STATE OF DELAWARE

This Copy is for information only.
You must request a CD from
DelDOT in order to bid.

DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T201580202.01

JENNY RUN STREAM RESTORATION

NEW CASTLE COUNTY

ADVERTISEMENT DATE: January 30, 2017

COMPLETION TIME: 104 Calendar Days

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DELAWARE DEPARTMENT OF TRANSPORTATION
AUGUST 2001

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time **February 28, 2017**

Contract No.T201580202.01

JENNY RUN STREAM RESTORATION
New Castle County

GENERAL DESCRIPTION

LOCATION

These improvements are located in New Castle County more specifically shown on the Location Map(s) of the enclosed Plans.

DESCRIPTION

The improvements consist of furnishing all labor and materials for this Contract. The purpose of this project is to restore the Outfall for Jenny Run and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION TIME

All work on this contract must be complete within 104 Calendar Days. The Contract Time includes an allowance for 14 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about June 27, 2017.

PROSPECTIVE BIDDERS NOTES:

1. BIDDERS MUST BE REGISTERED with DelDOT and request a cd of the official plans and specifications in order to submit a bid. Contact DelDOT at dot-ask@state.de.us, or (302) 760-2031. Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time February 28, 2017 unless changed via addendum.
2. QUESTIONS regarding this project are to be e-mailed to dot-ask@state.de.us no less than six business days prior to the bid opening date in order to receive a response. Please include T201580202.01 in the subject line. Responses to inquiries are posted on-line at http://www.bids.delaware.gov.
3. THE BID PROPOSAL incorporates a cd containing **Expedite**, **version 5.9a** and its installation file. Bidders are to use the cd provided to enter their bid amounts into the Expedite file. The Expedite bid file must be printed and submitted in paper form along with the cd and other required documents prior to the Bid due date and time.
4. SURETY BOND - Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the bid.
5. DRUG TESTING - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 **Del.C.** §6908(a)(6). **Refer to the full requirements by following the below link:** http://regulations.delaware.gov/register/september2015/final/19%20DE%20Reg%20207%2009-01-15.htm
   Please note a few of the requirements listed below;
   * At bid submission - submit with the bid a signed affidavit certifying that the Contractor has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for their Employees that complies with this regulation;
   * Two business days prior to contract execution - The awarded Contractor shall provide to **DelDOT** copies of the Employee Drug Testing Program for the Contractor, and may submit any Subcontractor's Employee Drug Testing Program for approval;
   * Subcontractors - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the subcontractor in writing;
   * Testing Report Forms shall be submitted to DelDOT monthly (forms will be provided).
   * Penalties for non-compliance are specified in the regulation.
6. SUPPLEMENTAL SPECIFICATIONS to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be viewed here. The ***Specifications Note*** document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.

7. NO RETAINAGE will be withheld on this contract.
8. EXTERNAL COMPLAINT PROCEDURE can be viewed on DelDOT's Website at; http://www.deldot.gov/information/business/, or you may request a copy by calling (302) 760-2555.
9. PLEASE NOTE revisions to 'Equality of Employment Opportunity on Public Works' under General Notices.
10. REMINDER; A copy of your firm's Delaware Business License must be submitted with your bid.
11. SECTION 106.06 BUY AMERICA Contract Requirement in the Delaware Standard Specifications for Road and Bridge Construction, August, 2001 does not apply to this contract.
12. **BREAKOUT SHEETS** MUST be submitted either with your bid documents; or within seven (7) calendar days following the bid due date by the lowest apparent bidder. Refer to instructions adjacent to the Breakout Sheets in this document.
13. Planting of shrubs and tubelings and final seeding is to occur between the dates of September 1, 2017 and November 30, 2017. We anticipate needing approximately 14 Calendar Days and 2 Weather Days for this and is to start on or about September 5, 2017 and be completed on or about September 23, 2017. Time charges will be stopped after the completion of Phase 2 and will restart at the beginning of Phase 3.

STATE OF DELAWARE
CONSTRUCTION ITEMS UNITS OF MEASURE

English Code	English Description	Multiply By	Metric Code	Metric Description	Suggested CEC Metric Code
ACRE	Acre	0.4047	ha	Hectare	HECTARE
BAG	Bag	N/A	Bag	Bag	BAG
C.F.	Cubic Foot	0.02832	m^3	Cubic Meter	M3
C.Y.	Cubic Yard	0.7646	m^3	Cubic Meter	M3
EA-DY	Each Day	N/A	EA-DY	Each Day	EA-DY
EA-MO	Each Month	N/A	EA-MO	Each Month	EA-MO
EA/NT	Each Night	N/A	EA-NT	Each Night	EA/NT
EACH	Each	N/A	EA	Each	EACH
GAL	Gallon	3.785	L	Liter	L
HOUR	Hour	N/A	h	Hour	HOUR
INCH	Inch	25.4	mm	Millimeter	MM
L.F.	Linear Foot	0.3048	m	Linear Meter	L.M.
L.S.	Lump Sum	N/A	L.S.	Lump Sum	L.S.
LA-MI	Lane Mile	1.609	LA-km	Lane-Kilometer	LA-KM
LB	Pound	0.4536	kg	Kilogram	KG
MFBM	Thousand Feet of Board Measure	2.3597	m^3	Cubic Meter	M3
MGAL	Thousand Gallons	3.785	kL	Kiloliter	KL
MILE	Mile	1.609	km	Kilometer	KM
S.F.	Square Foot	0.0929	m^2	Square Meter	M2
S.Y.	Square Yard	0.8361	m^2	Square Meter	M2
SY-IN	Square Yard-Inch	0.8495	m^2-25 mm	Square Meter-25 Millimeter	M2-25 MM
TON	Ton	.9072	t	Metric Ton (1000kg)	TON
N.A.*	Kip	4.448	kN	Kilonewton	N.A.*
N.A.*	Thousand Pounds per Square Inch	6.895	MPa	Megapascal	N.A.*

*Not used for units of measurement for payment.

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GENERAL NOTICES

SPECIFICATIONS:

The specifications entitled "Delaware Standard Specifications, for Road and Bridge Construction, August, 2001", hereinafter referred to as the Standard Specifications, Supplemental Specifications, the Special Provisions, notes on the Plans, this Bid Proposal, and any addenda thereto shall govern the work to be performed under this contract.

CLARIFICATIONS:

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the " Basis of Payment" paragraph in the Standard Specifications or Special Provisions, no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

ATTESTING TO NON-COLLUSION:

The Department requires as a condition precedent to acceptance of bids a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered.

QUANTITIES:

The quantities shown are for comparison of bids only. The Department may increase or decrease any quantity or quantities without penalty or change in the bid price.

PREFERENCE FOR DELAWARE LABOR:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (4)b:

> "In the construction of all public works for the State or any political subdivision thereof, or by firms contracting with the State or any political subdivision thereof, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State. Each public works contract for the construction of public works for the State or any political subdivision thereof shall contain a stipulation that any person, company or corporation who violates this section shall pay a penalty to the Secretary of Finance equal to the amount of compensation paid to any person in violation of this section."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (7) states;

a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:

   During the performance of this contract, the contractor agrees as follows:

   1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation, gender identity or national origin. The contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, sexual orientation, gender identity or national origin.
3. The contractor will ensure employees receive equal pay for equal work, without regard to sex. Employee pay differential is acceptable if pursuant to a seniority system, a merit system, a system which measures earnings by quantity or quality of production, or if the differential is based on any other factor other than sex.

TAX CLEARANCE:

As payments to each vendor or contractor aggregate $2,000, the Division of Accounting will report such vendor or contractor to the Division of Revenue, who will then check the vendor or contractor's compliance with tax requirements and take such further action as may be necessary to insure compliance.

LICENSE:

A person desiring to engage in business in this State as a contractor shall obtain a license upon making application to the Division of Revenue.

CONTRACTOR / SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

(b) No agency shall accept a proposal for a public works contract unless such contractor has provided a proper and current copy of its occupational and/or business license, as required by Title 30, to such agency.

(c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

DIFFERING SITE CONDITIONS,

SUSPENSIONS OF WORK and SIGNIFICANT CHANGES IN THE CHARACTER OF WORK:

Differing site conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract of if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.

No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

Suspensions of work ordered by the engineer: If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set fourth the reasons and support for such adjustment.

Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

Significant changes in the character of work: The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.

The term "significant change" shall be construed to apply only to the following circumstances:

(A) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or

(B) When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

RIGHT TO AUDIT

The Department shall have the right to audit the books and records of the contractor or any subcontractor under this contract or subcontract to the extent that the books and records relate to the performance of the contract or subcontract. The books and records shall be maintained by the contractor for a period of 3 years from the date of final payment under the prime contract and by the subcontractor for a period of 3 years from the date of final payment under the subcontract (*29 Del.C. §6930*)

PREVAILING WAGES

Included in this proposal are the minimum wages to be paid various classes of laborers and mechanics as determined by the Department of Labor of the State of Delaware in accordance with Title 29 Del.C. §6960, relating to wages and the regulations implementing that Section.

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

(b) Every contract based upon these specifications shall contain a stipulation that the employer shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics. The specifications shall further stipulate that the scale of wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work, and that there may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay to laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims.

(c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

Bidders are specifically directed to note the Department of Labor's prevailing wage regulations implementing §6960 relating to the effective date of the wage rates, at Part VI., Section C., which in relevant part states:

"Public agencies (covered by the provisions of 29 Del.C. §6960) are required to use the rates which are in effect on the date of the publication of specifications for a given project. In the event that a contract is not executed within one hundred twenty (120) days from the date the specifications were published, the rates in effect at the time of the execution of the contract shall be the applicable rates for the project."

Contractor may contact:

Department of Labor, Division of Industrial Affairs, 4425 N. Market Street, Wilmington, DE 19802
Telephone (302) 761-8200

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **HEAVY CONSTRUCTION** EFFECTIVE MARCH 15, 2016

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	21.82	19.20	41.74
BOILERMAKERS	75.62	31.72	58.19
BRICKLAYERS	46.43	22.91	24.60
CARPENTERS	52.81	52.81	41.97
CEMENT FINISHERS	43.05	24.05	17.91
ELECTRICAL LINE WORKERS	72.73	27.89	63.84
ELECTRICIANS	65.10	65.10	65.10
GLAZIERS	20.17	17.51	11.85
INSULATORS	54.38	54.38	54.38
IRON WORKERS	60.19	60.19	57.58
LABORERS	43.60	43.60	43.60
MILLWRIGHTS	66.83	66.83	53.40
PAINTERS	75.26	75.26	75.26
PILEDRIVERS	72.97	38.86	30.25
PLASTERERS	18.99	16.49	11.15
PLUMBERS/PIPEFITTERS/STEAMFITTERS	82.03	76.87	17.67
POWER EQUIPMENT OPERATORS	61.36	61.36	61.36
SHEET METAL WORKERS	30.35	18.82	17.68
SPRINKLER FITTERS	32.70	12.38	10.25
TRUCK DRIVERS	31.56	20.36	21.99

CERTIFIED: 1/12/17 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: T201580202.01; Jenny Run Stream Restoration, New Castle County, DE,

SUPPLEMENTAL SPECIFICATIONS TO THE AUGUST 2001 STANDARD SPECIFICATIONS

EFFECTIVE AS OF THE ADVERTISEMENT DATE OF THIS PROPOSAL AND INCLUDED BY REFERENCE

The Supplemental Specifications can be viewed and printed from the Department's Website.

To access the Website;
- in your internet browser, enter; http://www.deldot.gov
- on the left side of the page under 'INFORMATION', Click; 'Publications'
- scroll down under 'MANUALS' and Click; "Standard Specifications 2001"

The full Website Link is;
http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

Printed copies of the Supplemental Specifications are available upon request. A printed copy of the above referenced Supplemental Specifications will be included in the final contract documents upon award.

The Contractor shall make himself aware of these revisions and corrections (Supplemental Specifications), and apply them to the applicable item(s) of this contract.

SPECIAL PROVISIONS

CONSTRUCTION ITEM NUMBERS

All construction pay items are assigned a six (6) digit number, shown as Item Number on the Plans and/or in the Special Provisions, and shall be interpreted in accordance with the following:

Standard Item Number:

The first three digits of the construction item numbers indicates the Section number as described in the Standard Specifications, and all applicable requirements of the Section shall remain effective unless otherwise modified by the Special Provisions. The last three digits of the construction item identifies the item by sequential number under that Section. Sequential numbers for all items covered under Standard Specifications range from 000 to 499. A comprehensive list of construction item numbers begins on page 421 of the Standard Specifications. Additions to this list will be made as required.

Special Provisions Item Number:

The first three digits of the construction items, covered under Special Provisions, indicates the applicable Section number of the Standard Specifications, and shall be governed fully by the requirements of the Special Provisions. The last three digit of the items covered under Special Provisions identifies the item by sequential number. Sequential numbers for Special Provision items, range from 500 to 999.

Examples

Standard Item Number - 202000 Excavation and Embankment

202 Indicates Section Number

000 Indicates Sequential Number

Special Provision Item Number - 202500 Grading and Reshaping Roadway

202 Indicates Section Number

500 Indicates Sequential Number

NOTE:

PLEASE NOTE revised Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be viewed here and at www.deldot.gov.

SPECIFICATIONS: The Department is currently updating the August 2001 Specifications for Road and Bridge Construction. Through this update, some Divisions were renumbered and some new ones were created and added. The ***Specifications Note*** document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.

202573 - TEST HOLES

Description:

This work consists of excavation of test holes to locate existing subsurface structures and utilities, prior to the start of adjacent construction activities, that may be affected by or interfere with the proposed construction at the locations shown on the plans or at locations directed by the Engineer. This work also consists of excavating test holes at proposed construction locations where excavation may impact existing facilities, known or unknown, at the construction location.

Construction Methods:

When facilities and utility lines must be discovered or exposed and identified at specified locations, the contractor shall use minimally intrusive excavation techniques, acceptable to DelDOT, that ensure the safety of the excavation, the integrity of the facility / utility line to be located, and that of other facilities which may be encountered during test hole excavation.

Excavation shall be by means of air-assisted vacuum excavation equipment manufactured specifically for the purpose.

Clear the test hole area of surface debris.

In paved areas, neatly cut and remove existing pavement, which cut shall not exceed 225 square inches (0.15 square meters) unless otherwise approved. Excavate the test hole by the method(s) acceptable to DelDOT and noted above. The nominal diameter of the test hole shall not exceed 15 inches (375 mm) unless otherwise approved.

Where facilities are discovered or located, expose the facility / utility only to the extent required for identification and data collection purposes. Avoid damage to lines, wrappings, coatings, cathodic protection or other protective coverings and features.

Hand-dig as needed to supplement mechanical excavation and to ensure safety.

Test hole locations may be revised, as directed or approved by the engineer, in the field as necessary to positively expose the utility or to determine the absence of facilities within the area impacted by te proposed construction.

Store excavated material for re-use or disposal, as appropriate.

Replace bedding material around exposed utility lines in accordance with owner's specifications or as otherwise directed or approved. Backfill and compact the excavation in lifts no greater than six inches using excavated material with appropriate moisture/density control. If test holes are excavated within paved areas that will be exposed to traffic, provide pavement restoration within the limits of the original cut using materials, compaction, and pavement thickness matching the excavated pavement material and thicknesses.

Method of Measurement:

The quantity of test holes will be measured by the number of EACH excavated.

