baled hay or straw, silt fences, floating turbidity barriers, staked turbidity barriers, rock bags, or as otherwise shown on the Plans or Stormwater Pollution Prevention Plan (SWPP). The furnishing and application of these measures shall be in accordance with Section 104 of the *FDOT Specifications*, as amended herein, and, where specified herein or on the Plans, applicable standard drawings of the *FDOT Roadway and Traffic Design Standards*.

The work shall consist of the construction of baled hay or straw dams across water flow paths, and the placement of baled hay or straw barriers around drainage structures during the construction thereof, to protect against downstream or lateral accumulations of silt and debris. The dams shall be placed so as to effectively control silt and debris dispersion under the conditions present on the project, or any conditions created during construction activities, which might tend to produce erosion or the accumulation of silt and debris. Silt fences and turbidity barriers shall be constructed in accordance with the details shown in the Plans, or as may be directed by the Engineer, in a manner such as to insure the adequate performance of their intended function.

The Contractor shall inspect on a daily basis and re-establish, at no additional expense to the County, all baled hay or straw dams, silt fences, turbidity barriers, rock bags or sections thereof, which may become damaged, destroyed or otherwise rendered unsuitable for their intended function during the construction of the project.

The work specified under this Section shall include the installation and inspection, re-establishment and maintenance of all required baled hay or straw dams, silt fences, turbidity barriers and rock bags, and all other work required to control effectively the downstream or lateral accumulation of silt and debris, control erosion, reduce suspended solids in downstream waters, and the removal of all such temporary erosion control facilities upon completion of the project. The work specified under this Section shall include the removal and proper disposal of debris, sediment, etc, which accumulates against erosion control or turbidity barriers. It will also include the removal of the erosion control barriers after construction is deemed complete.

Re-establishment and maintenance as described above, shall be performed within twenty-four (24) hours after receiving notice by the Engineer. For each day following the twenty-four (24) hour period the deficiency is not

# **PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION, CONTINUED**

104

corrected, the Contractor shall be assessed an amount of Five Hundred (\$500.00) dollars per day. Payment to the County of said sums may become payable under the provisions of this article and shall be made by identifying said sums as a credit item on the Contractor's monthly pay estimate.

## **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of tons of Baled Hay or Straw, linear feet of Silt Fences, linear feet of Floating Turbidity Barriers or Staked Turbidity Barriers, each of Rock Bags, actually constructed, placed and accepted, as authorized by the Engineer, and maintained to the satisfaction of the Engineer for the duration of the construction period.

# CLEARING AND GRUBBING

The work specified under this Section consists of the clearing and preparation of sites for proposed construction, in accordance with the requirements of Section 110 of the *FDOT Specifications*, as amended herein.

The work specified under this Section shall include the removal and off-site disposal of all trees indicated on the Plans to be removed, the removal and off-site disposal of all brush, stumps, roots, rubbish and debris, and all obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas, the removal and off-site disposal of all existing facilities, structures and pavement indicated on the Plans to be removed, plugging of water wells, and the removal and off-site disposal of all buildings, structures, appurtenances, and other facilities necessary to prepare the area for the proposed construction.

All buildings, structures, utilities and other obstructions indicated on the Plans to remain shall be carefully protected against displacement or damage.

Except as otherwise provided for in these Specifications, the work to be performed under this Section shall also include the clearing and grubbing necessary for the excavation of detention ponds, borrow pits, and the like, and the clearing and grubbing necessary for the construction of designated haul routes.

Included under this Section shall be the removal and off-site disposal of all product and debris except that which is to be salvaged or which is required to complete the construction of the project.

Whenever it is necessary to cut for removal large roots of trees to be preserved, the roots to be cut shall be cleaned prior to cutting and cut with a saw. Cut shall be smooth without jagged edges.

The Contractor shall make his own inspection to determine the character, density and extent of trees, vegetation and other items subject to removal and disposal under these provisions. The attention of the Contractor is directed to the fact that the burning of debris resulting from clearing and grubbing operations shall not be permitted within County-owned lands or rights-of-way.

Nothing in these provisions shall be construed to authorize the removal or disturbance of any tree or other form of vegetation, or any marine, land or air creature natural habitat, which may be subject to the jurisdiction of regulatory agencies.

## **Basis of Payment**

The pay quantity shall consist of all clearing and grubbing required in connection with the construction of the project, performed to the satisfaction of the Engineer. The pay quantity for the work specified under this Section shall be one lump sum quantity.

# **EXCAVATION AND EMBANKMENT**

120

The work specified under this Section consists of the excavation and embankment required for completion of the project. All work specified under this Section shall conform to the requirements of Section 120 of the *FDOT Specifications*, except as amended herein.

Excavation specified under this Section shall include the excavation and removal of all existing materials, debris, obstructions, structures and utilities encountered during excavation, except where designated in the Plans or Specifications to remain, between the original ground or top of existing pavement and the surface of the completed earthwork, within the limits shown in the Plans. Fill material, borrow material, and embankment shall consist of suitable earthen material acceptable to the Engineer. Ownership of all suitable excavated material shall remain with the County until all earthwork requirements for the project have been fulfilled. Except as otherwise provided for in the Plans and Specifications, all surplus material and other items not claimed by the County shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor. The Contractor shall not over-excavate a construction site below the elevations shown in the Plans and Permits, unless specifically pre-approved by the County.

**EXCAVATION OF UNSUITABLE MATERIAL** specified under this Section consists of the removal of muck, clay, rock and all other types of unsuitable material and shall include the furnishing, placement and compaction of fill material as replacement for unsuitable material.

The location and quantity of unsuitable material is estimated, and is approximate only. The removal of unsuitable material may be required at additional locations to be determined in the field by the Engineer. For roadway construction in general, unsuitable material shall be removed to a minimum depth of four (4) feet below proposed centerline grade, or as directed by the Engineer in the field. In areas adjacent to existing structures, the Contractor shall remove unsuitable material to a minimum depth of four (4) feet below proposed grade, or as directed by the Engineer, and backfill immediately with suitable material.

**EXCAVATION OF DETENTION POND AND/OR MITIGATION AREA** specified under this Section shall include all excavation required for the construction of detention ponds, mitigation areas, reservoirs and other facilities of a similar nature and also shall include all grading, the preparation of side slopes, compacting as required, final dressing and all incidental work required for the construction of detention ponds.

Unless otherwise provided for in these Specifications, the work to be performed under this Section shall include the hauling, to designated sites, of all material which may remain the property of

## **EXCAVATION AND EMBANKMENT, CONTINUED**

the County, and the stockpiling, compaction, and shaping of such material to the template lines shown in the Plans or as directed by the Engineer. Except as otherwise provided for in the Plans and Specifications, all surplus material and other items not claimed by the County shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor. Pay item for excavation of detention pond shall include the excavation of unsuitable materials.

**FILL MATERIAL** Work specified under this Section consists of the placement and compaction of fill material for such purposes as filling of ditches and channels, and the filling of substantial voids and depressions. The fill material used to replace excavated unsuitable material shall be paid under "excavation of unsuitable material."

The work specified under this Section shall include the shaping, compaction and dressing of material to the condition required for the placement of embankment, bedding, pavement or other material, and where required, to the slopes and tolerances normally associated with final grading operations, such as required for seeding and the placement of sod. The work specified under this Section shall include the furnishing of all required borrow material. Borrow material shall be furnished from areas provided by the Contractor, and shall be approved by the Engineer prior to placement.

For limits of payment, where no other material, such as embankment, pavement, bedding or other select material, is to be constructed over fill material, the limits of payment for Fill Material shall extend from the line of contact between Fill Material and original ground or completed excavation to the finished earthwork lines for Fill Material shown in the Plans. Where embankment is to be constructed directly over Fill Material, the limits of payment for Fill Material shall extend from the line of contact between Fill Material and original ground or completed excavation to the straight line connecting the highest points of original ground to which Fill Material is to be placed. Where bedding or other select material is to be constructed directly over Fill Material, the limits of payment for Fill Material shall extend from the line of contact between Fill Material and original ground or completed excavation to the bottom line of bedding or select material, whichever is first encountered. Where pavement is to be constructed directly over Fill Material, the limits of payment for Fill Material shall extend from the line of contact between Fill Material and original ground or completed excavation to the bottom line of Stabilization, Base material or pavement, whichever is first encountered. The limits of payment defined above shall be adjusted as necessary by the Engineer to exclude payment for such quantities of suitable fill material, measured in cubic yards after placement and compaction, as may be available

## **EXCAVATION AND EMBANKMENT, CONTINUED**

as surplus material on the project site.

**BORROW MATERIAL** work in this Section provides for the payment for borrow material for the construction of embankment, fill and backfill, and miscellaneous grading required for the completion of the project.

The work specified under this Section consists of the furnishing of such borrow material as may be required, and the placement, compaction, shaping and dressing of such material to the lines and grades shown in the Plans, and to the lines and grades specified by the Engineer for such additional work as he may authorize and direct outside the limits shown in the Plans. Borrow material shall be furnished from areas provided by the Contractor, and shall be approved by the Engineer prior to placement.

**EMBANKMENT** work specified under this Section consists of the furnishing and placement of embankment material where such work involves the construction of side slopes, and the shaping and dressing of material to neat lines conforming to definite geometric configurations, such as required in the construction of berms, roadbeds and other embankments, and the reshaping of ditches, stream channels and pond bottoms, etc.

Where grading operations outside the limits shown in the Plans require the placement, compaction, shaping and dressing of fill material for the completion of the project, and where no separate pay items for such work are provided in the Schedule of Values, such work, including the furnishing of borrow material, shall be included under this Section. Borrow material shall be furnished from areas provided by the Contractor, and shall be approved by the Engineer prior to placement. The limits of payment for Embankment shall extend from the line of contact with original ground or Fill Material to the finished earthwork lines shown in the Plans. Where pavement is to be constructed over Embankment the upper limit of payment for Embankment shall be the bottom line of Stabilization, Base material or pavement, whichever is first encountered.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values as a lump sum quantity, the pay quantity shall consist of all work described and specified herein which may be required in connection with the construction of the project, performed to the satisfaction of the Engineer. Unless specified to be paid for at the lump sum price, the work specified under this Section shall be paid for at the contract price per cubic yard.

## **EXCAVATION AND EMBANKMENT, CONTINUED**

120

For FILL MATERIAL, payment shall be made only for the furnishing and placement of such quantities of fill material as may be required in excess of suitable material available on the project site as surplus material.

For FILL MATERIAL AND BORROW MATERIAL, the pay quantity for work specified herein shall be the number of cubic yards of material actually furnished, as determined by field measurement of the compacted in-place material, and accepted by the Engineer.

FOR BORROW MATERIAL, at the discretion of the Engineer, the material furnished under this Section may be measured in its loose state and the volume thereof converted to the equivalent volume of compacted in-place material. In such case a shrinkage factor of 35% shall be assumed, and the equivalent volume of compacted in-place material shall be taken as the volume of the material in its loose state multiplied by the factor 0.74074.

For EMBANKMENT, the work specified herein shall be paid for under the pay items shown in the Schedule of Values for Embankment. All quantities shown in the Plans or the Schedule of Values shall be the theoretical quantities calculated, with no factor applied for shrinkage, losses due to clearing and grubbing, or any other consideration. It shall be the responsibility of the Contractor to address the various factors affecting the cost of the completed work, and to include in the unit bid price the costs associated with such factors.

If the schedule of values does not provide a specific pay item for the aforementioned work, then the work shall be included in the pay item for grading (lump sum).

# GRADING

120-1100

All work specified under this Section shall conform to the requirements of Sections 110 and 120 of the *FDOT Specifications*, except as amended herein.

Except for that work excluded under other provisions of this Section, and except as provided for under other Sections of these Specifications, the work to be performed under this Section shall consist of all excavation, the furnishing, placement and compaction of all embankment and fill material, all grading of roadway shoulders and ditches, the construction or rechannelization of all ditches and swales, all graded road connections, the shaping or reshaping of slopes, all final dressing, and all other earthwork operations required for the completion of the project. The Contractor shall not over-excavate a construction site below the elevations shown in the Plans and permits, unless specifically pre-approved by the County.

Unless otherwise provided for, all borrow material required for the completion of work performed under this Section shall be furnished by the Contractor from areas provided by the Contractor.

When the project includes the construction of Road Base, the work performed under this Section shall include also the furnishing, placement and compaction of all embankment material required between existing ground and the bottom of the Road Base.

The work to be performed under this Section shall not include the excavation of unsuitable material, or the furnishing or placement of borrow material as replacement for unsuitable material, or other items of work for which separate payment is to be made, but shall include the placement and compaction of suitable fill material as replacement for unsuitable material where suitable fill material is available as surplus material from the project site.

Ownership of all suitable material shall remain with the County until all earthwork requirements for the project have been fulfilled. Except as otherwise provided for in the Plans and Specifications, all surplus material and other items not claimed by the County shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor.

## **Basis of Payment**

The pay quantity for work specified under this Section shall be one lump sum quantity which shall include all work described and specified herein.

# **DREDGING**

120-1200

The work specified under this Section consists of the excavation of submerged channels by the use of drag lines or by methods of hydraulic dredging.

Dredging by the use of drag lines or other non-hydraulic methods shall be classified as regular dredging.

Dredging by hydraulic methods shall be classified as hydraulic dredging.

All dredging operations shall conform to the applicable requirements of Section 120 of the *FDOT Specifications*, as amended herein, and shall be performed in accordance with all provisions and conditions of all permits issued for dredging operations on this project.

## **Basis of Payment**

The quantity to be paid for under this Section shall be one lump sum quantity which shall include all items of work described and specified for:

Dredging, Regular

Dredging, Hydraulic

# **FLOWABLE CONCRETE FILL**

121

All work specified under this Section shall conform to the requirements of Section 121 of the *FDOT Specifications*, except as amended herein. The work specified under this Section consists of the furnishing and application of Flowable Concrete Fill, as shown on the Plans, and as directed by the Engineer. The unit price shall include all excavation to the springline of pipe, disposal of excess excavated soil, formwork if required, placement of flowable fill and all other operations required to protect the pipe. This Section shall include all cost of the mixture, any ad-mixtures, cost for delivery, labor and finishing for Excavatable or Non-Excavatable Flowable Concrete Fill, as specified in the Plans. Any clean fine aggregate with 100% passing a 3/8 inch mesh sieve and not more than 10% passing the 200 mesh sieve may be used for the Fine Aggregate. High air generators or foaming agents may be used in lieu of conventional Air Entraining Admixtures and may be added at jobsite and mixed in accordance with manufacturer's recommendation.

## **Mix Design**

Flowable Concrete Fill is a mixture of Portland cement, fly ash, fine aggregate, air entraining admixture and water. Flowable Concrete Fill contains a low cementitious content for reduced strength development. Submit mix designs to the Engineer for approval. If conditions warrant, an anti-washout admixture shall be added to the mix design at the dosage rate of 3 gallons per cubic yard. This is an add-on product and must be specified when ordering.

## **Production and Placing**

Deliver Flowable Concrete Fill using concrete construction equipment. Place Flowable Concrete Fill by chute, pumping or other methods approved by the Engineer. Revolution counter requirements are waived.

## **Construction Requirements**

Use straps, soil anchors or other approved means of restraint to assure correct alignment when Flowable Concrete Fill is used as backfill for pipe or where flotation or misalignment may occur. Place Flowable Concrete Fill to the designated fill line without vibration or other means of compaction. Do not place Flowable Concrete Fill during inclement weather, e.g. rain or ambient temperatures below 40° F. Take all necessary precautions to prevent any damages caused by the hydraulic pressure of the fill during placement prior to hardening. Provide the means to confine the material within the designated space.

## **Acceptance**

Leave the fill undisturbed until the material obtains sufficient strength. Sufficient strength is 200 psi penetration (maximum 250 psi) resistance as

## **FLOWABLE CONCRETE FILL, CONTINUED**

120

measured using a hand held penetrometer in accordance with FM 1-T 197. Provide a hand held penetrometer to measure the penetration resistance of the hardened Flowable Concrete Fill.

### **Basis of Payment**

When the item of Flowable Concrete Fill is included in the Contract, payment will be made at the contract unit price per cubic yard. Such price and payment will include all cost of the mixture, in place and accepted, determined as specified above. No measurement and payment will be made for material placed outside the neat line limits or outside the adjusted limits, or for unused or wasted material.

# **BEDDING MATERIAL**

125-3000

## **CRUSHED STONE**

The work specified under this Section consists of the furnishing and placement of crushed stone as bedding and backfill material for concrete pipe culvert and standard drainage structures.

The crushed stone used under this Section shall be of the Size Number specified in the Plans and shown in the table "Standard Sizes of Coarse Aggregate" contained in Section 901-1.4 of the *FDOT Specifications*, and shall be placed in accordance with the Plans or placed to a thickness of 10 inches unless otherwise directed by the Engineer. For drainage structures, the bedding material shall extend beyond the outside the bottom dimensions of the structure for a distance of 12 inches, or as shown in the Plans or as directed by the Engineer. For pipe and box culverts, the bedding is to be extended for a distance of 12 inches beyond the outside diameter or width of the culvert, or as shown in the Plans, or as directed by the Engineer.

No payment will be allowed for select bedding material, which might be utilized for convenience in lieu of dewatering.

### **Basis of Payment**

The pay quantity for work specified under this Section shall be the number of tons of crushed stone, of the various sizes specified, actually placed and accepted.

The tonnage to be paid for shall be determined from batch weights, truck scale weights, volume measurements or other methods approved by the Engineer

# **STABILIZATION**

## **TYPE B**

The work specified under this Section consists of the stabilizing of designated portions of the roadbed to provide a firm and unyielding subgrade, in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer. The construction of stabilized roadbed shall conform to the requirements of Section 160 of the *FDOT Specifications*, as amended herein.

Premixed Stabilization shall be required when proposed pipe culvert falls within area to be stabilized.

