

TECHNICAL SPECIFICATIONS

**Specifications will follow the latest edition of Indiana Department of Transportation Standard Specifications with Supplements, unless otherwise noted.*

SECTION 100 – GENERAL PROVISIONS

SECTION 101 – DEFINITIONS AND TERMS

101.10 CONSTRUCTION LIMITS: Prior to beginning work in the project, the Contractor shall verify the exact limits of construction with the Engineer. All areas disturbed by the contractor outside these limits shall be repaired/restored to its original condition prior to project acceptance by the Owner. No additional payment shall be made for this restoration work.

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

103.04 INSURANCE: Refer to Article 8 of the General Conditions for insurance requirements.

103.06 WAGE AND LABOR REQUIREMENTS: The following requirements shall apply for all contractors performing work on public works contracts for the City of West Lafayette, Indiana.

(a) NON-DISCRIMINATION OF EMPLOYEES: The Contractor for the work specified in this Contract agrees to take affirmative action to insure that applicants and employees of the Contractor (and any subcontractors) are treated in a manner which provides equal employment opportunity and tends to eliminate inequality based upon race, color, creed, religion, ancestry, national origin, gender, disability, age, marital status or status with regard to public assistance. Affirmative action shall include but not be limited to the issuance of a policy statement regarding equal employment and its communication to all personnel involved in recruitment, hiring, training, assignment, and promotion; notification of all employment sources of company policy and active efforts to review the qualifications of all applicants regardless of race, color, creed, religion, ancestry, national origin, gender, disability, age, marital status or status with regard to public assistance; recruiting in the minority/female group community for employees; and establishing an internal system of reporting concerning equal employment, recruiting, hiring, training, upgrading and the like. Breach of the obligation to take affirmative action shall be a material breach of the contract for which the City shall be entitled to at its option:

To cancel, terminate, or suspend the contract in whole or in part; and/or to declare the Contractor or Vendor ineligible for further City contracts.

(b) AFFIDAVITS AND PAYROLLS: The affidavit form provided in a non-collusion affidavit must be properly executed.

SECTION 104 – SCOPE OF WORK

104.04 MAINTENANCE OF TRAFFIC: The contractor will be responsible for adequate maintenance of traffic measures throughout construction operations and follow the maintenance of traffic details laid out in the plans, and in

accordance with the MUTCD and Purdue General Provisions. All barrels, cones, barricades, flagmen, and other associated items shall be provided to protect the workmen and the public. The contractor shall provide adequate means to safely direct traffic past the point of construction, and shall provide for safely conducting traffic at all other points that are affected by the work, at all times. Should Alternate 2 and/or Alternate 3 become part of the project, the Contractor shall submit a revised MOT plan in accordance with the MUTCD which incorporates the alternate work.

Contractor shall provide a minimum of one lane of travel, in each direction, along Northwestern Avenue at all times. Coordination with adjacent construction projects is the responsibility of the Contractor to ensure this requirement is met throughout all phases on construction.

Contractor shall be responsible for maintaining pedestrian traffic in accordance with the MUTCD and Purdue General Provisions. The pedestrian MOT shall prohibit pedestrian street crossings at any unmarked crosswalk location. Contractor is responsible for prohibiting pedestrian jaywalking, with Owner approved physical barriers, until the decorative Purdue fence has been installed for the project (by others) and the Owner has given authorization to remove Contractor's barriers. The cost for maintaining pedestrian traffic control devices shall be included in the Maintaining Traffic pay item.

Prior to the start of work, the Contractor shall provide a traffic and pedestrian maintenance plan for engineering approval. Work can only commence after a traffic and pedestrian maintenance plan has been approved.

Any and all lane restrictions shall be reviewed and approved by the Owner. Access to all property shall be maintained, and any times where there is a loss of access, the contractor shall coordinate with the property owner and/or occupant(s). When requested by the City, the contractor will provide adequate notification to the media and any property owners prior to commencing work in a given area.

Temporary daytime closures, between the hours of 8:30AM and 4:30PM, will be allowed between Wiggins St. and North St. for the purposes of constructing the concrete work related to the bump-outs and installing storm sewer, only. No closures will be allowed after July 4th, 2015. This work shall be phased to complete all work requiring closures within 14 calendar days. Contractor shall coordinate closures with the Fire Station. Contractor shall maintain 2-way traffic on Vine Street during closures, in accordance with MUTCD.

Contractor shall coordinate with the City's summer resurfacing Contractor, regarding work between Wiggins St. and North St. Work shall be phased such that the west side of Northwestern Ave, between Wiggins St. and North St. is complete no later than July 17th, and the adjacent parking lots are accessible to the resurfacing Contractor.

The Fire Station shall maintain full access to their driveway approach on North Street, at all times. Fire Station shall maintain full access to at least

one garage door bay on their Northwestern Avenue driveway approach, at all times.

The driveway approach, to the alley, north of the Fire Station shall be removed, poured, and open to traffic in one work day. This approach shall be open to emergency vehicle traffic no later than 4:30PM on said work day.

SECTION 105 – CONTROL OF WORK

105.08 CONSTRUCTION STAKES, LINES AND GRADES

(b) Construction Engineering by the Contractor: The contractor shall be responsible for creating **As-Built** drawings of all underground structures placed as part of this project. The Engineer will furnish one set of electronic CADD files in AutoCAD software, upon the completion of a release form provided by the Engineer. Surface information will not be provided; on the Construction Detail drawing will be provided. The Contractor will revise the received CADD files to reflect all construction amendments.

The Contractor shall revise (2) two sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a daily basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans, which are made in the work, or additional information, which might be uncovered in the course of construction, shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural, Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Inspector and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Owners Representative will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings from the cost of Construction Engineering. This monthly deduction will continue until an agreement can be reached between the inspector and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

- 1) The actual location, kinds and sizes of all sub-surface utility lines encountered during construction. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to three permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The invert elevation of each utility surface of each run shall also be recorded relative to the vertical benchmark for the project.

- 2) The Contractor shall locate all new and existing utilities that are removed, relocated, installed or encountered during the construction of the project and record all location information (X-Y-Z coordinates). All elevations shall be North American Vertical Datum 88 (NAVD 88). All horizontal coordinates shall be NAD83 State Plane Coordinate values.
- 3) Certain control points and benchmarks are shown on the plans. These points must be used by the Contractor to provide as-built utility information for this project. The Contractor must locate all existing utilities encountered during the construction of the project and record all information necessary to accurately locate that item in the future.
- 4) The minimum amount of information is that all newly installed utilities must have the x-y-z coordinates (distance north-south, and east-west; and depth) referenced to the control and a written description of all points located (i.e., elevation, location, material, etc.). This information should include information at the start point, end point and any change in direction of the newly installed utility. Reference should also include structures, and any splice from damaged utility lines.
- 5) As-built drawings need to show all changes in size, material, location, and elevation of all new, existing, and/or abandoned underground utility lines or other pertinent work. The drawings must also show the location (x-y-z) of all valves, manholes, etc., referenced by dimension to permanent structures such as building corners or by coordinates and elevations.
- 6) Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- 7) Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- 8) The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
- 9) Changes or modifications which result from the final inspection.
- 10) Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.
- 11) Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect) and compliance with the following procedures:
 - i. A Modification Circle shall be placed at the location of each deletion.
 - ii. For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.

- iii. For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).
- iv. For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.
- v. For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.
- vi. The Modification Circle size shall be (½ inch) diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Owner's Representative after approval by the Owner. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Owner.

The as-built drawing sheet size will be the same as your original drawings unless other-wise authorized by the Project Manager. We expect these drawings to be prepared by a competent draftsman in a neat and acceptable manner to scale and finally dimensioned. As-built information will be accepted in an electronic format (AutoCAD Civil3D 2014), and a reproducible PDF.

Upon completion of the project, the "As-built" drawings will be delivered to the Owner's Construction Superintendent.

It will be the responsibility of the Contractor to have the Owner's Construction Superintendent verify all dimensions and/or entries on the drawings. The cost of providing As-Built Drawings shall be included in the cost of Construction Engineering.

SECTION 106 – CONTROL OF MATERIAL

106.02 SAMPLES, TESTS, CITED SPECIFICATIONS

INDEPENDENT TESTING: The Contractor shall perform all necessary laboratory and field tests required to meet INDOT standards and frequency of tests. Test shall be made in accordance with the current INDOT frequency of sampling and testing Manual.

It is the responsibility of the Contractor to have the tests performed and to provide the results to the Owner and the Engineer.

The City will not perform QC/QA HMA testing on the project; the Contractor shall perform the HMA testing, in accordance with section 401, and provide

the results to the Engineer for acceptance.

All other requirements within 106.02 shall apply.

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107.08 PUBLIC CONVENIENCE AND SAFETY: The contractor shall coordinate all work with the West Lafayette Police and Fire Departments.

The contractor shall be responsible for all proper public safety provisions for the construction site and any machinery or equipment whether in operation or not as well as work zones.

No work site(s) shall be left unprotected at any time. The public shall be protected from inadvertently entering a worksite by appropriate means such as cones, barrels, barricades, fencing, warning lights, arrow boards, flagmen, etc.

The contractor shall bring a traffic safety plan to the pre-construction meeting. The contractor must follow all procedures set forth by the West Lafayette Police Department in coordination with the City Engineer's Office.

