

## ADDENDUM NUMBER 01

Project Number 89008121

Project Title Englewood Boulevard Complete Streets Upgrade Highway 169 to NW Waukomis Drive

ISSUE DATE: <u>11-7-17</u>

Information to Bidders The following is provided to Bidders for information only:

Q1.	Where is the CIPP work and Manhole Lining shown in the Plans?										
A1.	Sheet K71. Note revised description for CIPP line items.										
Q2.	Is there retainage or a maintenance bond required for this project?										
A2.	In accordance with federal requirements, retainage and maintenance bonds will										
	not be included in this project.										
Q3.	Are there profile drawings of retaining walls and will handrails be subsidiary to retaining										
	walls? Details of Modular Block walls?										
A3.	There are not profile drawings of the retaining walls. Handrails will be subsidiary										
	to the cost of wall construction. Blocks shall be Big Block/Large block for MSE										
	retaining walls. Typical colors are standard concrete or Buckskin. Facing is										
	typically a natural rock face. Graffiti Protection coating shall be applied. Refer to										
	spec 06310 included in addenda, and 2701 Graffiti Protection.										
Q4.	Where is the information on Bid Item 18 – Vehicle Tracking Device?										
A4.	Sheets K144-K147 and APWA Detail ESC-01.										
Q5.	Is there a separate bid item for 6" MoDOT Type 5 shown under 4" decorative concrete?										
A5.	This quantity is included in Bid Item 13 – Rock Subbase (6" MoDOT Type 5).										
Q6.	Is there a separate bid item for street light poles?										
A6.	Street Light Poles shall be included in cost of Luminaires, see revised line items:										
	Sheet 02, L1, and Spec section 0412.										
Q7.	Is there a typical section for CG-1 Modified Curb and where on the project is it used?										
A7.	CG-1 Modified Curb has been removed and this quantity of curb added to CG-1.										

#### Contracting Requirements

- 1. 210-Notice to Contractors. Item 3. Period of Performance: Revise Contract times from 820 calendar days to 850 calendar days.
- 2. All 12-inch pipe to be restrained the length of Line 3 along N Summit St.
- 3. Additional fill material can be used by arrangement with owner of Kinsley Commercial site if needed. Soil may need conditioning to meet geotechnical fill requirements.
- 4. Anti-Collusion Statement to be inserted into Project Manual and included with Bids. Form attached.

#### **Specifications**

1. 2200.1.B – Delete "Blue Parkway & Eastwood Trafficway dated April 3, 2012" and replace with "Englewood Road Improvements dated October 30, 2015." The Geotechnical Report (Appendix A) is included in this addendum.

2. Add Section 01075 Water Main Measurement and Payment spec section - attached

#### Drawings:

- 1. Sheet K169/Water Plans Sheet 14 Add detail H.
- 2. Sheet K170/Water Plans Sheet 15 Add Service line notes:
  - 1. Contractor shall pothole and determine locations of existing 16inch DIP main, 2-inch service line (Reg No. 51506), and existing meter pit location. Coordinate location of new tee, shut off valve, and meter setting with the City.
  - Contractor shall cut into the existing 16-inch DIP main and install 16"x6" Tee with backing block and 16-inch solid sleeves. Contractor shall provide 6-inch gate valve, 6-inch plug tapped for 2" K Copper with dielectric coupling.
  - 3. Contractor shall provide 2" K copper and new 2" meter setting in accordance with Water Services Drawing 6207 of the Rules and Regulations for Water Service Line with all appurtenances. City Shall provide 2-inch meter. Contractor shall connect the new meter setting to the existing 2" water service line.
  - 4. Contractor shall demolish and remove the abandoned 2-inch meter pit.
- 3. Sheet K160/Water Plans Sheet 005 Detail A, Delete 24" DIP CL54 and replace with 24" PCCP.
- 4. Sheet 01 Revise Index of Sheets as follows: Delete Street Lighting Plans L1-L15 Replace with - Street Lighting Plans L1-L12
- 5. Sheet 02 Replace Quantity sheet with revised.
- 6. Sheet K03 Asphalt Pavement Section Revise Asph. Conc. Base Course from 5.5" to 6".

- 7. Sheets K160-K172/Water Plans Sheet 5-17: Add dropped leaders and water line labels.
- 8. Sheets K01-K03 Add note regarding 9" Fly Ash Stabilized Subgrade for all pavement.
- 9. Sheet L1 Revised quantity table.

**NOTE:** Bidders must acknowledge receipt of this Addendum by listing the number and date, where provided, on the Bid Form - Document 00410.

#### SECTION 06310 – LARGE BLOCK GRAVITY RETAINING WALL

#### PART 1 - GENERAL

- A. This section shall cover the furnishing of all labor, materials, and equipment necessary for the installation of a large-block gravity retaining wall in accordance with the information indicated on the Plans and the information contained within the Geotechnical Report.
- B. Retaining wall systems are to be furnished as installer design-build structures with design and performance of the wall as a specific obligation of the contractor.

#### PART 2 - SUBMITTALS

A. Shop Drawings: The contractor shall submit shop drawings of the large-block gravity retaining wall system signed and sealed by a Professional Engineer licensed in the State of Missouri.