The work specified under this Section shall include the furnishing and placement of all stabilizing material required, and all mixing, shaping and compacting of the stabilized area.

Unless specifically authorized in writing by the Engineer, the Engineer will determine compliance with the bearing value requirements by the Limerock Bearing Ratio (LBR) method (FM 5-515), including Sections 6.0 and 6.1, specifying that the material will be soaked prior to penetration. The under-tolerance for a Specified Bearing Value of LBR 40 shall be 2.0.

The material utilized for type B stabilized subgrade, either existing or imported material, in addition to the 'select stabilized material,' shall be suitable material having a plasticity index less than ten and a liquid limit less than 40.

The Engineer will conduct materials testing during construction. The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether the work performed and materials used are in accordance with the requirements and intent of the Plans and Specifications. Certain tests (e.g., Limerock Bearing Ratio Tests) performed may require a number of days (four to six) for the test results to be obtained by the Engineer. If the test results indicate that the material represented by the test is not in accordance with the Plans and Specifications, all such materials, whether in place or not, will be rejected. The bearing value determined by the initial LBR test will be used to determine compliance with Specifications, and an additional 'verification' test will not be performed unless otherwise authorized by the Engineer. Unless otherwise permitted by the Engineer, the Contractor shall correct the material in non-compliance by additional work performed or replacement of the material.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Stabilization, Type B, at the thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

# ROADWAY BASE

200-1000

## **LIMEROCK**

The work specified under this Section consists of the construction of roadway base utilizing limerock on prepared subgrade, in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer. The construction of Limerock Base shall conform to the requirements of Section 200 of the *FDOT Specifications*, as amended herein.

The Engineer will conduct materials testing during construction. The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether the work performed and materials used are in accordance with the requirements and intent of the Plans and Specifications. Certain tests (e.g., Limerock Bearing Ratio Tests) performed may require a number of days (four to six) for the test results to be obtained by the Engineer. If the test results indicate that the material represented by the test is not in accordance with the Plans and Specifications, all such materials, whether in place or not, will be rejected. Unless otherwise permitted by the Engineer, the Contractor shall correct the material in non-compliance by additional work performed or replacement of the material.

The construction of Limerock Base under this Section shall also include the furnishing and application of a bituminous material prime coat conforming to the requirements set forth in Section 3 of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

The material will be inspected, tested and approved by the Engineer prior to incorporation in the work. Any work in which material not previously approved is used, shall be performed at the Contractor's risk and may be considered as unauthorized and unacceptable and not subject to the payment provisions of the contract. Upon delivery to the project site, the material will be sampled and tested by the Engineer or a duly authorized, qualified representative of the Engineer in accordance with Pinellas County Limerock Sampling Procedures and Guidelines, or as so directed by the Engineer.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Roadway Base, Limerock, at the thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

# ROADWAY BASE

## **RECYCLED CRUSHED CONCRETE/GRADED AGGREGATE**

The construction of recycled crushed concrete/graded aggregate shall conform to the requirements of Section 204 of the *FDOT Specifications*, as amended herein.

The work specified under this Section consists of the construction of roadway base utilizing crushed concrete on prepared subgrade, in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

The construction of Crushed Concrete Base shall conform to the requirements of this Section, or, in lieu thereof, such requirements as may be established by the Engineer during construction. The Engineer shall have full authority to modify the provisions of this Section as deemed necessary, in his opinion, to meet field conditions and requirements.

The construction of roadway base under this Section shall include also the furnishing and application of a bituminous-material prime coat conforming to the requirements set forth in Section 3 of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

## **MATERIALS**

### **Composition**

Base material shall conform to the following gradation:

<b>SIEVE SIZE</b>	<b>PERCENT BY WEIGHT PASSING</b>
2"	100
1 1/2"	95-100
3/4"	65-90
3/8"	45-75
No. 4	35-60
No. 10	25-45
No. 50	5-25
No. 200	0-10

Material for Crushed Concrete Base shall consist only of crushed concrete and such additive materials as may be approved by the Engineer for the purpose of facilitating construction and achieving the desired characteristics of the finished in-place product. Material which shows a significant tendency toward adverse chemical or physical change on exposure to moisture will not be acceptable. The material shall be free of any Ferrous Metals.

### **RECYCLED CRUSHED CONCRETE/GRADED AGGREGATE, CONTINUED**

#### **Mechanical and Physical Properties**

The material shall not contain lumps, balls, or pockets of sand or clay material in size or quantity sufficient to be detrimental to the proper bonding, finishing, or strength of the crushed concrete base.

The specific mechanical and physical properties of crushed concrete aggregate and any additive materials permitted in the construction of Crushed Concrete Base under this contract shall be determined on the basis of test results as the work progresses. The finished in-place product shall provide at least an LBR of 100 or greater.

### **CONSTRUCTION**

#### **Placement and Spreading of Material**

The material shall be transported to the point where it is to be used, over crushed concrete previously placed where possible, and dumped at the end of the preceding spread. Hauling over the subgrade, or dumping on the subgrade for further placement operations, will be permitted only when, in the opinion of the Engineer, such procedures will not adversely affect the integrity of the completed base and subgrade.

Spreading shall be accomplished by mechanical spreaders capable of producing an even distribution of the crushed concrete aggregate. Spreading by other means shall be permitted only where and as directed by the Engineer.

#### **Base Courses**

The minimum thickness of the Crushed Concrete Base constructed under this contract shall be as shown on the Plans.

#### **Compacting and Finishing Requirements**

After spreading is completed the crushed concrete shall be uniformly compacted, with water being added as required, to a density of not less than ninety eight (98%) of the maximum density as determined by AASHTO T-180. During final compaction operations, if the blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to the performance of density tests on the finished base.

#### **Priming and Maintaining**

The prime coat shall be applied only when the base meets the required moisture and density requirements. At the time of priming, the base shall be firm, unyielding, and in such condition that no undue distortion will occur.

## **ROADWAY BASE, CONTINUED**

204

### **CONSTRUCTION, CONTINUED**

The Contractor will be responsible for insuring that the true crown and template of the base are maintained, with no rutting or other distortion, and that the base meets all requirements at the time the surface course is applied.

### **Correction of Defects**

All defects in materials and construction shall be corrected by the Contractor, at his expense, and to the satisfaction of the Engineer, as the work progresses.

### **Testing**

The County shall be responsible for all testing performed in connection with the construction of the base under this contract.

### **Basis of Payment**

The pay quantity for work performed under this Section shall be the number of square yards of Roadway Base, Recycled Crushed Concrete/Graded Aggregate, at the total thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

# ROADWAY BASE

270

## **SOIL-CEMENT**

The construction of roadway base under this Section shall comply with the requirements of Section 270 of the *FDOT Specifications*, as amended herein, and the details and notes shown on the Plans.

The work specified under this Section consists of the construction of roadway base, composed of a combination of **SOIL** (meeting the requirements of Section 270), **PORTLAND CEMENT** (meeting the requirements of Section 921) and **WATER**; proportioned, mixed, shaped, compacted, finished and cured in accordance with these Specifications and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown in the Plans. The soil-cement mixture shall have a compressive strength of 300 psi to 400 psi and be processed by either the mixed-in-place method or the central-plant-mixed method except when the Plans specifically require the central-plant-mixed method.

**LIMEROCK MATERIAL** meeting the requirements of Section 911 may be used in lieu of soil. There shall be no separate pay item for limerock material.

The subgrade on which soil-cement base is to be constructed shall be stabilized in accordance with the details and notes shown on the Plans, prior to the construction of the soil-cement base.

The construction of Soil-Cement Base under this Section shall include also the furnishing and application of a bituminous material prime coat conforming to the requirements set forth in Section 3 of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Roadway Base, Soil-Cement, at the thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

# ASPHALTIC BASE COURSES

280

## **ABC-PC-1**

The work specified under this Section consists of the construction of asphaltic base course, in accordance with the requirements of Section 280 of the *FDOT Specifications*, as amended herein, utilizing Asphaltic Concrete Type PC1 in accordance with the applicable provisions of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

The work specified under this Section includes the furnishing of material for, and the application of, all required tack coats.

Asphaltic concrete base course shall be constructed in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Asphaltic Base Course, Type PC1, at the thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

When the quantity for a pay item under this Section is to be paid for per ton, the weight of the mixture shall be determined from batch weights, truck scale weights or other methods approved by the Engineer. Delivery tickets, in duplicate, signed by a sworn weigher, shall accompany each load of material to the project site. One copy of the delivery ticket shall be retained by the Contractor, and one copy shall be delivered to the Engineering Inspector. The total number of tons reflected in one set of all delivery tickets collected by the Inspector shall be the measured pay quantity.

### **Basis of Payment Adjustment For Asphaltic Cement**

The bid unit price for asphaltic concrete materials will be adjusted in accordance with applicable provisions and requirements of the *FDOT Specifications*, Section 9-2.1.1 and *FDOT Road and Bridge Supplemental Specifications*, as amended herein.

For the purposes of unit price adjustment determination, the following conditions shall be applicable:

- 1) *The Bituminous Material, Asphalt Price Index* (herein referred *API*) published monthly by the FDOT shall be used for the adjustment of unit prices in accordance with FDOT Specification 9-2.1.1. The FDOT *API* in effect at the bid opening date will be used for initial determination of asphaltic material price.

## ASPHALTIC BASE COURSES, CONTINUED

280

- 2) The formula referenced in FDOT Section 9-2.1.1, Paragraph (d) shall be modified as follows:
- $P_a = AC_q (I_d \ 1.05 I_b)$  during a period of increasing prices.  
 $P_a = AC_q (I_d \ 0.95 I_b)$  during a period of decreasing prices.  
 $P_a$  = Price adjustment for bituminous material, in dollars.  
 $AC_q$  = Quantity of Asphalt Cement, in gallons.  
 $I_b$  = **API** during the month in which bids were opened for this contract.  
 $I_d$  = **API** during the month material is incorporated into the project.
- 3) Asphaltic Concrete, for which the unit price is per square yard, shall be assumed to weigh one hundred (100) pounds per inch of thickness per square yard and asphaltic cement to weigh 8.58 pounds per gallon. With concurrence from the Contractor, in order to simplify calculations, the Engineer shall have the option of determining the Price Adjustment based on either square yards of actual installed material or tons of actual installed material.
- 4) Calculation of  $AC_q$  (Quantity of Asphalt Cement) shall be based on the Contractor's approved mix design Asphalt Content, percentage by weight of total mix.
- 5) No adjustment in bid prices will be made for either tack coats or prime coats.
- 6) Price adjustment shall be calculated and recorded as the bituminous material is incorporated into the project, however, the actual price adjustments will be processed on the contract's Final Change Order as a separate lump sum change order item.

# **ASPHALTIC CONCRETE FRICTION COURSE**

337

## **FDOT TYPES FC-2, FC-3, FC-5, FC-6**

The work specified under this Section consists of the overlaying of prepared roadway surfaces with an asphaltic concrete surface course identified in the *FDOT Specifications* as Asphaltic Concrete Friction Course.

The materials for and the construction of Asphaltic Concrete Friction Course shall conform to the requirements of Section 337 of the *FDOT Specifications*, as amended herein.

The work specified under this Section includes the furnishing of material for, and the application of, all required tack coats.

Asphaltic Concrete Friction Course shall be constructed in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

When the Bid Item Number specifies the quantity of the item in Square Yards, the "overlay" exception referenced in *Pinellas County Specifications for Hot Bituminous Mixtures, Plants Methods, Equipment and Construction Methods*, latest edition, Section 3-15.8 does not apply to acceptance and payment for asphaltic concrete under this section.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Asphaltic Concrete Friction Course of the type and thickness specified in the applicable pay item, actually constructed and accepted.

# **PAVEMENT**

350-0200

## **CEMENT CONCRETE DRIVEWAYS**

The work specified under this Section consists of the furnishing and placement of cement concrete pavement for the construction or restoration of driveways and driveway aprons, and the construction or restoration of concrete sidewalk across driveways.

Cement concrete pavement used for the work specified under this Section shall consist of Class I concrete, reinforced with 6 X 6 – W1.4xW1.4 welded wire fabric, placed on compacted subgrade. Concrete pavement for driveways, driveway aprons and sidewalk across driveways shall have a minimum thickness of six (6) inches.

Materials and construction shall conform to the requirements of Section 350 of the *FDOT Specifications*.

The Engineer may direct that the specified pavement thickness be increased to meet loading requirements identified in the field. In such cases the additional quantities shall be converted to the number of square yards corresponding to the specified thickness, and payment shall be made at the contract price per square yard for the specified thickness.

The work specified under this Section shall include the furnishing and placement of all forms, pavement, welded wire fabric and incidental accessories, and all grading, compaction and other incidental work not paid for under other pay items.

### **Basis of Payment**

The pay quantities for work specified under this Section shall be the number of square yards of Pavement, Cement Concrete (Driveways), of the various thickness' specified in the applicable pay items, actually constructed and accepted.

# **CONCRETE**

350-0201

## **WARNING STRIP**

The work specified under this Section consists of the furnishing and placement of concrete for warning strip. Concrete pavement used for the work specified under this Section shall consist of Class I concrete, reinforced with 6 X 6 – W1.4xW1.4 welded wire fabric, placed on compacted subgrade. Concrete warning strips shall have a minimum thickness of six (6) inches. Materials and construction shall conform to the requirements of Section 350 of the *FDOT Specifications*. A broom finish shall be applied unless otherwise directed by the Engineer.

The work specified under this Section shall include the furnishing and placement of all forms, pavement, welded wire fabric and incidental accessories, and all grading, compaction and other incidental work not paid for under other pay items.

### **Basis of Payment**

The pay quantities for work specified under this Section shall be the number of square yards of Concrete Warning Strips, actually constructed and accepted.

# **DRIVEWAY RESTORATION**

353

## **IN KIND**

The work specified under this Section consists of the restoration in kind of existing driveways, other than concrete and asphalt/limerock driveways, disturbed during construction, including the furnishing and placement of materials for the restoration in kind of driveways and driveway aprons, and the restoration of existing sidewalk across driveways.

Restoration of concrete and asphalt/limerock driveways shall not be paid under this Section when separate pay items for concrete and asphalt/limerock driveways are provided in the Contract. However, if separate pay items for concrete and asphalt/limerock driveways are not provided in this contract, then this Section shall also include restoration of concrete and asphalt/limerock driveways.

The work specified under this Section includes the furnishing and placement of all materials, and the construction of all forms, joints, bracing, expansion joint materials, wire fabric reinforcement, reinforcing steel, accessories, the application of required surface finishes, all required clearing and grubbing, excavation and backfilling and cleaning up after the work is completed, and all other required work necessary to complete restoration in kind of existing driveways

### **Basis of Payment**

The pay quantity for work specified under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of driveways, actually restored and accepted.

# **MILLING AND RESURFACING OF EXISTING ASPHALTIC CONCRETE PAVEMENT AND ROADWAY BASE**

380

The work specified under this Section consisting of the removal of existing asphaltic concrete pavement and roadway base, and the application of new surface course(s), shall conform to the requirements of Section 327 of the *FDOT Specifications*, as amended herein.

## **MILLING OPERATIONS**

### **A. Equipment**

The equipment for the milling operation shall include a machine capable of maintaining a depth of cut and cross slope which will achieve the results specified herein. The machine shall be equipped with automatic grade controls which operate by sensing from one or more skids moving along the pavement surface, and which shall produce, where required, a skid-resistant surface texture. The machine shall be equipped with a means to effectively limit the amount of dust escaping from the removal operation. Special attention is directed to the fact that, if the machine is equipped with preheating devices, local environmental and other regulations governing operation of this type of equipment may vary considerably from place to place. It shall be the Contractor's responsibility to be familiar with, and to comply with, all such local regulations, as well as State and Federal rules, and to obtain all permits required for the operation of such equipment.

### **B. Construction**

The existing pavement and base shall be removed to varying depths in a manner which will restore the pavement surface to a uniform longitudinal profile and cross-section as specified herein. Where indicated in the Plans, removal shall be to a specified depth and shall produce a specified cross slope. The longitudinal profile of the milled surface shall be established by skid sensor on the side of the cut nearest the centerline of the road. The cross slope of the milled surface shall be established by a second skid sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Engineer may waive the requirements for the automatic grade or cross slope controls where the situation warrants such action. The milling pattern, in conjunction with the pavement laydown operation, shall be approved by the Engineer prior to starting each phase.

If approved by the Engineer, the Contractor may elect to make multiple cuts to achieve the required pavement configuration or depth of cut.

**MILLING AND RESURFACING OF  
EXISTING ASPHALTIC CONCRETE PAVEMENT  
AND ROADWAY BASE, CONTINUED**

380

**MILLING OPERATIONS, CONTINUED**

The forward speed of the milling machine may be restricted by the Engineer to assure an acceptable finished surface.

Existing signal loops are to be located in the field prior to milling. Installation of signal loops shall be placed prior to final resurfacing course. Loops shall not be cut into the final surface course. After loop installation is complete, MEG readings shall be performed according to *FDOT Specifications*. Payment for signal loops shall be included in this Section, unless otherwise provided for in a different Section of this Contract.

Replacement of existing traffic loops shall immediately follow milling operations. Any cut loops shall be replaced within two (2) calendar days. For each day after the two (2) day period that the cut loops are not replaced, the Contractor shall be assessed the amount of one thousand (\$1,000.00) dollars per day. Payment to the County of such sums as may become payable under the provisions of this article shall be made by identifying the said sums as a credit item on the Contractor's final pay estimate.

The milling machine shall be operated to effectively minimize the amount of dust being emitted from the machine. Pre-wetting of the pavement may be required.

Prior to opening to traffic an area which has been milled (except for areas in which the roadway base is temporarily exposed), the pavement shall be thoroughly swept with a power broom or other approved equipment to remove to the greatest extent practicable, fine material which will dust under traffic. This operation shall be conducted in a manner such as to minimize the potential for traffic hazards and pollution to the air.