107.14 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE: Contractor shall protect existing trees in a five foot (5') length to all sides of the trunk. This area is to be kept clear of project equipment, project materials, waste, and excess soil. Minimal digging, trenching, compaction or other soil disturbance is allowed in this area (as determined by the Engineer).

SECTION 108 – PROSECUTION AND PROGRESS

108.01 SUBLETTING OF CONTRACT: The percent of allowed sublet work, in accordance with Section 108.01 of INDOT Standard Specifications, will be reduced from the standard 50% to **30%**. All other requirements within INDOT Standard Specifications Section 108.01 shall apply.

108.04 PROSECUTION OF THE WORK: The contractor shall coordinate all work with the City Engineer or designated representative prior to commencing and throughout the contract on at least a daily basis. All material tickets shall be promptly turned in at the end of each day of work for record keeping and basis of payment. Failure to report any material tickets shall result in denial of payment claims by the City.

Any work performed after the Substantial Completion date shall be restricted to between the hours of 9:00AM to 3:00PM and Monday through Friday, unless otherwise approved by the Owner. No work shall take place on Home Football Saturdays or Home Football Fridays after 2:00PM. Additionally, no work shall take place 4 hours in advance of or 4 hours after any other home athletic event, without authorization from the Owner. Any closures or delays shall be restricted to daytime hours only, and shall be approved by the Owner on a case-by-case basis.

SECTION 112 – PURDUE GENERAL PROVISIONS

112.01 INGRESS EGRESS:

- A. Ingress and egress to the Project construction areas shall be determined by the Owner's Superintendent.
- B. Contractors shall not damage any drives, curbs, sidewalks and other site improvements that remain in place.
 - a. Materials and items which are not designated to be removed and are damaged shall be removed and replaced with new materials which match existing.
- C. Such means of ingress and egress must take into account that the entrances to existing and adjacent buildings and related access ways must remain open, in operation, unobstructed and available for normal daily operations (and possible emergency exit).
- D. Obtain permission from the Owner's Superintendent where necessary to drive a vehicle of any sort over a curb and gutter and onto a sidewalk and on or across a utility tunnel. Such permission will only be granted after an inspection of the areas involved is made. Any damages resulting from passage of vehicles of any sort over curbs, gutters and sidewalks shall be repaired by the contractor at his own expense. Driving of any vehicle over curbs and gutters onto sidewalks without permission will be considered to have been the cause of any flaws found and the contractor shall repair them at his expense.

112.02 ACCESS TO EXISTING ADJACENT BUILDINGS

- A. The Contractor shall caution all workmen regarding blocking of roadways, illegal parking, blocking of loading docks and blocking of existing facilities from buildings.
- B. Throughout the construction period, emergency vehicles routes and access to service entrances of adjacent buildings must be maintained.
- C. Coordinate any temporary shutdown of drives or entrances with the Owner.

112.03 PROTECTING EXISTING CONDITIONS

- 1. All existing materials and finishes designated to remain shall be protected from damage by construction operations and from the elements during the entire period of construction operations. Any existing materials, finishes, mechanical and electrical installations damaged by construction operations or by the elements shall be repaired or replaced as necessary, at no cost to the Owner and to the approval of the Owner's Superintendent.

112.04 SECURITY

- 1. Secure the Project against the entrance of unauthorized persons through construction areas. Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
 - A. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate

where indicated, or if not indicated, enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.

B. Chain-Link Fencing: Minimum 2-inch 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts. (Plastic fence is prohibited from being used on campus.) The cost of which will not be paid for directly, but shall be included in the cost of the various pay items.

2. The Contractor shall confine storage of materials within the contract work area as directed by the Owner's Superintendent.
3. Contractor shall be responsible for assigning locations and space for each subcontractor's storage and staging area.
4. Make arrangements for use of all storage areas with Owner's Superintendent.

112.05 SMOKE-FEE FACILITY

1. As per Purdue University's Smoke-Free Campus Policy effective July 1, 2010, smoking is prohibited on campus except in designated smoking areas. Construction job sites must comply with this policy.
2. A map of the designated smoking areas on campus may be requested at the pre-construction meeting.
3. Smoking is only permitted in the designated areas or inside privately owned, closed vehicles.

112.06 CONTRACTOR PARKING

1. 2 spaces will be available within the proximity of the Project Site. These parking spaces require green "Contractor Parking Permits" and a location to be determined by the Purdue Construction Department. The Contractor is responsible for returning all permits. The Contractor will be billed \$50.00 for each permits not returned.
2. Contractor personnel shall park in the Contractor Parking Lot located north of the PFSB Building (see project location map). An orange "Contractor Personnel" parking permit must be requested by the Contractor through the Construction Inspector. The permits must be returned to Purdue at the conclusion of the project. A fee of \$50.00 will be charged to the Contractor for lost parking permits.

112.07 LANDSCAPE PROTECTION AND TRIMMING

PART 1 - GENERAL

SUMMARY

- A. This section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

DESCRIPTIONS

- A. Protected Tree: Any tree that the Campus Arborist, in agreement with the site Construction Superintendent, has designated to be of high value because of its type, age, or other professional criteria.
- B. Root Zone: The ground area surrounding each tree containing its root system, defined by a radius equal to the trunk diameter at breast height (dbh) in inches multiplied by 1.5 feet per inch. For example, a 10 inch dbh tree would have a root zone extending 15 feet from the trunk in all directions.
- C. Protected Root Zone (PRZ): The part of the Root Zone of a Protected Tree which must be protected from construction damage.
- D. Landscape Protection Plan: A plan that identifies areas of plant preservation and methods of protection within the Protected Root Zones. The methods may consist of fencing, mulching, etc.
- E. Compaction: Increased soil density. This results in death of existing roots and/or greater difficulty for new roots to develop. Damage may be caused by many agents, including the use of heavy equipment, concentrated foot traffic, and storage of heavy materials under or around trees.
- F. Damage: Shall include any of the prohibited practices listed below and as determined solely by the Owner.
- G. Prohibited Practices: Shall include, but are not limited to:
 - 1. Breaking of branches, scraping of bark, or unauthorized cutting.
 - 2. Nailing or bolting into trees or using trees as temporary support in any way (including cabling around any part of the tree).
 - 3. Unauthorized filling, excavating, trenching, or use of augers within Protected Root Zones.
 - 4. Compaction of or driving over Protected Root Zones.
 - 5. Storage of any materials or vehicles within Protected Root Zones.
 - 6. Dumping of construction waste or materials within Protected Root Zones.
 - 7. Disposal of liquid waste or contaminants in an area which may impact protected trees or their Protected Root Zones.
 - 8. Unauthorized removal or relocation of Protected Trees.
 - 9. Removal of tree protection barricades or construction fencing prior to completion of project.
 - 10. Any other practices listed on the Landscape Protection Plan.

QUALITY ASSURANCE

- A. Before tree protection and trimming operations begin, Contractor will meet with Owner's representative to review tree protection and trimming procedures and responsibilities.

C. On-going Site Inspection

1. The Campus Arborist will monitor the construction site throughout the construction process. Violations and damages will be handled according to construction department guidelines and specifications stated in the contract or Landscape Protection Plan.
2. The Campus Arborist will notify the construction inspector of any breach of the contract or Landscape Protection Plan. At this time the contractor will stop and/or correct whatever practice led to the breach.
3. If a breach of contract occurs, damages will be assessed according to the Tree Appraisal Schedule listed in the landscape protection plan. (Damages are established based on the pre-established value of the affected tree and the amount of both short and long term damage done to that tree. The Campus Arborist shall perform the damage assessment.)
4. The Contractor shall immediately contact the Owner's representative should protected trees be compromised in violation of agreed upon specifications. Failure to communicate promptly could result in damages of up to 100% of the appraised value.

PART 2 - PRODUCTS

MATERIALS

- A. Chain-Link Fence: Metallic-coated steel chain-link fence fabric of 0.120-inch- (3-mm-) diameter wire; a minimum of 72 inches (1200 mm) high; with 1.9-inch- (48-mm-) diameter line posts; 2-3/8-inch- (60-mm-) diameter terminal and corner posts; 1-5/8-inch- (41-mm-) diameter top rail; and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
- B. Organic Mulch: Shredded hardwood bark, free of deleterious materials.

PART 3 - EXECUTION

PREPARATION

- A. Temporary Fencing: Install 6-foot high, non-moveable, temporary, chain link fencing around Protected Root Zones where indicated on plans to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.
 1. Provide access for landscape maintenance equipment.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Keep Protected Root Zones free of ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Mulch Protected Root Zones where indicated on plans to minimize compaction.
 1. Apply 12-inch (300-mm) average thickness of organic mulch. Do

not place mulch within 6 inches (150 mm) of tree trunks.

2. Mechanical equipment can be used to place and remove mulch as long as it operates only on previously placed mulch.
- D. Do not store construction materials, debris, or excavated material inside Protected Root Zones. Do not permit vehicles or persistent foot traffic within Protected Root Zones; prevent soil compaction over root systems.
- E. Maintain fence enclosed Protected Root Zones in pre-construction condition and free of weeds and trash.
- F. Do not allow fires within protected root zones.

EXCAVATION

- A. Install shoring or other protective support systems to minimize sloping or benching of excavations adjacent to Protected Root Zones.
- B. Do not excavate within Protected Root Zones, unless otherwise indicated.
- C. Where utility trenches are required within Protected Root Zones the Owner should be consulted. Tunneling under or around roots by drilling, auger boring, pipe jacking, or digging by hand may be required.
 1. Root Pruning: Cut roots with sharp pruning instruments; do not break or chop.