B. Calculations: The Contractor shall submit signed and sealed design calculations of the large-block gravity retaining wall system. The design calculations must consider the following as a minimum:

1. External stability, including base sliding, overturning, bearing capacity, and settlement.

2. Internal stability, including pullout and tensile overstress of soil reinforcement and internal sliding between courses.

- 3. Local stability of segmental units including facing connection and bulging.
- 4. Global stability.
- 5. Gravity loads due to soil pressure resulting from grades.
- 6. Superimposed (surcharge) loads.
- 7. Connection design between blocks and geosynthetic reinforcement.

#### PART 3 - MATERIALS

A. Blocks: Concrete for blocks shall be high-strength, low absorption having a minimum 38-day compressive strength of 4,000 psi in accordance with ASTM C94 and ASTM C 1372. The concrete shall have adequate freeze-thaw protection to withstand 300 cycles of accelerated freeze-thaw cabinet exposure in accordance with ASTM C 666, with a maximum absorption rate of seven percent.

B. The exterior dimension of the face shall be approximately 48"x 16" for a full unit and 24" x16" for a half unit. Actual dimensions may vary slightly based upon manufacturer's standard block sizes. The depth of each unit shall be as required

to construct a gravity retaining wall. Texture shall be a natural rock face and color shall be standard concrete or Buckskin, or as directed by the Owner.

- C. Base Leveling Pad: The wall base leveling pad material shall consist of a compacted crushed stone base or non-reinforced concrete as determined by the contractor's retaining wall engineer.
- D. Drainage Aggregate: Drainage aggregate shall consist of clean 1" minus crushed stone or gravel meeting the requirements of the Plans.
- E. Drainage Pipe: Drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034 or corrugated HDPE pipe manufactured in accordance with ASTM D-1248. Drainage pipe shall be covered with a geotextile filter fabric.
- F. Unit adhesive: Adhesive shall be a premium, construction grade suitable for concrete and exterior applications.
- G. Backfill: Backfill material shall be job excavated material when approved by the City unless otherwise specified on the Plans.

#### PART 4 – INSTALLATION:

- A. Excavation: Contractor shall excavate to the lines and grades shown on the Plans. Overexcavation shall be filled with approved backfill or drainage fill material compacted to 95% of a standard proctor density. The Contractor shall be careful not to disturb the subbase beyond the lines shown.
- B. Foundation Preparation:
  - 1. Foundation soil shall be excavated as required for footing dimensions shown on the Plans or as directed by the City.
  - 2. Compact foundation soil zone to 95% standard proctor prior to installing base leveling pad. Soils not meeting the required strength shall be removed and replaced with acceptable material and retested.
- C. Block installation:
  - Follow manufacturer's instructions for installation. The first course of concrete blocks shall be placed on the prepared foundation, checking for alignment and level, and insuring proper contact. Blocks shall be placed side by side for the full length of the wall alignment making sure there are no gaps between blocks.

- 2. Place drainage aggregate directly behind blocks and compact in six-inch layers to 95 percent of maximum density.
- 3. Sweep off all excess material from the top of units and install the next course of blocks, drainage fill and backfill.
- 4. Tracked equipment shall not be operated directly on geo-grid reinforcement. A minimum of six inches of backfill is required prior to the operation of any tracked equipment. Turning of tracked equipment shall be held to a minimum to avoid displacing the fill and damaging the geo-grid.
- 5. Within twelve inches of the top of the wall, place impervious fill material over the drainage fill and throughout the excavated area. Impervious fill cap shall be graded to drain runoff laterally along the wall alignment.

### PART 5 – CERTIFICATION:

A. Upon completion of construction, the wall designer shall certify in writing that the wall system is installed properly. Additional geotechnical testing and/or inspection services, if necessary, shall be the responsibility of the manufacturer and shall be included in the bid price for the wall system.

## PART 6 – MEASUREMENT AND PAYMENT:

A. The large-block retaining wall shall be measured in square feet from the top of the wall to the finished grade in front of the wall (the exposed surface of the wall). Payment for large-block gravity retaining walls shall be made at the contract unit price identified in the bid tab and shall constitute full payment for all materials, labor, and equipment necessary to complete the work. Handrail installation shall be subsidiary to the large-block retaining wall work.

### **END OF SECTION 06310**

#### SECTION 01075

#### WATER MAIN MEASUREMENT AND PAYMENT

1. SCOPE. This section covers methods of measurement and payment for items of Work for water main relocations and installation of new water mains.

2. WATER MAIN PIPE. Payment for all water main pipe will be made on the basis of the unit price bid for each type. Measurements for payment will be made on a horizontal plane of the water main pipe stationing as determined by surveys made after installation. The unit price bid for each size and type of water main pipe shall include all costs incurred with excavation and trenching, removal of existing thrust blocking if required, removing and stockpiling topsoil, removal of existing piping if required, pipe embedment, piping, pipe laying, jointing materials, including gaskets, glands, and fasteners, restrained joints as required, polyethylene encasement, cutting into existing water mains, and dewatering the existing water main pipe between the connection and the nearest existing sectionalizing valves as required, backfilling with appropriate materials required by the specifications, replacing topsoil, ground water barriers, , cleanup, and all other appurtenant work required to complete the installation of the water main pipe that is not covered under another bid item.