Sweeping of the milled surface with a power broom shall be required prior to the placement of new surface course.

At the time of paving operations, immediately prior to placement operations, the use of a pick-up sweeper will be required in areas as directed by the Engineer. Special care shall be taken to clean all loose material from the area adjacent to the curb and gutter prior to paving operations.

**C. Finished Surface**

If the milled surface is to be the final surface of the pavement, it shall have either continuous or intermittent striations or any other preapproved pattern which will provide an acceptable level of skid resistance. If pavement is to be constructed over the milled surface

**MILLING AND RESURFACING OF  
EXISTING ASPHALTIC CONCRETE PAVEMENT  
AND ROADWAY BASE, CONTINUED**

380

**MILLING OPERATIONS, CONTINUED**

it shall have a texture which will produce good bonding.

The finished surface shall have a reasonably uniform texture, shall be within 1/4 inch of a true profile grade, and shall have no deviation in excess of 1/4 inch from a straight edge applied to the pavement perpendicular to the centerline. Areas varying from a true surface in excess of the above stated tolerance may be accepted without correction if the Engineer determines that they were caused by preexisting conditions which could not reasonably have been corrected by the milling operations. Any unsuitable texture or profile, as determined by the Engineer, shall be corrected by the Contractor at no additional expense to the County.

The Engineer may require the re-milling of any area in which a surface lamination causes a nonuniform texture to occur.

**D. Salvageable Materials**

All surplus existing materials resulting from milling operations, except those materials designated by the Engineer as deleterious materials, shall remain the property of the County.

All salvageable materials claimed by the County shall be transported to and stockpiled at locations as indicated on the Plans

The transporting and stockpiling of salvageable materials shall be performed by the Contractor. The method of handling and stockpiling of salvageable materials shall be approved by the Engineer.

**E. Disposable Materials**

All surplus materials not claimed by the County shall become the property of the Contractor, and shall be disposed of by the Contractor in areas provided by the Contractor.

**F. Coordination of Milling Operations and Paving Operations**

No milled surface shall be left open to vehicular traffic for a period greater than five (5) consecutive calendar days. For each day after the five (5) day period that the milled surface is left open to vehicular traffic, the Contractor shall be assessed the amount of two thousand (\$2,000.00) dollars per day. Payment to the County of such sums as may become payable under the provisions of this article shall be made by identifying the said sums as a credit item on the Contractor's final pay estimate.

**MILLING AND RESURFACING OF  
EXISTING ASPHALTIC CONCRETE PAVEMENT  
AND ROADWAY BASE, CONTINUED**

380

**ADJUSTMENT OF UTILITIES**

All utilities and related structures requiring adjustment shall be adjusted by their owners at the owner's expense. The Contractor shall arrange his schedule to allow utility owners the time required for such adjustments.

All utility adjustments shall be completed prior to the commencement of milling and resurfacing operations.

**RESURFACING**

After the milled areas are declared by the Engineer to be suitably prepared for resurfacing operations, and all utility adjustments have been completed to the satisfaction of the Engineer, the areas shall be resurfaced in accordance with the materials and thicknesses specified in other applicable Sections of these Specifications.

Prior to installation of the resurfacing material, the milled surfaces shall be thoroughly cleaned of all dust and loose material, and a uniform application of tack shall be applied as specified in the *Pinellas County Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition, Section 3-7, at a rate of 0.04 to 0.06 gallons per square yard.

The "overlay" exception referenced in *Pinellas County Specifications for Hot Bituminous Mixtures, Plants Methods, Equipment and Construction Methods*, latest edition, Section 3-15.8 does not apply to acceptance and payment for asphaltic concrete under this section.

**Basis of Payment**

The pay quantity for work specified under this Section shall be the number of square yards of milling, of the various materials and the thicknesses thereof specified in the applicable pay items shown in the Schedule of Values, completed and accepted.

The work specified under this Section for milling operations shall be paid for under the various pay items shown in the Schedule of Values for:

Mill Existing Asphalt Pavement

Mill Existing Asphalt Pavement And Shell Base

No payment shall be made under this Section for work related to resurfacing operations. All payment for such work shall be made under separate pay items specified in other Sections of these Specifications.

No payment shall be made for the adjustment of utilities. The cost of adjusting utilities shall be borne by the respective utility owners.

# **ASPHALTIC CONCRETE**

391

## **TYPE PC-1**

The work specified under this Section consists of the construction of asphaltic concrete surface course utilizing Asphaltic Concrete, Type PC-1, in accordance with the applicable provisions of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

The work specified under this Section includes the furnishing of material for, and the application of, all required tack coats.

Asphaltic concrete surface course shall be constructed in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

When the Bid Item Number specifies the quantity of the item in Square Yards, the "overlay" exception referenced in *Pinellas County Specifications for Hot Bituminous Mixtures, Plants Methods, Equipment and Construction Methods*, latest edition, Section 3-15.8 does not apply to acceptance and payment for asphaltic concrete under this section.

### **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Asphaltic Concrete, Type PC-1, at the thickness specified in the applicable pay item, actually constructed and accepted by the Engineer.

When the quantity for a pay item under this Section is to be paid for per ton, the weight of the mixture shall be determined from batch weights, truck scale weights or other methods approved by the Engineer. Delivery tickets, in duplicate, signed by a sworn weigher, shall accompany each load of material to the project site. One copy of the delivery ticket shall be retained by the Contractor, and one copy shall be delivered to the Engineering Inspector. The total number of tons reflected in one set of all delivery tickets collected by the Inspector shall be the measured pay quantity.

### **Basis of Payment Adjustment For Asphaltic Cement**

The bid unit price for asphaltic concrete materials will be adjusted in accordance with applicable provisions and requirements of the *FDOT Specifications*, Section 9-2.1.1 and *FDOT Road and Bridge Supplemental Specifications* as amended herein.

## ASPHALTIC CONCRETE, CONTINUED

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### TYPE PC-1, CONTINUED

For the purposes of unit price adjustment determination, the following conditions shall be applicable:

- 1) *The Bituminous Material, Asphalt Price Index* (herein referenced **API**) published monthly by the FDOT shall be used for the adjustment of unit prices in accordance with FDOT Specification 9-2.1.1. The FDOT **API** in effect at the bid opening date will be used for initial determination of asphaltic material price.
- 2) The formula referenced in FDOT Section 9-2.1.1, Paragraph (d) shall be modified as follows:

$P_a = AC_q (I_d \ 1.05 I_b)$  during a period of increasing prices.

$P_a = AC_q (I_d \ 0.95 I_b)$  during a period of decreasing prices.

$P_a$  = Price adjustment for bituminous material, in dollars.

$AC_q$  = Quantity of Asphalt Cement, in gallons.

$I_b$  = **API** during the month in which bids were opened for this contract.

$I_d$  = **API** during the month material is incorporated into the project.

- 3) Asphaltic Concrete, for which the unit price is per square yard, shall be assumed to weigh one hundred (100) pounds per inch of thickness per square yard and asphaltic cement to weigh 8.58 pounds per gallon. With concurrence from the Contractor, in order to simplify calculations, the Engineer shall have the option of determining the Price Adjustment based on either square yards of actual installed material or tons of actual installed material.
- 4) Calculation of  $AC_q$  (Quantity of Asphalt Cement) shall be based on the Contractor's approved mix design Asphalt Content, percentage by weight of total mix.
- 5) No adjustment in bid prices will be made for either tack coats or prime coats.
- 6) Price adjustment shall be calculated and recorded as the bituminous material is incorporated into the project, however, the actual price adjustments will be processed on the contract's Final Change Order as a separate lump sum change order item.

# ASPHALTIC CONCRETE

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## **TYPE PC-2**

The work specified under this Section consists of the construction of asphaltic concrete leveling course utilizing Asphaltic Concrete Type PC-2 in accordance with the applicable provisions of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

Prior to the application of tack coat and leveling course, all dust, dirt and other foreign materials shall be removed, by scraping and brooming, from the entire area of the pavement to be resurfaced. Mechanical scraping and brooming shall be supplemented as necessary by hand brooming to insure the complete removal of all foreign materials from the area to be resurfaced. Particular care shall be taken to clean the outer edges of the area to be resurfaced. All grass and other vegetation covering the existing surface shall be removed. All material so removed shall be disposed of by the Contractor in areas provided by the Contractor.

After the area to be resurfaced is cleaned as described above, and prior to the construction of leveling course, a tack coat shall be applied on the existing pavement surface at the target tack rate as determined by the Engineer.

### **Basis of Payment**

The pay quantity for work specified under this Section shall be the number of tons of Asphaltic Concrete, Type PC-2 actually placed and accepted,

The weight of the mixture shall be determined from batch weights, truck scale weights or other methods approved by the Engineer. Delivery tickets, in duplicate, signed by a sworn weigher, shall accompany each load of material to the project site. One copy of the delivery ticket shall be retained by the Contractor, and one copy shall be delivered to the Engineering Inspector. The total number of tons reflected in one set of all delivery tickets collected by the Inspector shall be the measured pay

### **Basis of Payment Adjustment For Asphaltic Cement**

The bid unit price for asphaltic concrete materials will be adjusted in accordance with applicable provisions and requirements of the *FDOT Specifications*, Section 9-2.1.1 and *FDOT Road and Bridge Supplemental Specifications* as amended herein.

For the purposes of unit price adjustment determination, the following conditions shall be applicable:

## ASPHALTIC CONCRETE, CONTINUED

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### TYPE PC-2, CONTINUED

- 1) *The Bituminous Material, Asphalt Price Index* (herein referenced *API*) published monthly by the FDOT shall be used for the adjustment of unit prices in accordance with FDOT Specification 9-2.1.1. The FDOT *API* in effect at the bid opening date will be used for initial determination of asphaltic material price.
- 2) The formula referenced in FDOT Section 9-2.1.1, Paragraph (d) shall be modified as follows:

$P_a = AC_q (I_d \ 1.05 I_b)$  during a period of increasing prices.

$P_a = AC_q (I_d \ 0.95 I_b)$  during a period of decreasing prices.

$P_a$  = Price adjustment for bituminous material, in dollars.

$AC_q$  = Quantity of Asphalt Cement, in gallons.

$I_b$  = *API* during the month in which bids were opened for this contract.

$I_d$  = *API* during the month material is incorporated into the project.

- 3) Asphaltic Concrete, for which the unit price is per square yard, shall be assumed to weigh one hundred (100) pounds per inch of thickness per square yard and asphaltic cement to weigh 8.58 pounds per gallon. With concurrence from the Contractor, in order to simplify calculations, the Engineer shall have the option of determining the Price Adjustment based on either square yards of actual installed material or tons of actual installed material.
- 4) Calculation of  $AC_q$  (Quantity of Asphalt Cement) shall be based on the Contractor's approved mix design Asphalt Content, percentage by weight of total mix.
- 5) No adjustment in bid prices will be made for either tack coats or prime coats.
- 6) Price adjustment shall be calculated and recorded as the bituminous material is incorporated into the project, however, the actual price adjustments will be processed on the contract's Final Change Order as a separate lump sum change order item.

# ASPHALTIC CONCRETE

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## TYPE PC-3

The work specified under this Section consists of the construction of asphaltic concrete surface course, asphaltic concrete base course, and temporary roadways, sidewalk and other asphaltic concrete facilities, utilizing Asphaltic Concrete Type PC-3, in accordance with the applicable provisions of the *Pinellas County, Florida, Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods*, latest edition.

The work specified under this Section includes the furnishing of material for, and the application of, all required tack coats.

Asphaltic concrete surface course shall be constructed in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

Asphaltic concrete base course shall be constructed on prepared sub-grade in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the Engineer.

When the Bid Item Number specifies the quantity of the item in Square Yards, the "overlay" exception referenced in *Pinellas County Specifications for Hot Bituminous Mixtures, Plants Methods, Equipment and Construction Methods*, latest edition, Section 3-15.8 does not apply to acceptance and payment for asphaltic concrete under this section.

### Basis of Payment

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per square yard, the pay quantity shall be the number of square yards of Asphaltic Concrete, Type PC-3, at the thickness specified in the applicable pay item, actually placed and accepted.

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per ton, the pay quantity shall be the number of tons of Asphaltic Concrete, Type PC-3 actually placed and accepted.

When the quantity for a pay item under this Section is to be paid for per ton, the weight of the mixture shall be determined from batch weights, truck scale weights or other methods approved by the Engineer. Delivery tickets, in duplicate, signed by a sworn weigher, shall accompany each load of material to the project site. One copy of the delivery ticket shall be retained by the Contractor, and one copy shall be delivered to the Engineering Inspector. The total number of tons reflected in one set of all delivery tickets collected by the Inspector shall be the measured pay quantity.

## ASPHALTIC CONCRETE, CONTINUED

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### TYPE PC-3, CONTINUED

#### **Basis of Payment Adjustment For Asphaltic Cement**

The bid unit price for asphaltic concrete materials will be adjusted in accordance with applicable provisions and requirements of the *FDOT Specifications*, Section 9-2.1.1 and *FDOT Road and Bridge Supplemental Specifications* as amended herein.

For the purposes of unit price adjustment determination, the following conditions shall be applicable:

- 1) The Bituminous Material, Asphalt Price Index (herein referenced API) published monthly by the FDOT shall be used for the adjustment of unit prices in accordance with FDOT Specification 9-2.1.1. The FDOT *API* in effect at the bid opening date will be used for initial determination of asphaltic material price.
- 2) The formula referenced in FDOT Section 9-2.1.1, Paragraph (d) shall be modified as follows:

$P_a = AC_q (I_d \cdot 1.05 I_b)$  during a period of increasing prices.

$P_a = AC_q (I_d \cdot 0.95 I_b)$  during a period of decreasing prices.

$P_a$  = Price adjustment for bituminous material, in dollars.

$AC_q$  = Quantity of Asphalt Cement, in gallons.

$I_b$  = *API* during the month in which bids were opened for this contract.

$I_d$  = *API* during the month material is incorporated into the project.

- 3) Asphaltic Concrete, for which the unit price is per square yard, shall be assumed to weigh one hundred (100) pounds per inch of thickness per square yard and asphaltic cement to weigh 8.58 pounds per gallon. With concurrence from the Contractor, in order to simplify calculations, the Engineer shall have the option of determining the Price Adjustment based on either square yards of actual installed material or tons of actual installed material.
- 4) Calculation of  $AC_q$  (Quantity of Asphalt Cement) shall be based on the Contractor's approved mix design Asphalt Content, percentage by weight of total mix.
- 5) No adjustment in bid prices will be made for either tack coats or prime coats.
- 6) Price adjustment shall be calculated and recorded as the bituminous material is incorporated into the project, however, the actual price adjustments will be processed on the contract's Final Change Order as a separate lump sum change order item.

# CONCRETE STRUCTURES

400

The work specified under this Section consists of the construction of concrete structures, concrete endwalls, gravity walls, cast-in-place concrete box culverts, wingwalls for cast-in-place and pre-cast box culverts and other concrete members, in conformance with the lines, grades, dimensions and notes shown in the Plans. This Section does not include concrete pavement, incidental concrete construction and concrete structures paid for under separate pay items.

Unless otherwise specified, concrete structures shall be constructed of concrete of FDOT Class I, II, III or IV, according to whichever is shown on the Plans, or in applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition. Endwalls shall be constructed of Class I or Class IV concrete, whereas Box Culverts and Concrete Wingwalls shall be constructed of Class II or Class IV concrete, whichever is specified in the Plans and applicable pay items. All Portland Cement Concrete shall comply with Section 9-2.1 of the *FDOT Specifications*.

Materials, placement, finishing and curing shall conform to the requirements of Sections 346 and 400 of the *FDOT Specifications*, as amended herein, and, where specified herein or on the Plans, applicable drawings of the *FDOT Roadway and Traffic Design Standards*. A surface finish, of the Class specified on the Plans, or in applicable drawings of the *FDOT Roadway and Traffic Design Standards*, shall be applied to all exposed surfaces of concrete structures. A Class 2 surface finish shall be required on all endwalls and wingwalls. All concrete shall be 3,000 psi strength or greater.

The work specified under this Section includes the furnishing and placement of all concrete, and the construction of all forms, falsework, joints, bracing, expansion joint materials, wire fabric reinforcement, reinforcing steel, weep holes, bearing pads, the setting of anchor bolts, dowels and similar accessories, the application of required surface finishes, all required clearing and grubbing, excavation and backfilling and cleaning up after the work is completed, and all required pumping, drainage diversion or other work required to handle drainage flow during construction. The work specified under this Section shall include also the furnishing and placement of reinforcing steel and accessory items for endwalls and headwalls, but not for cast-in-place concrete box culverts and wingwalls.

## **Basis of Payment**

The pay quantity for work specified under this Section is shown in the Schedule of Values to be paid for per cubic yard, the pay quantity shall be the number of cubic yards of Concrete, of the Class designated in the applicable pay items, actually placed and accepted.

The pay quantity for work specified under this Section shall be the number of cubic yards of Concrete, computed within the neat lines of the structure or wall, as shown on Plans, actually placed

## **CONCRETE STRUCTURES, CONTINUED**

400

and accepted. No deductions shall be made for weep holes, chamfers, scorings, fillets, or radii 1-1/2 square inches or less in cross-sectional area.

# **BOX CULVERT SECTION**

410

## **CONCRETE, PRE-CAST**

The work specified in this Section consists of the construction of Pre-cast Concrete Box Culvert. The work shall be done in accordance with these specifications and the requirements of Section 410 of the *FDOT Specifications*, as amended herein, and in conformity with the lines, grades, dimensions, and notes shown in the Plans.

### **Materials and Manufacture**

The materials and manufacture of Pre-cast Concrete Box Culvert sections shall conform to the requirements of the following specifications, as amended herein:

AASHTO M259 – for box sections with two feet or more of earth cover and subjected to highway loading, or subjected to dead load only.