REGRADING

- A. Grade Changes: Where new finish grade is indicated below or above existing grade around trees, slope grade beyond Protected Root Zones. Maintain existing grades within Protected Root Zones.

TREE PRUNING

- A. All tree pruning before, during, and after construction activity, will be performed by Owner.

TREE DAMAGE, REPAIR, AND REPLACEMENT

- A. Immediately notify Owner of trees damaged by construction operations.
- B. Repairs and replacements will be handled by Owner.

DISPOSAL OF WASTE MATERIALS

- A. Burning is not permitted.
- B. Disposal:
 1. Remove excess excavated material and displaced trees per Owner's direction.

SECTION 114 – INFORMATION PROVIDED BY ENGINEER

114.01 No electronic files will be provided to the Contractor.

- A. Should the Owner request the release of the electronic files, Butler, Fairman and Seufert's "Terms, Release and Waiver for Disclosure of CAD Files" form will need signed by both the Owner and the Contractor. At which

time, the Engineer will provide the Contractor only the "Construction Details" drawing, in Civil 3D 2014 format.

- i. Despite any revisions that may occur after bidding to these electronic files, the revised electronic files will not be provided.
- ii. The construction drawing prints hold over any discrepancies found within electronic files.

SECTION 200 - EARTHWORK

SECTION 201 – CLEARING AND GRUBBING

207.03 (e) CLEARING RIGHT OF WAY: Clearing right-of-way shall be in accordance with Section 201.07 (e) of the INDOT Specifications and include the removal and proper disposal of all obstructions within the limits of the construction that are not specifically covered as pay items of the Contract. It shall be the responsibility of the Contractor to visit the site prior to the submittal of bids in order to become familiar with the scope of work. Disposal of all materials encountered shall be off site and shall be the responsibility of the Contractor and shall be consistent with all applicable Local, State, and Federal rules, regulations, and guidelines.

No trees are to be removed or relocated inside or outside the construction limits without prior approval from the Engineer and Owner. Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with B-borrow and compacted in accordance with 203.23.

SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202.02 GENERAL REQUIREMENTS: Removal of Structures and Obstructions shall be in accordance with Section 202 of the INDOT Specifications and include the removal and proper disposal, i.e. salvage, storage and transport to the Owner, West Lafayette Street Department: 705 S. River Road, (in accordance with Section 613), when noted on plans or within, of all structures and obstructions. These obstructions shall include but are not limited to: abandoned pipe lines, walls, foundations, poles, light poles and luminaires, signs, cantilevers, variable depth concrete sidewalks, concrete steps, variable depth concrete curb ramps, variable depth concrete curbs, concrete gutters, variable depth concrete drives, concrete center curb, and any other obstructions or structures encountered.

Existing street lights shall remain in operation until the new are ready for install, and authorization for removal and salvage has been given by the Owner. Coordination with Duke Energy shall be required for the timely removal of their street lights to not impede construction.

202.05 REMOVAL AND RECYCLING OF PCCP, SIDEWALKS, CURBS, ETC: All PCCP, sidewalks, curbs, gutters, etc. designated for removal shall be broken into pieces and hauled to an offsite recycling facility.

SECTION 400 – ASPHALT PAVEMENTS

401.19 Pay Factors

This work shall be in accordance with the INDOT Standard Specifications with the exception of Section 401.10 Pay Factors (PF), such that while both bonuses and penalty pay factors will be applied, the final accepted quantities for this work will not be paid at a pay rate greater than 1.00. Therefore, no additional payment shall be made for exceeding the quality standards with respect to mixtures, density and smoothness established by the contract.

SECTION 600 – INCIDENTAL CONSTRUCTION

SECTION 604 – SIDEWALKS, CURB RAMPS, STEPS, AND HANDRAILS

604.02 MATERIALS: Concrete is to be limestone aggregate, six bag mix with either wire reinforcement, or fiber reinforcement when not otherwise noted on plans, in the sidewalk and curb ramps. All concrete is to be in accordance with the requirements of the current Indiana Department of Transportation Standard Specifications.

The contractor is responsible for protecting any new concrete work from pedestrian and/or vehicular traffic until it is fully cured and capable of carrying traffic. In the event that it cracks due to lack of strength or negligence in letting traffic on it too soon, the contractor is responsible for replacing the concrete without reimbursement from the City.

Concrete testing is to take place no less than one time every fifty (50) cubic yards or at least one time per day. The owner's representative will be responsible for conducting this test. The contractor is responsible for contacting the owner's representative and coordinating the concrete pour and testing schedules. The testing requirements are:

- Slump = 4", \pm 1"
- Air Content = 6.5%, \pm 1.5%
- 28 day compressive strength \geq 4000 psi

High-Early Strength Concrete shall conform to the follow criteria, or Engineered approved equal:

- Minimum cement content (no fly ash) (type I or III cement): 658 lbs
- Maximum water to cement ratio: 0.45
- Maximum slump: 6inch
- Minimum Open to Traffic Strength (OTT): 300 psi (3rd pt loading) at 14 hours maximum, 2500 psi compressive strength (average or 2-4x8 cylinders), maturity method for OTT is acceptable if qualified sia trial batch, minimum concrete cure time is 8 hours.
- Minimum acceptance strength: 500 psi (3rd pt loading) at 3 days
- INDOT approved 506 or 502 HES Modified concrete mixes will be accepted if an INDOT approved mix cannot be provided, a trial batch will be required to prove OTT and acceptance strength.
- Minimum 35% fine aggregate to total aggregate ratio and 45% maximum

- Calcium chloride at 1-2% is acceptable (32% solution); if ambient temperature is below 65-F, calcium chloride is required.

Handrail shall be replaced in kind. The decorative handrail located on either side of the steps of the Shoemaker Cooperative building shall be replaced with equal or greater quality material, and include a protective coating for outdoor installation. Contractor shall provide the Owner a minimum of three options for selection by the property owner. Final installed product shall be black.

604.03 CONSTRUCTION REQUIREMENTS: INDOT Standard Specification section 604.03 shall apply for all 604 material.

(k) CURB RAMPS: Curb Ramps shall meet current ADA standards for accessible design and comply with the proposed guidelines for Public Rights-of-Way. All curb ramp layouts shall be approved by the Engineer prior to installation. Ramps shall be 6-inch thick. Joints shall be installed at grade breaks. Curb shall be installed on the outside of the ramp, based on field conditions and when approved by the Engineer, to minimize grading, to protect against trip hazards, or to match surrounding structures, i.e. structure faces, controller foundations, parking lots, etc. This curb shall be included in the price of the curb ramp. Thickened curb returns and tapered curb returns shall be included in the price of the curb ramp. Curb or curb and gutter replacement, for required roadway curb tapers, adjacent to the curb ramps shall be included in the price of the curb ramp. Bed course material shall be coarse aggregate No. 53, or approved equal, material, and shall be placed in lifts not exceeding 4in. in depth. Each lift shall be thoroughly compacted. Thickness of bed course shall be in accordance with City Standards, or as detailed in construction drawings.

The Contractor shall install detectable warning surface that is compliant with ADA accessibility guidelines, and in accordance with the Public Rights-of-Way guidelines. Detectable warning surfaces shall be cast iron plates manufactured by East Jordan Iron Works, or approved equal. The detectable warning surface shall be placed such that it is free of gaps between plates and shall extend across the full width of the ramp run (excluding any flared sides); concrete borders required for proper installation should not exceed 2-inches. Radial plates and/or field cutting of plates may be required to produce a continuous detectable warning surface that meets the curvature of the back of curb. The cost of the detectable warning surface shall be included in the price of the curb ramp.

Concrete curb ramps will be measured by the square yard in accordance with the pay limits shown on the plans. The accepted quantities of curb ramps will be paid for at the contract unit price per square yard for curb ramp, concrete, per the type, complete in place.

Concrete sidewalk shall be placed per plan. Concrete sidewalk shall be reinforced with wire mesh or fiber reinforcing. All concrete sidewalks must be according to West Lafayette Standard Specifications and current ADA Standards.

604.09 Hand Rails

Installation shall conform with Section 604.09. The removal of the existing handrail shall not disturb the concrete steps. Any damage to the steps shall be repaired to the satisfaction of the Engineer and the Owner. The new hand railing shall be placed at the same location of the existing.

SECTION 605 – CURBING

605.02 **MATERIALS:** Concrete is to be limestone aggregate, six bag mix with fiber reinforcement in the sidewalk and in the curb and gutter. All concrete is to be in accordance with the requirements of the current Indiana Department of Transportation Standard Specifications.

The contractor is responsible for protecting any new concrete work from pedestrian and/or vehicular traffic until it is fully cured and capable of carrying traffic. In the event that it cracks due to lack of strength, the contractor is responsible for replacing the concrete without reimbursement from the City.

Concrete testing shall take place no less than one time every fifty (50) cubic yards or at least one time per day. The owner's representative will be responsible for conducting this test. The contractor is responsible for contacting the owner's representative and coordinating the concrete pour and testing schedules. The testing requirements are:

- Slump for Hand Placement = 4", \pm 1"
- Slump for Slip Form = 2", \pm 1"
- Air Content = 6.5%, \pm 1.5%
- 28 day compressive strength \geq 4000 psi

605.04 **CAST IN PLACE CEMENT CONCRETE CURBING:** All curb types shall be cast in place, formed and placed in accordance with the City of West Lafayette Standard Specifications and the Construction Drawings.