No direct payment will be made for excavation or trenching. Excavation and trenching shall include all materials, equipment, and labor to complete the excavation and trenching work. All excavation and trenching shall be unclassified as to materials that may be encountered. In addition, trenches shall be unclassified as to depth. No separate payment will be made for different types of excavation or varying depths of trenching work.

All excavation and backfill required for other items of Work, not otherwise paid for as installed piping, shall be considered a subsidiary obligation of the CONTRACTOR and the cost of such excavation and backfilling shall be included in the prices bid for the item.

Separate payment will not be made for bracing, sheeting, shoring, or supports that may be needed by the CONTRACTOR to install the water main pipe, valves, fittings, casings and all other appurtenances. All bracing, sheeting, shoring, or supports shall be considered a subsidiary obligation of the CONTRACTOR.

3. CASING PIPE. Payment for casing pipe will be made on the basis of the unit price bid for each location and type as noted in the bid. Measurement for payment will be made horizontally along the longitudinal centerline of the casing from end to end of the casing. The unit price bid for the encasement shall include all costs in connection with excavation and backfilling for the jacking and receiving pits when jacking methods are utilized and excavation requirements for the encasement when cut and cover encasement is allowed, the excess cost of installing pipe in the casing above the amount bid for the pipe laid in open trench, casing insulators, straps, jointing materials, casing spacers, end seals, and all other work required to complete the encasement installation that is not included under another bid item. 4. BENDS WITH BACKING BLOCKS AND PLUGS. Payment for bends and associated backing blocks and plugs will be made on the basis of the unit price bid for each type of fitting above the amount paid for water main installation. The unit price shall include furnishing and installing the fitting; gaskets, glands, and bolts; concrete, reinforcing steel, and accessories for the associated backing block per the standard details; excavation, trenching, and backfill; joint restraint, and all other associated costs not included in another bid item.

5. ADAPTORS AND SLEEVE COUPLINGS. All water main adaptors and sleeve couplings, including bolts, gaskets, and glands, will be paid for at the unit price bid for each item. The unit price shall include all costs associated with the furnishing and installation of the appurtenance above the amount paid for water main installation. The unit price shall include required restraint systems including welding, excavation, trenching, and backfilling not included under the price for water main installation and all other costs not included under another bid item.

6. VALVES. All line and isolation valves will be paid for at the unit price bid for each size and type of valve. The unit price shall include all costs incurred in completing the valve installation over and above the amount paid for water main installation. The unit price shall include furnishing and installing the valve; gaskets, glands, and bolts if required; joint restraint; blocking if required; valve box; extension stem and appurtenances; torque limiting devices for butterfly valves; excavation, trenching, and backfill not included under water main installation; and all other associated costs not included under other bid items. Payment for the additional sleeve coupling required with each butterfly valve according to Construction Detail Drawing No. 09808 shall be made separately under the respective sleeve coupling unit price.

7. AIR RELEASE ASSEMBLIES. Payment for the air release assemblies will be made on the basis of the unit price bid by diameter of the valve. The unit price bid for each air release valve assembly shall include all costs incurred for excavation, trenching, and backfilling not included under the price of water main installation; precast and cast-in-place concrete vaults; reinforcing steel; castings, air valves; miscellaneous piping, isolation valves, 6-inch plugs tapped for 2-inch piping, reducing flanges and other fittings and miscellaneous piping; and all other associated work required to complete the air valve assembly as detailed on the drawings that is not included under another bid item. <u>Payment for 36"x6" Tees or 42"x6" Tees required for air</u> release assemblies shall be made separately under the Tee unit price.

8. REDUCERS. Payment for the reducers will be made on the basis of the unit price bid for each item. The unit price shall include the additional costs over and above that required for water main installation including supplemental excavation, trenching, and backfill; the additional cost of the fitting, including gaskets, glands, and bolts if required; extra shoring, sheeting, or bracing if required; polyethylene encasement; and all other associated costs not included under another bid item. The unit price shall include required restraint systems including welding, excavation, trenching, and backfilling not included under the price for water main installation and all other costs not included under another bid item.

9. TEES WITH BACKING BLOCKS, CROSSES AND WYES. Payment for tees, crosses, wyes, and associated backing blocks will be made on the basis of the unit price bid for each size tee, cross and wye. The unit price shall include excavation, trenching, and backfill not included under water main pipe construction; furnishing and installing the tee, cross or wye, including gaskets, glands, and bolts if required over and above that required for the water main pipe; joint restraint; polyethylene encasement; concrete, concrete placement, reinforcing steel, and finishing; and

all other associated costs not included under other bid items.

10. FIRE HYDRANT ASSEMBLIES. Payment for installation of hydrants will be made on the basis of the unit price bid. The unit price bid for each type of hydrant installation shall include all costs incurred in completing the hydrant work from the connection with the main to the hydrant over and above the price paid for the excavation and installation of the main. The unit price bid shall include excavation and trenching, pipe embedment, piping, fittings, jointing materials, concrete blocking, accessories and appurtenances, backfilling, cleanup, and all other associated costs required to complete the hydrant installation that are not included in another bid item. <u>Payment for all hydrant isolation</u> valves shall be made separately under the respective valve unit price.