AASHTO M273 – for box sections with less than two feet of earth cover and subjected to highway loading.

When approved by the Engineer, in writing, ASTM C789 may be used in lieu of AASHTO M259, and ASTM C850 may be used in lieu of AASHTO M273, subject to such requirements as may be stipulated, in writing, as a condition of approval. Also required is conformance with *FDOT Structures Design Guidelines*, latest edition and amendments thereto.

### **Concrete**

Concrete shall be Class IV. Minimum concrete cover for slightly aggressive environment shall be 2 inches, and for moderately or extremely aggressive environment shall be 3 inches.

### **Construction**

The methods for construction of trench and foundation, and for laying and backfilling shall conform to the requirements specified in Section 430 of the *FDOT Specifications*, with the following additional requirements:

### **Trench, Foundation, Laying and Backfill**

The bedding shall consist of coarse concrete sand or other suitable granular material placed below the culvert to a minimum depth of 6 inches and to a minimum width of one foot outside the exterior walls of the culvert, between graded forms set one foot outside each exterior wall of the box culvert. When required by the Plans, other special bedding shall be provided.

## **BOX CULVERT SECTION, CONTINUED**

410

### **CONCRETE, PRE-CAST, CONTINUED**

#### **Lifting Holes**

Holes provided for lifting or joint restraint shall be sealed by plugging, using a non-shrinking mortar in accordance with Section 934 of the *FDOT Specifications*. Mortar shall be properly cured to insure a sound and water-tight plug.

#### **Joints**

Field joints for Pre-cast Concrete Box Culvert shall be made with a butyl rubber-based pre-formed plastic gasket material, or as detailed in the Plans. Culverts to be laid with joints made from preformed plastic gasket material shall be subject to the applicable requirements of Section 430-7.3 of the *FDOT Specifications*, with the following additional requirements:

- 1) The culvert producer shall furnish to the Engineer a written recommendation as to the cross-sectional area of gasket material which will create a watertight seal. This recommended cross-sectional area shall be the minimum permitted for gasket material.
- 2) The outside of each joint shall be completely wrapped with either a woven or non-woven filter fabric. The fabric shall be a minimum of two feet in width, and shall be secured tightly against the box culvert section by metal or plastic reinforced strapping.
- 3) When specified in the Plans, the joint shall be secured by a suitable device capable of holding the sections to line and grade as well as fully home. These devices shall be removed after sufficient backfill has been placed and compacted to secure the sections.

#### **Detail Drawings**

Shop drawings, signed and sealed by a Florida licensed professional engineer, shall be submitted to the Engineer for review.

Details of special units, modifications and required devices shall be submitted for review to the Engineer prior to the manufacture thereof.

#### **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of linear feet of Box Culvert Section, Concrete, Pre-cast, and portions thereof, of the sizes of box culvert specified in the applicable pay items, actually constructed and accepted. Payment for this quantity shall constitute full compensation for all work specified under this Section.

# **REINFORCING STEEL**

415

The work specified under this Section consists of the furnishing and placement of reinforcing steel and wire fabric in concrete structures, and in incidental concrete construction.

The materials, fabrication and placement of Reinforcing Steel shall conform to the requirements of Section 415 of the *FDOT Specifications*, as amended herein, such additional requirements as may be shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the *FDOT Roadway and Traffic Design Standards*.

Grade 60 reinforcing steel shall be used.

The Contractor shall submit reinforcing steel shop drawings to the Engineer for approval. The shop drawings shall show clearly the locations for all slab bolsters and high chair layouts.

## **Basis of Payment**

When the quantity for a pay item under this Section is shown in the Schedule of Values to be paid for per pound, the pay quantity shall be the number of pounds (lbs) of Reinforcing Steel actually placed and accepted.

# **INLETS, MANHOLES AND JUNCTION BOXES**

425

## **FDOT AND PCED TYPE STRUCTURES**

The work specified under this Section consists of the construction of Inlets, Manholes, Junction Boxes, Underdrain Inspection Manholes, Shoulder Gutter Inlets, Yard Drains, Back-of-Sidewalk Drains, and similar small drainage structures. The work under this Section shall also include the adjustment of structures shown in the Plans to be adjusted or which are required to be adjusted for the satisfactory completion of the work. New structures shall be constructed in accordance with these specifications, Pinellas County Engineering Department standard construction details, and Florida Department of Transportation standard construction details.

The work specified under this Section shall also consist of the furnishing and placement of filter fabric wrap around all pipe-to-structure joints and grouting in accordance with Pinellas County Standard Detail Index No. 1265. Cost for fabric wrap and grout shall be included in the cost of the drainage structure.

Materials and construction shall conform to the requirements of Section 425 of the *FDOT Specifications*, as amended herein, and such additional requirements as may be shown on the Plans, applicable standard drawings of the Pinellas County Engineering Department, and applicable drawings of the *FDOT Roadway and Traffic Design Standards*.

### **Grates For Drainage Structures**

All grates for drainage structures shall be galvanized steel grates having a diamond, hexagonal or similar reticuline pattern. Additionally, all grates utilized on drainage structures shall be secured to the structure and shall be capable of withstanding H20 loading, and shall be the equivalent of those grates manufactured by U.S. FOUNDRY & MANUFACTURING CORPORATION in its H20 Loading series.

### **Underdrain Inspection Manholes**

Underdrain Inspection Manholes shall be as shown in the Plan and the Pinellas County Engineering Department Standard Details book, latest edition.

The work specified under this Section shall include the furnishing and placement of all concrete, reinforcing steel and accessory items, removable clean-out plugs for upstream ends of underdrains ("T-gripper mechanical plugs without bypass" or approved equal), gratings, frames, covers and any other necessary fittings, and providing plugs and openings in existing structures, as shown in the Plans or as directed by the Engineer, all forms and falsework, all excavation and backfilling around the structure, all labor and materials required to restore the work site and affected property and facilities to a condition acceptable to the Engineer, and the disposal of surplus materials not claimed by the County. Unless otherwise provided for in the

## **INLETS, MANHOLES AND JUNCTION BOXES, CONTINUED**

425

### **FDOT AND PCED TYPE STRUCTURES, CONTINUED**

contract documents all materials disposed of by the Contractor shall be disposed of in areas provided by the Contractor.

#### **Basis of Payment**

The pay quantity for the work specified under this Section shall be the number each of the structures identified in the applicable pay items, satisfactorily completed and accepted.

# PIPE CULVERT

430

The work specified under this Section consists of the furnishing and installation of steel reinforced round or elliptical Concrete Pipe Culvert, Polyvinyl-Chloride (PVC) Pipe Culverts or round corrugated High Density Polyethylene (HDPE) Pipe with an integrally formed smooth interior in conformity with the lines, grades and elevations shown on the Plans, and as directed by the Engineer, in accordance with the manufacturer's recommendations and in accordance with the requirements of Section 430 of the Standard Specifications, as amended herein, and all applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition. The designation "concrete pipe" in the pay items refers to steel reinforced concrete pipe as described in ASTM C361 and C507.

For HDPE pipe, the pipe and fittings shall be made of polyethylene compounds and shall meet or exceed the requirements of ASTM D1248, ASTM F810, ASTM F667, and AASHTO M294-97. Pipe shall be equivalent to the HDPE pipe manufactured by Advanced Drainage Systems, Inc or equal. The nominal size of the pipe and fittings is based on the nominal inside diameter of the pipe. Joints may be made with bell and spigot or with couplings, but the outside diameter must be uniform throughout the length of the pipe. Joints shall utilize gaskets to ensure a watertight seal. All pipe joints shall be wrapped with filter fabric pipe jackets. Cost for filter fabric pipe jackets shall be included in the cost of the pipe. If specified in the Plans, non-corrosive pipe straps and screw anchor assembly shall be installed at the specified spacing.

For PVC pipe, the pipe shall have a permanently installed reinforced rubber ring gasket in an integral bell joint. The pipe shall meet the requirements of ASTM D 3034. There shall be no evidence of splitting, cracking or breaking while meeting the specifications as outlined in ASTM D 1784 and no shattering or splitting result when the pipe is tested in accordance with ASTM 2444. Joint tightness shall conform to ASTM D 2152. All pipe joints shall be wrapped with filter fabric pipe jackets. Cost for filter fabric pipe jackets shall be included in the cost of the pipe.

The work shall include all excavation, sheeting and bracing, trench boxes, backfilling and compacting around the culvert, patching through existing endwalls, the furnishing and installation of fittings, including pipe strap and screw anchor assembly, disposal of surplus materials and the connection of proposed pipes to existing structures. All backfill shall be compacted to a density of at least 100% of the maximum density as determined by AASHTO T 99, Method C, for concrete pipes and 95% of the maximum density as determined by AASHTO T 99, Method C, for metal and plastic pipes.

The Contractor shall make every attempt to dewater the area with normal dewatering equipment including, but not limited to, surface pumps, sump pumps, wellpoints and header pipes and trenching/digging machinery. Once the Engineer is satisfied that the Contractor has made every effort to dewater the area, and the conditions still remain wet, the Engineer will then

## PIPE CULVERT, CONTINUED

430

consider authorization for payment for the use of select material. In either case, the Contractor must schedule the backfilling work to allow the Engineer to determine staged in-place density determinations as the area is being backfilled. If the area is backfilled without the specified in-place density being verified, and the ground water subsequently rises above the back-filled area adjacent to the structure, no payment will be made for this pipe culvert/storm sewer/structure until the area can be dewatered and the specified density verified by the Engineer.

In locations outside the plane describe by a two (horizontal) to one (vertical) slope downward from the roadway shoulder line or back of curb as applicable and along storm sewer outfall lines where no vehicular traffic will pass over the pipe, compact the backfill to a density of at least ninety-five (95) percent of the maximum density as determined by AASHTO T 99, Method C.

All joints of round and elliptical concrete pipe shall be wrapped with filter fabric pipe jackets. Elliptical pipes shall have rubber gasket joints. Cost for filter fabric pipe jackets shall be included in the cost of the pipe.

Unless specified to be paid for under other items, the work under this Section shall include the restoration of all driveways, curb, sidewalk, sod and any other existing features and facilities disturbed or damaged in the performance of the work. Existing features and facilities shall be restored to the condition existing prior to the commencement of construction activities. Payment for restoration under this Section shall be made only for that restoration within the limits of payment shown in the Plans for such restoration. The Contractor shall restore, at his expense, and in accordance with the intent of these Specifications and the details and notes for restoration shown in the Plans, all existing features and facilities disturbed or damaged during construction activities outside the limits of payment shown in the Plans. Unless otherwise specified in the Plans, lawn sprinkler systems shall be removed from the public right-of-way and capped off at the right-of-way line. Unless otherwise specified, concrete pipe shall meet the design requirements of class III ASTM C76.

The work to be performed under this Section shall not include the excavation of unsuitable material, the furnishing, placement and compaction of fill material as replacement for unsuitable material, the furnishing and placement of bedding material, or other items of work for which separate payment is to be made.

Ownership of all suitable material shall remain with the County until all earthwork requirements for the project have been fulfilled. Except as otherwise provided for in the Plans and Specifications, all surplus material and other items not claimed by the County shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor.

The work under this Section shall include the internal televising of new stormwater drainage pipes and drainage structures. The Contractor shall pro-

## PIPE CULVERT, CONTINUED

430

vide the County with a videotape of the completed stormwater drainage system, and a written report. The Contractor shall pump down and clean the pipes and drainage structures, to the satisfaction of the County, prior to televising.

The videotape shall be of the standard VHS format, in color, with all pertinent data and observations recorded as audio on the tape. The video shall also be provided on a computer CD. The data should include:

- 1) an accurate recorded footage of the pipe lengths.
- 2) the drainage structure number and pipe size.
- 3) the run of the pipe and direction of flow (i.e. from S-1 to S-2).
- 4) details of structural defects, broken pipes, sags, dips, misalignments, obstructions and infiltration.

The written report shall include the 4 items listed previously.

All visual and television inspections shall be completed and approved by the County prior to the placing of any concrete, asphalt or sod. Televising shall occur after backfilling is complete and water table returns to natural levels. For pipes located under roadways, televising shall occur after road has been stabilized. A 360-degree view shall be taken of each joint. Any deficient or damaged pipe discovered during televising shall be the responsibility of the Contractor to repair or replace at their own expense. The televising shall include a numerical scale by which viewers of the video can visually determine the precise width of cracks and/or joint gaps.

As a complement to the video, the Contractor shall also provide digital photos of areas of concern in electronic (computer CD) and hard-copy form (in color).

All known or indicated breaks shall be repaired by the Contractor regardless of the test allowances. Faulty sections of drainage pipes or drainage structures rejected by the Engineer shall be removed and re-laid by the Contractor. Sections of pipe that are repaired, re-laid or replaced shall be re-televised at the Contractor's expense.

In all cases that a leak is found, re-televising shall be required at the Contractor's expense, to confirm that the problem has been resolved.

### **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of linear feet of the types and sizes of pipe specified in the applicable pay items, actually constructed and accepted, including that portion of the pipes extending into the walls (farthest point) of the structures to which the pipes are connected. Payment for this quantity shall constitute full compensation for all work specified under this Section, and shall include the televising and digital photos specified herein. For **all pipe culverts**, payment shall also include filter fabric pipe jackets at all joints.

# **JACKING AND BORING**

430-4000

The work specified under this Section consists of the installation of pipe culvert under roadways, railroads and other types of embankment by tunneling or driving through the embankment.

Jacking and boring under railroad embankments shall conform to the requirements of Section 430-6 of *FDOT Specifications*, except as amended herein. The Contractor shall be solely responsible for any damages from negligent operations or failure to comply with the methods and procedures prescribed.

Where jacking and boring operations are not subject to the requirements of Section 430-6 of the *FDOT Specifications*, it shall be the responsibility of the Contractor to devise and use adequate methods and procedures to insure the safety and integrity of jacking and boring operation, and to prevent damage to existing facilities. The Contractor shall be solely responsible for any damages to existing facilities.

The work specified under this Section shall include all materials, labor and equipment required for the acceptable completion of the pipe culvert installation. Also, the furnishing and construction of the pipe culvert and the casing shall be included in the work specified herein.

## **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of linear feet of jacking and boring, measured as the length from end to end of pipe casing.

# **U-TYPE ENDWALLS AND FLARED OR MITERED END SECTIONS**

430-5000

The work specified under this Section consists of the construction of U-Type Endwalls for pipe culverts and the furnishing and installation of pipe culvert end sections, flared or mitered, in accordance with the requirements of Sections 346, 400, 415 and 430 of the *FDOT Specifications*, as amended herein, all applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition, and the details and notes shown in the Plans.

A Class II surface finish shall be applied as directed by the Engineer.

The work specified under this Section shall include all forms, bracing, concrete, reinforcing steel, grates and other required materials and accessories, all clearing and grubbing, excavation, backfilling, disposal of surplus material, and any other incidental work required to complete the installation of the end sections to the satisfaction of the Engineer.

Ownership of all suitable material shall remain with the County until all earthwork requirements for the project have been fulfilled. Except as otherwise provided for in the Plans and Specifications, all surplus material and other items not claimed by the County shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor.

## **Basis of Payment**

For U-Type Endwalls, the pay quantities for the work specified under this Section shall be the number each actually constructed and accepted.

For End Sections, Flared or Mitered, the pay quantities for the work specified under this Section shall be the number each of the types and sizes of End Sections specified in the applicable pay items actually constructed and accepted.

# UNDERDRAIN

440-1000

## **POLYVINYL-CHLORIDE (PVC) ROADWAY**

The work specified under this Section consists of the furnishing and installation of Polyvinyl-Chloride (PVC) Pipe for roadway underdrain systems, and shall include all pavement cuts, trench excavation, the furnishing and installation of all filter aggregate, earth backfill and filter wrap material, and all restoration not paid for under separate pay items.

When incorporated by reference into the Specifications for such work, applicable provisions of this Section shall apply also to the furnishing and installation of underdrain systems for retention/detention ponds, stormwater treatment filtration systems, and other facilities requiring the installation of underdrain.

The furnishing and installation of underdrains shall conform to the requirements of Section 440 of the *FDOT Specifications*, as amended herein, and to the details shown in the County's standard ROADWAY UNDERDRAIN DETAIL and applicable pavement restoration details contained in the Plans. Where a conflict occurs between the specifications and the details shown on the Plans, the details shown on the Plans shall govern.

Polyvinyl-chloride pipe for use as underdrain shall conform to the requirements of ASTM F 758 or ASTM F 949. Also, PVC underdrain manufactured from PVC pipe meeting ASTM D 3034, perforated in accordance with the perforation requirements given in AASHTO M 36 or AASHTO M 196 will be permitted. All roadway underdrain, including that installed under driveways, shall be perforated in accordance with the perforation detail shown in the Plans, except that in the vicinity of trees, and under roadways, non-perforated sections of underdrain shall be used where directed by the Engineer.

Underdrain installed under driveways, streets and other pavement shall be installed by open-cut trenching in accordance with the details shown in the County's standard ROADWAY UNDERDRAIN DETAIL and applicable pavement restoration details contained in the Plans. Underdrain installed in the vicinity of trees shall be installed in accordance with the provision entitled Underdrain in the Vicinity of Trees contained in these Specifications.

Underdrain shall be placed as directed by the Engineer to avoid conflict with existing utilities. Any change in the location of underdrain, or the length of underdrain used, from that shown on the Plans, shall be authorized in writing by the Engineer.

No separate payment will be made for non-perforated roadway underdrain. It shall be the responsibility of the Contractor to determine from inspection of the project site the quantity of non-perforated underdrain anticipated to be required in the vicinity of trees and under roadways.

### **Underdrain in the Vicinity of Trees**

When underdrain is to be installed in the vicinity of trees designated on the Plans or by the Engineer to be preserved, trenching, and the installation of underdrain in such areas, shall be accomplished by hand operations in order to prevent damage by machinery to the trees and their root systems. Filter aggregate and the top membrane shall be deleted in areas where intertwined root systems may prevent excavation of the trench to standard width, and the underdrain installed in such areas shall consist of solid-walled underdrain (non-perforated) of the specified material laid on grade, with all backfill material placed, compacted and dressed by hand to the required final grades.