New curb shall be per plan and set to existing lines and grades in a manner to permit positive drainage.

SECTION 610 - APPROACHES

610.02 **MATERIALS:** Concrete is to be limestone aggregate, six bag mix, constructed to City Standards. All concrete approaches shall be doweled into the curb and gutter per direction of the owner's representative. The cost of the dowel bars and the labor involved will be included in the cost of the approach. All concrete is to be in accordance with the requirements of the current Indiana Department of Transportation Standard Specifications.

The contractor is responsible for protecting any new concrete work from pedestrian and/or vehicular traffic until it is fully cured and capable of carrying traffic. In the event that it cracks due to lack of strength, the contractor is responsible for replacing the concrete without reimbursement from the City.

Concrete testing shall take place no less than one time every fifty (50) cubic yards or at least one time per day. The owner's representative will be responsible for conducting this test. The contractor is responsible for contacting the owner's representative and coordinating the concrete pour and testing schedules. The testing requirements are:

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- Slump = 4", \pm 1"
- Air Content = 6.5%, \pm 1.5%
- 28 day compressive strength \geq 4000 psi

610.03 GENERAL REQUIREMENTS: Concrete drive approaches shall be formed and placed in accordance with Indiana Department of Transportation Standard Specifications Section 610 as well as West Lafayette Standard Specifications. Drive approaches shall be reinforced with wire mesh or fiber reinforcing, per City Standards. Refer to Maintenance of Traffic specification for additional requirements.

SECTION 613 – SALVAGED ROAD MATERIALS

613.02 MATERIALS: This work shall also include all items noted as "salvage" on the construction drawings, as well as: signal equipment, signage, sign posts, and castings, etc.

613.05 BASIS OF PAYMENT: The cost of the salvaging, storing, and transporting the material to the Owner (West Lafayette Street Department: 705 S. River Road) will not be paid for directly, the cost thereof will be included in the various pay items of the Contract.

SECTION 622 – PLANTING TREES, SHRUBS, AND VINES

622.01 This work shall be performed in accordance with City Standards. All work not addressed by City Standards or this provision shall comply with Section 622. All Trees, sodding, shrubs and perennials shall be installed prior to the substantial completion date.

622.02 MATERIALS: Raingarden Perennials shall be 1 gallon size, shall be thoroughly rooted throughout the container, and shall be free from rot and disease. No species shall be substituted without approval of the Engineer. Raingarden perennials shall be delivered in original labeled and undamaged containers. Raingarden perennials shall be inoculated with VAM (Vesicular Arbuscular Mycorrhizae) endomycorrhizal fungi; no pre-emergent herbicides shall be applied during the six (6) months prior to installation.

622.03 CONSTRUCTION REQUIRMENTS:

A. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus one (1) inch of finish elevation in rain gardens. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

B. Restore areas if eroded or otherwise disturbed after finish grading and before planting. Verify that the site is clean and free of debris. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Two weeks (14 days) prior to installation, apply a glyphosate herbicide approved for use around water (Rodeo) to kill existing lawn grasses and other vegetation.

D. Verify the depth and quality of the bio-soil and that the bio-soil has been placed according to specifications.

E. Do not apply any fertilizer.

622.18 CARE, INSPECTION, AND REPLACEMENT:

All work in this Section shall be guaranteed against any and all defects in workmanship and materials appearing within a period of one (1) year after final completion and acceptance of the work by the Owner (warranty period). Survivability must be 95% or greater. Dead plant material in excess of 5% of all planted material shall be replaced by the Contractor prior to the end of the warranty period without additional expense to the Owner.

A. Initial Maintenance Service: Provide maintenance by skilled employees of landscape installer. Begin maintenance immediately after Raingarden perennials are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

a. Maintenance Period for Raingarden perennials: one (1) year

B. Throughout the first year, treat any noxious weeds, non-native, or invasive species with glyphosate herbicide approved for use around water (Rodeo) by spot-spraying or other means that minimize incidental herbicide drift. Re-seed and/or replant any die-back areas resulting from incidental treatment with herbicide.

Year 1 Evaluation and Success Criteria:

A. All Raingarden perennials shall exhibit vigorous growth and be thoroughly rooted by the end of first complete growing season and prior to the release of any maintenance or guarantee obligations. For installations occurring prior to June 1 the end of the first complete growing season would be in October (or at the first hard freeze) of the installation year. For installations occurring on and after June 1 the end of the first complete growing season would be in October (or at the first hard freeze) of the following year.

B. A minimum of 95% of Raingarden perennials shall be alive and growing at the end of the first complete growing season.

622.21 METHOD OF MEASUREMENT

The number of Raingarden perennials planted, as provided above, will be measured by the number of units of each tue and size specified, installed and accepted.

622.22 BASIS OF PAYMENT

The number of Raingarden perennials planted, as provided above, will be paid for at the contract unit price for "Plant, Perennial, Raingarden" each.

SECTION 623 – RAINGARDEN INSTALLATION

623.01 CONSTRUCTION:

Rain gardens shall be constructed in accordance with the contract document's cross-sections, plans, details, and specifications.

Installation of soils must be completed in a manner that will ensure preservation of the infiltrative capacity of the underlying soils. The moisture content of the soil shall be low enough to prevent clumping and compaction

during placement. Contractor shall connect the bio-soil mix to the underground sand-gravel layer by drilling two, evenly spaced 3-ft deep x approximately 2-inch diameter auger through the silty load soil layer, per rain garden. Void shall be filled with bio-soil mix.

To prevent compaction within the limits of the basins, only hand laborers, small excavation hoes with wide tracks, light equipment with turf tires, marsh equipment or wide-track loaders may be used. No heavy equipment shall be used within the perimeter of the bio-retention facility before, during, or after the placement of the bio-retention soil mix.

Soil surfaces shall be scarified by manual raking to aerate and reduce soil compaction. Soil shall be placed in 6" loose depth lifts and lightly hand-tamped or compacted with a water-filled landscape roller, to reduce potential for excessive settling. No other mechanical equipment shall be used to compact the bio-soil or underlying soils.

Re-fracture subgrade soils that have been compacted or smeared by raking, disking or tilling to a minimum depth of 6 inches.

Uniformly grade bio-soil mix to achieve a smooth surface, free of irregular surface changes. Do not over-work or excessively compact bio-soil mix. Grade to cross sections, thickness and elevations indicated on plans. Settling of soil by walking on surface and working with hand equipment is acceptable.

Plantings, non-woven geotextile fabric and the gravel top layer shall be supplied and installed as shown in the contract documents.

- 623.02 BASIS OF PAYMENT: The cost of work to install the raingarden properly, in accordance with this section, will not be paid for directly; the cost therefore, shall be included in the cost of the various other pay items.

SECTION 629 – SAW CUTTING, CURB PAINTING, CURB PATCHING

- 629.01 GENERAL REQUIREMENTS: In locations where the new pavement abuts the existing pavement edge, to include but is not limited to roadway and driveways, the existing pavement shall be saw cut with an approved saw to assure a uniform flush edge with the new pavement. The saw cut shall be full depth and thoroughly flush edge with the new pavement. The saw cut shall be thoroughly cleaned in its entire length. .

All patching shall be in accordance with the City Standards and the Construction plans. Patching material shall be placed on 6" Compacted Aggregate No. 53, Base on 6" of compacted Subgrade in accordance with Subgrade Treatment Type III.

Curbs installed on the outside edge of the pavement shall be painted yellow, as directed by the Engineer.

- 629.02 BASIS OF PAYMENT:

Payment for saw cutting will not be paid for directly, the cost thereof to be included in the various pay items

Payment for patching related to all curb, curb and gutter, concrete center curb, and curb ramp installation to include the associated concrete, asphalt, compacted aggregate base, and compacted subgrade will not be paid for directly, the cost thereof to be included in the various pay items.

Payment for curb painting will not be paid for directly, the cost thereof to be included in the various pay items

SECTION 630 – UNDISTRIBUTED PAY ITEMS

Undistributed quantities shown on the itemized proposal will be deleted from the lump sum contract unit price if they are not directed by the Engineer to be used during construction.

If an undistributed quantity of an item is called for in addition to the quantity that is known to be necessary to construct the project, as shown on the plans, that item will be field-measured by the Engineer to determine the additional amount. Payment will then be used on the contract unit price indicated on the proposal.

The itemized proposal contains the following undistributed quantities:

Pay Item	Quantity
SIDEWALK, CONCRETE, 4IN.....	200 SYS
SIDEWALK, CONCRETE, 6IN.....	25 SYS
CURB RAMP, CONCRETE.....	60 SYS
CURB, CONCRETE, 6IN ..	325 LFT
FULL DEPTH PATCHING.....	100 SYS

The Full Depth Patching Undistributed item listed above is for the fire station parking lot, between the curb patching and the limits of the sidewalk removed, and the sinkhole located in the northbound lanes, at the south leg approach of the Grant Street intersection. Patch thickness and material shall be in accordance with City Standards. All other patching shall be in accordance with Section 629 of these provisions.

The exact location of the undistributed quantities, if required, shall be determined by the Engineer during the time of construction.

SECTION 631 – IRRIGATION HYDRANT ASSEMBLIES

630.01 DESCRIPTION

The work includes the construction of service lines for irrigation hydrant assemblies, including fittings, valves and valve boxes, tapping sleeve and tapping valve, water service lines, and other appurtenances in accordance with 105.03.