Basis of Payment:

The quantity of test holes will be paid for at the Contract price per EACH. Price and payment will constitute full compensation for performing all the work described in these Special Provisions, as noted on the Plans, and/or as directed by the Engineer, and includes, excavation, backfill, backfilling, pavement restoration, disposal and removal, away from the site of the unsuitable materials, for all labor, tools, equipment, and incidentals necessary to complete the item.

209506 - CLAY BORROW, SUBSURFACE CLAY CHANNEL BLOCK

Description:

This work consists of the construction of a subsurface clay channel block for the purpose of inhibiting subsurface water flow along the channel bed. Clay channel blocks shall be keyed into the existing channel bed. The subsurface clay channel block is to be constructed in locations as designated and shall be completely buried and present no visible presence upon completion of project grading.

Materials:

Clay Channel Block. Clay Channel Block Material shall conform to Unified Soil Classifications GC, SC, CH, or CL, and shall pass a minimum of 35-percent through the #200 sieve. Material used for clay channel block construction shall be approved by the Engineer prior to use, including any alternative material not conforming to the Unified Soil Classifications listed above. The clay material shall be free of roots, stumps, wood, rubbish, stones, as well as frozen and objectionable materials.

Construction:

Clay Channel Block Method. Clay channel block shall be constructed as indicated on the Plans with a minimum top width of 3 ft and upstream side slope of 2:1. The top elevation of the clay channel block shall be 12 inches below the proposed finished channel bed elevation. The clay channel block shall extend at least 1 foot (minimum) below the existing (pre-construction) channel bed surface and shall extend at least 1 foot (minimum) into the existing channel banks. The channel bed and bank key-in, noted previously, shall be placed to prevent piping under or around the clay blocks. Thus, the material shall be well compacted and placed to the limits of the excavation trenches, as tamped backfill adjoining / below the clay block is not anticipated to provide a suitable water barrier.

Clay fill materials shall be placed in maximum 12 inch thick lifts (pre-compaction), which shall be continuous over the entire length of the fill. Fill material shall contain sufficient moisture such that the required degree of compaction shall be obtained with the equipment used. Subsequent layering and compaction of the clay shall follow as needed to meet the design dimensions for the clay channel block.

Clay fill material shall be compacted to assure maximum density and minimum permeability. Compacted fill shall conform to a minimum 97 percent of maximum dry density as determined according to PMT No. 106, Method B. Material shall be maintained so that moisture content shall remain within ± 2 percent of optimum. Each layer of fill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum compaction and minimum permeability, and shall be approved by the Engineer at the time of construction. The side slope of the clay channel block shall be overlaid with compacted heavy backfill or cascade material as shown on the construction Plans. The top elevation of the clay channel block shall be 12 inches below the final streambed elevation as indicated on the construction Plans. The top of the clay channel block shall be overlaid with cascade material to meet the final streambed elevation.

Method of Measurement:

Subsurface Clay Channel Blocks for construction shall be measured based upon the cubic yardage of material placed.

Basis of Payment:

Subsurface Clay Channel Blocks shall be paid for at the Contract unit price per cubic yard.

The payment shall be full compensation for furnishing suitable clay material, preparation, installation, compaction, and disposal of excess material, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Excavation necessary for placement of the Clay Channel Block shall be measured and paid for in accordance with Item 203000 - Channel Excavation. Heavy Backfill shall be measured and paid for in accordance with Item 712555 - Heavy Backfill. Furnished Cascade Material shall be measured and paid under Item 712501 Furnished Cascade Materials. Imbricated rock sills shall be measured and paid for under Item 712553 - Imbricated Rock Structures.

601520 - TEMPORARY TIMBER MAT

Description:

The item shall consist of furnishing all materials and constructing a temporary timber mat for access across the wetland area as shown on the Plans and as directed by the Engineer. All equipment shall utilize this temporary timber mat when trying to access the stockpile/staging area and the underside of the bridge.

Materials:

In accordance with Section 601 of the Standard Specifications and the following:

Timber shall have a strength and grade adequate to support the Contractor's anticipated vehicular or equipment loads. Any preservative treatment applied to the matting shall be environmentally safe for wet conditions and be preapproved by the Department.

Hardware shall be in accordance with Section 601.07 of the Standard Specifications.

Construction Methods:

The Contractor shall submit to the Department for approval shop drawings and design calculations indicating the layout, size of members, arrangement of members and the construction methods at least two weeks prior to initiating construction. This information shall be signed and sealed by a Professional Engineer registered in the State of Delaware. A timber mat system is shown on the plans and shall be used for conceptual purposes only. The actual timber mat system utilized for the construction shall be designed for the anticipated construction loads and shall be compatible with the environment. Placement of stone within the wetland area is not permitted.

The temporary timber matting should be periodically inspected by the Contractor and any damaged or deteriorated components should be replaced. The Contractor assumes full responsibility for the load carrying capability of the system and for its anchorage, as required, to resist high water flows. No additional compensation will be granted for repairing any portion of the system damaged during naturally occurring weather events or contractor usage. The Contractor is responsible for retrieving lost mats and repairing any damage caused by naturally occurring weather events.

Basis of Payment:

The payment for the item shall be made for at the contract unit price bid per Lump Sum for "601520 - Temporary Timber Mat", which price and payment shall constitute full compensation for furnishing and placing all materials, for design, submission of signed and sealed drawings and computations, installation and removal of timber mat materials, and for all labor, equipment, tools and incidentals required to complete the work.

7/16/08

708512 - DRAINAGE INLET, SPECIAL I
708513 - DRAINAGE INLET, SPECIAL II
708514 - DRAINAGE INLET, SPECIAL III
708515 - DRAINAGE INLET, SPECIAL IV
708516 - DRAINAGE INLET, SPECIAL V
708517 - DRAINAGE INLET, SPECIAL VI
708518 - DRAINAGE INLET, SPECIAL VII

Description:

This work consists of furnishing all materials and constructing special drainage inlets (catch basins) in accordance with locations, notes, details on Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for special drainage inlets shall conform to the applicable requirements of Section 708 of the Standard Specifications, and notes with details on the Plans.

Method of Measurement and Basis of Payment:

Measurement and payment for the special drainage inlets shall be made in accordance with the Subsections 708.15 and 708.16 of the Standard Specifications.

10/29/01

709518 - SANITARY CLEANOUT

Description:

This item shall consist of furnishing all necessary materials for adjusting the sanitary cleanouts in accordance with this special provision, as shown on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 709 of the Standard Specification, requirements of the utility owner, and the notes and details on the Plans. All materials required for the completion of the adjustment of the sanitary cleanout shall be furnished and installed under this item, including riser pipes, covers, handholes, gravel, and concrete for anchors and pads.

Basis of Payment:

The payment for the sanitary cleanout shall be made at the contract unit price bid per Each and constructed and accepted in place in accordance with the Plans and Special Provisions. Price and payment shall constitute full compensation for furnishing and installing all materials, excavation, backfill, backfilling, disposal of surplus materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

9/26/16

712501 - FURNISHED CASCADE MATERIAL

Description:

This work consists on furnishing, stockpiling, and placing Furnished Cascade Material in the proposed stream channel locations as indicated on the construction plans. The Furnished Cascade Material shall be supplied as two different size range of materials, Type A and Type B. The two size ranges shall be transported, stockpiled, and installed separately, to ensure the installed material meets the size range of this specification. The materials shall be installed at the following locations:

Cascade Type A. To be installed at:

(a) Cascade #1: Sta. 10+63 - Sta. 10+84
(b) Cascade #2: Sta. 10+88 - Sta. 11+08
(c) Cascade #3: Sta. 11+12 - Sta. 11+33
(d) Cascade #4: Sta. 11+37 - Sta. 11+57
(e) Cascade #5: Sta. 11+61 - Sta. 11+79
(f) Cascade #6: Sta. 11+83 - Sta. 11+99

Cascade Type B. To be installed at:

(a) Cascade #7: Sta. 12+03 - Sta. 12+22
(b) Cascade #8: Sta. 12+26 - Sta. 12+35
(c) Cascade #9: Sta. 12+39 - Sta. 12+44

Materials:

Furnished Cascade Material shall be round, hard, durable rock, resistant to weathering and water action, and free from overburden, spoil, shale, slate, and organic material. Limestone, sandstone, or other sedimentary rock materials shall not be acceptable rock material for Furnished Cascade Material.

The color of the Furnished Cascade Material shall be similar to the native rock present at the site (e.g., green/gray, brown/gray, dark gray, and/or dark brown in color). White, red, and light tan rock is not acceptable. Angular quarry rock shall not exceed more than 30% of the mixture, by weight.

Furnished Cascade Materials shall have the following size distribution:

Cascade Type A:

Distribution	Size and Type
D10	3 in. stone
D50	6 in. stone
D84	10.5 in. stone
D100	12 in. stone

Cascade Type B:

Distribution	Size and Type
D10	6 in. stone
D50	12 in. stone
D84	21 in. stone
D100	24 in. stone

Stone quantities shall be determined by weight.

Furnished Cascade Material shall be washed prior to delivery to the site and shall be free of rock dust, silt, organics, and overburden.

The Contractor shall locate potential sources for rock. The Contractor shall obtain from the quarry and submit to the Engineer a certificate verifying the following:

Rock size;
Weight per cubic foot;
Specifications;
Color;
Weight range of rock being supplied;
Sample of rock to be supplied.

Construction:

Furnished Cascade Material shall be installed according to the construction plans and details.

The construction of the cascade areas shall progress in working sections from downstream to upstream (for individual cascade areas only, the overall stream construction shall commence from upstream to downstream). The working sections shall be sized appropriately so that they can be constructed in one day or in a predicted rain free time period.

The Contractor shall excavate / backfill as necessary to the required subgrade for the installation of and the full depth Furnished Cascade Materials and for any associated bank / bed stabilization materials. Heavy backfill shall be installed according to the construction plans and the Special Provision - Heavy Backfill. Unsuitable materials shall be over-excavated and backfilled with Heavy Backfill. Unsuitable materials shall include mucks, organics material, trash, or otherwise as determined by the Engineer. Excavation and backfill for the installation of the cascade areas shall conform to the dimensions, grades, and details specified in the Contract Documents. No excavations shall remain open or un-stabilized during non-work hours (i.e. evenings, weekends, and holidays). Over-excavation for the removal of unsuitable materials or for placement of Furnished Cascade Material key-ins below the existing streambed shall conform to Item 203000 - Channel Excavation.

The Contractor shall place Furnished Cascade Material to the proposed channel grade with a standard depth of 24 inches. Cascade material shall be placed in such a manner that low flow meanders along the width of the cascade and micro pools are created. Tolerances of the finished channel as described in this special provision shall conform to the following criteria:

Channel Surface Elevation:	+ - 0.1 ft.
Channel Width:	+ - 0.25 ft
Channel Slope:	+ - 0.1 percent

Following the placement of the Furnished Cascade Material, wash-in of fine materials shall be performed to choke off the open pore space in the Furnished Cascade Material, thus allowing for stream low flows to flow along the surface of the cascade. The wash-in procedure shall involve a 1-in. lift of Furnished Channel Bed Sand and Gravel placed on the surface of the Furnished Cascade Materials. The sand and gravel shall be hydraulically washed into the cascade material pore spaces using methods determined by the Contractor and approved by the Engineer. The Contractor shall select a method that is energetic enough to adequately wash material into the cascade pore spaces without causing movement of the cascade material itself. The Contractor shall continue washing successive lifts of the sand and gravel into the cascade material until the material no longer washes into the pore spaces / void spaces and travels down slope, i.e. refusal. Wash water to be utilized in the procedure may be pumped from the stormwater pond, a smaller pump than utilized for the clear water pumping operations may be desired for this operation so as to allow for settlement and wash-in of the fines and so as to not cause movement of the Furnished Cascade Material. Water from the dirty water pumping pits shall not be utilized for the wash-in procedure. Chlorinated potable water shall not be utilized for this operation. All dirty water produced by the wash-in procedure shall be pumped to a dewatering bag for treatment.

Method of Measurement:

Furnished Cascade Material will be measured based upon the tonnage of material furnished to the site and installed.

Basis of Payment:

Furnished Cascade Material shall be paid for at the contract unit price per cubic yard of material installed. Payment will be in full compensation for transport, stockpiling, placement, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work as specified in these Contract Documents.

Furnished Channel Sand and Gravel used as the fine material wash-in shall be measured and paid for as Item 712557. Water and water pumping operations for the wash-in procedure shall be incidental to the lump sum cost for Item 909005 - Stream Diversion. Excavation for full depth placement of the Furnished Cascade Material and over-excavation, as necessary, shall be paid under Item 203000 - Channel Excavation. Filling of streambed areas and backfilling of over-excavation areas shall be measured and paid for under Item 712555 - Heavy Backfill.

6/23/16

712506 - GABIONS

Description:

The item shall consist of furnishing all materials and assembling, filling open wire baskets with aggregate forming gabions of the type indicated on the Plans and as directed by the Engineer.

Materials:

Materials for the gabions include stone, wire baskets and filter cloth.

Stone for gabions shall be hard, durable, angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale, slate and organic material; and shall meet the size requirements below:

Gabion Height	Aggregate Size
Less than 1 ft	3 - 5 inch
1 ft or over	4 - 8 inch

QUALITY REQUIREMENTS

Test and Method	Specification Limits
Apparent Specific Gravity, AASHTO T 85, min.	2.50
Absorption, AASHTO T 85, % max.	3.00
Sodium Sulfate Soundness, 5 cycles, 63-37.5 mm (2 1/2 - 1 1/2 in.) Aggregate - AASHTO T 104, % max. loss	12.00

Wire for gabions shall have a minimum tensile strength of 60,000 psi when tested in accordance with ASTM A370. The netting shall have a minimum 12 percent elongation and a minimum 4,000 lb. load bearing resistance, and shall have galvanized or zinc coating of not less than 0.8 oz/ft when tested in accordance with AASHTO T 65 and extruded with a coating of poly vinyl chloride (nominal thickness of 0.02165 inches).

Filter fabric shall be AMOCO 4551 or MIRAFI 160N or Exxon 150D or approved equal.

Construction Methods:

Excavation shall be made in reasonably close conformity with the lines and grades shown on the Plans. The subgrade shall be smooth, firm and free from protruding objects or voids that would affect the proper placement of the wire baskets or damage the filter fabric when one is specified.

When filter fabric is specified on the Plans, it shall be carefully and loosely placed on the prepared subgrade and held in place by methods acceptable to the Engineer. Adjacent strips shall be overlapped by a minimum of 8 in. Care shall be exercised in placing, stretching and holding the empty basket units in good alignment in order to avoid damage to the cloth. If the filter fabric should be torn or damaged, it shall be replaced or repaired at the Contractor's expense. The empty wire basket units shall be set on the prepared subgrade and the vertical ends bound together with wire ties at spacings that are adequate to permit stretching of the units to remove kinks. Stretching methods shall be optional with the Contractor. The use of stakes, pins or other acceptable methods shall be used to insure a good alignment of the empty wire basket units.

The empty basket units shall be filled carefully with stone placed by hand or machine to assure good alignment with a minimum of voids between stones and to avoid bulging of mesh. The maximum height from which the stone may be dropped into the units shall be 36 in. The stone shall be so placed as to provide a minimum of two courses. Care shall be taken in placing the top layer of stone to assure a uniform surface thus avoiding any bulging of the lid mesh. After a basket unit has been filled, its lid shall be bent over until it meets the ends of the unit. The lid shall then be secured to the sides and ends with wire ties. When a complete basket unit cannot be installed on slopes or channels because of space limitations, the basket unit shall be cut to fit in the manner approved by the Engineer.