### **Restoration requirement for Annual Underdrain contract only**

The work specified under this Section shall include the restoration of all driveways, curb, sidewalk, sod, lawn sprinkler systems, including distribution lines and sprinkler heads, mail boxes, walls, fences, shrubs, plants, and any other existing features and facilities disturbed or damaged in the performance of the work specified under this Section, except that restoration, if any, shown in the Plans to be paid for by separate payment. The contract price for the work to be performed under this Section shall include the cost of all restoration not shown in the Plans to be paid for by separate payment. Where the Plans indicate restoration that is to be paid for by separate payment, such payment shall be made only for that restoration within the limits of payment shown in the Plans for such restoration. All restoration shall be performed in accordance with the details and notes shown in the Plans. Where the details of restoration are not specified in the Plans, existing features and facilities shall be restored to the condition existing prior to the commencement of construction activities. The Contractor shall restore, at his expense, and in accordance with the intent of these Specifications and the details and notes for restoration shown in the Plans, all existing features and facilities disturbed or damaged during construction activities outside the limits of payment shown in the Plans.

### **Restoration requirement for roadway construction contracts**

Unless specified to be paid for under other items, the work under this Section shall include the restoration of all driveways, curb, sidewalk, sod and any other existing features and facilities disturbed or damaged in the performance of the work. Unless otherwise specified in the Plans, lawn sprinkler systems shall be removed from the public right-of-way and capped off at the right-of-way line.

### **Unsuitable Material**

Unless otherwise provided for under separate pay items in this contract, the work to be performed under this Section shall include the excavation of

## **UNDERDRAIN, CONTINUED**

440-1000

unsuitable material, the furnishing, placement and compaction of fill material as replacement for unsuitable material.

### **Identification**

Each section of underdrain pipe delivered to the construction site shall be clearly stamped with the ASTM designation, in a size and pattern such as to be immediately visible to the Engineer.

### **Basis of Payment**

The work specified under this Section shall be paid for under the pay items for Underdrain, Polyvinyl-Chloride (PVC), Perforated, Roadway. No separate payment will be made for non-perforated underdrain.

The pay quantity for the work specified under this Section shall be the number of linear feet of Underdrain, of the various types and sizes specified in the applicable pay items, actually constructed and accepted.

# PIPE HANDRAIL

515

The work specified under this Section consists of the furnishing and erection of aluminum or steel pipe handrail, in accordance with the requirements of Sections 515 and 965 of the *FDOT Specifications*, as amended herein.

Steel Pipe Handrail shall be constructed of galvanized steel pipe railings, with galvanized steel diamond wire fabric, assembled and erected as shown in the Plans.

Aluminum Pipe Handrail shall be constructed in accordance with the requirements of Sections 515 and 965 of the *FDOT Specifications*, and Index No. 520 of the *FDOT Roadway and Traffic Design Standards*, latest edition.

The work specified in this Section includes the furnishing and erection of all posts, railing, bracing, wire fabric and anchorage assemblies required for the completed work.

## **Basis of Payment**

The pay quantity for the work specified under this Section shall be the number of linear feet of Handrail, Steel Pipe or Handrail, Aluminum Pipe actually constructed and accepted.

# **CURB AND GUTTER & TRAFFIC SEPARATOR**

520

## **CONCRETE**

The work specified under this Section consists of the construction of concrete curb, curb and gutter, valley gutter, shoulder gutter, and traffic separators in accordance with the requirements of Section 520 of the *FDOT Specifications*, as amended herein, applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition, applicable standard construction details of the Pinellas County Engineering Department, and the details and notes shown in the Plans.

Job-mix design formulas for all Portland Cement Concrete, of the type specified, shall be submitted at least 14 days prior to use on the project. The submitted formulas shall be derived or approved by the County and/or its agents. All concrete mix designs shall meet FDOT Concrete Class mix guidelines, except as follows:

WHEN APPROVED, IN WRITING, BY THE ENGINEER, an Alternate Class I Concrete mix design formula, for concrete curb and gutter to be placed by automated curb machines, may show, as a substitution for #57 aggregate, an amount of #89 aggregate not to exceed 33 percent, by weight, of the #57 aggregate.

Sample mix designs will be available upon request.

All Portland Cement Concrete shall be FDOT Class I Concrete with a minimum cementitious content of 508 lbs/cy, a maximum water cementitious ratio of 0.50 lbs/lb, and a minimum compressive strength of three thousand (3000) psi at twenty-eight (28) days.

The work specified under this Section shall include the construction of all Curb Transitions called for in the Plans in accordance with the details shown or referenced in the Plans, the furnishing and placement of all required Reinforcing Steel, and the furnishing and construction of all necessary forms.

### **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of linear feet of concrete curb, curb and gutter, valley gutter, shoulder gutter, wheel stops or traffic separator actually constructed and accepted. Payment for the quantities determined as specified herein shall constitute full compensation for all work specified under this Section.

# WHEEL STOPS

520-9000

## **CONCRETE**

The work specified under this Section consists of the construction of concrete wheel stops in accordance with the requirements of Section 520 of the *FDOT Specifications*, as amended herein, all applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition, and the details and notes shown in the Plans.

Concrete Wheel Stops shall be of a standard length of six (6) feet, and shall conform with Index No. 300 of the *FDOT Roadway and Traffic Design Standards*, latest edition, and to the following requirements:

Concrete shall be FDOT Class I Concrete with a minimum cement content of 508 lbs./c.y., a maximum water cement ratio of 0.50 lbs./lb, and a minimum compressive strength of three thousand (3000) psi at twenty eight (28) days.

Each wheel stop shall be reinforced with two (2) #4 Reinforcing Steel bars 5 feet 6 inches in length. Reinforcing steel shall meet the requirements of Section 931 of the *FDOT Specifications*.

Each wheel stop shall be anchored by two (2) #5 bars 18 inches in length.

The work specified under this Section includes the furnishing of all required Reinforcing Steel, and the furnishing and construction of all necessary forms.

### **Basis of Payment**

The work specified under this Section shall be paid for under the pay items for Wheel Stops, Concrete. The pay quantity for the work specified under this Section shall be the number each of concrete wheel stops actually constructed and accepted.

# **BARRIER WALL**

521

## **CONCRETE**

The work specified under this Section consists of the construction and placement of Concrete Barrier Wall to the lines, grade, dimensions and notes shown on the Plans in accordance with the requirements of Sections 346, 400 and 521 of the *FDOT Specifications*, and FDOT Index No. 410.

The work specified under this Section shall include all ties, bolts, anchors, and joints which may be required; all handling, including loading, transport, unloading, and stockpiling; and all other materials or labor necessary to complete installation in accordance with Plans.

## **CONCRETE**

Shall be Class II Concrete as defined by Section 346 of the Standard Specifications, unless otherwise noted. Class IV shall be used for aggressive environments when specified in the Plans.

A Class 3 finish shall be given to the barrier wall unless otherwise specified.

## **Basis of Payment**

The work specified under this Section shall be paid for at the contract unit price per linear foot for Concrete Barrier Wall.

# **SIDEWALK**

522

## **CONCRETE**

The work specified under this Section consists of the construction of Concrete Sidewalk to the lines and grades shown on the Plans, and as directed by the Engineer.

The construction of Concrete Sidewalk shall conform to the requirements of Section 522 of the *FDOT Specifications*, as amended herein, to the details and notes shown in the Plans, and to all applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition, and the *Pinellas County Department of Public Works Standard Construction Details*, latest edition.

Unless otherwise specified, concrete sidewalk for pedestrian traffic shall be constructed to a minimum thickness of four (4) inches, with no reinforcement. Concrete sidewalk having a design thickness greater than four (4) inches shall be reinforced with either Welded Wire Fabric or Reinforcing Steel bars, as shown on the Plans or as approved by the Engineer.

All Portland Cement Concrete shall be FDOT Class I Concrete with a minimum cementitious content of 508 lbs/cy, a maximum water cementitious ratio of 0.50 lbs/lb, and a minimum compressive strength of three thousand (3000) psi at twenty-eight (28) days.

If separate restoration pay items are not provided, then the work specified under this Section shall include the restoration, to the condition existing prior to the commencement of construction activities, of all existing roadway pavement, curb and gutter, driveways, sidewalk, topsoil, and sod disturbed or damaged in the performance of the work specified under this Section. All surplus materials resulting from construction operations shall remain the property of the County until all construction requirements have been fulfilled, and such materials as may be acceptable to the Engineer for restoration purposes shall be so utilized.

The work specified under this Section shall include the furnishing and construction of all necessary forms, and the furnishing and placement of all required Welded Wire Fabric or Reinforcing Steel.

### **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of square yards of Sidewalk, Concrete, at the thicknesses specified in the applicable pay items, actually constructed and accepted.

# **DITCH PAVEMENT**

524

## **CONCRETE**

The work specified under this Section consists of the construction of concrete pavement for erosion protection in ditches and on side slopes. All Portland Cement Concrete shall be FDOT Class I Concrete with a minimum cementitious content of 508 lbs/cy, a maximum water cementitious ratio of 0.50 lbs/lb, and a minimum compressive strength of three thousand (3000) psi at twenty-eight (28) days.

The construction of concrete ditch pavement shall conform to the requirements of Section 524 of the *FDOT Specifications*, as amended herein, the details and notes shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition.

Concrete ditch pavement and concrete slope pavement not subjected to vehicular traffic or other forces of unusual magnitude shall be constructed to a minimum thickness of four (4) inches. Concrete ditch pavement and concrete slope pavement which will be subjected to vehicular traffic or other forces of unusual magnitude shall be constructed to a minimum thickness of six (6) inches, and shall be reinforced with reinforcing steel or welded wire fabric, as detailed on the Plans or as approved by the Engineer.

The work specified under this Section includes the furnishing of all required Welded Wire Fabric or Reinforcing Steel, and the furnishing and construction of all necessary forms.

### **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of square yards, determined by measurement along the surface of the completed work, of concrete ditch pavement or concrete slope pavement, at the thicknesses specified in the applicable pay items, actually constructed and accepted. The volume of headers and toe walls shall be converted into equivalent square yards of pavement at the thickness applicable, and that quantity shall be added to the number of square yards determined by surface measure to obtain the total pay quantity.

# RIPRAP

530-1000

## **SAND-CEMENT**

The work specified under this Section consists of the construction of riprap composed of sand and cement.

The construction of sand-cement riprap shall conform to the requirements of Section 530 of the *FDOT Specifications*, as amended herein, the details and notes shown on the Plans, and, where specified herein or on the Plans, applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition.

Geotextile fabric shall meet the requirements of Section 514. Sand for sand-cement riprap shall meet the quality requirements of 902-2 and gradation limits of 902-3.3.

The work specified and paid for under this Section shall include all materials, sacks, geotextile fabric, grouting, hauling, excavation and backfill.

### **Basis of Payment**

The pay quantity for the work specified under this Section shall be the number of cubic yards of sand-cement mixture, placed in sacks or used in the grout, actually placed and accepted. For payment purposes, 36 bags shall constitute 1 cubic yard (1 bag = 0.75 cubic feet).

# RIPRAP

530-2000

## **RUBBLE**

The work specified under this Section consists of the construction of riprap composed of broken stone. The construction of rubble riprap shall conform to the requirements of Section 530 of the *FDOT Specifications*, as amended herein, the details and notes shown on the Plans, and, where specified herein or on the Plans, applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition.

### **Materials**

Rubble riprap shall consist entirely of broken stone conforming to the following requirements:

The material shall be sound and durable, and shall have a minimum specific gravity of 2.3.

The material shall be free of cracks, soft seams or other structural defects. The pieces shall be roughly angular, and the lot shall be reasonably free of thin, flat or elongated pieces.

Stones shall be of a graded mixture, with individual pieces weighing, in general, from 20 pounds to 150 pounds each.

Not more than 20 percent of the total volume shall be composed of pieces weighing less than 50 pounds each, and at least 50 percent of the total volume shall be composed of pieces weighing 120 pounds or more. The thickness of stones shall not exceed 12 inches.

### **Construction Methods**

The riprap shall be dumped in place and arranged to form compact layers conforming to the neat lines called for in the Plans, and to the thickness' specified, plus or minus three inches.

The riprap shall be placed in a manner such that the smaller pieces are evenly distributed and placed so as to fill the voids between the larger pieces, and in a manner to avoid sharp exposed edges.

### **Basis of Payment**

Rubble material shall be measured by the ton, in its surface-dry natural state. Measurement shall be by railroad scales, truck scales, barge displacement, volume measurements or other methods approved by the Engineer. Weights shall be determined as specified in Section 530 - 4.2 of the *FDOT Specifications*. The Engineer shall approve which of the methods, i.e., railroad weights, truck weights, barge displacement, or volume measurements, is to be used.

## **RIPRAP, CONTINUED**

530-2000

If the method of truck weights is to be used, duplicates of the sworn certificates of weight shall be furnished with each truckload of material, and presented to the job inspector for his signature. Certificates of weight, which do not bear the signature of the job inspector, will not be considered for payment.

# **GABIONS**

530-3000

The work specified under this specification consists of furnishing, assembling, filling, and tying open-wire mesh rectangular-compartmented gabions to the lines, grades and dimensions shown on Plans, or as directed by the Engineer in the field, in accordance with these Specifications and the details and notes shown on the Plans.

Gabion units shall consist of compartmented rectangular basket containers, with a minimum dimension greater than 12 inches, fabricated from triple-twisted PVC-coated galvanized steel wire mesh with hexagonal openings, placed on a prepared surface covered with filter fabric as specified herein, and filled with stone.

## **MATERIALS**

### **PVC-Coated Galvanized Steel Wire Mesh Gabions**

PVC coated gabion basket units shall be of non-raveling construction, fabricated from a triple-twisted hexagonal mesh of hot-dipped galvanized steel wire having a minimum diameter of 0.105 inches after galvanization, and coated additionally with a minimum of 0.020 inches of PVC. The steel core wire used shall be galvanized and PVC-coated prior to fabrication into mesh.

The core wire of all gabion diaphragm and frame components shall equal or exceed Fed. Spec QQ-W-461g, possess medium tensile strength, and a Finish 5 Class 3 coating of not less than 0.08 oz./sq. ft. of uncoated wire surface. Mesh openings shall be hexagonal in shape and uniform in size measuring approximately 3-1/4 inches by 4-1/2 inches.

Salvage or perimeter basket frame core wire shall be of heavier gauge than that of the wire mesh, with a minimum diameter after galvanization of 0.132 inches, and an overall diameter (core wire plus PVC coating) of 0.174 inches.

Coated wire used for lacing or internal connecting wire within basket cells may be of soft tensile strength and an overall diameter (core wire plus PVC coating) of 0.117 inches.

The PVC-coated wire of all gabion components shall be resistant to the destructive effects of immersion in acidic, salt, or polluted water, exposure to ultraviolet light and abrasion, and retain these characteristics after a period of not less than 3,000 hours under test in accordance with ASTM Test Designation G23.

## **STONE FILL**

### **Quality**

Stone shall have a minimum Specific Gravity of 2.4, and shall be of a quality and durability sufficient to insure permanency in the structure and climate in which it is to be used. The individual stones shall be free of cracks, seams and other defects that would tend to promote deterioration from natural causes, or which might reduce the stones to sizes that could not be retained in the gabion baskets. The inclusion of dirt, sand, clay, and rock fines will not be permitted.

The sources from which the Contractor proposes to obtain the material shall be selected well in advance of the time that the material will be required in the work, and suitable samples of stone fill material shall be submitted to the Engineer for approval prior to delivery of any such material to the job site.

Unless otherwise specified, all tests samples shall be obtained by the Contractor and delivered at his expense to the Engineer at the job site at least 30 days prior to the time that placement of the stone-filled gabions is expected to begin.

Suitable tests and service records will be used to determine the acceptability of the stone. In the event suitable test reports and service records are not available, as in the case of newly-established sources, the material shall be subjected to such tests as are necessary to determine its acceptability for use in the work. Tests to which the material may be subjected include petrographic analysis, specific gravity, absorption, wetting and drying, freezing, thawing, and such other tests as may be considered necessary to demonstrate to the satisfaction of the Engineer that the materials are acceptable for use in the work.

All tests shall be made by an approved testing laboratory, and shall be at the Contractor's expense.

### **Gradation**

Stone fill used in the gabions shall be a well-graded mixture with sizes ranging between 4 inches and 8 inches in diameter, based on U.S. Standard square-mesh sieves. No stone shall have a minimum dimension of less than 3 inches.

## **FILTER FABRIC**

Filter Fabric shall be a non-woven fabric consisting of a perforous sheet of polymeric fibers oriented into a stable network so that the fibers retain their relative position with respect to each other. The fabric shall be free of any chemical treatment or coating which

## GABIONS, CONTINUED

530-3000

### **FILTER FABRIC, CONTINUED**

might significantly reduce permeability, shall have no flaws or defects which could significantly alter its physical properties. The non-woven fabric shall meet the requirements listed below:

<b>PROPERTY</b>	<b>TEST METHOD</b>	<b>CHARACTERISTIC %</b>
Grab Strength	*ASTM 1682	Minimum: 90 lbs
Grab Elongation	*ASTM 1682	Minimum: 50%
Permeability	***	Minimum: 2x10 to minus 2 cm/sec
Effective Opening Size		** Openings no smaller than that of a No. 140 sieve and no larger than a No. 50 sieve

\* Test shall be run on wet samples soaked twenty-four hours. Grab test method using one square inch jaws and a travel rate of 12 inches per minute.

\*\* The fabric shall be affixed to a US Standard Sieve size in which 85% of the soil is retained. Test to be performed in accordance with Corps of Engineers Guide Specification, Section 02502.