11. STRADDLE BLOCKS. Payment for straddle blocks on ductile iron pipe water main will be made on the basis of the unit price bid for the construction of each straddle block per the standard details. The unit price bid for each size of straddle block per diameter of the water main shall include excavation, forms and supports, steel reinforcement, approved restraining device installed on the pipe, concrete, backfilling, cleanup, and all other associated costs required to complete the straddle block that are not included in another bid item.

#### 12. WATER SERVICE TRANSFERS.

A. Payment for the water service transfer for 5600 NW Waukomis Drive (Reg No. 51506) shall be made on the basis of the unit price bid. The unit price bid shall include all costs to furnish and install new 6-inch tapped plug and 30 linear feet of 2" K copper service line and meter pit per standard detail 6207 and all necessary fittings and appurtenances, backfill of the new meter pit and piping; blocking and thrust restraint; drainage, disinfection, and dewatering; disconnecting the existing services from the existing main and plugging and abandoning existing service lines, meter vault, and valves, and all other associated work required to complete the water service transfer that is not covered under another bid item. Payment for the materials and labor to excavate and cut in the new 16"x6" Tee with 6-inch branch valve and new 16-inch solid sleeve on the existing 16-inch ductile iron main shall be made separately under the respective tee, sleeve, and valve unit prices.

B. Payment for the water service transfers for 1506 NW Englewood Road and 5800 N Madison Avenue shall be made separately under the respective pipe, bends, tees, sleeve couplings, valves, straddle block, testing and disinfection unit prices, and all other applicable unit prices required to complete the Work.

#### END OF SECTION

# Appendix A

Report of Subsurface Exploration and Geotechnical Engineering Evaluation

Englewood Road Improvements

# REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

ENGLEWOOD ROAD IMPROVEMENTS KANSAS CITY, MISSOURI TSI PROJECT NUMBER 20152010

**LUTJEN, INC.** 1301 Burlington Street North Kansas City, Missouri 64116



1322 Adams Street Kansas City, Kansas 66103

October 30, 2015



October 30, 2015

Mr. Scott Cargill LUTJEN, INC. 1301 Burlington Street North Kansas City, Missouri 64116

#### Re: Report of Subsurface Exploration and Geotechnical Engineering Evaluation Englewood Road Improvements Kansas City, Missouri TSi Project No. 20152010

Dear Mr. Cargill:

TSi Geotechnical, Inc. (TSi) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the referenced project and is pleased to submit this report of our findings to Lutjen, Inc. (Lutjen). The purpose of our work was to determine subsurface conditions at specific exploration locations and to gather data on which to prepare geotechnical recommendations for the design and construction of the proposed improvements to NW Englewood Road in Kansas City, Missouri. This report describes the exploration procedures used, documents the data obtained, and presents our evaluations and recommendations relative to the geotechnical engineering aspects of the project.

We appreciate the opportunity to assist you with this project. If you have any questions, or if we may be of further service to you, please call us.

Respectfully submitted, **TSI GEOTECHNICAL, INC.** 

Times

Jim Jacobe, PE



Denise B

Principal

1322 Adams Street Kansas City, KS 66103 913.749.4010 (tel) 913.749.4011 (fax)

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Unified Soil Classification System

# SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION ENGLEWOOD ROAD IMPROVEMENTS KANSAS CITY, MISSOURI

### 1.0 Scope of Services

This report summarizes the results of a geotechnical study performed for the proposed improvements to NW Englewood Road in Kansas City, Missouri. The study was performed in general accordance with TSi's proposal to Lutjen, dated October 28, 2014, which identified the following items for inclusion in this study report:

- subsurface conditions at the boring locations;
- laboratory test results;
- influence of groundwater on the project;
- infiltration and dewatering recommendations;
- lateral earth pressures for subsurface structures;
- pavement recommendations;
- minimum setback recommendations for excavations near existing structures;
- seismic site classification per MoDOT guidelines;
- excavation and general construction considerations;
- recommendations for fill and backfill materials, placement, and compaction; and
- recommendations for observation and testing services during construction.

## 2.0 SITE AND PROJECT DESCRIPTIONS

This project includes the design of Englewood Road from just east of US 169 to Waukomis Drive and will include the relocation of North Summit Street. The proposed roadway will be a two-lane boulevard with raised median, bicycle lanes, sidewalks, street lights, and left turn lanes at the relocated North Summit, North Liberty, and North Mercier intersections. The US 169 interchange will also be improved and will include widening to provide a six-lane section underneath US 169. The project will also include sidewalks behind the bridge piers and traffic signal improvements. A right turn lane will be added to both off-ramps. Enclosed storm sewer systems will be designed as part of the project. MoDOT standard plans or pre-cast typical drawings will be used for the reinforced concrete box culvert just west of North Summit. A single-lane roundabout at the intersection of Englewood Road and Waukomis Drive is also planned for this project. North Summit will be relocated 400 feet to the west and will be improved for approximately 800 feet north of Englewood, and the design professional will evaluate the possibility of constructing a sidewalk up to NW 57<sup>th</sup> Terrace.

Englewood will be designed as an APWA secondary arterial with AASHTO design standards for K-values. The posted speed limit is 35 mph; therefore, the design speed will be 40 mph. Modification from requirements in APWA standards, and KCMO supplements, will be noted and identified. Improvements to the interchange ramps will be designed to MoDOT standards.