Any excavation voids existing along the edges of the completed gabions shall be backfilled to the satisfaction of the Engineer.

Method of Measurement:

The measurement of gabions, will be by the Cubic Yard of stone filled wire baskets.

Basis of Payment:

The payment for the accepted quantities of gabions as measured above, shall be at the contract unit price bid per Cubic Yard for "Gabions", complete in place, which prices and payment shall be full compensation for excavation, filter fabric, when specified, disposal of surplus materials, backfill, backfilling, as well as all labor, materials, equipment, tools and incidentals necessary to complete the work.

712553 - IMBRICATED ROCK STRUCTURES

Description:

This work consists of furnishing and placing imbricated rocks, geotextile, and cascade material backfill to construct stream stabilization structures including the following:

Rock Sill Type 1. To be installed at:
(a) Rock Sill #1: Sta. 10+60.00

Rock Sill Type 2. To be installed at:
(a) Rock Sill #2: Sta. 10+85.00
(b) Rock Sill #3: Sta. 11+08.80
(c) Rock Sill #4: Sta. 11+33.80
(d) Rock Sill #5: Sta. 11+57.81
(e) Rock Sill #6: Sta. 11+80.00
(f) Rock Sill #7: Sta. 12+00.00
(g) Rock Sill #8: Sta. 12+22.67

Rock Sill Type 3. To be installed at:
(a) Rock Sill #9: Sta. 12+35.53

Materials:

Imbricated Rock. Imbricated rocks shall consist of rectangular flat rock and of a similar texture and color to the native rock present at the site (e.g., green/gray, brown/gray, dark gray, and/or dark brown in color) obtained from an approved source. These rocks shall not be harvested from streams or rivers outside a commercial quarry operation. All imbricated rocks shall be free from laminations, weak cleavages and will not disintegrate from the action of air, salt water, and in handling and placing. Limestone, sandstone, shale, mudstone, or any other sedimentary rock types are not acceptable. Concrete will not be considered as an alternative for stone. White stone is not acceptable.

Imbricated Rocks shall adhere to the following dimensions. The length measurements along the rocks have an allowable tolerance as shown on the construction plans.

Imbricated Rocks Dimensions	Minimum Weight
1.5 ft x 2 ft x 3 ft	0.65 tons

Unless otherwise stated the imbricated rocks used for in-stream structures shall have a minimum unit weight of 165 lb/cu ft. The imbricated rocks shall be rectangular in shape in accordance with the size criteria specified in the contract documents; square, round, and triangular imbricated rocks are not to be used unless accepted by the Engineer prior to installation for a particular application on a case by case basis.

The Engineer reserves the right to reject any imbricated rocks delivered to the site that do not meet the contract specifications. The Contractor will not be eligible for any claims or compensatory payments for imbricated rocks rejected for not meeting the project requirements.

Prior to the start of work on this item, the Contractor shall submit a construction schedule, including source of supply of imbricated rocks, to the Engineer for review. No work shall be performed until the Engineer has approved this schedule. It shall be the responsibility of the Contractor to identify and secure a source of imbricated rocks prior to the start of the job. The Contractor shall not be compensated for any added project costs caused by delays related to the supply of imbricated rocks. The Contractor and Engineer will jointly visit the site to determine whether the rock meets the specified requirements. The Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval, or disapproval of boulder material under the requirements of these specifications. The Contractor shall obtain from the quarry and submit to the Engineer a certificate verifying the following:

Boulder classification;
Weight per cubic foot;
Type of rock;
Weight of imbricated rocks being supplied;
Boulder quality shall meet all of the above specifications.

Imbricated rocks will be used for top rocks, footer rocks, cutoff rocks, and drop rocks on all structures where these types of rocks are specified.

Furnished Cascade Materials. Furnished cascade materials for rock structures shall meet the materials presented in these specifications under SPECIAL PROVISIONS Furnished Cascade Materials.

Geotextile. A nonwoven separation style geotextile liner will be installed along the upstream side of the in-stream structures to prevent piping and structural failure. Geotextile materials shall be Geotextile, Separation and shall conform to AASHTO M 288 Class 2 or 3 Table-2 for drainage.

Construction:

Rock Sill Construction Methods. Rock sill structures shall be installed according to the sequence of construction, the plans and details, the following specifications, and as directed by the Engineer. All field changes to structure dimensions and elevations must be approved in writing by the Department prior to installation.

Prior to placement of the rock sills, the streambed shall be either raised with compacted Heavy Backfill or excavated to the appropriate elevation as shown in the construction plans. Placement of the rock sills shall be coordinated with placement of the subsurface clay channel blocks.

The Rock sill shall be installed in the center of the channel, meeting the station and offset measurements as shown in the construction plans. The imbricated rocks along the length of the sill shall be set at the proposed invert elevation and shall be set in a manner that provides a low saddle area at the center of the structure.

The geotextile shall be placed along the upstream face of the entire structure and extending a minimum of 2 ft under the stream bed upstream and along the toe of bank. For rock sills placed adjacent to Subsurface Clay Channel Blocks, the geotextile shall be keyed-in a minimum of 2 ft below the footer rock and extend along the upstream face of the entire structure. Geotextile torn or damaged shall be replaced in a manner acceptable to the Engineer. Geotextile shall be keyed-in, placed and trimmed to avoid exposed edges upon completion of construction.

Rocks shall be seated firmly and shall not rock or rotate in place.

Rock shall be selected and placed to avoid the creation of voids. Voids that are unavoidable are to be chinked and filled using cascade material.

The outer rock surface shall be even and present a generally neat appearance. Surface elevations or individual rocks within the finished installations shall be within 0.1 ft of the elevations specified on the construction drawings.

Furnished cascade material or heavy backfill shall be installed over top of the upstream geotextile liner to bring the excavated channel bed to grade. Geotextile shall not be keyed-in to a clay channel block.

Placed stone not conforming to specifications shall be removed and replaced as directed by the Engineer at no additional cost to the Department.

Method of Measurement:

Imbricated Rock Structures shall be measured per ton of rock furnished and installed. Geotextile, Separation shall not be measured.

Basis of Payment:

Imbricated Rock Structures shall be paid for at the Contract unit price per ton of rock. Payment shall include furnishing, handling, transporting, installing and maintaining the materials as specified on the Contract Drawings or as directed by the Engineer in the field.

Payment shall also include transport, stockpiling and placing of all imbricated rocks, including top, footer, cutoff and drop rocks, excavation, installation and for all material, labor, equipment, tools, and incidentals necessary to complete the work as specified in these Special Provisions and on the Contract Drawings.

Excavation necessary for placement of the Imbricated Rock Structures shall be measured and paid for in accordance with Item 203000 - Channel Excavation. Heavy Backfill shall be measured and paid for in accordance with Item 712555 - Heavy Backfill. Furnished Cascade Material shall be measured and paid under Item 712501 Furnished Cascade Materials. Subsurface Clay Channel Block shall be measured and paid for in accordance with Item 209506 - Subsurface Clay Channel Block.

Geotextile, Separation shall not be measured and shall be incidental to the Contract unit price per ton of Imbricated Rock Structures.

1/10/17

712555 - HEAVY BACKFILL

Description:

Heavy Backfill is a rock enhanced mixture of backfill consisting of 10% R-4 riprap, 20% bank run gravel and 70% salvaged subsoil/furnished by volume for use in reconstruction of streambanks. The work consists of placement of a mixture of R-4 riprap, Bank Run Gravel, and salvaged subsoil or furnished borrow placed with a top layer of furnished topsoil to be used as backfill for reconstruction of channel banks. The rock enhancement is utilized to better mimic the rock content of natural stream banks and to increase the long-term erosive resistance of the banks. Heavy Backfill shall be utilized in all areas of channel bank reconstruction and general fill.

Materials:

The materials to be used in the construction of the heavy backfill shall conform to the following:

The rock materials utilized in the mixture shall consist of hard / durable rock similar in texture, colors, and composition of rock native to the site. Limestone, sandstone, or other sedimentary rock materials shall not be utilized for R-4 riprap, bank run gravel, or furnished borrow, or as any other component of Heavy Backfill.

R-4 Riprap shall conform to Section 712020 - Riprap.

Bank run gravel shall have the following aggregate test requirements:
(a) Maximum Sodium Sulfate Soundness (ASTM C88) : 12%
(b) Maximum Los Angeles Abrasion (ASTM C131): 50%
(c) Gradations: The Bank Run Gravel shall conform to the following table of gradation.

Sieve Size	**Percent Passing Each Sieve by weight by Weight**
2-1/2 inch	100
1 inch	90-100
1/2 inch	60-100
No. 10	35-90
No. 40	20-55
No. 200	5-25

Furnished borrow shall conform to Section 209 – Borrow for Borrow Type A. Furnished borrow shall be primarily composed of native soils and shall not be a crushed stone derivative.

All topsoil shall meet the requirements of Section 908 and the following:

1. Topsoil shall contain no less than 3-percent and no more than 10-percent organic matter as determined in accordance with AASHTO T 194.
2. Topsoil shall have an acidity range of pH 6.0 to pH 7.5.
3. The method of testing topsoil shall be in accordance with the requirements of AASHTO T 88, Modified; AASHTO T 89, Method B; and AASHTO T 90; and shall meet the following gradation requirements:

Gradation Requirements

Sieve Size	Minimum Percent Passing by Weight
2” (50 mm)	100
No. 4 (4.75 mm)	90
No. 10 (2.00 mm)	80

	Minimum Percent	Maximum Percent
Passing No. 10 (2.0 mm and retained on No. 200 (75 mm) sieve		
Sand	15	65
Passing No. 200 (75 mm) sieve		
Sand	10	60
Silt	5	40

Existing topsoil salvaged from the project shall be utilized, where it meets the criteria for Furnished Topsoil and the above.

Construction:

The R-4 riprap, gravels, and furnished borrow shall be thoroughly mixed prior to placement as backfill. The materials may be pre-mixed or mixed on-site, but shall be thoroughly mixed such that an even distribution of the rock materials throughout the backfill is evident.

Heavy Backfill placed below the Furnished Cascade Material and Imbricated Rock Structures shall be placed in one (1) foot lift along the bed of the channel, extending from edge of bank to edge of bank, and compacted. Successive lifts shall be placed and compacted to fill from the existing channel bed up to the sub-grade elevation for placement of the Furnished Cascade Material and Imbricated Rock Structures.

Heavy Backfill placement for the reconstruction of the streambed shall be coordinated with placement of the Subsurface Clay Channel Blocks and the Imbricated Rock Structures. Heavy backfill placement for reconstruction of the channel banks shall be sequenced for proper placement of the Coir Mat and Coir Blanket materials. After placement and compaction of required heavy backfill and clay channel blocks for streambed reconstruction and initial placement of the Coir Blanket and Mat as specified in Item 908511, place additional heavy backfill, shape, and compact to form the streambank areas. Place 2-inches of topsoil in all specified planting areas to meet final lines and grades and as specified in the Stream Restoration Seeding specification. Upon completion, the bank surface shall be an evenly graded soil surface free from stones, clods, or debris. The streambank surface shall be prepared and seeded in accordance with Item 908510. The coir blanket and matting shall then be wrapped along the face of the final stream bank, placed immediately after seeding operations have been completed. Placement of the Coir Blanket and Coir Matting shall be completed and secured as specified for Items 908511 and 908504.

For all other areas of Heavy Backfill, topsoil shall be placed to a depth of 2-inches covering the planted surfaces of the heavy backfill, as specified on the Construction Plans for areas of Riparian Buffer Seed Mix.

Any excavation voids existing along the edges of the completed slope and channel protection should be backfilled with topsoil and compacted.

Method of Measurement:

Heavy Backfill will be measured in cubic yards. The measurement will be taken in place.

Basis of Payment:

Heavy Backfill shall be paid for at the Contract unit price per cubic yard of material placed. Payment shall be full compensation for furnishing all R-4 riprap, Bank Run Gravel, and Borrow Type A, stockpiling of backfill materials, mixing, placement, compaction, and fine grading; and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Placement of 2-inch depth topsoil shall be measured and paid for under Item 908002. Furnishing and placement of Subsurface Clay Channel Blocks and Furnished Cascade Material shall be measured and paid for under Items 209506 and 712501, respectively. Coir Matting, Coir Blanket, and Seeding shall be measured and paid for under Items 908504, 908511, and 908510, respectively.

712557 - FURNISHED CHANNEL BED SAND AND GRAVEL

Description:

Furnished Channel Bed Sand and Gravel shall be used as fine material wash-in for choking of void spaces in the Furnished Cascade Material.

Materials:

The materials to be used as Furnished Channel Bed Sand and Gravel shall conform to the following:

Furnished streambed material consists of sand and gravel with some natural bed silts. The material composition shall be 20% silt, 30% gravel with a size distribution ranging from a No. 8 sieve up to 1 inches, and 50% sand. Material quantities are to be determined by weight.

Furnished streambed materials shall be free from overburden, spoil, shale, slate and organic material. Limestone, sandstone, or other sedimentary rock materials shall not be utilized as a component of Furnished Channel Bed Sand and Gravel.

The color of the furnished gravel material shall be similar to the native rock present at the site (e.g., green/gray, brown/gray, dark gray, and/or dark brown in color). White, red, and light tan material is not acceptable.

Disturbance of channel bed areas outside of the channel reconstruction area for harvesting of streambed materials is strictly prohibited.

Construction:

Furnished Channel Bed Sand and Gravel shall be utilized as a fine material wash-in for choking of voids in cascade areas. Installation of the fine material wash-in shall follow the specifications for Item 712501 - Furnished Cascade Material.

Method of Measurement:

Furnished Channel Bed Sand and Gravel will be measured in cubic yards. The measurement will be taken in place.

Basis of Payment:

Furnished Channel Bed Sand and Gravel shall be paid for at the contract unit price per cubic yard of material installed. Payment will be full compensation for furnishing, transport, stockpiling, mixing, placement, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Water flow and pumping for performance of the wash-in procedure shall not be measured and shall be paid for under Item 909005 - Stream Diversion.

1/10/17

720556 - BOLLARD

Description:

This work consists of furnishing and installing a removable timber bollard in accordance with the notes, Standard Construction Details and as directed by the Engineer.

Materials and Construction Methods:

The bollard shall be made of seasoned uniform, and straight timber conforming to the requirements of Section 601 and treated with the water borne preservative chromated copper arsenate in accordance with Section 814.

Concrete shall be Class B conforming to the requirements of Section 612.

Reflector panels, if required, shall conform to the requirements of Section 749.

Steel housing for accommodating the bollard shall be galvanized and installed in the hole in vertical position on a 6″ (150 mm) bed of stone and encased with concrete as shown on the Standard Construction Details and/or as directed. All hardware shall be galvanized steel.

Method of Measurement:

The quantity of bollards will be measured as the actual number of bollards installed and accepted.

Basis of Payment:

The quantity of bollards will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing all materials, including stone, steel housing and hardware, reflector panels as shown on the Standard Construction Details, timber and concrete, excavation, backfilling, disposing of the surplus material, for all labor, tools, equipment and necessary incidentals to complete the work.

1/29/02

735500 - MULCH ACCESS ROADS

Description:

This work shall consist of constructing stabilized maintenance access roads at the locations indicated on the plans according to the Contract Documents and as directed by the Engineer.