A. SHOP DRAWINGS

The Contractor shall promptly supply to the Engineer for approval shop drawings with details and schedules for all items as noted in the drawings and specifications and required by the Owner.

B. LOCATIONS OF EXISTING APPURTENANCES AND ASSOCIATED PIPING

Where new piping or appurtenances are to connect to existing piping or appurtenances, preliminary locations have been shown on the drawings.

These locations have been taken from existing construction drawings. The Contractor shall take full responsibility for any discrepancies due to changes in locations to make the piping fit the appurtenances.

C. AS-BUILT DRAWINGS

The Contractor shall submit as-built drawings upon completion of the work.

630.02 MATERIALS

Specification references made herein for manufactured materials such as pipe, valves and fittings refer to designations for American Water Works Association, AWWA, or the American National Standards Institute, ANSI, as they are effective on the date of call for Bids.

Copies of these publications may be obtained at a nominal cost from the American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235, and from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

All water lines, piping, valves and fittings shall be installed and tested in accordance with ANSI/AWWA Specification C600-05.

Water lines shall be installed as specified under Part 3 with the minimum cover.

A. SERVICE LINES

Service lines less than 3 inches in diameter shall be copper tubing type "K" conforming to ASTM B88.

Service lines 3 inches in diameter and greater shall be ductile iron pipe.

B. VALVE BOXES AND OPERATING WRENCHES

Valve boxes shall be cast iron, three piece, Buffalo, screw type boxes. The boxes shall be 5¼ inch shaft size with a round base. The word "WATER" shall be cast on the box lid.

Curb boxes shall be cast iron 2 piece, Buffalo, screw type boxes. The box shall be 3 inch diameter with a round base. The word "WATER" shall be cast on the lid. The lid shall be held in place with a standard brass pentagon head screw.

4 inch to 12 inch valves shall be provided with a valve box as detailed in the Contract Drawings. Valve box shall be designed to fit neatly around valve to resist mud encroachment onto operating nut. Each valve box shall be complete with cast iron lid. For every 24 valves the Contractor shall provide a valve operating wrench for a 2 inch square nut. Any valve installed deeper than 60 inches from top of nut shall be equipped with a valve stem adapter to allow operation with standard length valve wrench.

C. IRRIGATION HYDRANT ASSEMBLY

Irrigation hydrant assemblies, as shown on the plan, shall be self draining, non-freezing, compression type with a $\frac{3}{4}$ inch inlet connection and $\frac{3}{4}$ inch outlet connection. Irrigation Hydrants shall have a steel riser with a cast iron box and lid. Principal interior operating parts shall be brass and removable from the irrigation hydrant for servicing without excavation. Irrigation hydrants shall be set in 4 cu ft of crushed stone to allow for proper drainage. AWWA recommendations shall be followed when installing the irrigation hydrant. Product shall be Murdock M-V476.

630.03 CONSTRUCTION REQUIREMENTS

The entire sequence of construction of the connections with existing mains shall be scheduled by the Contractor and shall be subject to approval by the Engineer and Owner. The schedule shall be arranged to cause the minimum of interference with traffic and without interruption of service. Schedules shall be updated monthly and submitted to both the Engineer and the Owner for approval.

Services are preferred to cross other utility conduits, highways, and railroads at 90° angles. Minimum depth of cover for service lines shall be 5 feet.

VALVE AND FITTING INSTALLATION

Valves and pipe fittings shall be set and jointed to new pipe in the manner heretofore specified. All effort should be made to avoid placement of valves in street pavement areas.

EXAMINATION OF MATERIAL

Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage, and cracks. Defective valves shall be corrected or held for inspection by the Owner. Valves shall be closed before being installed.

PLACEMENT

Valves, fittings, plugs, and caps shall be set and joined to the pipe in the Valves shall be installed in the closed position. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.

VALVE PROTECTION

A valve box or a vault shall be provided for every valve. A valve box shall be provided for every valve that has no gearing or operating mechanism or in which the gearing or operating mechanism is fully protected with a gear case. The valve box shall not transmit shock or stress to the valve. The valve box shall be centered over the operating nut of the valve, with the box cover flush with the surface of the finished area or such other level as may be directed by the Owner.

SERVICE INSTALLATION AND CONNECTION

LAYING WATER SERVICE PIPE

Underground water service pipe shall be laid not less than 10 feet horizontally from the building drain, and shall be separated therefrom by undisturbed or compacted earth. Where these conditions cannot be met, the water service pipe shall be installed in accordance with the following provisions:

- The bottom of the water service pipe, at all points, shall be at least 18 inches above the top of the building drain line at its highest point.
- The water service pipe shall be placed on a solid shelf excavated to one side of the common trench.

Where both the water service pipe and building drain line are installed with less separation, or in the same trench, the building drain line shall be constructed of cast iron soil pipe with push-on joints, Type K, hard-tempered copper pipe with sweated joints. The trench shall not be backfilled until the installation is approved by the Engineer.

Service piping shall be installed below the frost line (5.0 feet minimum cover) and shall be laid with no unnecessary bends.

WATER SERVICE CONNECTION

The Contractor shall make all taps for service connections and install the new service pipe as shown on the plans. The Contractor shall provide 5 additional feet of service tubing coiled around a 1 inch C.I. locator rod at the hydrant assembly. The Contractor shall provide compression fittings as required to connect the new service line to an existing service line.

Each water service pipe shall be connected to the water main through a brass corporation stop as detailed on the Contract Drawings. The main shall be tapped at an angle of 45 degrees with the vertical, and the stop must be turned so that the T-handle will be on top. Polyethylene encasement shall be properly cut and repaired. Service lines of dissimilar metals shall be polyethylene wrapped for a minimum clear distance of 3 feet. No tap shall be installed until the main passes the pressure leakage test and has been successfully disinfected.

The service pipe shall be laid in the trench sufficiently weaving to allow not less than 1 foot extra length in its entire length.

No splices or couplings will be allowed in the new lengths of service piping between the service connection and the right-of-way line.

MATERIAL CERTIFICATION

The Engineer may require that any materials proposed for use in this project be accompanied by an attested Manufacturer's Certificate which states that the material proposed for use in this project complies with the pertinent Specifications quoted within these Documents stating the Specification reference and giving the approximate date of manufacture of the materials.

Furnishing of such certifications shall not be in lieu of other testing requirements set out herein, and the Engineer reserves the right to require further tests if it is deemed such tests are necessary.

630.04 METHOD OF MEASUREMENT

The project payment is based on unit price items. Final quantities of unit price items will be determined by the Engineer, accompanied with the Contractor. The method of measurement for payment shall be:

- Count each irrigation hydrant assembly and water service connection, actually provided during construction and approved by the Engineer.
- Measure water service line and trenchless installed service lines along the centerline of constructed water service line. The linear quantity in feet shall be a horizontal measurement along constructed water service line centerline.

630.05 BASIS OF PAYMENT

CONDITIONS

The project payment is based on unit prices with final quantities determined by measurements performed by the Engineer and agreed to by the Contractor. The items and quantities listed in the bid under the heading "Itemized Proposal" indicate the items to be considered in constructing and completing this Contract. For unit price bid items, measurement for payment will be the actual number of units furnished and installed times the unit price specified, either additive or deductive to the total bid amount.

The Contractor should refer to the appropriate sections in the Contract Documents for clarification of the scope of work. The Contractor shall perform all work as indicated within the Contract Documents to produce a complete, finished job. The Contractor shall become fully acquainted with the scope of the work prior to construction. Requests for clarification must be submitted during the bid period if there is question or doubt.

Payment for work performed will be in accordance with the Standard Specifications.

PAY ITEMS

IRRIGATION HYDRANT ASSEMBLY

Include in the unit price per each irrigation hydrant assembly as outlined in this Special Provision and as outlined in the Itemized Proposal all work required to produce a complete, finished job as required by the Contract Documents, including, but not limited to, excavation, structure backfill, compaction, backfill, bedding, dewatering, irrigation hydrant, steel riser with cast iron box and lid, valve and valve box, curb stop, piping and other miscellaneous or incidental work. The unit price also includes all costs to haul and dispose of excavation spoils at an approved dump site.

WATER SERVICE CONNECTION, 0.75 IN.

Include in the unit price per each water service connection, 0.75 in. as outlined in this Special Provision and as outlined in the Itemized Proposal all work required to produce a complete, finished job as required by the Contract Documents, including, but not limited to, excavation, structure backfill, compaction, backfill, bedding, dewatering, tapping of the proposed water main, fittings, saddles, corporation stop, backflow preventer, disinfection,

testing, rough grading, fine grading, and other miscellaneous or incidental work. The unit price also includes all costs to haul and dispose of excavation spoils at an approved dump site.

WATER LINE, COPPER, 0.75 IN.

Include in the unit price per linear foot of water line, copper, 0.75 in. as outlined in this Special Provision and as outlined in the Itemized Proposal, all work required to produce a complete, finished job as required by the Contract Documents, including, but not limited to, trenching, pipe, fittings, bends, laying, dewatering, compaction, structure backfill, tamping, progressive clean-up, bracing or shoring, protecting existing utilities, fences and mailboxes, and providing all components as indicated on the Detail Sheets of the Contract Drawings.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit Symbol</u>
Irrigation Hydrant Assembly	EACH
Water Service Connection, 0.75 in.....	EACH
Water Line, Copper, 0.75 in	EACH

SECTION 800 – TRAFFIC CONTROL DEVICES AND LIGHTING

SECTION 805 – TRAFFIC SIGNALS

805.01 DESCRIPTION

This work includes installing traffic signal control devices in accordance with 805 as shown on the plans and as specified herein. All other items, not superseded by the information within, shall be furnished and installed per INDOT Standard Specifications section 805.