The general location of the project site is shown below. The Site and Boring Location Plans, Figures 1.1 and 1.2 in Appendix A, provide a more detailed plan of the project area.



# 3.0 FIELD EXPLORATION AND LABORATORY TESTING

#### 3.1 FIELD EXPLORATION

TSi conducted an exploration program between July 24 and October 8, 2015 consisting of fifteen soil borings, designated as Borings B-01 to B-13, B-06A and B-09A; and four pavement cores, designated as C-01 to C-03 and C-01A. The logs from this exploration are included in Appendix B. The approximate locations of the borings are indicated on the Site and Boring Location Plans, Figures 1.1 and 1.2 in Appendix A. The boring locations were selected by Lutjen and staked in the field by TSi. Approximate elevations were provided by Lutjen and based on the survey data.

Borings B-01 and B-04 through B-13 were drilled using a CME -75 track-mounted drill rig to advance hollow-stem auger and continuous flight auger drilling tools to the requested depth or auger refusal. Borings B-06A and B-09A were drilled using a CME-45 truck-mounted drill rig to advance continuous flight auger drilling tools to the requested depth or auger refusal. Due to access, Borings-02 and -03 were drilled with hand auger drilling tools. A geotechnical specialist from TSi directed the exploration procedures in the field, maintained a field log of the conditions encountered in the borings, and collected and classified the samples recovered. Split-spoon and Shelby tube samples were recovered from the borings. Split-spoon samples were recovered from the borings using a 2-inch outside-diameter, split-barrel sampler, driven by an automatic hammer in accordance with ASTM D 1586. The split-spoon samples were placed in plastic bags for later testing in the laboratory. Shelby tube samples were obtained in accordance with ASTM D 1587. The Shelby tube samples were 3 inches in diameter and were preserved by sealing the entire sample in the tube. Borings were backfilled with auger cuttings.

The results of the field tests and measurements were recorded on field logs and appropriate data sheets by TSi's geotechnical specialist. Those data sheets and logs contain information concerning the exploration methods, samples attempted and recovered, indications of the presence of various subsurface materials, and the observation of groundwater. The field logs and data sheets contain the engineer's interpretations of the conditions between samples, based on the performance of the exploration equipment and the cuttings brought to the surface. The final logs included in this report were based on the field logs, modified as appropriate based on the results of laboratory testing of soil samples.

#### 3.2 LABORATORY TESTING

A laboratory testing program was conducted by TSi to determine selected engineering properties of the obtained soil samples. The following laboratory tests were performed on the samples recovered from the borings:

- visual description by color and texture of each sample (ASTM 2488);
- natural moisture content of each sample (ASTM D 2216);
- Atterberg limits on selected cohesive samples (ASTM D 4318);
- sieve analysis of selected granular materials (ASTM D 422);
- unconfined compressive strength of selected cohesive samples (ASTM D 2166);
- unit weight of selected cohesive samples (ASTM D 7263);
- standard Proctor compaction of selected samples (ASTM D 698); and
- California Bearing Ratio (CBR) (ASTM D 1883).

The results of the laboratory tests are summarized on the Logs of Boring. Results of the standard Proctor and CBR are included in Appendix C. The analyses and conclusions contained in this report are based on field and laboratory test results and on the interpretations of the subsurface conditions as reported on the logs. Only data pertinent to the objectives of this report have been included on the logs; therefore, these logs should not be used for other purposes.

### 4.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered at the boring locations are shown on the logs in Appendix B. The general subsurface conditions encountered and their pertinent engineering characteristics are described in the following paragraphs. Conditions represented by the borings should be considered applicable only at these locations on the dates shown; the reported conditions may be different at other locations or at other times.

#### 4.1 GENERALIZED SUBSURFACE PROFILE

The borings were drilled along the proposed alignment of Englewood Road, most of which encountered native clay soil at the surface. Three borings encountered fill at the surface, Borings B-02, -03 and -06. Borings B-02 and -03 were drilled near Highway 169 and Boring B-06 was drilled within the roadway pavement of the existing Englewood Road. Underlying the surficial soil or fill, all of the borings encountered lean to fat clay (CL or CH, in accordance with the Unified Soil Classification System) with varying amounts of sand, to depths ranging between 2.0 and 20.0 feet.

Shale and/or limestone was encountered below the lean to fat clay in all of the borings except Borings B-02, -03, -07, -09A, -12, and -13. In these six borings, lean and fat clays (CL and CH) continued to boring termination depths.

The standard penetration test (N) values in the clay ranged from 2 to 27 blows per foot (bpf) with an average of 8. Moisture content tests of the clay ranged from 17% to 33% with an average of 24%. Atterberg limits tests on samples of the clay resulted in liquid limits (LL) of 33 to 54 and plasticity index values (PI) of 16 to 34. Dry unit weights of the clay range from 94 to 120 pounds per cubic foot (pcf), with an average of 105 pcf. Unconfined compressive strength tests on samples of the clay resulted in undrained shear strengths of 0.20 to 2.12 tons per square foot (tsf), with an average of 0.76 tsf.

Four pavement cores, C-01 through -03 and C-01A, are summarized in Table 1 below. C-01 was drilled in the shoulder and the other three were drilled in the roadway. Photographs of the pavement cores are included in Appendix D.