\*\*\* Tested in accordance with Alabama Highway Department Test for permeability for Filter Fabric.

Storage and handling of non-woven fabric shall be in accordance with the manufacturer's recommendations. The fabric shall be protected from direct sunlight, ultraviolet rays, and temperatures greater than 140 degrees F.

The Contractor shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this specification.

### **FOUNDATION PREPARATION**

After excavation or stripping to the extent indicated on the Plans or as directed by the Engineer, remaining loose or otherwise unsuitable materials shall be removed and all depressions carefully backfilled and compacted using suitable materials from adjacent required excavation. Any buried debris protruding from the foundation that will impede the proper installation and final appearance of the gabion layer shall also be removed, and the voids shall be carefully backfilled and compacted as directed by the Engineer.

Immediately prior to placing the filter fabric, the prepared foundation surface shall be inspected by the Engineer, and no fabric shall be placed thereon until that area has been approved.

## **GABIONS, CONTINUED**

530-3000

### **FABRICATION – PVC COATED GALVANIZED STEEL WIRE MESH GABIONS**

Gabions shall be fabricated in a manner such that the sides, ends, lid, and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown on the Plans.

Dimension for heights, lengths, widths and diaphragm(s) spacing are subject to a tolerance of 5% of manufacturer's stated sizes.

Gabions shall be of single unit construction, i.e., the base, lid, ends, and sides shall be either woven into a single unit, or one edge of these members connected to the base section of the gabion in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

Where the length of the gabion exceeds one and one-half its horizontal width, the gabion shall be equally divided by diaphragms of the same mesh and gauge as the body of the gabions, into cells whose length does not exceed the horizontal width.

The gabion shall be furnished with the necessary diaphragms, secured in proper position on the base in a manner such that no additional tying at this juncture will be necessary. All perimeter edges of the mesh forming the gabion shall be securely salvaged so that the joints formed by tying the salvages have at least the same strength as the body of the mesh. Lacing wire or connecting wire shall be supplied in sufficient quantity for securely fastening all diaphragms and edges of the gabion.

### **ASSEMBLY AND INSTALLATION**

Empty gabion units shall be assembled individually and placed on the approved surface to the lines and grades as shown on the Plans or as directed by the Engineer, with the sides, ends, and diaphragms erected in such a manner to insure the correct position of all creases and that the tops of all sides are level. All adjoining empty gabion units must be connected by tie wire lacing along the perimeter of their contact surfaces in order to obtain a monolithic structure.

Lacing of adjoining basket units shall be accomplished by continuous stitching with double loops at intervals of not more than 6 inches. All lacing wire terminals shall be securely fastened. The use of expedient clip connections for this purpose as final lid closing will not be permitted.

The initial line of basket units shall be placed on the prepared surface in a direction parallel to stream flow, and partially filled to provide anchorage against deformation and displacement during

## **GABIONS, CONTINUED**

530-3000

### **ASSEMBLY AND INSTALLATION, CONTINUED**

filling operations. After adjoining empty basket units are set to line and grade and common sides with adjacent units thoroughly laced, they may be placed in tension and stretched to remove any kinks from the mesh and to a uniform alignment. The stretching of empty basket units shall be accomplished in such a manner as to prevent any possible unraveling.

Stone filling operations shall carefully proceed, with placement by hand or machine so as not to damage PVC wire coating, to assure a minimum of voids between the stones, and the maintenance of alignment throughout the filling process.

Undue bulging of the mesh shall be avoided. To avoid localized deformation, the 3-foot high basket units in any row are to be filled in stages consisting of courses of a maximum thickness of 12 inches, and at no time shall any cell be filled to a depth exceeding 12 inches more than the adjoining cell.

The maximum height from which the stone may be dropped into the basket units shall be 36 inches. For gabion units in excess of 2 feet in thickness, a minimum of two uniformly spaced connecting wires shall be placed between each stone layer in all cells, connecting compartment faces that are parallel to stream flow. Connecting wires shall be looped around two mesh openings at each basket face and the wire terminals shall be securely twisted to prevent their loosening.

Along all exposed faces, the outer layer of stone shall be carefully placed and arranged by hand to insure a neat and compact appearance. The gabions shall be slightly overfilled, and then levelled to allow for potential settlement of the embankment.

Lids shall be stretched tight over the stone fill using crowbars or lid closing tools, until the lid meets the perimeter edges of the front and end panels. The lid shall then be tightly laced with tie wire along all edges, ends and internal cell diaphragms by continuous stitching with double loops at intervals of not more than 6 inches. Special care shall be taken to see that all projections or wire ends are turned into the baskets.

Where shown on the Plans or as directed by the Engineer, or where a complete gabion unit cannot be installed because of space limitations, the basket unit shall be cut, folded and wired together to suit existing site conditions. The mesh must be cleanly cut and the surplus mesh folded back and neatly wired to an adjacent gabion face. The assembling, installation, filling, lid closing, and lacing of the reshaped gabion units shall be carried out as specified above.

## **GABIONS, CONTINUED**

530-3000

### **ASSEMBLY AND INSTALLATION, CONTINUED**

The work specified under this Section shall include the furnishing, assembling and placing of the wire baskets, filter material, toe walls and stone fill, and all other materials, labor, equipment, tools, and incidental items required for the completion of the work.

### **Basis of Payment**

The quantity determined as specified above shall be paid for at the contract price per cubic yard and shall be paid for under the pay items for Gabions.

The pay quantity for the work specified under this Section shall be the number of cubic yards of stone fill actually placed and accepted.

# GUARDRAIL

536

## **METAL**

The work specified under this Section consists of the construction of Metal Guardrail in accordance with the requirements of Section 536 of the *FDOT Specifications*, as amended herein, applicable drawings of the *FDOT Roadway and Traffic Design Standards*, latest edition, and the details and notes shown on the Plans. Box Beam guardrail shall be constructed in accordance with the details shown in the Plans.

### **Basis of Payment**

The pay quantity for Guardrail under this Section shall be the number of linear feet of guardrail, measured along the centerline of the guardrail panel, actually constructed and accepted. Payment for the said pay quantity shall be full compensation for all work and materials specified in the construction of metal guardrail, including posts, fasteners, any required bending of the guardrail panels, miscellaneous asphalt (3 inches thick) and any other materials or work incidental to the construction of the guardrail, except that work and materials specified to be paid for under other pay items.

The pay quantity for End Anchorage Assembly shall be the number each of end anchorage assemblies actually installed and accepted. Payment for the said pay quantity shall be full compensation for all work and materials specified in the construction of guardrail anchorage assemblies, including miscellaneous asphalt (3 inches thick).

The work specified under this Section shall be paid for under the following pay items:

Guardrail, Metal, With Timber Posts, FDOT Index 400

Guardrail, Metal, With Steel Posts, FDOT Index 400

End Anchorage Assembly, FDOT Type

Guardrail, Metal, Box Beam Type

# FENCING

550

## **FDOT TYPE B**

The work specified in this Section consists of the construction of chain link fencing, and the furnishing and installation of cantilever gates as shown in the Plans. If shown in the Plans, the work in this Section shall also include vinyl coated fence fabric, extra-length posts and top rails.

The construction of Fencing under this Section shall conform to the applicable provisions of Section 550 of the *FDOT Specifications* and Index No. 452 of the *FDOT Roadway and Traffic Design Standards*, latest edition, as amended herein, and the lines, grades, dimensions and notes shown in the Plans. Fencing shall be constructed to the heights specified in the Plans.

The construction of Cantilever Gates under this Section shall conform to the applicable requirements of Section 550 of the *FDOT Specifications* and Index No. 452 and 453 of the *FDOT Roadway and Traffic Design Standards*, latest edition, as amended herein, and the details and notes shown in the Plans. Cantilever gates shall be of the type specified in the Plans (i.e., swing, slide, etc).

### **Basis of Payment**

The pay quantity for Fencing, FDOT Type B shall be the number of linear feet of fencing installed and accepted. Payment for this quantity shall constitute full compensation for all fence material and fastening accessories, all line posts at the length required for construction of the fence to Plan height (nominal fence height, plus two feet), all concrete encasements for posts, and all clearing and grubbing, grading and miscellaneous work necessary to the completed work, except that work for which payment is specified to be made under other pay items. Temporary fencing shall include furnishing, installation, maintenance and removal.

The pay quantity for the following shall be the number each of the different types of assembly installed at Plan height (nominal fence height, plus two feet) and accepted:

Pull or End Post Assembly, FDOT Fencing Type B

Corner Post Assembly, FDOT Fencing Type B

The pay quantity for Gate, Cantilever, FDOT Fencing Type B shall be the number each of the various sizes and types of gates shown in the Plans installed and accepted. Payment for this quantity shall constitute full compensation for all accessories and incidentals necessary to complete the work.

# **BOLLARDS**

550-1000

## **CONCRETE**

The work specified in this Section consists of furnishing and installing Bollards as shown on the Plans, or as directed by the Engineer in the field, in accordance with these specifications and the details and notes shown on the Plans.

Bollards shall be pre-cast Class I concrete fence post as shown in FDOT Index 451.

Bollards shall be set by driving or digging. If by digging, the posts shall be set at the center of the hole and the soil stamped securely on all sides.

### **Payment**

The work specified under this Section shall be paid for under the pay items for Bollards, Concrete.

### **Pay Quantity**

The pay quantity for the work specified under this Section shall be the number of Bollards actually constructed and accepted.

### **Basis of Payment**

The quantity of Bollards determined as specified above shall be paid for at the contract price per each.

# **SODDING**

575

The work specified under this Section shall consist of the furnishing and placement of grass sod within the limits shown on the Plans, and in such other areas as the Engineer may direct. The furnishing and placement of sod shall be in accordance with Section 575 of the *FDOT Specifications*, as amended herein, and, where specified herein or on the Plans, applicable standard drawings of the *FDOT Roadway and Traffic Design Standards*. Sod shall be tropical soda apple free.

The work specified under this Section shall include all necessary mowing of sod to the satisfaction of the Engineer for the duration of the construction period. It shall include all staking of sod specified on the Plans.

If this contract includes the construction of grass medians, then the work specified under this Section shall include the furnishing and placement of 6 inches of topsoil in the median prior to the placement of the sod. Topsoil materials shall be in accordance with Section 162-2 of the Standard Specifications.

No clay or limerock shall be allowed in the median to a depth of 24 inches from the back of curb to the back of curb (or edge of pavement). The medians shall not be used for the disposal (burying) of debris.

## **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of square yards of Sodding, of the types specified in the applicable pay items, actually placed and accepted. This pay quantity shall include all required water and fertilizer, excavation of the trench for the sod, and the satisfactory disposal of excavated material. No payment shall be made for unauthorized areas of sodding, and no additional allowance shall be made for furnishing and applying the fertilizer and water necessary to establish the growth of sodding.

# TRAFFIC SIGNALS

620-690

## **SIGNAL CONDUIT SYSTEM**

The work specified under this Section shall include all work required for the installation of the traffic signals and signal conduit, including all excavation, backfilling, and compacting around the conduit, disposal of surplus materials and restoration of driveways, sod, pavements, curb, sidewalk, etc. to existing conditions prior to construction. The furnishing and installation of all items in connection with Traffic Signals shall be in accordance with Sections 603 to 690 of the Supplemental Specifications to the *FDOT Specifications*.

### **Polyvinyl-Chloride (PVC)**

Construction of Polyvinyl-Chloride signal conduit shall conform to the requirements of Section 630 of the 2000 Traffic Signal Supplement to the *FDOT Specifications*, or latest edition.

### **Bridge Pipe Hanger**

Shop drawings for the pipe hanger required for the installation of the conduit on the bridges shall be submitted for review and approval.

### **Pull Boxes**

Signal cable pull boxes shall be **Brooks 38 Series Polymer Heavy Duty** or approved equal.

Signal Cable Pull Boxes shall be installed at an approximate 500 foot spacing interval or the pull boxes shall be installed adjacent to G.T.E. manholes, if appropriate, or as directed by the Engineer.

### **Basis of Payment**

The work specified under this Section shall be paid for under the pay items for Polyvinyl-Chloride (PVC) (Signal Conduit), Signal Cable Pull Boxes and Traffic Signals.

The pay quantities for the work specified under this Section shall be the number of linear feet of the types and sizes of conduit specified in the applicable pay items, actually constructed and accepted, including that portion of the conduit extending into the walls (farthest point) of the structures to which the conduits are connected and the number each of pull boxes completed and accepted, and assembly of traffic signals installed and accepted.

# **TRAFFIC SIGNAL LOOP INSTALLATION AND REPAIR**

630

## **GENERAL**

The work specified under this Section consists of the installation of Traffic Signal Detector Loops and lead-ins. The work specified in this Section shall include all materials, labor and equipment required for completion of the loop installation.

Unless otherwise noted all materials, work and provisions relating to this Section shall be governed by the FDOT Specifications and shall conform to applicable standards and specifications of the National Electrical Manufacturers Association (NEMA), the International Municipal Signal Association (IMSA) and the National Electrical Code (NEC).

Beginning with the time when the Contractor begins any on-site work and continuing until all work is completed and accepted by the County, the Contractor shall maintain a traffic signal technician possessing a Level 2 or Level 3 Traffic Signal Technician Certification from the International Municipal Signal Association.

## **INSTALLATION OR REPLACEMENT OF UNDERGROUND CONDUIT**

All conduit shall conform to the requirements of the FDOT Specifications.

As part of the conduit installation, the Contractor shall furnish and install all necessary elbows, couplings and all labor, trenching, back filling, and restoration materials necessary for a complete and accepted installation.

The quantity of conduit to be paid for shall be the actual number of linear feet of 2" conduit which is furnished and installed. Payment will be made under:

Conduit (Underground, 2"),

Furnish and Install Linear Feet

## **INSTALLATION OR REPLACEMENT OF PULL BOXES**

The Contractor shall furnish and install pull boxes in accordance with the FDOT Specifications, the Typical Drawings and the Plans. As part of the pull box installation, the Contractor shall furnish and install washed gravel or crushed stone in accordance with the Typical Drawings.

The quantity of pull boxes to be paid for shall be the actual number of pull boxes which are furnished and installed. Payment will be made under:

Pull Box, Furnish and Install - Each

# **TRAFFIC SIGNAL LOOP INSTALLATION AND REPAIR, CONTINUED**

630

## **INSTALLATION OF LOOP ASSEMBLIES**

The Contractor shall furnish and install loop assemblies in accordance with the FDOT Specifications, the Typical Drawings and the Plans.

The Contractor shall not damage existing loops or loop lead-in cables which are intended to be retained while installing new loops and lead-in cables. Where damage to existing loops or lead-in cables cannot be avoided, the Contractor shall obtain the written approval of the Engineer prior to damaging said loops or lead-in. Where such approval is obtained, the Contractor shall furnish and install an entirely new loop assembly of the type damaged which will be paid for at the contract unit price for that type of loop assembly. All loop assemblies damaged without the prior approval of the Engineer shall be replaced in their entirety by the Contractor at the Contractor's expense.

### **Loop Slot Sealant**

The Contractor shall furnish loop slot sealant conforming to the following requirements for sealing the loop slots, the loop conduits and the splices between the loop wires and the lead-in cables.

The sealant shall be a single-compound, polyurethane sealant which is flexible at all temperatures of 40 degrees Fahrenheit and above and which utilizes moisture curing.

The sealant shall have a consistency which resists flowing out of the slot, even on inclined roadways. Furthermore, the consistency of the sealant shall permit it to completely encapsulate the wires or cables in the slot to the full depth of the slot.

#### **Property and Result**

Hardness (indentation):  
65 - 85  
50% Relative Humidity

Weathering Resistance:

Chemical Resistance

Chemical and Results:

De-icing chemical; Motor Oil;  
Hydraulic Break Fluid;  
Calcium Chloride (5%)  
No effect

#### **Measuring Standard and Conditions**

ASTM D 2240 Rex, Type A,  
Model 1700, 77 degrees Fahrenheit,

ASTM D 822 Weatherometer,  
350 Slight chalking hours.  
Cured 7 days at 77 degrees  
Fahrenheit, 50% Relative Humidity

ASTM 471

# **TRAFFIC SIGNAL LOOP INSTALLATION AND REPAIR, CONTINUED**

630

## **INSTALLATION OF LOOP ASSEMBLIES, CONTINUED**

<b>Property and Result</b>	<b>Measuring Standard and Conditions</b>
Gasoline: Slight Swell	
Salt Spray Resistance: 500 psi, 100 minimum degrees Fahrenheit, 5% NaCl, tensile, 400% minimum Die C, pulled at 20 IPM elongation	ASTM B 117 28
Dielectric Constant: Less than 25% Change over a temperature of -30 to 50 degrees Celsius	ASTM D 150

The Contractor shall furnish a certified report to the Engineer from an independent testing laboratory acceptable to the Engineer stating that the sealant he furnishes conforms to the above requirements. If the sealant manufacturer has had previous lots of sealant so tested, the Engineer will accept certified test reports on those lots, provided they are accompanied by a statement from the manufacturer certifying that the sealant to be provided was manufactured in the same way.

### **Installation Requirements**

All loops furnished and installed on this project shall be Type A, Type B, Type C or Type F loops as defined in the Typical Drawings. Type A, C and F shall be 30ft in length.

Prior to installing the loop wire or lead-in cable, the Contractor shall cut the saw slots, drill the conduit hole, and install the needed conduit, to the existing pull boxes. The Contractor shall prevent blowing dust from the slot cutting operations by the use of water. The Contractor shall install the loop wire in the slots, taking care not to damage the insulation. The Contractor shall utilize loop wires with different colored insulations, as shown on the typical drawings, so that no two loops on the same approach have the same color insulation; however, colors may be repeated in sequence if the approach has more than four (4) loops. Loops in adjacent lanes shall be formed of wires having different colored insulations.