805.02 GENERAL REQUIREMENTS

(a) REMOVED EQUIPMENT

Existing traffic signal equipment shall remain in operation until the new are ready for install, and authorization for removal and salvage has been given by the Owner.

All removed traffic signal equipment that is not re-used shall be salvaged and transported to the City of West Lafayette Street Department.

(b) ORNAMENTAL SIGNAL AND SIGN STRUCTURES

DESCRIPTION: Ornamental “Signal Cantilever Structure, Single Arm, ___FT”, Ornamental “Signal Cantilever Structure, Dual Arm, ___FT”, Ornamental “Cantilever for Signs, ___FT” and Ornamental “Signal Pole, Pedestal, 10FT” shall be furnished and installed by the Contractor. The work shall consist of furnishing all materials, labor, equipment, and incidentals necessary for the placement of these signal structures, embedded conduit, and all wiring and appurtenances as required. This shall include required excavation, construction of reinforced concrete foundation, furnishing and placement of reinforcing steel and anchor bolts where required for complete installation in accordance with the manufacturers’ and INDOT specifications,

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as found appropriate by the Engineer.

Contractor shall inform themselves of delivery lead times required by the supplier/manufacturer and shall be responsible for making necessary considerations in his bid.

SIGNAL CANTILEVER STRUCTURE, WITH MAST ARM:

Structure shall be manufactured and installed per the Construction Drawings, and in accordance with INDOT Standard Specifications and Design requirements. The traffic pole unit and all materials used in the manufacture shall meet the requirements of the latest edition American Association of State Highway and Transportation Officials (AASHTO), specifically the Standard Specification of Structural Supports for Highway Signs, Luminaires and Traffic Signals. Structures shall comply with the following requirements:

1. The round tapered pole shall be formed from tubes conforming to ASTM A595 Grade A, or ASTM A572 Grade 55, with a minimum yield strength of 55 ksi, and have a constant linear taper of 0.14 in/ft, or approved equal. The shaft shall be one piece, and contain no circumferential welded butt splices. Laminated tubes are not permitted. The pole shall have a reinforced hand hole with cover located approximately 1'-6" from the pole base. Each pole shall be provided with a decorative end cap secured in place with set screws. The pole shall be hot dip galvanized per ASTM A123, black finish coat to be TGIC or urethane polyester powder, or approved equal. The pole length shall be approximately 24'-7" above ground.
2. The round tapered mast arm shall be formed from tubes conforming to ASTM A595 Grade A, or ASTM A572 Grade 55, with a minimum yield strength of 55 ksi, and have a constant linear taper of 0.14 in/ft or approved equal. Arms up to 50' in length shall be manufactured and shipped in one piece. Circumferential welded tube butt splices and laminated tubes are not permitted. Each arm shall be provided with a decorative end cap secured in place with set screws. The mast arm shall be hot dip galvanized per ASTM A123, black finish coat to be Triglycidyl Isocyanurate (TGIC) or urethane polyester powder, or approved equal. The fixed end of the mast arm shall be mounted on the signal pole approximately 16-ft above ground and have an approximate 5-ft rise to the free end.
3. Base plates shall conform to ASTM A36. Plates shall be integrally welded to the tubes with a telescopic welded joint and shall be hot dip galvanized per ASTM A123, black finish coat to be TGIC or urethane polyester powder, or approved equal.
4. Anchor bolts shall conform to the requirements of ASTM F1554 Grade 55. The upper 12" of the bolts shall be hot dip galvanized per ASTM A153. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts.

SIGNAL PEDESTAL POLE, 10FT:

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Structure shall be manufactured and installed per the Construction Drawings, and in accordance with INDOT Standard Specifications and Design requirements. Product shall be DS202R426A090GFBK, round tapered steel pole with pole cap, as manufactured by Valmont Industries, Inc., or approved equal.

(c) ACCESSIBLE PEDESTRIAN SIGNALS AND PUSH BUTTONS

Contractor shall furnish and install LED pedestrian control signal countdown systems and accessible pedestrian pushbutton stations with the R10-3e sign, meeting PROWAG, at the specified locations.

All signal modules shall be fully compliant to the ITE PTCSI Part-2: LED Pedestrian Traffic Signal Modules specification adopted March 19, 2004 or the latest adopted version as listed on the ITE website. Combination hand/person pedestrian signal modules shall incorporate separate power supplies for the hand and the person icons. In addition to, and in excess of the above applicable ITE specification compliance, the on-board circuitry of all LED traffic signal modules shall include voltage surge protection, to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.8, NEMA Standard TS 2-2003.

All pushbutton modules shall be in accordance with PROWAG and the IMUTCD 4E.09 through 4E.13, and meet all requirements for an accessible pedestrian crossing as defined in the IMUTCD. All Accessible Pedestrian Pushbuttons shall utilize the speech message described in IMUTCD 4E.11 Paragraph 18.

- i. Modules shall be a contrasting color from the pole.
- ii. The center of the push button shall be installed 42", vertically, above the curb ramp's all weather surface.
- iii. Push buttons shall be installed within a 10" horizontal reach of the curb ramp's all weather surface. Compatible extension brackets shall be installed to provide compliance with PROWAG. Push button module shall not protrude into the pedestrian circulation path.
- iv. Arrows on modules shall be installed such that it is parallel to the direction of travel it provides guidance for.
- v. A clear and level space of 2.5ft minimum by 4.0ft minimum shall be provided in front of each pushbutton module.

All products shall be installed per manufacturer's recommendations and current INDOT standards.

The manufacturer shall provide, at time of bid, a written warranty which provides for repair or replacement of modules that fail to function as intended due to workmanship or material defects within the first 60 months from date of delivery. Modules which exhibit luminous intensities less than the minimum as specified in the ITE specifications as indicated above, within the first 60 months from date of delivery shall be replaced or repaired.

Subject to compliance with requirements, suppliers offering these products that may be incorporated into the work include the following:

Traffic Control Corporation, Granger, IN 46530, (574)-243-0901

The preferred accessible pedestrian module is the "Advisor Guide Accessible Pedestrian Station" (AGPS), provided by Campbell Company.

Contractor shall be responsible for all connections, wiring, and other miscellaneous material and incidental work required to install a working pedestrian signal head or a working accessible pedestrian pushbutton, each, complete in place.

(d) PUSH BUTTON SIGNAL POLE

Push button Signal Pole, Pedestal, 4FT shall be 4-inch diameter, schedule 40 aluminum poles with spun finish and anodic coating per MIL-A-8625C for type II, class-2 black coating. Post shall be 4-feet in length, with anodized aluminum dome cap and nominal 4-inch National Pipe Thread as required at the end of the pipe. Mounting Posts shall be installed on an anodized aluminum, rounded, breakaway pedestal base, of a foot print of approximately 7" x 7", and be approximately 10" tall. Base shall support the 4-inch NPT pedestal post screwed in at the top of the base and with a minimum of two set stainless steel screws. Frey Manufacturing Corporation Pedestal Base CP6, or approved equal.

- i. Base shall fully enclose and cover the anchor rods internally, shall be mounted directly to foundation with a 6-inch bolt circle (with 4 mounting anchor bolts and supported by 5/8" x 7.5" stainless steel anchor rods imbedded in concrete foundation, 6" deep with two part epoxy), and have a grounding lug installed which supports 14 AWG thru 4 AWG conductors. Base shall have an anodized access door, attached with stainless steel hardware, on one vertical side with a minimum 21 square inch opening.
- ii. Foundation shall be 18" diameter x 12" depth, Class A concrete. Contractor shall increase the sidewalk thickness to 12" (min.) to provide for the push button station foundation, when located inside walkway.

(e) LED STREET NAME SIGNS

LED Street Name sign bodies shall be aluminum or approved equal. The maximum allowable weight of the sign (without hanging brackets) shall be 95 lbs, unless otherwise approved.

The sign body shall be fabricated in accordance with NEMA 3R standards. The sign body shall be reinforced to allow for mounting hardware on the back and top of the sign. The sign body shall have a weep hole every 12" increment to allow exfiltration of any moisture. The sign body shall include internal electrical box with watertight access door.

The color of the exterior of the sign assembly shall be black. All exterior surfaces of the sign assembly shall be powder-coat painted in accordance

with Military Standard MIL-C-24712. Finish will meet the requirements of ASTM D 3359, ASTM D 3363, and ASTM D 552.

Contractor shall coordinate with Owner for the custom street name sign design, which shall include options for custom logo(s), custom colors, and custom font.

The sign face shall be constructed of 1/8" white polycarbonate or clear polycarbonate with 3M™ Diamond Grade™ reflective film or approved equal.

The sign shall have a watertight seal between the sign panel and the housing.

The sign assembly including sign panel and mounting assemblies shall be designed, tested and constructed so that no permanent deformation, warping or failure will occur when subjected to 110 mph wind loads.

There shall be a sufficient quantity of white LED's to uniformly illuminate the viewing area with no more than a 20% deviation from any two points on the sign face in light output.