Boring Location	Asphalt (in)	Concrete (in)
C-01	9.00	NE
C-01A	4.25	6.75
C-02	1.50	8.00
C-03	1.50	8.00

# TABLE 1.PAVEMENT THICKNESS

NE = Not Encountered

#### 4.2 GROUNDWATER

Groundwater was observed during drilling in three borings at varying depths, summarized in Table 2 below. The presence or absence of groundwater at a particular location does not necessarily mean that groundwater will be present or absent at that location at other times. Seasonal variations, the water level in the nearby creek, and other unknown considerations will cause fluctuations in water levels and the presence of water in the soils. During rainy seasons, groundwater may be present in the fill, perched above the limestone or shale bedrock, or within seams in the limestone bedrock.

	GROUIDWIII							
Boring	Groundwater	Groundwater						
Location	Depth While Drilling (ft.)	Elevations (ft.)						
B-02	10.0	886.0						
B-07	18.5	832.2						
B-12	13.0	776.8						

# TABLE 2.GROUNDWATER

# 5.0 Engineering Assessments and Recommendations

#### 5.1 CONSTRUCTION CONSIDERATIONS AND SUBGRADE MATERIALS

Existing structures adjacent to trenches and excavations should be monitored when the distance between the edge of the excavation and the structure is less than the total depth of the excavation. In these cases, the structure should be closely monitored for any unacceptable movement during construction. If the measurements show unacceptable movement, the construction activities should be halted and stabilization of the adjacent structures should be considered.

The current project plans show new pavement areas over existing drainage swales adjacent to the roadways. The bottoms of these drainage swales will likely be soft, wet, and contain a greater thickness of organic soil than encountered in the surrounding borings. The soft material may continue several feet below the bottom of the drainage swale. TSi recommends that any soft and/or organic soil encountered in these or other areas be excavated until a subgrade is encountered that can pass the proofrolling recommendations described in Section 6.1 of this report.

The project includes extending a concrete box culvert within the creek. TSi probed the base of the creek and determined that limestone and/or intact shale was present within 1 to 2 feet.

#### 5.2 SWELLING SHALE CONSIDERATIONS

Shale bedrock may be exposed during excavation in some areas. The shale bedrock is of concern with regard to its potential for volume change. This concern applies to this material whether it is in its natural condition or used as fill material. This material tends to swell when it absorbs water and to shrink when it dries out. Some relatively simple design and construction considerations are recommended that will help to maintain the natural moisture content of the shale. Avoiding conditions that could result in excessive wetting or drying of the shale will reduce its potential for volume change. The following design and construction precautions are recommended:

- 1. Shale material should not be used as backfill within 2 feet of the pavement section or 2 feet of the ground surface in unpaved areas.
- 2. Shale used as fill should be placed and compacted wet of its optimum moisture content, as discussed in Section 6.5 of this report.
- 3. The shale maximum particle size should not exceed 2 inches in any dimension.
- 4. Positive surface drainage should be provided during and after construction to prevent ponding of water in and around the trench.
- 5. Excavations into shale should be backfilled with lean clay to avoid collecting water in crushed limestone backfill on top of shale.

#### 5.3 LATERAL EARTH PRESSURES FOR WALLS AND BURIED STRUCTURES

Lateral earth pressure parameters are provided for the design of the soil nail walls and buried structures such as manholes or concrete boxes that may be included in the project. It is assumed that the walls of these structures will be restricted from movement at the top and therefore should be designed to resist at-rest earth pressures. Earth pressures are a function of the excavation configuration and the backfill materials. Table 3 provides recommended design parameters for subsurface walls with horizontal surfaces behind and in front of the wall. Undrained values should be used for calculation of lateral pressures for those portions of wall that extend below the highest level of anticipated groundwater, or where positive drainage of the wall backfill is not provided.

Significant wall movements would generally be necessary to develop the full values of passive pressures given; typically the passive values stated are reduced by up to one-half for design. The effects of vertical surcharge loads are not included for the stated fluid pressures. Resistance to sliding along the soil/concrete interface at the bottom of the buried concrete structures may be analyzed using an ultimate friction factor of 0.30. An appropriate factor of safety should be applied to this friction factor.

Parameter		Crushed Limestone	Cohesive Soil		
At-Rest Equivalent	Drained	55 pcf	74 pcf		
Fluid Pressure	Undrained	90 pcf	100 pcf		
Passive Equivalent Fluid	Drained	480 pcf	296 pcf		
Pressure	Undrained	310 pcf	210 pcf		
Active Equivalent Fluid	Drained	35 pcf	52 pcf		
Pressure	Undrained	80 pcf	88 pcf		
Soil Unit Weight		130 pcf	125 pcf		
Angle of Internal Friction	for Backfill	35°	24°		
Assumed Surcharge Cond	ition	None	None		
Slope Profile behind Wall		Horizontal	Horizontal		

# TABLE 3. LATERAL EARTH PRESSURE PARAMETERS FOR WALLS AND SUBSURFACE STRUCTURES

No factor of safety has been applied to the above values.

pcf = pounds per cubic foot

#### 5.4 PAVEMENT DESIGN

A California Bearing Ratio (CBR) test of the native soil was conducted on a combined sample of subgrade soil from 0 to 2 feet across the site. This test resulted in a CBR of 3.1. The CBR test results are included in Appendix C of this report. Based on the general character of the on-site subsurface conditions and assuming a properly prepared subgrade, the measured CBR value of 3 is considered appropriate for use in designing the flexible pavement sections for the site.