Materials:

The materials to be used in the construction of the mulch access road shall conform to the following:

Shredded Hardwood Bark Mulch, which shall consist of natural wood and bark from hardwood trees that has been milled and screened to a maximum 4 inch particle size. Shredded hardwood mulch shall not be composted. Shredded Hardwood Mulch may be either produced onsite using available waste hardwood or purchased from offsite vendors. Onsite trees utilized for Shredded Hardwood Mulch must be designated on the Construction Plans for removal and approved for removal by the Engineer. Harvesting of trees marked for protection or outside of the LOC is strictly prohibited.

Construction:

Construction of the mulch access road shall be as shown on the Contract Documents and shall be coordinated with construction of the Pond Access Road. Prior to constructing the mulch access road, the Limits of Construction shall be flagged or staked by the contractor and field reviewed by the Engineer. Changes to alignment may be necessary based on changed field conditions or to avoid unnecessary impacts to natural resources / trees. The Engineer shall then give the Contractor authorization to proceed with construction of the mulch access road.

The Contractor shall verify that all required materials delivered to the site comply with the Contract Specifications. The location for the mulch access road is a shown on the plans.

The mulch access road shall consist of a minimum depth of 12 inches of Shredded Hardwood Bark Mulch on existing grade. In the event minor grading is required, the Contractor shall obtain prior permission from the Engineer. Shredded Hardwood Bark Mulch shall be replenished as directed by the Engineer during the construction period to maintain the minimum dimensions, or as directed by the Engineer at no additional cost to the Department. Upon completion of construction activities along the mulch access road, Shredded Hardwood Bark Mulch shall be dispersed to maximum depth of 1" within the limits of construction. Shredded Hardwood Bark Mulch that is removed shall become the property of the Contractor. Compacted Shredded Hardwood Bark Mulch that remains onsite shall be scarified at the direction of the Engineer.
Upon dispersion of the mulch access road, the ground shall be seeded as shown on the Contract Drawings.

MAINTENANCE. The mulch access route shall be maintained as needed and as directed by the Engineer through the completion of the project. Mulch-only portions of the access route shall be maintained at 12 inches at all times during active construction.

Method of Measurement:

The Mulch Access Road shall be measured as the square yardage of access road installed to a standard 12-inch depth. Maintenance repairs and replenishment of mulch shall not be measured and shall be considered incidental to the original installation dimensions.

Basis of Payment:

Mulch Access Road shall be paid for at the Contract unit price per square yard of access road. Payment shall include full compensation for all furnished or field manufactured Shredded Hardwood Bark Mulch and all material, labor, equipment, tools, and incidentals necessary to complete the work. The payment will be full compensation for all installation, maintenance, and ultimate removal of the shredded hardwood bark mulch as specified.

6/23/16

737515 - PLANTINGS, TUBELINGS

Description:

This work shall consist of furnishing and installation of tubelings as shown on the Construction Plans.

Installation of Dormant tubelings shall take place during the dormant period of the year; i.e., November 1 through March 31. Active Tubelings may also be planted outside the dormancy window and into the growing season.

Materials:

Tubelings shall consist of grown cuttings of *Cornus racemosa* (Gray Dogwood) and *Salix* discolornigra (Willow). Materials shall be purchased from a nursery specializing in the production of similar materials and shall include confirmation of species. Each tubeling shall have a minimum root volume of 6 to 10 cubic inches.

Construction:

Handling. Tubelings shall be transported in climate-controlled conditions to insure against temperatures greater than 50° F. Tubelings stored on site shall be kept moist, shaded, and protected against desiccation. Materials stored offsite shall be refrigerated and kept moist. In no case shall non-refrigerated materials be stored longer than five (5) calendar days.

During installation, tubelings shall be kept damp by heeling into moist mulch until ready for use. Cuttings shall be inspected for signs of desiccation, including but not limited to blackening of cut ends and lengthwise wrinkling of bark, and all unsuitable materials shall be appropriately discarded.

Installation. Tubelings shall be installed in two rows along each channel bank as shown in the Contract Documents. The row closest to the channel thalweg shall be planted at the toe of the 0.5 foot floodplain terrace at a spacing of 1.0 foot on center. The second row shall be planted at the top of the floodplain terrace at a spacing of 2.0 feet on center. With the approval of the Engineer, the Contractor shall achieve such spacing by preparing holes using a pointed digging bar, rebar, or other similar implements to achieve both the 6-10 inches of depth as well as the diameter required for each cutting. Coir matting placed along the streambank, in the planting areas, shall not be cut during installation. The coir mat opening shall be pried open to allow for installation. Tubelings shall be installed vertically into the bank with the root crown level with existing ground or slightly higher. The Contractor shall firmly backfill by hand, all voids surrounding all tubelings, hand tamping the soil tightly against each cutting without damaging the roots or plant. Tubelings shall be watered the equivalent of a 3 inch diameter container at 0.15 gallon per event.

Method of Measurement:

Tubelings shall be measured per each live tubeling installed and warranted.

Basis of Payment:

Tubelings shall be paid for at the Contract unit price per each. Payment shall be full compensation for furnishing, transporting, storing, watering, and planting, and for all material, labor, equipment, tools, and incidentals necessary to complete this work.

6/23/16

737523 - PLANTINGS

737.01 Description.

This work consists of furnishing and planting specified plants, shrubs, and trees and the replacement and cultural care of the material.

MATERIALS.

737.02 Plant Material.

a. *Quality.* All plants shall be true to type and nomenclature and typical of their species or variety. They shall have a normal habit of growth with well-developed branch systems and vigorous root systems. They shall be sound, healthy, and vigorous plants, free from defects, disfiguration, injury, disease of any kind, insect eggs, borers, and any infestation. All plants shall be nursery grown. They shall have been growing under similar climatic conditions to those of the locality of the Project for at least two years prior to planting. All plant material shall have been grown in a soil that is similar to this area and shall not have been grown in a muck type soil or other foreign type. It shall be the responsibility of the Contractor to inspect the plants before removal from the nursery where they have been grown to make sure that the plants meet these requirements. All plants shall be freshly dug, and no heeled-in or cold storage plants will be accepted, with the exception of plant material delivered prior to planting as outlined in Subsection 737.14.

b. *Measurements.* All plants shall conform to all sizes and measurements specified in the Plant List. Plants that conform to the requirements specified in the Plant List but do not have a normal balance between height and spread will not be accepted. Where any requirement or exact measurement is omitted, the plants furnished shall be normal for the species and variety as listed in AAN's "USA Standards for Nursery Stock". Plants for use where symmetry is required shall be matched as close as possible. All plants shall be measured for height and spread with the branches in their normal position. The trunk diameter of all trees shall be taken 6" (150 mm) above the ground level for up to and including 4" (100 mm) diameter sizes, and 12" (300 mm) above the ground level for larger sizes. The height of the branches on the tree trunks need not be as specified if the required height can be obtained by pruning the lower branches without leaving unsightly scars and damaging the trunk. No pruning of branches for this effect shall be done before delivery to the site unless approved. Plants larger in size than specified may be used. Larger plants, when selected for use over that which is specified, shall be dug with an earth ball or root spread proportionate to the increased size. With plants smaller than specified, credit shall be offered to the Department for approval. The basis of a credit shall be the average wholesale value based on the difference between the specified size and the next smaller size. The average wholesale value shall be substantiated with written submissions in accordance with Subsection 737.02 (e).

c. *Inspection.* The Contractor shall be responsible for all certificates of inspection of plant materials that may be required by Federal, State, or other authorities to accompany shipment of plants. The Contractor shall furnish complete information as to the location of all plants which it intends to supply and use. The right is reserved to inspect, tag, and approve all plants at the source of supply. This inspection and tagging shall not in any way eliminate the right of rejection at the site. All plants must be inspected and approved before they are planted. Any plants placed without prior inspection at the site will be rejected at the discretion of the Engineer. The Plant materials shall be protected according to best horticultural practice while in transit in such a way as to prevent the drying or possible desiccation of plant tissue. All plant material arriving at the site with broken or loose balls, or dry or insufficiently developed roots, and plants which are weak or thin, damaged or defective, or which do not comply with the specifications, will not be accepted. The Engineer reserves the right to reject all stock that is found to be unsatisfactory. All plant material determined as unsatisfactory by the Engineer shall not be planted under any circumstances and shall be removed from the Project site by the close of the working day. Failure on the part of the Contractor to comply with any of the above procedures will require an immediate suspension of all work.

d. *Nomenclature.* Plants shall conform to the nomenclature of "Standard Plant Names" as accepted by the American Joint Commission of Horticulture Nomenclature, 1942 Edition. Names of varieties not included shall conform to names accepted in nursery trade. Size and grading shall conform to those listed in AAN's "USA Standards for Nursery Stock". No substitution will be permitted except by written permission of the Engineer.

e. *Availability.* The Engineer, after receiving written request from the Contractor for substitution, will verify and establish the non-availability of the specified plant and size to this satisfaction. Upon determining that a substitution is justified, the Contractor will be directed to provide certification in the form of five letters from five independent growers who list the specified plant form in their most current catalog, stating that the item in question is not available as specified.

f. *Experience.* Under Special Condition No. 22 of the U.S. Army Corps of Engineers 404 Permit, it is stipulated that: *The mitigation and post-planting monitoring plans shall be developed and implemented by a firm with demonstrated expertise in wetland creation activities.*

Therefore, the firm that does the actual planting and seeding of the mitigation site shall possess a record of successful wetland woody and wetland herbaceous and seeding programs that have received final approval by the U.S. Army Corps of Engineers, or have on-site staff personnel who have managed successful wetland woody and herbaceous planting and seeding programs that have received final approval by the U.S. Army Corps of Engineers. At the request of the Department, information indicating compliance with this "Special Condition" shall be forwarded within 14 days.

737.03 Trees. Trees shall have straight trunks according to their habit of growth and shall be well branched and rooted. Shade trees of standard variety shall have a single leader and shall be branched at 6 to 8' (1.8 to 2.4 m) height unless otherwise directed.

737.04 Shrubs. Shrubs shall be well branched, with full and compact growth and have ample well branched root systems capable of sustaining vigorous plant growth.

a. *Woody Shrub Cuttings* Cuttings shall be fresh 24" (600 mm) long stems of woody plants. Each cutting shall have a living terminal bud (end bud). Prior to installation, the cutting shall be kept cool and moist to prevent desiccation of the material. Degraded, rotting, or dried out material will not be accepted.

737.05 Ground Cover and Herbaceous Perennials.

Ground cover shall be one year old, container grown plants, unless otherwise approved or specified in the Contract documents and shall have been growing for at least six months in the size specified as verified by the Department's inspection representative. Herbaceous plant material shall be at least six months old and shall have been growing for at least three months in the size specified unless otherwise detailed in the plans, and as verified by the Department's inspection representative.

737.06 Soil Mix.

a. *Topsoil.* Planting topsoil shall consist of natural surface soil from well drained areas from which no topsoil has previously been stripped. The topsoil shall be free of subsoil, heavy clay, hard clods, weeds, roots, sticks, toxic substances, or any other extraneous material. The topsoil shall have a pH range of from 5.5 to 6.8 and contain not less than 2% nor more than 10% organic matter. The topsoil shall exhibit the following grading analysis:

Sieve Size Minimum Percent Passing
2" (50 mm) 100
No. 4 (4.75 mm) 90
No. 10 (2.00 mm) 80

The Contractor shall take the necessary action to ensure that the topsoil meets the sieve analysis, acidity, and organic matter requirements. A certificate of analysis of soil samples shall be provided to the Engineer and approved prior to delivery of topsoil to the Project site.

b. *Peat Moss and Peat Humus.*

i. *Peat Moss. Peat moss shall be from sphagnum peat bogs. All peat moss shall be shredded, not dusty, and free of twigs, stones, hard lumps, roots, or any other undesirable materials. All peat moss must be moistened before using, but not watered to a saturated or puddled, unworkable condition. Peat moss shall show an acid reaction of 3.5 to 5.5 pH. The Contractor shall provide written certification from the manufacturer that the peat moss was obtained from sphagnum peat bogs.*

ii. Peat Humus. Peat humus shall be a natural peat or peat humus from fresh water saturated areas, consisting of sedge, sphagnum, or reed peat and be of such physical condition that it passes through a 2" (12.5 mm) sieve. The humus shall be free from sticks, stones, roots, and other objectionable materials. Samples taken at the source of supply shall have the following analysis:

Acidity Range	*4.0 to 7.5 pH*
Minimum Water Absorbing Ability	*200% by weight on oven-dry basis*
Minimum Organic Content	*60% when dried at 221 EF (105 EC)*

c. Composted leaf mulch free of wood, metallic substances, glass or other contaminates may be used in lieu of peat moss or peat humus.

737.07 Fertilizer. Fertilizer shall be a 20-10-5 analysis or approved equal in accordance with the following minimum guaranteed analysis:

Total Nitrogen (N)	20.00%
Derived from urea-formaldehyde	
7.0% water soluble nitrogen	
13.0% water insoluble nitrogen	
Available Phosphoric Acid (P_2O_5)	10.00%
Derived from calcium phosphate	
Soluble Potash (K_2O)	5.00%
Derived from potassium sulfate	
Combined Calcium (Ca)	2.60%
Derived from calcium phosphate	
Combined Sulfur (S)	1.60%
Derived from ferrous and potassium sulfates	
Iron (expressed as elemental Fe)	0.35%
Derived from ferrous sulfate	

The fertilizer shall be formulated in tablet form weighing a minimum of 20g per tablet. The fertilizer shall conform to all State and Federal regulations. The Engineer will require the Contractor to furnish an affidavit from the vendor or a testing laboratory as to the available nutrients contained therein.

Fertilizer shall be furnished in new, clean, sealed, and properly labeled packages or containers. Fertilizer failing to meet the specified analysis may be used as determined by the Engineer, providing sufficient materials are applied to comply with the specified nutrients per unit of measure.

737.09 Mulch. Mulch shall be shredded hardwood bark or wood chips, or an approved equal as accepted by the Engineer. All mulching materials will be visually inspected by the Engineer prior to delivery at the planting site and shall conform to the following requirements:

a. Shredded hardwood bark shall be from a deciduous hardwood source and be mechanically ground to a maximum size of 6" (150 mm). In addition, the bark shall be relatively free of bark fines dust and shall exclude all foreign and toxic substances.
b. Wood chips must be stockpiled for at least one year prior to placement as verified by the Department's inspection representative and shall not contain leaves, twigs, wood shavings and sawdust, or any foreign or toxic substances. In addition, loose, non-pelletized fertilizer with analysis in accordance with Subsection 737.07 shall be applied at the rate of 0.5 lb/yd^2 (0.25 kg/m^2) prior to wood chip placement.

Only one of the above mulches will be selected and approved for use throughout the entire Project, and written certification for the above listed requirements of the mulch shall be submitted by the Contractor.

737.10 Stakes, Guys, and Related Materials. Staking and guying shall be as per the Standard Construction Details or alternate method approved by the Engineer.

a. *Tree Stakes.* Hardwood stakes shall be at least 2" by 2" (50 by 50 mm) rough sawed to the length required. Stakes shall be free from knots, rot or other defects that impair strength.
b. *Guying straps.* Guying straps shall be one and one-half to two inches (1.5-2.0") wide, of polymer or nylon construction, with grommets at both ends to accept wire or heavy twine.
c. *Anchoring systems.* Anchors for guy wire shall be malleable iron or aluminum alloy with 3000 lb (13 kN) holding capacity designed to be inserted with a driving rod to a depth specified by the manufacturer. The anchor assembly shall be designed to turn, once located at the proper depth, at a right angle to the line of force applied. All manufacturers' recommendations shall be followed for installing ground anchoring systems.