Power use shall be 3-4 watts per square foot of viewing area. The failure of one (1) LED shall not reduce the light output by more than eight percent (8%) per foot of sign face. If any one LED should fail it will not cause any other LEDs to fail.

The LED light engine panel shall be permanently attached to the LED panel.

The LED light engine panel shall pass the following tests per NEMA standards:

- a) Thermal Shock Test: 85/-40°C with 2-hour dwells for 5 cycles with a 2-hour presoak at -40°C.
- b) Salt Spray and Soak Test: The LED panel shall endure 48 hours of continuous salt spray and 240 hours of a salt water soak.

All LED panels shall be burned-in for 24 hours and certified for compliance by the manufacture.

The manufacturers name and date of manufacture along with a Quality Control tracking sticker shall be mounted on the inside of the LED light engine panel.

The entire surface of the sign panel shall be evenly illuminated. The average maintained luminous intensity measured across the letters, operating under the conditions shall be of a minimum value of 200 cd/m².

The manufacturer shall make available independent laboratory test results to verify compliance to the Photometric and Light Panel sections above.

LED Light Engines shall be replaced or repaired if they fail to function as intended due to workmanship or material defects within the first sixty(60) months from the date of delivery.

LED Light Engines that exhibit luminous intensities less than the minimum

value specified herein within the first sixty (60) months from the date of delivery shall be replaced or repaired.

All LED street name signs shall be warranted for a period of (60) months from date of delivery.

805.03 FIBER OPTIC CABLE

DESCRIPTION: Fiber optic shall be provided to each of the traffic signal controller cabinets, for connection to the fiber optic data hardware switch provided by others. All other items, not superseded by the information within, shall per INDOT Standard Specifications section 805.03.

- A. The Contractor shall coordinate configuration details with the City of West Lafayette Facilities Director, Tim Clark: 765-426-6694 and BF&S Technical Advisor Michael Mang: 317-997-5091.

CONSTRUCTION REQUIRMENTS:

- A. All conduit installed for the Fiber System shall include a pull tape, manufactured by Mule Tape or approved equal, and a tracer wire.
- B. Splicing into existing City fiber optic cable shall be performed by others.
- C. It shall be the responsibility of the Contractor to carefully examine the plans and specifications relating to this work for completeness, accuracy, and clarity. Any conflict, errors or clarifications request shall be immediately brought to the attention of the Engineer for written interpretation or instruction.
- D. Contractor is responsible for obtaining all permits required for installation of this work.
- E. Fiber Optic Cable shall be 12 strand single mode.
- F. Fiber Optic terminations will be completed by others.

805.08 CONTROLLER CABINET, SIGNAL SERVICE, AND DETECTOR HOUSING INSTALLATION

The neutral load (induced voltage) shall be measured between each signal head indication field terminal and the AC neutral circuit in the controller cabinet during the off (dark) state of each signal indication, and must not read more than 2V AC RMS.

An Econolite ASC/2M-1000 master controller will be supplied by the City and shall be installed by the contractor at the intersection of Northwestern Avenue and Stadium Avenue for either Alternate 3 or Alternate 4. The master controller shall coordinate the existing Econolite ASC/3 secondary controllers at the following intersections:

Northwestern Ave & Cherry Ln	ASC/3-2100
Northwestern Ave & Dodge St	ASC/3-1000
Northwestern Ave & Stadium Ave	ASC/3-2100
Northwestern Ave & Pedestrian Midblock	ASC/3-1000
Northwestern Ave & Grant St	ASC/3-1000

The signal service for the traffic signal at Northwestern Avenue and Cherry Lane shall be provided in an aluminum or grey colored commercial pedestal provided by Milbank, or approved equal.

805.15 METHOD OF MEASUREMENT

Signal Cantilever Structures, Cantilever for Signs, and Signal Pedestal Poles will be measured by each unit installed complete in place.

Accessible Pedestrian Pushbutton will be measured by each working unit installed.

Push button Signal Pole, Pedestal, 4FT will be measured by the number of units of each installed complete in place, to include the cost of the base and foundation.

LED Street Name Signs will be measured by the number of working units installed complete in place, to include the cost of all wiring, brackets, hardware, and associated materials.

805.16 BASIS OF PAYMENT

The basis of payment will be in accordance with 805.16.

All traffic signal equipment removed shall be paid at a contract lump sum price.

Payment will be made under:

Pay Item	Pay Unit Symbol
Traffic Signal Equipment, Remove.....	LS
Pedestrian Pushbutton, APS.....	EACH
Signal Cantilever Structure, Single Arm, ___FT.....	EACH
Signal Cantilever Structure, Dual Arm, 25 FT, 30 FT.....	EACH
Cantilever for Signs, ___FT.....	EACH
Signal Cantilever Structure, Drilled Shaft Foundation, Type A.....	EACH
Signal Cantilever Structure, Drilled Shaft Foundation, Type B.....	EACH
Signal Cantilever Structure, Drilled Shaft Foundation, Type E.....	EACH
Signal Pole, Pedestal, 4FT.....	EACH
Sign, Street Name, LED.....	EACH
Installation of Master Controller.....	EACH
Signal Service, Commercial Pedestal and Foundation.....	EACH

The cost of the backplates and associated retroreflective borders shall be included in the cost of the traffic signal heads.

The cost of the extension bracket shall be included in the cost of the Pedestrian Pushbutton, APS.

The cost of master controller installation, wiring for master controller, testing and all incidentals to complete a working coordinated closed-loop signal system along Northwestern Ave from Cherry Ln to Grant St with the supplied master controller and existing secondary controllers shall be included in the cost of Installation of Master Controller.

The cost of the commercial pedestal, foundation, weatherhead, 1 in. conduit rise, entrance switch, 1 to 2 in. conduit reducer, ground rod, ground wire, and all hardware required to complete the installation, including the meter base when required and supplied by the utility company shall be included in the cost of Signal Service, Commercial Pedestal and Foundation.

The cost of signal cable between the radio antenna to the controller necessary to provide a working radio interconnect shall be included in the cost of Radio, Interconnect.

SECTION 807 – HIGHWAY ILLUMINATION

807.01 DESCRIPTION: This work includes the furnishing and installation of decorative lighting structures, LED luminaires and incidental materials in accordance with 807, as shown on the plans and as specified herein. All other items, not superseded by the information within, shall be furnished and installed per INDOT Standard Specifications section 807.

(a) SUBMITTALS

Product Data shall be submitted for Contractor supplied luminaires, poles, and support components, arranged in order of lighting unit designation. Include data on features, accessories, and finishes.

Shop Drawings shall include anchor-bolt templates keyed to specific poles and certified by manufacturer.

807.02 MATERIALS

A. Lighting Structure No. 1 shall be “Light Pole, Ornamental, 14 FT E.M.H.” and “Luminaire, L.E.D., Acorn”, to be Owner supplied and Contractor installed. Cut sheets will be provided for bidding purposes.

Lighting Structure No. 2 shall be “Light Pole, Ornamental, 30 FT E.M.H, W/ Mast Arm” and “Luminaire, L.E.D., Cobra Head”, to be Owner supplied and Contractor installed. Cut sheets will be provided for bidding purposes.

Lighting Structure No. 3 shall be “Light Pole, Ornamental, 30 FT E.M.H, W/ Dual Mast Arm” and “Luminaire, L.E.D., Cobra Head”, to be Owner supplied and Contractor installed. Cut sheets will be provided for bidding purposes.

The Owner will purchase these structures prior to the Notice to Proceed of the contract. Shipment will be delivered directly to the successful Contractor. Contractor shall be responsible for inspecting the material upon receiving for any defects, and the handling and storing the material until the time of installation. The Owner shall be notified immediately of any defects found at delivery; defects found after delivery will be the responsibility of the Contractor. Contractor shall inform themselves of delivery lead times required by the supplier/manufacturer and shall be responsible for making necessary considerations in his bid.

- B. Lighting Structure No. 4 shall be “Light Pole, Ornamental, 24 FT E.M.H., W/ Mast Arm” and “Luminaire, L.E.D., 100-140W”, to be furnished and installed by the Contractor.

Bidders shall contact both ESL Spectrum (Scott Parkinson 317-989-2532) and Techlite Corp (Steve Bates 317-506-0706) for competitive pricing.

- a. LED Luminaire: Sternberg Libertyville (1914LED-FG/CSA6/33L45T3-MDL10/HS-H/BK), Sun Valley (LCLS20-FG-VLED-III-120LED-350mA-NW-RAL-9005), or Owner approved equal.

- 1) Note: The Sternberg Libertyville part number includes the required decorative mast arm and decorative hanging bracket. These items are not included in the Hapco part number in section b.
- 2) E.M.H. shall be 25-feet 3-inches +/-
- 3) Lamping: A minimum of 0.8fcd shall be maintained.
- 4) Finish: Prior to coating, each assembly shall be chemically cleaned and etched. Powder coated black.
- 5) Remote photocell controllable. Any photocells within luminaires shall be covered with shorting caps.
- 6) Distribution: Type III
- 7) No fins on the housing.

- b. Ornamental Light Pole: Hapco (RTA25C7B4-GFI-BC-BA, Banner: BA27300-BA), Valmont (Drawing No. IN220563P1), or Owner approved equal.