Rigid pavement design can be based on a modulus-of-subgrade reaction (k) of 75 pounds per cubic inch (pci) for the subgrade. These values for rigid and flexible pavement design are based on the requirement that the pavement subgrade is prepared in accordance with the recommendations provided in this report.

TSi recommends that the subgrade be stabilized with "Class C" fly ash. Stabilization of the subgrade will provide a stiffer, more durable subgrade, which will improve the durability of the pavements. It will also provide a subgrade that is less prone to disturbance under construction traffic, especially during rainy weather.

A fly ash-treated Proctor and CBR testing was not included in the scope of this exploration. Based upon previous experience, the pavement subgrade should be stabilized with "Class C" fly ash applied at a rate of 15% of the treated soil on a dry weight basis to a depth of 9.0 inches. TSi can determine the optimal percentage of fly ash application in the laboratory using additional soil samples from the site to perform standard Proctor and CBR tests at varying fly ash percentages. The soil should be treated and compacted in lifts with a maximum thickness of 9.0 inches to help mixing of the soil and fly ash. Based on previous experience, a design CBR value of 20 and a modulus-of-subgrade reaction (k) of 240 pci can be used for fly ash-treated soils. This CBR value should be verified during construction using dynamic cone penetrometer (DCP) tests. The stabilized soils should be compacted as recommended in Section 6.5 of this report. Suggested specifications for the fly ash stabilization can be provided if desired.

#### 5.5 SLOPE STABILITY

Final grading plans should limit cut and fill slopes to inclinations no steeper than 3 Horizontal to 1 Vertical (3H:1V). Slopes steeper than 3H:1V may be stable, but should be analyzed on a caseby-case basis, and would be harder to maintain. In general, grading should be designed to prevent surface water from collecting at the top of slopes and to avoid concentrated flow over the slopes, which would increase the potential for soil erosion.

If a 2H:1V slope is desired in areas of limited right of way, a rock wedge slope may be constructed. The rock wedge should be constructed of Class C material with a maximum size of 24 inches. The size of the rock wedge depends on the properties of the embankment fill. TSi utilized design friction angles and unit weights of 35 degrees and 135 pounds per cubic foot (pcf) for the rock wedge, and 24 degrees and 125 pcf for the clay material in analyzing the slope for design. The embankment fill parameters were selected to reflect the locally available soils.

Figure 2 below gives the general slope and dimensions of an acceptable rock wedge. In general, grading should be designed to prevent surface water from collecting at the top of slopes and to avoid concentrated flow over the slopes, which would increase the potential for soil erosion.



5.6 SEISMIC SITE CLASSIFICATION

Based on MoDOT EPG Figure 751.9.1.3.3, the project site is located within Seismic Performance Category (SPC) "A". As such, the soils at the site are not considered susceptible to liquefaction or substantial settlement or loss in strength when subject to the design earthquake loading. The seismic analysis and design procedures outlined in MoDOT EPG 751.9.1 are not required for this project.

# 6.0 SITE PREPARATION AND EXCAVATION CONSIDERATIONS

#### 6.1 SUBGRADE PREPARATION

Construction areas should be stripped of existing pavement, organic soil, and any deleterious materials prior to site excavation and grading. Tree stumps and root balls should also be removed. Care should be taken during stripping to prevent excessive disturbance of the underlying soil. After the removal of these materials, and where further excavation is not required, the exposed subgrade should be proofrolled. Proofrolling is accomplished by passing over the subgrade with proper equipment, such as a loaded tandem-axle dump truck or scraper, and observing the subgrade for pockets of excessively soft, wet, disturbed, or otherwise unsuitable soils. Any unacceptable materials thus found should be excavated and either recompacted or replaced with new structural fill.

Prior to placing fill in any area, the subgrade should be scarified to a depth of about 6 inches, the moisture content adjusted to near its optimum moisture content, and the subgrade recompacted in accordance with recommendations made in subsequent sections of this report. The recommended proofrolling and/or scarification and recompaction may be waived if, in the opinion of a geotechnical engineer, this procedure would be detrimental or unnecessary. Following satisfactory preparation of the subgrade, controlled fill material may be placed.

#### 6.2 EXCAVATIONS

Trenching, excavating, and bracing should be performed in accordance with Occupational Safety and Health Administration (OSHA) regulations and other applicable regulatory agencies. In accordance with the OSHA excavation standards, the existing silt and clay soils at the site are considered Type C, which requires a side slope for excavations of not steeper than 1.5 horizontal to 1.0 vertical (1.5H:1.0V). However, worker safety and classification of the excavation soil is solely the responsibility of the contractor. Also according to OSHA requirements, any excavation extending to a depth of more than 20 feet must be designed by a registered professional engineer. An excavation retention system, such as soldier pile and lagging or sheet piling, may be used as an alternate to sloping back the sides of trench excavations.

#### 6.3 SUBGRADE PROTECTION

Construction areas should be properly drained in order to reduce or prevent surface runoff from collecting on the exposed subgrade. Any ponded water on the exposed subgrade should be removed immediately. Temporary stormwater swales and collection areas may be required to control surface water flow into low areas of the site.