737.11 Water. Conform to the requirements of Section 803.

CONSTRUCTION METHODS.

737.12 Planting Periods. Plant during the following planting period with the exceptions as noted:

Balled or Burlapped and Potted or Container Grown Plant Material:
March 1 to May 15; September 1 to November 30:
(1) All planting of broadleaf evergreens during the fall season shall be completed by November 1.
(2) All material planted from May 16 to August 31 must be treated with an approved antitranspirant in a manner recommended by the manufacturer, and written approval for moving plants within this period must first be obtained from the Engineer.
(3) Woody Shrub Cuttings Install as dormant materials between October 30 and December 1 or between March 1 and April 1.

The above mentioned periods may be extended or reduced according to weather and soil conditions at the time and upon written request from the Contractor to the Engineer for approval. Planting outside the planting window does not relieve the contractor of his guarantee. The Engineer reserves the right to stop planting operations at any time. The Contractor shall not plant when weather conditions are unfavorable for proper work or when the soil is in a frozen condition.

737.13 Soil Mixture. Soil mixtures for the various plantings shall consist of the following:

a. *All Plants Except Ericaceous Material.* For each cubic yard (cubic meter) of baled peat moss, or approved equal, add from 43 to 54 yd3; (43 to 54 m3) of planting topsoil.
b. *Ericaceous Plants.* For each cubic yard (cubic meter) of baled peat moss, or approved equal, add from 36 to 45 yd3; (36 to 45 m3) of planting topsoil. If peat humus is furnished in lieu of peat moss in the above mix, the mixture shall be based in the proportion of 1.8 yd3; (1.8 m3) of peat humus for each cubic yard (cubic meter) bale of peat moss specified for the above soil mix. Other approved equal materials shall be mixed according to manufacturer's printed recommendations which shall be submitted to the Engineer for written approval.

The above soil mixtures shall be mixed as specified in an area approved by the Engineer. No mix shall be prepared prior to notification of the Engineer at least 48 hours in advance of the mixing operation. Where ground covers or herbaceous perennials are specified, the soil mix may be mixed in place providing the existing topsoil conforms to the requirements of subsection 737.06.

The fertilizer as specified in accordance with Subsection 737.07 shall be placed according to the following requirements:

a. *Balled and Burlapped, or Container Stock.* Position the plant in the hole, and backfill no higher than halfway up the root ball. Place the recommended number of tablets evenly around the perimeter of and immediately adjacent to the root ball. Complete the backfilling, tamping, and watering.
b. *Small Ground Cover Plants and Herbaceous Perennials.* Position the plant in the hole, and backfill no higher than halfway up the root ball. Place the recommended number of tablets evenly around the perimeter of and immediately adjacent to the root ball. Complete the backfilling, tamping, and watering.

c. *Trees.* Use one 20 g tablet for each 1/2" (13 mm) of tree trunk diameter based on size specified for planting.
d. *Shrubs.* Use one 20 g tablet for each 12" (300 mm) of height or spread based on size specified for planting.
e. *Ground Cover and Herbaceous Perennials.* Use one 20 g tablet for each plant.

No backfill shall be placed in any pit until the excavation has been inspected. Excess excavated material shall be removed from the Project site.

737.14 Digging and Handling. All precautions customary in good trade practice shall be taken in preparing plants for transplanting. Plants transplanted with workmanship that fails to meet the highest standards will be rejected. All balled and burlapped plants shall have firm, natural balls of earth of ample proportions and diameter not less than as specified in AAN's "USA Standards for Nursery Stock". Plants with cracked, broken, or crushed balls, which occur either before or during planting operations, will be rejected or shall be removed from the site immediately. All plants shall be handled so that roots are adequately protected and moist at all times. Material that cannot be planted immediately after delivery shall be adequately protected by covering with canvas, wet straw, burlap, moss, or other suitable material and kept covered until ready to be planted. Trees should not be planted with frozen earth balls. Containerized plant material shall be growing in the specified size container for at least six months and shall not display signs of being root bound or unnatural ratio of planting medium vs. root mass.

737.15 Location of Plants. Plants shall be located as indicated on the Plans, but may be shifted to avoid utilities subject to the approval of the Engineer. No excavation shall commence until locations are approved.

737.16 Planting. All trees and shrubs shall be planted in pits as detailed on the Standard Construction Details. Pits shall not be excavated with vertical sides. Pits shall be of such a depth that, when planted and settled, the crown of the plant shall bear the same relation to finished grade as it did to soil surface in its place of growth. With the approval of the Engineer, the Contractor may elect to plant wetland grown containerized shrubs on small mounds raised no more than 2" (50 mm) above the final grading elevation shown on the Plans. Open plant pits shall not be allowed overnight in residential areas or in any location where it is determined by the Engineer to pose a potential hazard to pedestrians or traffic.

All backfill topsoil shall be covered with a waterproof material after mixing. Pits shall be backfilled with specified soil mix and compacted firmly under ball of roots to establish a firm foundation. Plants shall be set in the center of pits in a vertical position so that the crown of the plant is level with the finished grade after allowing for watering and settling of soil. The "Soil Mixture" shall be carefully and firmly worked and tamped under and around the base of the ball to fill all voids. When partially backfilled and compacted, the burlap and any wire baskets shall be removed from the sides and tops of the balls and cut away to prevent air pockets, but no burlap shall be pulled from under the balls. All burlap, wire baskets and other containers shall be removed from the jobsite at the end of the workday. The balance of the planting hole shall be filled with the planting mixture and a ring of earth shall be formed around the plant to produce a dish for watering. All plants shall be thoroughly watered immediately after planting as directed by the Engineer. This initial watering shall mean complete saturation of all backfill in the pits and beds during the same day of planting. Care shall be taken during all planting operations to ensure that no excavated material is dumped on any grassed area unless a suitable type of matting or protective underlay is used. The Contractor shall be responsible for all damage to any grassed, planted, or other landscaped area caused by its operations and shall repair any damage so caused in a manner satisfactory to the Engineer.

Ground cover and herbaceous perennial areas shall be prepared by rototilling to a minimum depth of 10" (250 mm). The mixing of peat moss, peat humus, or approved equal may be performed separately in order to obtain the proportion of ground cover or herbaceous perennial soil mixture as specified. Beyond the minimum excavation as stated above for soil mixing, the root system of the plant shall determine the actual depth for individual plant excavation. Plants shall be backfilled with the soil mixture and compact firmly around roots. All areas shall have a smooth and uniform grade and a minimum of 2" (50 mm) of approved mulch.

a. *Pruning.* All plants shall be pruned immediately after planting or transplanting to remove all injured or dead wood. All trees inspected and tagged at the nursery shall conform to AAN Standards, and any subsequent pruning by the Contractor shall in no way alter the natural habit or shape of the plant. All pruning shall be done with sharp tools by workers skilled in this operation. All cuts shall be made flush,

leaving no stubs. On all cuts over 3/4" (19 mm) in diameter and bruises or scars on the bark, the injured cambium shall be traced back to living tissue and removed; wounds shall be smoothed and shaped so as to preserve the branch bark ridge.

b. *Watering.* Plants shall be watered on the same day as planting unless otherwise approved by the Engineer. Quantity of water per plant shall be as detailed in Section 737.17.
c. *Mulching.* Trees and shrubs shall be mulched with at least a 4" (100 mm) cover of mulch. Mulch shall be placed the same day of planting, unless otherwise approved by the Engineer.
d. *Wire baskets, nylon binding and treated burlap* shall be cut away and removed from the top half of the root ball.
e. *Staking and Guying.* Unless approved by the Engineer, all staking and guying specified shall be completed the same day as planting and mulching.
f. *Cleaning Up.* Throughout the course of planting, excess and waste materials shall be immediately removed from the site, seeded areas kept clean, and all precautions taken to avoid damage to existing structures, trees, shrubs, plants, and grass. When planting in an area that has been otherwise completed, the area shall, upon completion of the planting, be immediately and thoroughly cleared of all debris, rubbish, subsoil, and all waste materials removed from the site. All ground surfaces shall be raked smooth. All sodded areas disturbed as a result of construction shall be repaired by the Contractor.

737.17 Plant Establishment. The plant establishment period for all planting shall begin immediately after all planting and replacements (as specified under Section 737.16, Planting) are complete and acceptable to the Engineer. The plant establishment period will consist of one full growing season during which time the Contractor shall be responsible for all work necessary to keep the plants in a live and healthy condition. A growing season is defined as the period from May 1 through September 30. If the Contractor completes all planting (as specified under Planting) by May 1, the inspection will be held on or about October 1 of that year. In the event the Contractor does not complete all planting by May 1, the inspection will be held on or about October 1 of the following year. All replacement plant material determined to be necessary at the inspection must then be approved at the replacement plant source by October 15. At this time, the Engineer will direct the Contractor to replace those plants determined to be dead or unhealthy by December 1. The Contractor will notify the Engineer in writing that all replacement planting has been accomplished. The Engineer will conduct an inspection within 15 days after such notification to determine the acceptability of the replacements. If all replacements are determined satisfactory by the Engineer, the Contractor will be relieved of all further responsibility for care and replacement.

All planting areas shall be kept free of weeds and grass during the life of the Contract. The Contractor may utilize a pre- or post-emergent herbicide to control such grass and broadleaf weeds incidental to the cost of planting and be totally responsible for the proper use and placement of any such herbicide. As requested in writing by the Engineer, the Contractor shall be responsible to weed within all plant beds and within the saucer limits of individual plants, beginning 10 calendar days after the date of notification. The Contractor shall prune and apply insecticides or fungicides as required, repair or replace stakes and guy wires, tighten guy cable or wire and repair plant saucer washouts when and as specified by the Engineer.

Any plants that settle below or rise above the desired finished grades shall be reset at the proper grades.

If dead or unhealthy plants are discovered, they shall be removed within 10 calendar days and replaced with the next appropriate planting season. All replacements shall be plants of the same kind, size and quality as originally specified in the Contract and they shall be furnished, planted, mulched, guyed, watered, etc. as specified herein for new plant material. The Contractor shall warrant all plant material against defects including death and unsatisfactory growth, except for defects resulting from incidents beyond the Contractor's control, such as vehicular impacts or vandalism. Submission of appropriate police reports or other approved evidence verifying the cause of the damage shall be required to relieve the Contractor of responsibility for replacement.

The cost of the above described work shall be incidental to Section **737**, Planting.

Contractor shall be required to water all major and minor trees, shrubs and all herbaceous beds bi-weekly during the period from June 15 through October 1. Watering, once initiated, shall continue without interruption until all plants on the project have been watered. Payment shall be per 1,000 gals of water applied and shall be based on the following schedule: Major trees-15 gals per tree, minor trees-10 gals per tree, shrubs-5 gals per shrub, perennials-10 gals per 100 square feet of planting bed. Water used for this item shall meet the requirements of Section 803 of the Standard Specifications. Tree watering bags, if utilized, shall be filled as a part of the watering operation; payment shall be as detailed herein. Tree watering bags shall remain the property of the contractor and shall be removed prior to final inspection.

737.18 Method of Measurement. The quantity of planting will not be measured.

737.19 Maintenance Bond. Upon Substantial Completion of the Work, the Contractor shall furnish to the Department a Maintenance Bond on the form provided by the Department for item 737523 - Planting. The Maintenance Bond shall meet the following requirements:

A sum equal to 100% of the value of all Planting Items paid to the Contractor, as detailed in the Breakout Sheet; All signatures are original signatures, in ink, and not mechanical reproductions or facsimiles of any kind; The Contractor is the named principle; Section 737.17 – Plant Establishment Work items associated with this section requires completion after substantial completion of the Project. The term of the Maintenance Bond will be for a period of one full growing season, as defined in the section, beyond the completion of permanent planting Work; and, Written by a Surety or insurance company that is in good standing and currently licensed to write surety bonds in the State of Delaware by the Delaware Department of Insurance.

737.20 Basis of Payment.

The quantity of planting will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including plants, soil mixes, and mulch; for protecting plants after digging and prior to planting; for staking, excavating plant pits, pruning, and guying; for the cultural care of the plants until the completion and acceptance of all landscape work; for disposing of excess and waste materials; for replacement planting; for cleanup; for repairs to plant material, tree protection, wire, or staking; for repairs to damaged grassed, planted, or other landscaped area due to the Contractor's operations; for ensuring that topsoil meets the sieve analysis, acidity, and organic matter requirements; for applying sufficient materials to fertilizer that originally failed to meet the specified analysis; for using pre- or post-emergent herbicide to control grass and weeds; for the work outlined under Subsection 737.17; and for all labor, equipment, tools and incidentals required to complete the work. The quantity of watering will be paid for in accordance with the price bid for, "Watering," as detailed on the breakout sheet. Payment shall be by the M/Gal (1,000 gallons) of water applied at each watering operation.

The breakout sheet attached to the proposal shows all plant material and the anticipated amount of water proposed for this Contract. The Contractor shall fill in the per each unit price and the cost (unit price times the proposed quantity) for each item listed. The lump sum price bid for 737523 - Planting shall be the sum of the total cost for all species and sizes listed.

The Department reserves the right to delete from the Contract the furnishing and installing of one or more of the species and/or sizes listed and the right to add or subtract from the quantity of each species and size listed. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletion are made. Watering item shall be paid separately for watering completed at the bid price indicated on the Breakout Sheet.

Payment for the planting as described above may be processed if, in the opinion of the Engineer all work required, except that specified under Subsection 737.17 is satisfactorily completed. No partial payment will be made for any living plant until and unless planted in accordance with these specifications. No additional payment will be made for using plants larger than specified.

On contracts where assessment of time is in working days, the Contractor will be charged working days while engaged in actual planting and directly related work such as plant pit excavation, staking, wrapping, and mulching. The Contractor will not be charged time for indirectly related work such as watering, weed control, pruning, and other responsibilities as described under Subsection 737.17

The cost to remove and replace plants that settle below or rise above the desired finished grades, or that die or are unhealthy as described in Subsection 737.17 shall be the responsibility of the Contractor.

4/30/2015

741503 – ROOT PRUNING

Description:

This work shall consist of tree root pruning at the locations indicated on the plans, according to the Contract Documents, and as directed by the Engineer. Root Pruning shall be performed by a certified arborist or tree care specialist.

Materials:

The equipment to be used in the pruning of tree roots shall conform to the following:

A trenching machine, vibratory knife, rock saw, or other approved device shall be operated by the Contractor to prune tree roots.

Construction Methods:

The Contractor shall operate a trenching machine, vibratory knife, or rock saw along the outside limits of channel grading prior to any grading operations. This root pruning shall be to a depth of 30 inches, unless otherwise directed by the Engineer, and shall clean cut roots and minimize construction activity shock to the affected trees. When a trenching machine is used, the trench shall be immediately backfilled. Root pruning shall be performed prior to the installation of the Tree Protection Fencing and Signage.

Root pruning operations shall meet ANSI A300 standards for Tree Care Operations.

The Contractor is responsible for the removal and disposal of wood debris and other waste materials.