The Contractor shall not splice the loop wire at any point. It shall be one continuous piece of wire from the pull box, through the loop, and back to the pull box. Loops shall be centered in their lanes, unless otherwise noted. Unless otherwise noted, where a lane is wider than normal to accommodate parking, the edge of the lane shall be taken as:

8 Feet from the curb or edge of pavement, when the parking is parallel

# **TRAFFIC SIGNAL LOOP INSTALLATION AND REPAIR, CONTINUED**

630

## **INSTALLATION OF LOOP ASSEMBLIES, CONTINUED**

to the curb; and

18 feet from the curb or edge of pavement, when angle parking is practiced.

Loop wire shall be XHHW A.W.G = 14 Stranded copper wire. The insulation color scheme shall be: Black for the loop closest to the pull box or cabinet, then white, then red, then green. The continuity of the lead-in cable shield shall be maintained and the shield shall not be grounded. To prevent the loop wire from floating in the sealant, short nonmetallic retainers shall be placed in the slot at approximately two-foot intervals. The retainers shall not be so large that they prevent total encapsulation of the wires in the sealant. The conduit mouth in the hole in the curb and gutter shall be blocked with a paper cup or other suitable device before sealing the hole in order to prevent the sealant from entering the conduit.

The slot and the hole in the curb and gutter shall be sealed with flexible embedded loop slot sealant. Loop wires shall be twisted together at the rate of at least six (6) turns per foot in the saw slot between the loop and the conduit, in the conduit and in the pull box. At least two (2) feet of slack shall be maintained in each lead-in cable and in each loop wire pair in the pull box. In order to prevent the relative movement of loop wires, the loop wires in the pull box shall be clamped or taped to one another. Saw cuts for loop lead-ins will vary in length as shown on the Plans. A maximum of three (3) lead-in cables may be installed in a single saw cut.

## **Connection and Testing**

At all intersections, the Contractor shall install all loop assemblies to the controller cabinet. The Contractor shall test the loop assemblies in accordance with the FDOT Specifications. The Contractor shall notify the County when he Plans to work in a control equipment cabinet and shall not open or work inside a cabinet unless a qualified representative of the County is present. Said notifications shall be sufficiently in advance so that the County can schedule its manpower utilization effectively.

## **Basis of Payment**

The quantity of loop assemblies to be paid for shall be the actual number and type of loop assemblies which are furnished and installed. Payment will be made under:

- Loop Assembly (Type A, 6 x 30 Rectangle), Furnish and Install Assembly
- Loop Assembly (Type B, 6 x 6) Furnish and Install Assembly
- Loop Assembly (Type C, 6 x 30) Furnish and Install Assembly
- Loop Assembly (Type F, 6 x 30 Quadrupole) Furnish and Install Assembly

**TRAFFIC SIGNAL LOOP**  
**INSTALLATION AND REPAIR, CONTINUED**

630

**INSTALLATION OF LOOP LEAD-IN CABLE**

The Contractor shall furnish and Install loop lead-in cable in accordance with the FDOT Specifications, the Typical Drawings and the Plans.

**Basis of Payment**

The quantity of lead-in cable to be paid shall be the actual number of linear feet of lead-in cable which is furnished and installed. Payment will be made under:

Lead-in Cable (IMSA Spec 502) Furnish and Installation Linear Feet

# HIGHWAY SIGNING

700

The work specified under this Section shall include the erection, installation and furnishing of all material necessary for the completion of all signing as shown on the Plans.

All work and material shall be in accordance with Section 700 of the *FDOT Specifications*.

For traffic sign installation into concrete median, work shall be completed in accordance with FDOT Index No. 17302, Case VIII, post in concrete detail, and PCED Index No. 1380.

All ground signs (red, green, blue and yellow background) shall have Type III D background sheeting unless otherwise noted on the Plans.

## **Basis of Payment**

The pay quantity for the work specified under this Section shall be the number each or per assembly of item actually installed and accepted.

# **SLOPE PAVING**

700-0100

## **INTERLOCKING BLOCK MATS**

The Contractor shall furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of cellular concrete erosion control mats in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

### **General**

All cellular concrete mats shall be pre-manufactured as an assembly of concrete blocks, with specific hydraulic capacities, bound into mats by the use of revetment cables.

Individual blocks in the cellular mats shall be staggered and interlocked for enhanced stability. The open cell version of the blocks shall have two (2) vertical openings of rectangular cross section with sufficient wall thickness to resist breakage during shipping and installation. The mats shall be constructed with a combination of open and/or closed cell blocks as shown on the Contract Drawings.

Parallel strands of cable shall extend through two (2) ducts in each block in a manner which provides for longitudinal binding of the blocks within the mats. Each row of blocks shall be laterally offset by one-half block width from the adjacent row so that any given block is cabled to four other blocks (two in the row above and two in the row below).

Each block shall incorporate interlocking surfaces that prevent lateral displacement of the blocks within the mats when they are lifted by the longitudinal revetment cables. The interlocking surfaces must not protrude beyond the perimeter of the blocks to such an extent that they reduce the flexibility or articulation capability of the cellular mats or become damaged or broken when the mats are lifted during shipment or placement. Mats containing broken interlocks will not be accepted. Once the mats are in place, the interlocking surfaces shall prevent the lateral displacement of the blocks even if the cables should become damaged or removed.

The cables shall be individually looped at one end of the mat and the ends of each cable spliced together at the other end of the mat with sleeves approved by the Engineer.

The cellular concrete mats shall be placed on a filter fabric as specified herein.

### **Cellular Concrete Grids**

#### **A. Scope**

This specification covers concrete blocks for erosion control mats used in revetments, storm channels, etc., and for soil stabilization.

# SLOPE PAVING, CONTINUED

700-0100

## **INTERLOCKING BLOCK MATS, CONTINUED**

NOTE 1: Concrete units covered by this Specification are made from lightweight or normal weight aggregates, or both.

NOTE 2: The values stated in U.S. customary units are to be regarded as the standard.

### **B. Materials**

1. Cementitious Materials - Materials shall conform to the following applicable ASTM specifications:
  - a. Portland Cements - Specification C 150, for Portland Cement.
  - b. Blended Cements - Specification C 595, for Blended Hydraulic Cements.
  - c. Hydrated Lime Types - Specification C 207, for Hydrated Lime Types,
  - d. Pozzolans - Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.
2. Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:
  - a. Normal Weight Specification C 33, for Concrete Aggregates.

### **C. Physical Requirements**

At the time of delivery to the work site, the units shall conform to the physical requirements prescribed in Table 1 below.

Durability - The manufacturer shall satisfy the purchaser by proven field performance that the concrete units have adequate durability even if they are to be subjected to a freeze-thaw environment.

**TABLE 1. PHYSICAL REQUIREMENTS**

**Compressive Strength**  
**Water Absorption**  
**Net Area Max. LB/FT<sup>3</sup>**  
**Min. psi (MPA)(Kg/M<sup>3</sup>)**

Average of 3 Units	Individual Unit	Average of 3 Units	Individual Unit
4,000	(27.6)	3,500	(24.1) 10 (16) 12 (18.2)

### **D. Visual Inspection**

All units shall be sound and free of defects that would interfere with the proper placing and performance of the unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual methods of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

### **E. Sampling and Testing**

The purchaser or authorized representative shall be accorded

## SLOPE PAVING, CONTINUED

700-0100

### **INTERLOCKING BLOCK MATS, CONTINUED**

proper access to facilities to inspect and sample the units at the place of manufacture from lots ready for delivery. Sample and test units in accordance with ASTM Methods C 140, Sampling and Testing Concrete Masonry Units.

#### **F. Expense of Tests**

Additional testing, other than that provided by the manufacturer, shall be borne by the Contractor.

**G. The Cellular Concrete Grids** shall have the following nominal characteristics:

**TABLE 2. STANDARD SIZES OF BLOCKS**

BLOCKWEIGHT		BLOCK SIZE (IN)		OPEN AREA		
TYPE	Lbs.	Lbs/Sq. Ft.	Length	Wide	Height	%
Open -	31-36	32-37	13.0	11.6	4.75	20
Open -	45-52	45-53	13.0	11.6	6.00	20
Closed -	39-45	40-45	13.0	11.6	4.75	10
Closed -	53-61	54-62	13.0	11.6	6.00	10
Open -	62-71	35-40	17.4	15.5	4.75	20
Open -	81-94	46-53	17.4	15.5	6.00	20
Open -	99-113	56-65	17.4	15.5	7.50	20
Open -	120-138	68-78	17.4	15.5	9.00	20
Closed -	76-89	43-50	17.4	15.5	4.75	10
Closed -	94-108	53-61	17.4	15.5	6.00	10
Closed -	120-138	68-78	17.4	15.5	7.50	10
Closed -	145-167	82-95	17.4	15.5	9.00	10

### **Revetment Cable and Fittings**

There is an option between two (2) types of revetment cables and fittings.

**A. Polyester Revetment Cable and Fittings.** Revetment cable shall be constructed of high tenacity, low elongating, continuous filament polyester fibers. Cable shall consist of a core construction comprised of parallel fibers contained within an outer jacket or cover. The weight of the parallel core shall be between 65% to 70% of the total weight of the cable. The revetment cable shall have the following characteristics:

## SLOPE PAVING, CONTINUED

700-0100

### **INTERLOCKING BLOCK MATS, CONTINUED**

<b>Nominal Cable Diameter</b>	<b>Approx. Ave. Strength Lbs.</b>	<b>Weight/100 Feet</b>	
		<b>Min. Lbs.</b>	<b>Max Lbs.</b>
1/4"-20mm	3,700	2.47	2.47
5/16"-27mm	7,000	3.99	4.42
3/8"-30mm	10,000	4.75	5.26
1/2"-40mm	15,000	8.93	9.90

(Note: For block less than 36 pounds, use 1/4 inch diameter cable for mat lengths up to 36 feet. Use 5/16 inch diameter cable for mat lengths greater than 36 feet but less than 45 feet. Use 1/2 inch diameter cable for larger block sizes. Refer to manufacturer's specifications for details.)

Elongation requirements specified below are based upon stabilized new, dry cable. Stabilization refers to a process in which the cable is cycled fifty (50) times between a load corresponding to  $200D^2$  and a load equal to 10%, 20% or 30% of the cable's approximate average breaking strength. Relevant elongation values are as shown in the table below. The tolerance on these values is  $\pm 5\%$ .

#### **Breaking Strength**

	<u>10%</u>	<u>20%</u>	<u>30%</u>
Permanent Elongation (While Working)	0.7	1.6	2.6
Elastic Elongation	0.6	1.4	2.2
Total Stretch	1.3	3.2	4.8

The revetment cable shall exhibit good to excellent resistance to most concentrated acids, alkalis and solvents. Cable shall be impervious to rot, mildew and degradation associated with marine organisms. The materials used in the construction of the cable shall not be affected by continuous immersion in fresh or salt water.

Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 60% of the minimum rated cable strength. Fittings such as sleeves and stops shall be aluminum and washers shall be galvanized steel unless otherwise shown on the Contract Drawings.

#### **Anchors**

Anchors shall be screw type helix anchors and shall conform to ASTM A36-latest. The anchors shall be galvanized in accordance to ASTM A123-latest. Anchor helix shall be pitch-controlled to ensure maximum holding capacity. The anchor shaft should be aligned with connecting mat rope loop to prevent premature failure of anchor rod. Under no circumstances should

## SLOPE PAVING, CONTINUED

700-0100

### **INTERLOCKING BLOCK MATS, CONTINUED**

the rod and rope loop join at an angle of departure exceeding 10°. The maximum installing torque shall be 2,300 lbs. The anchors shall meet the following physical characteristics:

<b>Helix Anchor Size Diameter</b>	<b>Area Sq. In.</b>	<b>Rod Diameter and Length</b>
6" (Minimum)	28 (Minimum)	3/4" x 66"

The maximum spacing between anchors shall not exceed 8'.

### **Filter Fabric**

Geotextile - The geotextile shall be a previous sheet of woven monofilament/multifilament plastic yarns. The geotextile shall meet the physical requirements listed in Table No. 3 of the Specifications.

The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextiles shall be finished to prevent the outer fiber from pulling away from the geotextiles.

The Contractor shall furnish the Engineer, in duplicate, manufacturer's certified test results showing actual test values obtained when the physical properties are tested for compliance with the Specifications.

During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultraviolet rays and temperatures greater than 140 degrees Fahrenheit. To the extent possible, the fabric shall be maintained wrapped in its protective covering.

**TABLE 3. PHYSICAL REQUIREMENTS OF FILTER FABRIC**

Physical Property	Test Procedure	Minimum Value
Grab Tensile Strength (Unaged Geotextile)	ASTM D4632	Warp: 285 Lbs. Fill: 400 Lbs.
<b>Breaking Elongation</b> (Unaged Geotextile)	<b>15 Percent in any Principal</b> ASTM D4632	Director (60% Maximum)
Burst Strength	ASTM D3786	520 psi
Puncture Strength	ASTM D4833	135 Lbs.
A.O.S., U.S. Std. Sieve	ASTM D4751	60
% Open Area	CWO-22125-86	10
Permittivity	ASTM D4491	.506 sec
Water Flow Rate	ASTM D4491	35 gpm/Sq. Ft.

## **SLOPE PAVING, CONTINUED**

700-0100

### **INTERLOCKING BLOCK MATS, CONTINUED**

The sheets of filter fabric shall be sewn together at the manufacturer or another approved location to form sections not less than 36 feet wide and 46 feet long.

At the time of installation, filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the Engineer, torn or punctured section of fabric shall be repaired by placing a filter fabric patch over the damaged area prior to placing the mats. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.

### **Size of Cellular Concrete Mats**

The cellular concrete grids, cables and fittings shall be fabricated at the manufacturer or another approved location into mats with a width of up to eight (8) feet and a length which is approved by the Engineer.

### **Structural Grout**

Structural grout shall conform to the requirements of Sections 345 and 400 of the *FDOT Specifications*.

### **Foundation Preparation**

Construction Methods. Areas on which filter fabric and cellular concrete mats are to be placed shall be constructed to the lines and grades shown on the Contract Drawings. Where such areas are below the allowable grades they shall be brought to grade by placing thin layers of selected material and compacted. The depth of layers and amount of compaction shall be as required by the Engineer. All obstruction, such as roots and projecting stones, must be removed and soft or low density pockets of removed material filled with selected material and compacted.

Excavation and preparation for anchor trenches, side trenches, and toe trenches or aprons shall be done in accordance to the lines, grades and dimensions shown in the Contract Drawings.

Immediately prior to placing the filter fabric and cellular concrete mats, the prepared area shall be inspected by the Engineer and no fabric or mats shall be placed thereon, until that area has been approved.

### **Placement Filter Fabric**

#### **A. General**

Filter Fabric, as specified elsewhere, shall be placed within the limits shown on the Contract Drawings.

# **SLOPE PAVING, CONTINUED**

700-0100

## **INTERLOCKING BLOCK MATS, CONTINUED**

### **B. Placement**

Filter Fabric shall be placed directly on the prepared area immediately after approval by the Engineer. Longitudinal and transverse joints shall be overlapped at least three (3) feet. The fabric shall be placed so that the upstream strip of fabric will overlap the downstream strip. If erosion is observed to take place underneath the fabric prior to placement of cellular concrete mats, the filter fabric shall be removed and the eroded area reshaped for approval by the Engineer.

## **Placement of Cellular Concrete Mats**

### **A. General**

Cellular concrete mats shall be placed within the limits shown on the Contract Drawings.

### **B. Placement**

The cellular concrete mats shall be placed on the filter fabric in such a manner as to produce a level surface, and shall be constructed within the specified lines and grades shown on the Contract Drawings.

The cellular concrete mats shall be attached to a spreader bar or other approved device to aid in the lifting and placing of the mats in their proper position by the use of a crane or other approved equipment. The mats shall be placed side by side and/or end to end, so that the mats abut each other such that there are no gaps greater than two-thirds of the grid size.

The cellular concrete mats shall be anchored, when required, by fastening cable loops to anchors placed into the anchor trenches as shown on the Contract Drawings.

Helix anchors shall be "screwed" into the ground by machine at the proposed locations as identified in the Contract Drawings. Trench excavation for the placement of helix anchors is not an acceptable means of installation. Helix anchors shall be installed in accordance with the manufacturer's guidelines and shall be capable of resisting a direct pull of at least 5000 pounds when installed at top of bank. (Note: Certain areas may require compaction at top of bank in order to achieve a blow count of 7-14 per ASTM-D1586, necessary to achieve 5000 pounds of pull.)

Anchor trenches and side trenches shall be backfilled and compacted flush with the top of the mats. Toe trenches shall be backfilled as shown on the Contract Drawings.

### **C. Finishing**

The cells or openings in the cellular concrete mats shall be left open below the normal water line. Above the normal water line the cells or openings shall be filled with soil/sand, then seeded.

## **SLOPE PAVING, CONTINUED**

700-0100

### **INTERLOCKING BLOCK MATS, CONTINUED**

**D. Structural grouting** will be required where the gaps in concrete mats occurs. Any surface where the clear span between mats is two (2) inches or greater, and at interface locations, as shown in the Plans and Details, shall be grouted. All anchoring shall be completed prior to placing grout.

### **E. Consultation**

The manufacturer of the cellular concrete mats shall provide design and construction advice to the Contractor and Engineer during the design and installation phases of the project, when required.

### **Basis of Payment**

The work specified under this Section shall be at the contract price per square yard for Slope Paving, Interlocking Block Mats.

The pay quantity for Slope Paving, Interlocking Block Mats shall be the number of square yards of Slope Paving, Interlocking Block Mats actually constructed and accepted by the Engineer and shall include all work and materials described and specified herein, including but not limited to filter fabric, anchors, cables, fittings, etc.