- 1) Pole Height: 24-feet
- 2) Pole Width: Base diam 7-inch, Top diam 4-inch +/-
- 3) Mast Arm: 6-feet, with 2-foot-5-inch rise; mounted 1-foot 3-inches below the top of pole.
- 4) Banner arms shall be installed on road side; bottom banner arm shall be 14-ft from the bottom of pole, top banner arm shall be spaced 4-feet 11-inches above the bottom banner arm (center to center). Banner arms shall be 2-foot 6-inches between the mounting bracket to end bulb.
- 5) Weatherproof GFI receptacle shall be installed 13-feet 7-inches from the bottom of pole, on the opposite side of the banner arms. Other acceptable options include a weatherproof twist lock 110V receptacle, to be wired into a GFI located in the pole handhole for easier access.

- 6) Finish: Prior to coating, each assembly shall be chemically cleaned and etched. Powder coated black.
- 7) Non-breakaway base
- 8) Anchor Bolts shall include right angle hook at the unthreaded end. Anchor bolts and bolt circle shall be supplied by the manufacturer.
- 9) Handhole with cover and stainless steel screws shall be located in base.

Point by Point required with submittal package, based on provided lighting layout and complying with the tables provided in the construction drawings.

Concrete Foundation: The concrete foundation shall be constructed to INDOT Standards and Specifications. If coarse aggregate bedding is required to bring the support up to grade, it shall be placed and mechanically compacted. Once the concrete support base is constructed, it shall be given sufficient time to cure before installing light pole. Concrete mix shall be Class A, and mix design shall be submitted for approval prior to construction. The ground rod, ground wire and connectors shall meet the Lafayette Electrical Codes and NEC guidelines.

Each light structure, with luminaire(s), shall be designed in accordance with the structural design criteria described in the INDOT Standard Specifications, including the criteria for wind loading, maximum horizontal deflection, maximum stresses, luminaire loads, material strengths, welds, bolts, etc.

Electric:

- a. Conductor counts and Gauges indicated on drawing are minimums, and Electrical Contractor to size Wire Gauge as required for Design Service Load, length of run, and voltage drops per individual section.
- b. All work for electrical installation must be performed per the City of West Lafayette and NEC guidelines and regulations.
- c. Electrical work must be inspected by the City of West Lafayette Electrical Inspector.
 - i. Contractor to coordinate City of West Lafayette Electrical Inspection with Project Inspector.
 - ii. Electrical Contractor to submit wiring diagram for approval with Material shop drawings. Diagram to indicate conductor count and gauge.
 - iii. Roadway lighting and GFI circuit shall be run on separate circuits.

807.18 METHOD OF MEASUREMENT

The Contractor will be compensated for the cost of storing and installing Lighting Structures No. 1, 2, and 3, complete in place. The work shall consist

of furnishing all materials, labor, equipment, and incidentals necessary for the placement of the structure with mast arm (if applicable), luminaire, embedded conduit, and all wiring and appurtenances as required. This shall include required excavation, construction of reinforced concrete foundation, furnishing and placement of reinforcing steel and anchor bolts where required for complete installation in accordance with the manufacturers' and INDOT specifications, as found appropriate by the Engineer.

The Contractor will be compensated in accordance with 807.18 for Lighting Structures No. 4. The work shall consist of furnishing all materials, labor, equipment, and incidentals necessary for the placement of the structure with mast arm, luminaire, embedded conduit, and all wiring and appurtenances as required. This shall include required excavation, construction of reinforced concrete foundation, furnishing and placement of reinforcing steel and anchor bolts where required for complete installation in accordance with the manufacturers' and INDOT specifications, as found appropriate by the Engineer.

807.19 BASIS OF PAYMENT

The basis of payment will be in accordance with 807.19

Payment will be made under:

Pay Item	Pay Unit Symbol
Light Pole, Ornamental, 14 FT E.M.H., Install.....	EACH
Light Pole, Ornamental, 24 FT E.M.H., W/ Mast Arm.....	EACH
Light Pole, Ornamental, 30 FT E.M.H, W/ Mast Arm, Install.....	EACH
Light Pole, Ornamental, 30 FT E.M.H., W/ Dual Mast Arm, Install.....	EACH
Luminaire, L.E.D., Acorn, Install.....	EACH
Luminaire, L.E.D., Cobra Head, Install.....	EACH
Luminaire, L.E.D., 100-140W.....	EACH

The cost of banner arms, GFI outlets and associated wiring, mounting hardware and all necessary incidentals to complete this work shall be included in the cost of the Light Pole, Ornamental, 24 FT EMH W/ Mast Arm.

The furnish and installation of the Light Pole, Ornamental, 24 FT EMH W/ Mast Arm, complete in place, and the Luminaire, L.E.D., 100-140W, complete in place, shall be bid as Alternate 2.

Existing street lights shall remain in operation until the new are ready for install, and authorization for removal and salvage has been given by the Owner. Coordination with Duke Energy shall be required for the timely removal of their street lights to not impede construction. The cost of this work shall be in accordance with section 202.

SECTION 900 – MATERIALS DETAILS

SECTION 904.01 - AGGREGATES

Decorative Gravel, No. 9 shall conform to the following criteria: shall consist of multi-colored earth-tone decorative gravel conforming to INDOT #9 gradation, and shall be washed and free of foreign material and viable plant seeds.

Payment for decorative gravel shall be paid for based on the contract unit price per ton for Gravel, No. 9 complete in place, including materials and labor.

SECTION 914 – TOPSOIL MATERIALS

914.01 SPECIAL TOPSOIL FOR ROADSIDE DEVELOPMENTS: The topsoil shall be the natural, fertile, friable surface layer of soil obtained from naturally drained areas and free from subsoil, clay lumps, stones, brush, stumps, roots, objectionable weeds or litter (glass, plastic, paper, etc.), excess acid or alkali, or other substances which may be harmful to plant growth or a hindrance to subsequent smooth grading, planting, or maintenance operations. Approximately 80% fines with low plasticity, slow dilatancy, low dry strength; approximately 20% medium sand; wet, dark brown, organic odor, weak reaction with HCl; Roots present throughout.

The pH of the material shall be between 5.5 and 7.6. The organic content shall be not less than two (2) percent or more than twenty (20) percent. The gradation shall be as follows:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
2 Inches	100
1 Inch	85-100
1/4 Inch	65-100
No. 200	20-80

RAINGARDEN BIO-SOIL MIX: The soil mix installed in the raingardens shall comply with the following criteria:

The soil shall be a uniform, well blended mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the bio-retention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The soil mix shall be free of Bermuda grass, Quack grass, Johnson grass, or other noxious weeds. The planting soil for bio-retention facilities shall consist of a mixture of sand or crushed glass cullet of equivalent grade, topsoil, and compost components, to obtain an engineered soil mix meeting the following specifications:

USDA Texture class: sandy loam or loamy sand. Mineral fraction consists of no less than 40% well-graded sand or glass cullet and no greater than 10% clay (dry weight basis)

Organic content: 5- 10% (dry weight basis)

TS-35

pH: 5.5 – 7.0

Soluble Salts (Salinity): less than 500 mg/kg (500ppm)

Phosphorous: soil p-index should be between 15 and 40

Permeability: Minimum 0.50 inches/hour

Soil chemical parameters should be tested according to Recommended Chemical Soil Test Procedures for the North Central Region, North Central Regional Research Publication No. 221, Revised 1998. Soil organic matter should be determined according to the "Loss of Weight on Ignition" procedure in the above-referenced publication. The manual is available on line at the following address:

<http://extension.missouri.edu/explorepdf/specialb/sb1001.pdf>.

Volumetric proportions of the components making up the bio-retention soil mix shall be as follows:

Sand: 40 - 50% by volume

Compost: 20 - 30% by volume

Topsoil: 25 - 30% by volume

Existing topsoil may be amended to meet the specifications of the bio-soil mix. Topsoil may be obtained from outside the limits of this project as directed by the Engineer and in accordance with Sections 621.04, 621.08 and 914.01 of the Standard Specifications. The topsoil shall be tested for organic content, grain size analysis and permeability to identify necessary amendments.

Tests on amended soil shall be performed once per rain garden facility for pH and organic content. Tests for remaining parameters are required for every 500 cubic yards of soil mix, and at a minimum once per rain garden area.

Compost shall be finished (aged), and composted material shall be of plant origin. Compost shall have a carbon to nitrogen (C:N) ratio $\leq 25:1$.

Payment will be made at the contract unit price bid per cubic yard complete and in place for "Soil, Bioengineered". No additional compensation shall be allowed for over hauling common excavation suitable for topsoil, stockpiling or placement of topsoil.

914.05 Mulch

Organic mulch free from deleterious materials and suitable for top dressing of trees, shrubs or plants. Samples for Verification shall be supplied in 5 pound sample in labeled plastic bags.

- a. Shredded and processed composted hardwood bark mulch
- b. At least 6 months old
- c. Not more than 3" in length and 1/2" in width

- d. Free from sawdust, wood chips, pallets, and any recycled construction materials
- e. Slow decomposition rate, with a minimum of one year longevity
- f. Landscape Architect to approve.

SECTION 922 – TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.01 DESCRIPTION

All other materials, not superseded by the information within, shall be per INDOT Standard Specifications section 922.

922.03 SIGNAL HEAD COMPONENTS

All signal head components shall be in accordance with INDOT Standard Specification 922.03. Specifically, the housing, door, and visor of the traffic signal head shall have black color permanently molded into the components and the housing for pedestrian signal heads shall be black and made of die-cast, corrosion resistant, copper free, non-ferrous metal which shall be in accordance with ASTM B 85.

END OF SECTION