Trees which are immediately adjacent to the root pruning may be affected adversely due to their close proximity to the excavation. Removal of any such additional trees must receive the written concurrence of the Engineer.

Removal of any limbs of trees which may interfere with construction operations will also require the written concurrence of the Engineer.

Method of Measurement:

Tree Root Pruning shall be measured at the contract unit price per linear foot of cutting, as measured along planform ground surface cuts.

Basis of Payment:

Tree Root Pruning shall be paid for at the Contract unit price per linear foot of cutting. The payment will be full compensation for all labor, material, equipment, tools, and incidentals necessary to complete the work.

6/23/16

763501 - CONSTRUCTION ENGINEERING

1) **Description:**

This work consists of construction lay out including; stakes, lines and grades as specified below. Subsection 105.10 Construction Stakes, Lines and Grades of the Standard Specifications is voided.

Based on contract plans and information provided by the Engineer, the Contractor shall stake out right-of-way and easements lines, limits of construction and wetlands, slopes, profile grades, drainage system, centerline or offset lines, benchmarks, structure working points and any additional points to complete the project.

The Engineer will only establish the following:

(a) Original and final cross-sections for borrow pits.
(b) Final cross-sections: Top and bottom pay limit elevations for all excavation bid items that are not field measured by Construction inspection personnel. The Contractor shall notify the Engineer when these pay limit elevations are ready and allow for a minimum of two calendar days for the Engineer to obtain the information.
(c) Line and grade for extra work added on to the project plans.

2) Equipment. The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover and Automatic Level for the duration of the contract. The GPS rover shall be in good working condition and of similar make and model used by the Contractor. The Contractor shall provide up to 8 hours of formal training on the Contractor's GPS system to a maximum of four Engineer's appointees (DELDOT Construction Inspectors). At the end of the contract, the Engineer will return the GPS rover to the Contractor. If any of the equipment/instruments are found to be out of adjustment or inadequate to perform its function, such instrument or equipment shall be immediately replaced by the Contractor to the satisfaction of the Engineer. Choosing to use GPS technology does not give the contractor authority to use machine control.- Construction Engineering (GPS) Machine Control Grading shall only be used if noted in the General Notes in the plan set outlining the available files that will be provided to the Contractor and "the Release for delivery of documents in electronic form to a contractor" are signed by all parties prior to delivery of any electronic files. Only files designated in the General Notes shall be provided to the contractor. If machine control grading is allowed on the project see the "machine control" section of this specification. GPS technology and machine control technology shall not be used in the construction of bridges.

3) Engineering/Survey Staff. The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the subcontracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

4) Performance Requirements:

(a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a horizontal and vertical circuit to verify the precision of given control points. Establishing plan coordinates and elevation marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.035 ft times [Square root of number of miles in the level run] (0.01 m times [square root of number of kilometers]). The Horizontal Control precision ratio shall have a minimum precision of 1:20,000 feet (1 meter per 20,000 meters or 1:20,000) of distance traversed prior to adjustment.

(b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.

(c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor must immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.

(d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces before and after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors or their designated representative, the Contractor shall survey top of beam elevations at a maximum of 10-ft (3.0-meter) stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.

(e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for utility relocations, which will be performed by others, after the Notice to Proceed has been given to the Contractor, shall be paid for under item 763597 - Utility Construction Engineering.

(f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.

(g) If wetland areas are involved and specifically defined on the Plans the following shall apply:

i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly enforced and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.

ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with these Special Provisions. Before any clearing operation commences the Contractor shall demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.

iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot (6.1 meter) intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 3 foot (one meter) wooden grade stakes shall be driven into the ground at approximate 20 foot (6.1 meter) intervals and tied with the flagging.

iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Contractor and deducted from any monies due under the Contract.

v. At the completion of construction, the Contractor shall remove all stakes and flagging.

vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.

(h) Whenever the Engineer will be recording data for establishment of pay limits, the Contractor will be invited to obtain the data jointly with the Engineer's Survey Crew(s) in order to agree with the information. If the Contractor's representative is not able to obtain the same data, then the information obtained by the Engineer shall be considered the information to be used in computing the quantities in question.

5) Submittals. All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes, electronic files, and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at any time as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades, and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work. Copies of all notes must be furnished to the engineer at the completion of the project.

The Contractor shall submit any of the following at the Engineer's request:

(a) Proposed method of recording information in field books to ensure clarity and adequacy.
(b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.
(c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.
(d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control - traverse closure report.
(e) Description of newly established benchmarks with location, elevation and closed loop survey field notes - bench closure report
(f) All updated electronic and manuscript survey records.
(g) Stakeout plan for each structure and culvert.
(h) Computations for buildups over beams, screed grades and overhang form elevations.
(i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.
(j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.

(k) Baseline for each borrows pit location.
(l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.
(m) Copies of cut sheets.

Machine Control Grading

This Section of the specification shall only be used if machine control is authorized for use on the project.

Description:

This specification contains the requirements for grading operations utilizing Global Positioning Systems (GPS).

Use of this procedure and equipment is intended for grading the subgrade surface; it is not intended for the use in constructing final surface grades. The Contractor may use any manufacturer's GPS machine control equipment and system that results in achieving the grading requirements outlined in section 202 of the standard specifications. The Contractor shall convert the electronic data provided by the Department into the format required by their system. The Department will only provide the information outlined in this document and no additional electronic data will be provided.

The Contractor shall perform at least one 500 foot test section with the selected GPS system to demonstrate that the Contractor has the capabilities, knowledge, equipment, and experience to properly operate the system and meet acceptable tolerances. The engineer will evaluate and make the determination as to whether additional 500 foot test sections are required. If the Contractor fails to demonstrate this ability to the satisfaction of the Department, the Contractor shall construct the project using conventional surveying and staking methods.

Materials:

All equipment required to perform GPS machine control grading, including equipment needed by DelDOT to verify the work, shall be provided by the Contractor and shall be able to generate end results that are in accordance with the requirements of Division 200 - EARTHWORK of the Standard Specifications.

Construction:

a. DelDOT Responsibilities:

1. The Department will set initial vertical and horizontal control points in the field for the project as indicated in the contract documents, (plans set). If the Contractor needs to establish new control points they shall be traversed from existing control points and verified to be accurate by conventional surveying techniques.

2. The Department will provide the project specific localized coordinate system.

3. The Department will provide data in an electronic format to the Contractor as indicated in the General Notes.

    a. The information provided shall not be considered a representation of actual conditions to be encountered during construction. Furnishing this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered including, but not limited to site visits, and basing the bid on information obtained from these investigations, and the professional interpretations and judgments of the Contractor. The Contractor shall assume the risk of error if the information is used for any purpose for which the information is not intended.

b. Any assumption the Contractor makes from this electronic information shall be at their risk. If the Contractor chooses to develop their own digital terrain model the Contractor shall be fully responsible for all cost, liability, accuracy and delays.

c. The Department will develop and provide electronic data to the Contractor for their use as part of the contract documents in a format as indicated in the General Notes. The Contractor shall independently ensure that the electronic data will function in their machine control grading system.

4. The Files that are provided were originally created with the computer software applications MicroStation (CADD software) and INROADS (civil engineering software). The data files will be provided in the native formats and other software formats described below. The contractor shall perform necessary conversion of the files for their selected grade control equipment. The Department will furnish the Contractor with the following electronic files:

a. CAD files
   i. Inroads -Existing digital terrain model (.DTM)
   ii. Inroads -Proposed digital terrain model (.DTM)
   iii. Microstation -Proposed surface elements - triangles

b. Alignment Data Files:
   i. ASCII Format

5. The Engineer shall perform spot checks of the Contractor's machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines that the work is not being performed in a manner that will assure accurate results, the Engineer may order the Contractor to redo such work to the requirements of the contract documents, and in addition, may require the Contractor to use conventional surveying and staking, both at no additional cost to the Department.

B. Contractor's Responsibilities

1. The Contractor shall provide the Engineer with a GPS rover and Automatic Level, for use during the duration of the contract. At the end of the contract, the GPS rover and Automatic Level will be returned to the Contractor. The Contractor shall provide a total of 8 hours of formal training on the Contractor's GPS machine control system to the Engineer and up to three additional Department appointees per rover.

2. The Contractor shall review and apply the data provided by the Department to perform GPS machine control grading.

3. The Contractor shall bear all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to application of GPS machine control grading techniques. Grade elevation errors and associated corrections including quantity adjustments resulting from the contractor's use of GPS machine control shall be at no cost to the Department.

4. The Contractor shall convert the electronic data provided by the Department into a format compatible with their system.

5. The Contractor's manipulation of the electronic data provided by the Department shall be performed at their own risk.

6. The Contractor shall check and if necessary, recalibrate their GPS machine control system at the beginning of each workday in accordance with the manufacturer's recommendations, or more frequently as needed to meet the requirements of the project.

7. The Contractor shall meet the accuracy requirements as detailed in the Standard Specifications.

8. The Contractor shall establish secondary control points at appropriate intervals and at locations along the length of the project. These points shall be outside the project limits and/or where work is performed. These points shall be at intervals not to exceed 1000 feet. The horizontal position of these points shall be determined by conventional survey traverse and adjustments from the original baseline control points.

The conventional traverse shall meet or exceed the Department's Standards. The elevation of these control points shall be established using differential leveling from the project benchmarks, forming a closed loop. A copy of all new control point information including closure report shall be provided and approved by the Engineer prior to construction activities. The Contractor shall be responsible for all errors resulting from their efforts and shall correct deficiencies to the satisfaction of the Engineer and at no additional cost to the Department.

9. The Contractor shall provide stakes at all alignment control points, at every 500 foot stationing, and where required for coordination activities involving environmental agencies and utility companies at the Contractor's expense. Work that is done solely for utility companies and that is beyond the work performed under item 763501 - Construction shall follow and be paid for under item 763597 -Utility Construction Engineering.

10. The Contractor shall at a minimum set hubs at the top of finished grade at all hinge points on the cross section at 500 foot intervals on the main line and at least 4 cross sections on side roads and ramps as directed by the engineer or as shown on the plans. Placement of a minimum of 4 control points outside the limits of disturbance for the excavation of borrow pits, Stormwater Management Ponds, wetland mitigation sites etc. These control points shall be established using conventional survey methods for use by the Engineer to check the accuracy of the construction.

11. The Contractor shall preserve all reference points and monuments that are identified and established by the Engineer for the project. If the Contractor fails to preserve these items the Contractor shall reestablish them at no additional cost to the Department.

12. The Contractor shall provide control points and conventional grades stakes at critical points such as, but not limited to, PC's, PT's, superelevation points, and other critical points required for the construction of drainage and roadway structures.

13. No less than 2 weeks before the scheduled preconstruction meeting, the Contractor shall submit to the Engineer for review a written machine control grading work plan which shall include the equipment type, control software manufacturer and version, and proposed location of the local GPS base station used for broadcasting differential correction data to rover units.

14. The Contractor shall follow the guidelines set forth in the "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques" and follow a minimum of Second Order Class 1, (2-I) classification standards.

Automated equipment operations have a high reliance on accurate control networks from which to take measurements, establish positions, and verify locations and features. Therefore, a strong contract control network in the field which is the same or is strongly integrated with the project control used during the design of the contract is essential to the successful use of this technology with the proposed Digital Terrain Model (DTM). Consistent and well designed site calibration for all machine control operations (as described below under *Contract Control Plan*) are required to ensure the quality of the contract deliverables. The Contract Control Plan is intended to document which horizontal and vertical control will be held for these operations. Continued incorporation of the Base Station(s) as identified in the Contract Control Plan is essential to maintaining the integrity of positional locations and elevations of features. The Contract Control Plan shall be submitted to the Department for review and approval by the Departments Survey Section 3 weeks prior to the start of any machine control work. The Contractor shall operate and maintain all elements of the Machine Grade Control continuously once the operations begin until otherwise approved by the Engineer.

Contract Control Plan:

The Contractor shall develop and submit a Contract Control Plan for all contracts which use Machine Control Grading. Contract control includes all primary and secondary horizontal and vertical control which will be used for the construction contract. Upon the Contractor's completion of the initial survey reconnaissance and control verification, but prior to beginning primary field operations, the Contractor shall submit a Contract Control Plan document (signed and sealed by the Delaware licensed Land Surveyor or Delaware Professional Engineer who oversees its preparation) for acceptance by the Engineer, which shall include the following:

1. A control network diagram of all existing horizontal and vertical control recovered in the field as contract control.

2. Include a summary of the calculated closures of the existing control network, and which control has been determined to have been disturbed or out of tolerance from its original positioning.

3. An explanation of which horizontal and vertical control points will be held for construction purposes. If necessary include all adjustments which may have been made to achieve required closures.

4. An explanation of what horizontal and vertical control (including base stations) was set to accomplish the required stakeout or automated machine operation. Include how the position of these new control points was determined.

5. Describe the proposed method and technique (technology and quality control) for utilizing the control to establish the existing and/or proposed feature location and to verify the completed feature location and/or measured quantity.

6. A listing of the horizontal and vertical datums to be used and the combined factor to be used to account for ellipsoidal reduction factor and grid scale factor.

7. If the Contractor chooses to use machine control as a method of measuring and controlling excavation, fill, material placement or grading operations as a method of measuring and controlling excavation, fill, material placement or grading operations, the Contractor Control Plan shall include the method by which the automated machine guidance system will initially be site calibrated to both the horizontal and vertical contract control, and shall describe the method and frequency of the calibration to ensure consistent positional results.

8. Issues with equipment including inconsistent satellite reception of signals to operate the GPS machine control system will not result in adjustment to the "Basis of Payment" for any construction items or be justification for granting contract time extension.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

3/27/15

908504 – COIR FIBER MATTING

Description:

This work consists of stabilizing the streambanks using Natural Fiber Matting, as shown on the Miscellaneous Stream Details, at the locations shown on the Plans, and as directed by the Engineer.

Materials:

Natural Fiber Matting. The Natural Fiber Matting shall be equivalent to Nedia KoirMat 900 or BioD-Mat 90, consisting of machine produced matting of degradable natural fibers meeting the following minimum specifications:

Material:	Woven Coir matting
Minimum Thickness:	0.30 inches
Minimum Weight:	25 oz/SY
Maximum Allowable Water Velocity:	16 ft/sec
Maximum Open Area:	40%

Anchoring Devices. Staple or Anchor Stake – as indicated on the plans, or as recommended by the mat manufacturer and approved by the Representative. Staples shall consist of 4 mm (No. 8 gauge) steel wire, bent U-shaped or square top with a throat width of 25 mm to 50 mm (1 inch to 2 inches), with and effective minimum driving depth of 200 mm (8 inches). Anchor Stakes shall consist of a 12" long, 1" x 2" hardwood notched stake.

Certification:

The Contractor shall furnish the Engineer with a specification and source of the Natural Fiber Matting for review and approval two (2) weeks prior to intended use. The specifications furnished to the Engineer shall be equivalent to Nedia KoirMat 900 or BioD-Mat 90.

Construction Methods:

Grading, Topsoil and Seeding shall be completed before the soil stabilization matting is installed. The bank surface shall be a smooth soil surface free from stones, clods, or debris. The matting shall be placed within 24 hours after seeding operations have been completed. Matting shall be laid smoothly and securely upon the seeded bed in the direction of water flow. Ensure full contact of the matting with the topsoil and that the matting is free of tears, folds, holes, or other inconsistencies in its final placement. Stretching shall be avoided.