# **SLOPE PAVING**

700-0101

## **PUMPED CONCRETE MATS**

The work shall consist of installing an unreinforced concrete mat revetment, characterized by a cobbled surface as shown on the Contract Drawings, by positioning a specially woven dual wall synthetic fabric formwork on the surface to be protected and filling it with a pumpable fine aggregate concrete slurry in such a way as to form a stable mat of required weight and configuration.

### **Fabric Formwork**

Fabric Formwork material shall be constructed of permeable, continuously woven panels of double-layer, open-selvage synthetic fabric jointed together to form a formwork for placing fine aggregate concrete slurry. The fabric shall consist of long chain polymeric yarns such as polypropylene, polyester or polyamide formed into a stable network such that the yarns retain their relative position to each other.

Uniform Section Fabric, designated as 6 inch Uniform Section Mat on the Contract Drawings, shall consist of double-layer fabric formwork jointed together by interwoven spacer cords of uniform length. The hydrostatic pressure relief where required, shall be provided by inserting plastic weep-hole assemblies through the mat at 3 foot centers.

Individual mill width panels shall be cut to the length required and the two layers of fabric separately joined edge to edge by means of sewing thread, to form multiple-mill width panels. Multiple-mill width panels shall be field joined edge to edge to adjacent panels by means of sewing thread, zippers or hook and loop type fasteners. The grab tensile strength of all joints shall be not less than 100 lbs. per inch when tested in accordance with ASTM D-1682-75.

Immediately following receipt of fabric to the job site, fabric shall be inspected and stored in a clean dry area where it will not be subject to mechanical damage, exposure to moisture or direct sunlight.

At the direction of the Engineer, the Contractor shall demonstrate the suitability of the fabric design by injecting the fine aggregate slurry into a 5-1/2" diameter fabric sleeve under pressure at 10 to 15 psi which shall be maintained by means of air pressure or a standpipe for 10 minutes. The sleeves shall be constructed of a single layer of Uniform Section fabric. Test cylinders, 12' long, shall be cut from each specimen and tested in accordance with ASTM C-39.

The average compressive strength of Armorform cast test cylinders or equivalent shall be at least 20% higher at 7 days than that of companion test cylinders made in accordance with ASTM C-31, and not less than 2,500 psi at 28 days.

## **SLOPE PAVING, CONTINUED**

700-0101

### **PUMPED CONCRETE MATS, CONTINUED**

#### **Mortar Grout**

Fine aggregate concrete shall consist of a mixture of Portland cement, fine aggregate, and water so proportioned and mixed as to provide a pumpable slurry. Admixtures and/or a pozzolan may be used with the approval of the Engineer.

Portland cement shall conform to ASTM C-150, Type I or Type II.

Fine aggregate shall conform to ASTM C-33, except as to grading. Aggregate grading shall be reasonably consistent and shall be well graded from the maximum size which can be conveniently handled with available pumping equipment.

Water for mixing shall be clean and free from injurious amounts of oil, acid, salt, alkali, organic matter or other deleterious substances.

Pozzolan, if utilized, shall conform to ASTM C-618 Type N, F or C.

Admixtures, if utilized, shall contribute to the nature of the specification. Pozzolan, or an equal water reducer conforming to ASTM C494, may be used to reduce segregation, increase workability and pumpability, improve strength, and increase water tightness. If an air entraining agent is used, it shall conform to ASTM C260, shall improve resistance to freezing and thawing, and shall reduce both bleeding and permeability. Other admixtures shall not be used.

Materials shall be proportioned to produce a hardened concrete with a minimum compressive strength of 2,500 psi at 28 days when specimens are made and tested in accordance with ASTM C-31 and C-39.

#### **Slope Preparation**

Areas on which fabric formwork is to be placed shall be constructed to the lines and grades shown on the Contract Drawings. Where such areas are below the allowable grades they shall be brought to grade by placing layers of selected material and compacted. The depth of layers and amount of compaction shall be as required to obtain a density equal to the adjoining undisturbed soil or as specified by the Engineer. All obstructions, such as roots, projecting stones and waste material shall be removed.

Excavation and preparation of anchor trenches, side trenches, and toe trenches or aprons shall be done in accordance with the lines, grades and dimensions shown on the Contract Drawings.

This preparation and grading work shall not progress more than 50' ahead of pavement operation, unless otherwise approved by the Engineer.

Place filter fabric immediately following grading, slope preparation, and acceptance by the Engineer.

## **SLOPE PAVING, CONTINUED**

700-0101

### **PUMPED CONCRETE MATS, CONTINUED**

#### **Fabric Formwork Placement**

Position fabric loosely along the bank before grout injection. Stake fabric at predetermined locations to allow for fabric contraction. Do not approximate fabric locations. Measure dimensions perpendicular to the shoreline for best appearance.

Fabric panels shall be jointed in the field with a bag closer (portable sewing machine) in the following manner: Layout the first panel and fold back the leading edge. Invert the adjacent abutting panel. Join the top layers of fabric. Join the bottom layers of fabric. Fold the jointed panels back on the bank with seams down.

To avoid field sewing as much as possible, prepare fabric assembly sketches in such detail that the great majority of the sewing can be done prior to delivery.

Provide each job with uncut, unassembled fabric for special field tailoring.

#### **Mortar Grout Placement**

Following panel placement, small cuts shall be made in the top layer of the fabric formwork to allow for the insertion of the injection hose or nozzle. Fine aggregate concrete slurry shall be injected between the top and bottom layers of fabric, inflating the revetment panel to recommended thickness and configuration.

Fine aggregate concrete slurry shall be injected in such a way that excessive pressure on the fabric formwork and cold joints within any one panel are avoided.

Holes in the fabric left by the removal of the injection hose shall be temporarily closed by inserting a piece of burlap or similar material. The burlap shall be removed when the concrete is no longer fluid and the surface is firm to the hand. Foot traffic on the filled mat shall be restricted to an absolute minimum until the surface will accept foot traffic without being displaced, distorted or deflected.

Upon completion of the concrete placement, all the anchor trenches, side trenches and toe trenches shall be backfilled, compacted and completed as specified in the Contract Drawings.

Spilled mortar shall be cleaned up by hand. Do not wash down mat with a water hose.

#### **Dimpled Drainboard**

The composite drainboard system consists of a lightweight, impermeable, three-dimensional, high impact-resistant polymeric dimpled core with a needle-punch, non-woven geotextile bonded to one side of the core dimples.

## SLOPE PAVING, CONTINUED

700-0101

### **PUMPED CONCRETE MATS, CONTINUED**

The core is manufactured to a 3/4 inch thickness with dimples produced on both sides having a spacing between dimples of 1.25+ .10% in both the horizontal and vertical directions.

Bonding of the geotextile is to be accomplished using a non-hardening, waterproof adhesive that is applied to the dimple tops so as not to impede the drainage characteristics of the geotextile.

The geotextile is to extend beyond both edges of the polymeric core by a minimum of five (5) inches to assure overlap with adjacent panels.

### **PHYSICAL PROPERTIES**

<b>PROPERTY VALUES</b>	<b>TEST METHOD</b>	<b>TYPICAL</b>
Color		Black
Weight, (oz,ft <sup>2</sup> )	ASTM D-3776	2.9
Thickness, (in.)	ASTM D-1777	.75
Compressive Strength, (psf)	ASTM D-1621	4000 +
Flow, Q, (gpm/ft.width) @1400 psf		5

Physical properties of the non-woven fabric shall be in accordance with *FDOT Specifications* Section 985.

### **Basis of Payment**

The work specified under this Section shall be at the contract price per square yard for Slope Paving, Pumped Concrete Mats.

The pay quantity for Slope Paving, Pumped Concrete Mats shall be the number of square yards of Slope Paving, Pumped Concrete Mats actually constructed and accepted by the Engineer and shall include all work and materials described and specified herein, including but not limited to filter fabric, drainboard, mortar grout, fabric formwork, perforated PVC pipe, etc.

# **PAVEMENT STRIPING, MARKINGS AND REFLECTIVE PAVEMENT MARKERS**

706

710

The work specified under this Section consists of the furnishing and installation of pavement striping, pavement markings, and reflective pavement markers.

Installation of the traffic stripes, directional arrows and solid traffic markings shall conform to the requirements of the applicable FDOT Index and Section 710 of the *FDOT Specifications*, except as amended herein.

Installation of the reflective pavement markers shall conform to the requirements of the applicable FDOT Index and Section 706 of the *FDOT Specifications*, except as amended herein.

Pavement striping, markings and reflective pavement markers shall be installed in accordance with the details shown on the Plans, or as may be directed by the Engineer.

## **Materials**

Pavement striping and markings shall be latex paint with glass beads. The paint shall be an FDOT approved product.

## **Basis of Payment**

The work specified under this Section shall be paid for at the contract price as identified in the Schedule of Values.

# **STREET LIGHTING CONDUIT SYSTEM**

715

The work specified under this Section shall include all work required for the installation of street lighting conduit, pull strings furnishing and laying the pipe fittings, installation of pull construction and 36" radius sweeps at ends. The furnishing and installation of all items in connection with Street Lighting Conduit System shall be in accordance with Sections 603 to 690 of the *FDOT Specifications*.

## **Polyvinyl-Chloride (PVC)**

Construction of Polyvinyl-Chloride Lighting Conduit shall conform to the requirements of Section 630 of the *FDOT Specifications*.

## **Pull Boxes**

Lighting Cable Pull Boxes shall be Davis Meter Type no. D-112, Cast Iron Traffic Type or approved equal.

Lighting Cable Pull Boxes shall be installed as shown on the Plans.

## **Basis of Payment**

The pay quantities for the work specified under this Section shall be the number of linear feet of the types and sizes of conduit specified in the applicable pay items, actually constructed and accepted, including that portion of the conduit extending into the walls (farthest point) of the structures to which the conduits are connected including the 36" radius sweeps at ends, and the number each of pull boxes accepted and items actually installed and accepted.

The work specified under this Section shall be paid for under the pay items for Polyvinyl-Chloride (PVC) (Lighting Conduit), Lighting Cable Pull Boxes.

# **RAILROAD CROSSINGS**

800-2500

The work specified under this Section consists of the construction of railroad crossings in accordance with the requirements of Index No. 560 of the *FDOT Roadway and Traffic Design Standards*, latest edition, as amended herein.

The pay items for railroad crossings are provided as contingency items, subject to the direction of the Engineer, and a determination by the railroad owner as to the necessity of this construction.

The work specified under this Section which shall include all materials, equipment and labor required for the construction of railroad crossings in accordance with these Specifications, the details and notes shown in the Plans, and the said Index No. 560.

## **Payment**

The work specified under this Section shall be paid for under the pay items for Railroad Crossings.

## **Pay Quantities**

The quantities to be paid for under this Section shall be one lump sum quantity for each of the pay items for Railroad Crossings shown in the Schedule of Values.

## **Basis of Payment**

The quantities determined as specified above shall be paid for at the contract price per lump sum.

# **BARRICADE**

800-9001

## **PCED TYPE III**

The work specified under this Section consists of the furnishing and installation of permanent traffic barricades constructed of wooden members coated with reflectorized material in accordance with the requirements of Sections 952 and 962-7 of the *FDOT Specifications*, as amended herein.

The barricades shall be fabricated and installed in accordance with Pinellas County Standard Details Book construction details for Type III Barricade. Stripes shall be retro-reflective white and retro-reflective red, reflectorized with a material that has a high intensity and smooth sealed outer surface. Only pressure treated posts (ASTM D-1760 pressure treatment of timber products) and galvanized coated hardware shall be used.

The barricades shall be permanently installed, at the locations shown in the Plans, as soon as the construction of the project reaches that stage of completion which, in the opinion of the Engineer, requires the level of protection to the public intended by the installation of the barricades.

The Contractor shall maintain the barricades, in a condition suitable for final acceptance, from such time as the barricades are installed until final acceptance of the project.

### **Basis of Payment**

The pay quantity for the work specified under this Section shall be the number each of Barricade, PCED Type III installed and accepted.

# REFLECTORS

800-9010

## **FDOT CASES I AND II**

The work specified under this Section consists of the furnishing and installation of FDOT 9-Button Reflector Panel-and-Post assemblies in accordance with the details and notes shown in the Pinellas County Standard Construction Details and Index No. 17349 of the *FDOT Roadway and Traffic Design Standards*, latest edition, as amended herein.

Any details, notes or dimensions shown in the Pinellas County Standard Construction Details or on the Plans for the installation of Reflectors specified under this Section shall govern over corresponding details, notes or dimensions shown in FDOT Index No. 17349.

Where Reflector Panel-and-Post Assemblies are shown on the Plans to be installed in connection with barricades, the Reflector Panel-and-Post Assemblies shall be installed concurrently with the barricades. Where the Plans call for Reflector Panel-and-Post Assemblies only to be installed, they shall be installed as soon as the construction of the project reaches that stage of completion which, in the opinion of the Engineer, requires the level of protection to the public intended by the installation of the barricades.

The work specified under this Section shall include all work, materials and accessory items required for the assembly and installation of the Reflectors to the satisfaction of the Engineer.

### **Basis of Payment**

The work specified under this Section shall be paid for under the pay items for:

Reflector Panel-and-Post Assembly - FDOT Case I

Reflector Panel-and-Post Assembly - FDOT Case II

The pay quantity for the work specified under this Section shall be the number each of Reflector Panel-and-Post Assemblies, of the type specified in applicable pay items, actually installed and accepted.

# SIGNS

900-0100

## **PROJECT IDENTIFICATION**

The work specified under this Section consists of the furnishing of all labor and equipment required for the erection and maintenance of two 6-foot x 4-foot x 3/4-inch plywood Project Identification Signs, one each at locations to be designated by the Engineer.

The signs shall be provided by the County, but shall be erected by the Contractor, and shall be maintained by the Contractor, to the satisfaction of the Engineer, for the duration of the construction period.

### **Basis of Payment**

The work specified under this Section shall be paid for at the contract lump sum price.

The pay quantity for the work specified under this Section shall be one lump sum quantity for Signs, Identification which shall include all work and materials described and specified herein.

# **OFFICE FOR THE ENGINEER**

900-0200

The Contractor shall provide the Engineer with an office, at a location to be approved by the Engineer, for the duration of construction activities. The office shall contain a minimum of 200 square feet of usable floor space, and shall be furnished with electric lights, telephone service, answering machine, facsimile machine (FAX), copy machine (capable of making 11" x 17" copies without reductions, all supplies, expendables, and maintenance), air conditioning, a desk, layout table, chairs, drinking water, plan rack, file cabinet, and water and sanitary facilities. The office shall have bars on the windows, and an adequate lock on the door. The Engineer and his representatives shall have full utilization of this facility, and shall be furnished with a key. The office shall be maintained from the notice to proceed until substantial completion of the project, unless removal at an earlier date is authorized, in writing, by the Engineer. The Contractor shall pay for all utilities except long distance telephone calls made by the Engineer or his representatives, for which the Contractor shall be reimbursed by the County. The Contractor, at his expense, shall obtain all required permits for electrical, water and sewer work and installations, shall have all required electrical, water and sewer inspections made, and shall be responsible for all repairs and maintenance required in connection with permits and inspections. Permit fees under the authority of the Board of County Commissioners are waived. All other permit fees shall be paid by the Contractor and shall be included in this pay item Office for the Engineer.

The Contractor shall also provide, at a minimum, a 20 ft. x 20 ft. fenced area to secure the County vehicles, during the length of the project.

## **Basis of Payment**

Payment for the furnishing of the facility and secured area specified under this Section, and all labor, materials, equipment and services incidental thereto, shall be made under the pay item for Office For The Engineer and shall be made at the contract price per day, except for long distance telephone calls made by the Engineer or his representatives, for which the Contractor shall be reimbursed by the County.

Payment per day by the County to the Contractor shall commence on the day that the Contractor provides a facility that satisfies the requirements of this specification.

# POND CLAY LINER

900-0300

The work specified under this Section consists of the furnishing and installation of a pond clay liner, in accordance with the details and notes shown in the Plans. The material of the clay liner shall exhibit a hydraulic conductivity of no greater than  $1 \times 10^{-5}$  cm/sec.

Except for that work excluded under other provisions of this Section, and except as provided for under other Sections of these specifications, the work to be performed under this Section shall consist of all excavation, the furnishing, placement and compaction of all fill material, all grading, the shaping or reshaping of the clay liner and all other earthwork operations and construction activities required to complete the Clay Liner installation. The work also includes the backfill over the clay liner up to the lines, grades and locations of the pond bottom with the material specified on the Plans.

The Clay Liner shall be constructed in conformity with the lines, grades, details and specification notes shown in the Plans, and as directed by the Engineer.

## **Basis of Payment**

The pay quantities for the work specified under this Section shall be one lump sum quantity for Pond Clay Liner and shall include all work and materials described and specified herein.

The work specified under this Section shall be paid for at the contract lump sum price.

# COFFERDAMS

900-1060

The work specified in this Section consists of the construction of cofferdams to facilitate excavation of bridge foundations, box culverts, storm sewers and all other pipe lines, retaining walls, headwalls for pipe culverts and drains, drop inlets, manholes and similar structures. It shall also include:

- 1) the construction & removal of cofferdams, excavation, sheeting, bracing, etc.
- 2) pumping or otherwise dewatering foundations.
- 3) the removal & disposal of any existing structures or portions of structures not covered by other items in the contract, including foundations, abutments, piers, wings, & all other materials, obstructions, etc., found necessary to clear the site for the proposed work.
- 4) backfilling, disposing of surplus material & final cleaning, as may be necessary for the proper execution of the work. This Section shall not include the work of excavating for bases or pavements, curbs & gutter, valley gutter, ditch pavement or rubble gutter. All work shall conform to the requirements of Section 125 of the Standard Specifications, as amended herein, and where specified herein or on the Plans.
- 5) Additional requirements stipulated in environmental permits.

## **Basis of Payment**

The quantity for Cofferdam shall be the number each or lump sum and shall include all work and materials described and specified herein.

The work specified under this Section shall be paid for at the contract per each price or lump sum price for Cofferdam.



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