The matting shall be rolled lengthwise along the streambank. The matting shall be secured throughout using staples placed every two (2) feet on center, except as indicated for matting overlap and along the edges of the matting.

Where more than one width of matting is required, the ends of each strip shall overlap at least one (1) foot for both vertical and horizontal overlaps. Overlapping shall be done with the upslope matting overlapping the downslope matting and the upstream matting overlapping the downstream matting. The overlapped mat shall be firmly fastened in place with anchor stakes driven vertically into the soil and flush with the surface. Anchor stakes shall be placed a maximum of two (2) feet on center along overlapping matting.

The Contractor shall secure the edges of the matting along the slope by excavating a six (6)-inch deep trench and securing the edge of the matting within the trench with anchor stakes placed every two (2) feet on center. The trench shall then be backfilled and tamped. The matting shall extend a minimum of one (1) foot beyond the limits of grading at the top of the slope, or to a location along the slope indicated by the Engineer.

Along the bottom of the slope, the matting shall be secured by trenching the mat a minimum of one (1) foot below the channel invert and securing with anchor stakes placed every two (2) feet on center. The trench shall be backfilled with channel bed material and tamped.

The matting shall be secured along the toe of slope along Rock Toe Protection, Step-pool Crest, and Step-pool Pool locations by extending the matting down one (1) foot vertical and securing with anchor stakes as shown on the details. The anchor stakes shall be placed every two (2) feet on center.

If any area of the Natural Fiber Matting degrades before the disturbed area is fully stabilized, the Contractor shall replace the matting and reseed the affected area at the Contractor's expense.

Method of Measurement:

The quantity of Natural Fiber Matting will be measured in square yards of actual surface covered along the surface of the treated area. The payment will be full compensation for furnishing and placing mat, staples, stakes, and for all material, labor, tools, and incidentals necessary to complete the work.

Basis of Payment:

The quantity of Natural Fiber Matting will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for ground preparation, furnishing and installing all materials, labor, equipment and other incidentals necessary to complete the work.

1/31/2015

908510 - STREAM RESTORATION SEEDING

Description:

This work shall include furnishing, seeding, and establishment of Riparian Buffer Seed Mix, Stormwater Pond Mix, and a cover crop of temporary stabilization seed.

Materials:

a. Riparian Buffer Seed Mix - 30 lbs/ac with 30 lbs of oats or cereals

Common Name (*Latin name)*	OVERALL MIX SEED RATE	Min. 30 LBS/AC PLS
	LBA/AC PLS	% OF MIX
Virginia Wildrye (*Elymus virginicus*)	7.5	25%
Riverbank Wildrye (*Elymus riparius*)	7.5	25%
Autumn Bentgrass (*Agrostis perennans*)	7.5	25%
Deertongue (*Dicanthelium clandestinum*)	4.5	15%
Soft Rush(*Juncus effusus*)	0.6	2%
Fox Sedge (*Carex vulpinoidea*)	0.6	2%
Swamp Milkweed (*Asclepias incarnata*)	0.3	1%
Mist Flower (*Eupatorium coelestinum*)	0.3	1%
Boneset (*Eupatorium perfoliatum*)	0.3	1%
New England Aster (*Aster novae-angliae*)	0.3	1%
Cardinal Flower (*Lobelia cardinalis*)	0.3	1%
Tall White Beardtongue (*Penstomen digitalus*)	0.3	1%

b. Stormwater Pond Mix

Common Name (*Latin name)*	OVERALL MIX SEED RATE	Min. 20 LBS/AC PLS
	LBA/AC PLS	% OF MIX
Virginia Wildrye (*Elymus virginicus*)	5	25%
Deertongue (*Dicanthelium clandestinum*)	5	25%
Fox Sedge (*Carex vulpinoidea*)	5	25%
Autumn Bentgrass (*Agrostis perennans*)	1	5%
Rough Bentgrass (*Agrostis scabra*)	1	5%
Soft Rush (*Juncus effusus*)	0.6	3%
Green Bulrush (*Scirpus atrovirens*)	0.6	3%
Woolgrass (*Scirpus cyperinus*)	0.6	3%
Swamp Milkweed (*Asclepias incarnata*)	0.4	2%
Mist Flower (*Eupatorium coelestinum*)	0.2	1%
Joe Pye Weed (*Eupatorium fistulosum*)	0.2	1%
Boneset (*Eupatorium perfoliatum*)	0.2	1%
Wrinkle Leaf Goldenrod (*Solidago rugosa*)	0.2	1%

Seeding rates shall be supplied on the basis of 100% Pure Live Seed (PLS) per acre. Seed tags to be supplied at the time of delivery shall indicate the LBS/AC PLS for each individual species. Seed quantities shall be adjusted for each species in the mix to meet the 100% LBS/ AC PLS rate listed in the tables above. Individual seed species shall have a maximum weed seed percentage of 0.75-percent, a minimum purity of 95-percent, and a minimum percentage germination of 90-percent.

All seed shall be fresh, clean, from new crop seed, and delivered to the site in original unopened tagged packages in accordance with the Delaware Code and respective State laws.

All areas of Riparian Buffer Seed Mix and Stormwater Pond Seed Mix shall be overlain by a temporary seed of Common Oat (Avena sativa) or Grain Rye (Secale cereal) applied at a rate of 30 LBS/AC. The temporary seed mix shall be broadcast seeded separately after placement of the permanent seed and shall not be mixed with the permanent seed mixtures during broadcast seeding. The temporary seed shall have a maximum weed seed percentage of 0.15-percent, a minimum purity of 98-percent, and a minimum percentage germination of 90-percent.

The seed mixes above shall be free of prohibited weed species listed in DelDOT Standard Specification 908. No Johnsongrass (Sorghum halapense), Canada Thistle (Cirsium arvense), Burcucumber (Sicyos angulatus), Giant Ragweed (Ambrosia trifida), and Texas Amaranth (Amaranthus palmeri) shall be allowed under the maximum allowable percentage of weed seeds and in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code. In accordance with Title 3, Chapter 15 of the Delaware Code, Seeds and its associated regulations, seed designated as Noxious Weeds by the Delaware Department of Agriculture shall not be part of the allowable percentage of weed seeds in any quantity.

Permanent Grass Seeding - Dry Ground (PGS-DG) shall follow requirements of Section 908.

Construction:

This work shall consist of preparing the seed bed, broadcast seeding, and watering for establishment in accordance with Section 908 of the Supplemental Specifications with changes to methods as shown on the plans.

Seed tags will be removed from the seed bags prior to seeding by the inspector and seed tags shall indicate the pounds per acre of pure live seed (LBS/AC PLS) of the supplied mix. Seed mixes will conform to the 908.02.C.3 (a) Materials Seeding section for Grass and Agricultural Seeds or as indicated on the plans. Manufacturer's guidelines will be submitted to the Engineer prior to installation. The Contractor shall be responsible for performing all work necessary to achieve and maintain an acceptable seed bed prior to seeding as directed by the Engineer at no additional cost to the Department.

No lime, fertilizer or other amendments shall be added to the mix.

Topsoil shall be placed to a depth of 2-inches in all areas specified for seeding with Riparian Buffer Seed Mix and Stormwater Pond Mix. All topsoil placement and grading shall be completed before seeding. All topsoil shall meet the requirements of Section 908 and the following:

1. Topsoil shall contain no less than 3-percent and no more than 10-percent organic matter as determined in accordance with AASHTO T 194.
2. Topsoil shall have an acidity range of pH 6.0 to pH 7.5.
3. The method of testing topsoil shall be in accordance with the requirements of AASHTO T 88, Modified; AASHTO T 89, Method B; and AASHTO T 90; and shall meet the following gradation requirements:

Gradations Requirements

Sieve Size	Minimum Percent Passing by Weight
2" (50 mm)	100
No. 4 (4.75 mm)	90
No. 10 (2.00 mm)	80

	Minimum Percent	Maximum Percent
Passing No. 10 (2.0 mm and retained on No. 200 (75 mm) sieve		
Sand	15	65
Passing No. 200 (75 mm) sieve		
Sand	10	60
Silt	5	40

Areas to be seeded shall be maintained at approved grades and shall not be smooth rolled. The seed bed shall be prepared by tilling, discing, or harrowing the finished grade to a depth of 3-inches. For areas, if grading or placement of topsoil has just been completed and the soil is loose and friable, not eroded or crusted, surface raking only may be permitted at the approval of the Engineer. The seeded soil shall be stabilized using Coir Matting and straw mulch; Coir Matting and Coir Blanket; or straw mulch as specified on the Contract Plans.

In areas where herbicide has been applied, but where no other treatment has been specified, the Contractor, using a weed trimmer or other suitable method approved by the Engineer, will cut existing vegetation to a minimum of 2 in. and a maximum height of 6 in.; will remove all excess debris to an extent approved by the Engineer; and will then perform seed establishment as applicable for that area.

Permanent seed will be applied by broadcast spreader in two passes in opposite directions in order to assure uniform distribution. Broadcast rates for the seed mixtures vary and shall follow the recommendations of the seed supplier. A carrier, sand or similar, may be added to the permanent seed mixtures to ensure even distribution of the broadcast seeds. The carrier shall be mixed with the seed at a rate recommended by the seed supplier. Temporary seed mix shall be applied in a separate pass after spread of the permanent seed. The seed bed shall be completed by a final shallow raking (1/4-inch) or scarification of the soil surface with a chain link fence to ensure adequate seed - soil contact. Seed shall be incorporated to a depth not more than 1/4 in.

Straw mulch shall be applied at a rate of 4,000 lb/ac. Small grain straw shall be uniformly and evenly applied immediately after seeding has been completed. Hand placement of straw or the used of an approved mechanical blower shall be used to apply the straw. Straw mulch applied by blowers shall provide a loose depth of not less than ½ nor more than 2". Ninety-five percent of the blown and shredded straw mulch shall be 6" or more in length when in place.

Placed straw shall not be crimped, tracked or disked into the soil in areas to be overlain by coir mat. Straw shall be crimped in all areas not overlain by matting. Straw mulch placement shall be placed at the locations as noted in the plans or as directed by the Engineer.

Water for establishment shall be applied by spraying or sprinkling at a rate of 25,000 gallons per acre or 0.57 gallons per square foot. Water for establishment shall include three (3) separate waterings. The first watering shall occur within 72 hours of seed placement, subsequent watering shall be spaced seven (7) days apart. Watering periods may be adjusted at the discretion of the Department based upon local weather conditions.

Acceptance of 908510- Stream Restoration Seeding shall be made six (6) - weeks after the first watering of the seed mix area.

Method of Measurement:

Seeding shall be measured based upon the square yards of surface area of acceptably placed permanent seed.

Basis of Payment:

The quantity and type of seeding will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for preparing the ground; for furnishing and placing all materials including seed; for watering, and for all labor, equipment, tools, and incidentals required to complete the work. Furnishing, placement and establishment of Temporary Seed shall be incidental to the unit price per square yard of the permanent seed mixtures. Straw mulch will be incidental to the seeding.

Placement of 2-inch depth topsoil shall be measured and paid for under Item 908002. Coir Mat and Coir Blanket shall be measured and paid for under Items 908504 and 908511.

10/7/16

908511 - COIR BLANKET

Description:

This work item shall include installation of Coir Blanket along the edge of the re-constructed stream banks in conjunction with Coir Fiber Matting, as shown on the soil stabilization details, at the locations shown on the plans, and as directed by the Engineer.

Materials:

Coir Blanket: The blanket shall consist of a 100% coconut fiber matrix stitched between biodegradable cotton netting or similar. The Coir Blanket shall be equivalent to Nedia C400B or approved equal. The Coir Blanket shall be supplied with a minimum of 8-foot width by 100-foot long rolls. The blanket shall meet the following minimum specifications:

Material:	Non-Woven Coir matting
Minimum Thickness:	0.3 inches
Minimum Weight:	11 oz/SY

Anchoring Devices: The Coir Blanket shall be secured in place by the anchoring devices for the Coir Matting in the final condition. For temporary anchoring of the Coir Blanket, if necessary, wire staples shall be utilized. Staples shall consist of 4 mm (No. 8 gauge) steel wire, bent U-shaped or square top with a throat width of 25 mm to 50 mm (1 inch to 2 inches), with and effective minimum driving depth of 200 mm (8 inches).

Certification:

The Contractor shall furnish the Engineer with a specification and source of the Coir Matting for review and approval two (2) weeks prior to intended use.

Construction Methods:

The Coir Blanket shall be placed in a single row running parallel to the centerline of the channel. The blanket will cross-sectionally extend from the 2-foot key-in below the stream bank soil and wrap around the face of the Heavy Backfill extending to 2 to 3-feet beyond the top of stream bank.

To ensure proper key-in and anchoring of the Coir Blanket and Coir Fiber Mat, the dual layer of material shall be placed along the proper limits of stream bank grading, after backfilling to obtain the proper streambed elevation and prior to backfilling of the stream banks. The blanket and matting shall be laid across the channel, with only the key-in portion of the materials placed in final positions. The blankets shall be laid with the Coir Matting below the Coir Blanket at the key-in point.

After initial placement of the Coir Blanket and Coir Fiber Mat, place, shape, and compact Heavy Backfill to form the streambank areas, place 2-inches of furnished topsoil, and perform final grading. Upon completion, the bank surface shall be a smooth soil surface free from stones, clods, or debris. The streambank surface shall be prepared and seeded in accordance with Item 908510. The blanket and matting shall then be wrapped along the face of the final stream bank, placed immediately after seeding operations have been completed. The blanket and matting shall be laid smoothly and securely upon the seeded bed. Ensure full contact of the matting with the topsoil and that the matting is free of tears, folds, holes, or other inconsistencies in its final placement. Stretching shall be avoided. The finished surface shall result in the Coir Blanket in contact with the soil surface and the Coir Matting overlaying the blanket.

The blanket shall be rolled lengthwise along the streambank. The blanket shall be secured throughout using staples placed every two (2) feet on center, except as indicated for blanket overlap and along the ends of the blanket.

In areas where streambank backfill is not specified, the Blanket shall be secured along the bottom of the slope by trenching a minimum of one (1) foot below the channel invert and securing with anchor stakes placed every two (2) feet on center. The trench shall be backfilled with Heavy Backfill and tamped.

If any area of the coir fiber material degrades before the disturbed area is fully stabilized, the Contractor shall replace the blanket and reseed the affected area at the Contractor's expense.

Method of Measurement:

The quantity of Coir Blanket shall be measured in linear feet of stream bank covered with an 8-foot wide roll.

Basis of Payment:

The quantity of Coir Blanket shall be paid for at the Contract unit price per linear foot for placed and secured Coir Blanket. Price and payment will constitute full compensation for ground preparation, furnishing and installing all materials, labor, equipment and other incidentals necessary to complete the work.

Coir Matting, Topsoil, Heavy Backfill, and Seeding shall be measured and paid for as Items 908504, 908002, 712555, and 908510.

1/10/17

UTILITY STATEMENT

STATE CONTRACT # T201580202
P3E# N/A
F.A.P # N/A
STABILIZATION OF SWM OUTFALL CHANNEL AT JENNY RUN
NEW CASTLE COUNTY

The following utility companies maintain facilities within the contract limits:

Delmarva Power & Light, Distribution
NCC Special Services - Sewer
Verizon Delaware
Windstream Communications
DelDOT Traffic

The following is a breakdown of the utilities involved, adjustments and/or relocations as required (all stations, offsets, lengths and calendar days are approximate)

- **NCC Special Services – Sewer:** The aforementioned utility maintains underground facilities along Paper Mill Road within the project limits and may represent a conflict with the proposed pond access road.

  Any adjustments and/or relocation to the aforementioned Company's existing facilities will be done concurrently with the project construction by the State contractor's forces as necessary after a minimum of seven (7) calendar days advanced notice from the State contractor.

- **Delmarva Power & Light, Distribution:** The aforementioned utility maintains overhead facilities along Paper Mill Road and along Parcel 0804700009 within the project limits. The overhead lines are situated +/- 20-feet above the construction entrances and should not provide a conflict with construction activities.

  Any adjustments and/or relocation to the aforementioned Company's existing facilities will be done concurrently with the project construction by the Company's forces as necessary after a minimum of seven (7) calendar days advanced notice from the State contractor.

- **Verizon Delaware:** The aforementioned utility maintains overhead facilities along Paper Mill Road within the project limits. The overhead lines are situated +/- 20-feet above the construction entrances and should not provide a conflict with construction activities.

  Any adjustments and/or relocation to the aforementioned Company's existing facilities will be done concurrently with the project construction by the Company's forces as necessary after a minimum of seven (7) calendar days advanced notice from the State contractor.

- **Windstream Communications:** The aforementioned utility maintains overhead fiber optic facilities along Paper Mill Road within the project limits. The overhead lines are situated +/- 20-

feet above the construction entrances and should not provide a conflict with construction activities.

Any adjustments and/or relocation to the aforementioned Company's existing facilities will be done concurrently with the project construction by the Company's forces as necessary after a minimum of seven (7) calendar days advanced notice from the State contractor.

- **DelDOT Traffic:** The aforementioned utility maintains underground facilities along Paper Mill Road within the project limits with no apparent conflicts.

  Any adjustments and/or relocation to the aforementioned Company's existing facilities will be done concurrently with the project construction by the Company's forces as necessary after a minimum of seven (7) calendar days advanced notice from the State contractor.

General Notes

1. The Contractor's attention is directed to Section 105.09 Utilities, Delaware Standard Specifications, August 2001. The Contractor shall contact Miss Utility (1-800-282-8555) two working days prior to any excavation. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The Contractor is advised to check the site for access purposes for his equipment and, if necessary, make arrangements directly with the utility companies for field adjustments for adequate clearances.

2. The Contractor shall work in accordance with Delaware Code (see 16 Del C. §7405B for the *Overhead High Voltage Line Safety Act*), the United States Occupational Safety and Health Administration (OSHA), and the National Electric Safety Code. This requires notification to the public utility and mutually agreeable measures be implemented by any person intending to carry on any function, activity, work or operation within dangerous proximity of high voltage overhead lines. Close coordination with public utility companies owning overhead lines is required and must take place prior to commencement of any work. At a minimum, a distance of 10'-0" must be maintained from all energized distribution lines and a distance of 20'-0" must be maintained from all energized transmission lines.

3. It is understood and agreed that the Contractor has considered in his bid all permanent and temporary utility appurtenances in their present and relocated positions as shown on the plans or described in the Utility Statement or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage due to any interference from the utility facilities and appurtenances or the operation of moving them, except that the Contractor may be granted an equitable extension of time.

4. Coordination and cooperation among the Utility Companies and the State's Contractor are of prime importance. Therefore, the Contractor is directed to contact the following Utility Company representatives with any questions regarding this work prior to submitting bids and work

schedules. Proposed work schedules should reflect the Utility Companies' proposed relocations. The Utility Companies do not work on weekends or legal holidays.

Angel Collazo	**DPL Distribution**	**302-454-4370**
David Clark	**NCC Special Services**	**302-395-5705**
George Zang	**Verizon Delaware**	**302-422-1238**
Dustin Velcoff	**Windstream Comm**	**501-748-4434**
Jim Bunting	**DelDOT Traffic**	**302-760-4814**

5. As outlined in Chapter 3 of the DelDOT Utilities Manual, individual utility companies are responsible for obtaining all required permits from municipal, State and federal government agencies and railroads. This includes but is not limited to water quality permits/DNREC Water Quality Certification, DNREC Subaqueous Lands/Wetlands permits, DNREC Coastal Zone Consistency Certification, County Floodplain permits (New Castle County only), U.S. Coast Guard permits, US Army Corps 404 permits, sediment and erosion permits, and railroad crossing permits.

6. Individual utility companies are required to restore any areas disturbed in conjunction with their relocation work. If an area is disturbed by a utility company and is not properly restored, the Department may have the highway contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.

DIVISION OF MAINTENANCE AND OPERATIONS

PREPARED AND RECOMMENDED BY:

Justin Lennon, Parsons Brinckerhoff — Date: 10/5/16

APPROVED AS TO FORM BY:

Utilities Section, DelDOT — Date: 5 Oct 2016

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T201580202

F.A.P. NO. N/A for R/W

STABILIZATION OF SWM OUTFALL CHANNEL AT JENNY RUN

NEW CASTLE COUNTY

Certificate of Right-of-Way Status – 100%

Status - LEVEL 1

As required by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certifications are hereby made in reference to this highway project:

All necessary real property interests have been acquired in accordance with current FHWA/State directives covering the acquisition of real property; and,

All necessary rights-of-way, including control of access rights when pertinent, have been acquired including legal and physical possession; and,

All project rights of way are currently available in accordance with the project right-of-way plans; and,

Any residential displaced individuals or families have been relocated to decent, safe and sanitary housing, or adequate replacement housing has been made available in accordance with the provisions of the current Federal Highway Administration (FHWA) directive(s) covering the administration of the Highway Relocation Assistance Program; and,

All occupants have vacated the lands and improvements; and,

The State has physical possession and the right to remove, salvage, or demolish any improvements acquired as part of this project, and enter on all land.

RIGHT OF WAY SECTION

Robert M. Cunningham
Chief of Right of Way

January 4, 2017

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

September 27, 2016

ENVIRONMENTAL REQUIREMENTS

FOR
State Contract No. T201580202
Federal Aid No.: N/A

Contract Title: Stabilization of SWM Outfall Channel at Jenny Run

Due to the nature of the proposed construction activities, permits are not required for this project. However, the following construction requirements and special provisions have been developed to minimize and mitigate impact to the surrounding environs. These requirements by DelDOT, not specified within the contract, are listed below. These requirements are the responsibility of the contractor and are subject to risk of shut down at the contractor's expense if not followed.

GENERAL REQUIREMENTS:

1. All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable dumping ground.

2. That effort shall be made to keep construction debris from entering adjacent waterways or wetlands. Any debris that enters those areas shall be removed immediately.

3. The disposal of trees, brush, and other debris in any stream corridor, wetland, surface water, or drainage area is prohibited.

4. DelDOT Environmental Studies Section (302) 760-2264 must be notified if there are any changes to the project methods, footprint, materials, or designs, to allow the Department to coordinate with the appropriate resource agencies (COE, DNREC, and SHPO), for approval.

ENVIRONMENTAL COMPLIANCE SHEET:

The contractor shall pay special attention to specific environmental requirements as laid out in the Environmental Compliance Sheet (sheet 16).

1. In particular, please carefully review the following requirements.

    - Protection of Resources – The LOC is adjacent to natural resources, including forested wetlands. The contractor shall ensure that there are no disturbances outside of the LOC. See Note 6 on the Environmental Compliance Sheet for more on these requirements.

    - Plantings – See Note 7 for information related to the project's planting requirements.

    - Outfall Channel Stabilization – See Note 4 for Outfall Channel Stabilization procedures.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

RAILROAD STATEMENT
For

State Contract No.: T201580202

Federal Aid No.: N/A

Project Title: Stabilization of SWM Outfall Channel at Jenny Run Stream Restoration

The following railroad companies maintain facilities within the contract limits:

- ☐ Amtrak
- ☐ CSX
- ☐ Delaware Coast Line
- ☐ East Penn
- ☐ Maryland & Delaware
- ☐ Norfolk Southern
- ☐ Wilmington & Western
- ☑ None

DOT Inventory No.: _____ No. Trains/Day:_____ Passenger Trains (Y / N):_____

In accordance with 23 CFR 635, herein is the railroad statement of coordination (check one):

☑ No Railroad involvement.

☐ Railroad Agreement unnecessary but railroad flagging required. The contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

☐ Railroad Agreement required. The necessary railroad agreement, attached, is complete and fully executed. Railroad related work to be undertaken and completed as required for proper coordination with physical construction schedules. The Contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

Approved As To Form:

Robert A. Perrihe
DelDOT Railroad Program Manager

28 Jan 2016
DATE

BID PROPOSAL FORMS

CONTRACT T201580202.01

UNLESS OTHERWISE DIRECTED, SUBMIT ALL FOLLOWING PAGES TO:

DEPARTMENT OF TRANSPORTATION
BIDDERS ROOM (B1.11.01)
800 BAY ROAD
DOVER, DELAWARE 19901

Identify the following on the outside of the sealed envelope:

- Contract Number T201580202.01

- Name of Contractor

CONTRACT ID: T201580202.01 PROJECT(S): T201580202

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 GENERAL					
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	202000 EXCAVATION AND EMBANKMENT	132.000 CY				
0030	202573 TEST HOLES	2.000 EACH				
0040	203000 CHANNEL EXCAVATION	51.000 CY				
0050	204000 MUCK EXCAVATION	14.000 CY				
0060	209006 BORROW, TYPE F	370.000 CY				
0070	209506 SUBSURFACE CLAY CHANNEL BLOCKS	19.000 CY				
0080	302011 DELAWARE NO. 3 STONE	187.000 TON				
0090	601520 TEMPORARY TIMBER MAT	LUMP	LUMP			

CONTRACT ID: T201580202.01 PROJECT(S): T201580202

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0100	705002 P.C.C. SIDEWALK, 6"	131.000 SF				
0110	708512 DRAINAGE INLET, SPECIAL I	1.000 EACH				
0120	709518 SANITARY CLEANOUT	1.000 EACH				
0130	712020 RIPRAP, R-4	24.000 TON				
0140	712501 FURNISHED CASCADE MATERIAL	85.000 CY				
0150	712506 GABIONS	48.000 CY				
0160	712553 IMBRICATED ROCK STRUCTURES	86.000 TON				
0170	712555 HEAVY BACKFILL	152.000 CY				
0180	712557 FURNISHED CHANNEL BED SAND AND GRAVEL	27.000 CY				
0190	713003 GEOTEXTILES, RIPRAP	40.000 SY				
0200	720556 BOLLARD	2.000 EACH				

CONTRACT ID: T201580202.01 PROJECT(S): T201580202

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0210	727014 CONSTRUCTION SAFETY FENCE	680.000 LF				
0220	735500 MULCH ACCESS ROAD	372.000 SY				
0230	736001 SODDING	123.000 SY				
0240	737002 MULCHING, PLANTS	14.000 SY				
0250	737515 PLANTING TUBELINGS	550.000 EACH				
0260	737523 PLANTINGS	LUMP	LUMP			
0270	741001 TREE REMOVAL 6" TO 10.9"	1.000 EACH				
0280	741003 TREE REMOVAL 15" TO 18.9"	1.000 EACH				
0290	741004 TREE REMOVAL 19" TO 24.9"	1.000 EACH				
0300	741503 ROOT PRUNING	42.000 LF				

CONTRACT ID: T201580202.01 PROJECT(S): T201580202

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0310	743000 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
0320	743024 TEMPORARY WARNING SIGNS AND PLAQUES	360.000 EADY				
0330	743050 FLAGGER, NEW CASTLE COUNTY, STATE	480.000 HOUR				
0340	763000 INITIAL EXPENSE	LUMP	LUMP			
0350	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
0360	905001 SILT FENCE	1315.000 LF				
0370	906002 DEWATERING BAG	3.000 EACH				
0380	907011 STONE CHECK DAM	5.000 TON				
0390	908002 TOPSOIL (CY)	3610.000 CY				
0400	908004 TOPSOIL, 6" DEPTH	745.000 SY				

CONTRACT ID: T201580202.01 PROJECT(S): T201580202

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0410	908014 PERMANENT GRASS SEEDING, DRY GROUND	1610.000 SY				
0420	908023 STABILIZED CONSTRUCTION ENTRANCE	31.000 TON				
0430	908504 COIR FIBER MATTING	755.000 SY				
0440	908510 STREAM RESTORATION SEEDING RIPARIAN BUFFER SEED MIX	745.000 SY				
0450	908510 STREAM RESTORATION SEEDING STORMWATER POND SEED MIX	2000.000 SY				
0460	908511 COIR BLANKET	366.000 LF				
0470	909005 STREAM DIVERSION	LUMP	LUMP			
0480	909006 STILLING WELL	3.000 CY				
	SECTION 0001 TOTAL					
	TOTAL BID					

BREAKOUT SHEET INSTRUCTIONS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T201580202.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER MUST APPEAR ON THE ENVELOPE.

BREAKOUT SHEET - 1 **CONTRACT NO. T201580202.01**

737523 - PLANTING

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	85	EA	Mulching, 4" Deep	$	$
2	14	EA	Southern Arrow, 30"	$	$
3	14	EA	Blackhaw Vibertum, 30"	$	$
4	15	EA	Gray Dogwood, 30" min.	$	$
5	16	EA	American Hornbeam, 30" min.	$	$
6	48	SY	Soil Mix	$	$
7	305	MGAL	Watering	$	$

TOTAL ITEM 737523 - PLANTING $_____

(LUMP SUM BID PRICE FOR ITEM 737523)

"ATTENTION"

TO BIDDERS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T201580202.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED, NOTARIZED, AND RETURNED WITH YOUR BID.

CERTIFICATION
Contract No. T201580202.01

The undersigned bidder, _____

whose address is _____

and telephone number is _____ hereby certifies the following:

I/We have carefully examined the location of the proposed work, the proposed plans and specifications, and will be bound, upon award of this contract by the Department of Transportation, to execute in accordance with such award, a contract with necessary surety bond, of which contract this proposal and said plans and specifications shall be a part, to provide all necessary machinery, tools, labor and other means of construction, and to do all the work and to furnish all the materials necessary to perform and complete the said contract within the time and as required in accordance with the requirements of the Department of Transportation, and at the unit prices for the various items as listed on the preceding pages.

The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each bidder and each person signing on behalf of any bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

==========

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date

BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

==========

AFFIRMATION:

Within the past five (5) years, has your firm, any affiliate, any predecessor company or entity, owner, Director, officer, partner or proprietor been the subject of a Federal, State, Local government suspension or debarment?

YES_____ **NO**_____ if yes, please explain _____

Sealed and dated this _____ day of _____ in the year of our Lord two thousand _____ (20___).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____ _____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ___ day of _____, 20____.

Notary Seal

_____
Notary

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That:_____

of_____ in the County of _____and State of _____

as **Principal**, and _____ of _____ in the County of

_____ and State of _____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly bound unto the **State** in the sum of _____

_____Dollars ($_____), or _____ percent not to exceed _____

_____ Dollars ($_____) of amount of bid on Contract No. T201580202.01, to be paid to the **State** for the use and benefit of its Department of Transportation ("**DelDOT**") for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of certain materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the **DelDOT**, this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord two thousand and _____ (20___).

SEALED, AND DELIVERED IN THE presence of

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

_____
Name of **Surety**

Witness:_____

By: _____

_____
Title