To prevent unnecessary disturbance of the subgrade soils, heavy construction vehicles should be restricted from traveling through the finished subgrade. If areas of disturbed subgrade develop, they should be properly repaired in accordance with the recommendations in this report.

The clay soils and shale present at the site are highly susceptible to disturbance from construction traffic, especially during rainy weather. Consideration should be given to leaving cut areas 1 to 2 feet higher than planned subgrade until immediately before paving operations are planned. The extra material that is left in place would protect the final subgrade from disturbance.

Immediately prior to construction of the pavement, it is recommended that the exposed subgrade be evaluated to determine whether moisture contents are within the recommended range and to identify areas disturbed by construction operations. Moisture conditioning of wet or dry areas is recommended prior to construction of the pavement section. Areas disturbed by construction traffic should be reworked.

#### 6.4 FILL AND BACKFILL MATERIALS

Soil with decayable material such as wood, trash, metal, or vegetation is typically not acceptable. Shale and fat clay should not be placed within 2 feet of the pavement section. Shale should not be placed within 2 feet of the ground surface in unpaved areas.

Some of the fill material may require the addition of moisture prior to compaction. This should be performed in a controlled manner using a tank truck with a spray bar, and the moistened soil should be thoroughly blended with a disk or pulverizer to produce a uniform moisture content. Repeated passages of the equipment may be required to achieve a uniform moisture content. If fill is placed during the winter season, fill materials should be carefully observed to see that no ice or frozen soils are placed as fill or remain in the base materials upon which fill is placed.

Some of the fill material may require moisture reduction prior to compaction. During warm weather, moisture reduction can generally be accomplished by disking, or otherwise aerating the soil. When air-drying is not possible, a moisture-reducing chemical additive, such as lime or Class C fly ash, may be used as a drying agent.

#### 6.5 FILL AND BACKFILL PLACEMENT

Cohesive fill should be compacted to a dry density of at least 95% of the standard Proctor maximum dry density (ASTM D 698) of the soil. Granular material, such as crushed limestone, placed for structure or pavement support, should be compacted to at least 100% of the standard Proctor maximum dry density. The moisture content of silt, clay or granular fill at the time of compaction should be within  $\pm 3\%$  of the optimum moisture content of the material as determined by the standard Proctor compaction test. The moisture content of fat clay or shale fill materials should be from the optimum moisture content to 4% above optimum. Fill should be placed in loose lifts not in excess of 8 inches thick, and compacted to the aforementioned criterion. However, it may be necessary to place fill in thinner lifts to achieve the recommended compaction when using small hand-operated equipment.

# 7.0 CONSTRUCTION OBSERVATION AND TESTING

It is recommended that TSi be retained during construction to perform testing and observation services for the following items:

- observation and documentation of the exposed soil after stripping topsoil during scarification, compaction, and proofrolling;
- testing of asphalt and concrete materials used for paving;
- construction of soil nail walls; and
- placement and compaction of fill materials.

These Quality Assurance services should help verify the design assumptions and maintain construction procedures in accordance with the project plans, specifications, and good engineering practice.

### 8.0 REPORT LIMITATIONS

This geotechnical report has been prepared for the exclusive use of **LUTJEN**, **INC.** for the specific application to the subject project. The information and recommendations contained in this report have been made in accordance with generally accepted geotechnical and foundation engineering practices; no other warranties are implied or expressed.

The assessments and recommendations submitted in this report are based in part upon the data obtained from the borings. The nature and extent of variations between the borings may not be evident at this time. If variations appear evident at a later date, it may be necessary to re-evaluate the recommendations of this report.

We emphasize that this report was prepared for design purposes only and may not be sufficient to prepare an accurate construction bid. Contractors reviewing this report should acknowledge that the information and recommendations contained herein are for design purposes.

If conditions at the site have changed due to natural causes or other operations, this report should be reviewed by TSi to determine the applicability of the analyses and recommendations considering the changed conditions. The report should also be reviewed by TSi if changes occur in the structure location, size, and type, in the planned loads, elevations, grading and site development plans or the project concepts.

TSi requests the opportunity to review the final plans and specifications for the project prior to construction to verify that the recommendations in this report are properly interpreted and incorporated in the design and construction documents. If TSi is not accorded the opportunity to make this recommended review, we can assume no responsibility for the misinterpretation of our recommendations.

# **APPENDIX** A

Site and Boring Location Plan







Figure 1.1, Site and Bori	Project No. 20152010	
Englewood Road Improv Kansas City, Missouri	211	
Not to Scale	Approved by: KDF	





# **APPENDIX B**

Logs of Boring General Notes Unified Soil Classification System

	LC Pro	) <b>G</b> ject	OF Desc	<b>BO</b> criptic	RING NO. B-01	6	TSi Geotechnical 1322 Adams Street Kansas City, KS 66103 (012) 740 4040 (012) 740 4041 FAX							TSI			
	Leptn, teet	Samples	Sample #	Graphic Log	Surface El.: 900.1 Location: Northing Easting:	: 1102761.88 2763428.38		Recovery %	dor 13) 14	Penetration Blows Per 6 inches	Hand Penetrometer	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_	-				Brown, lean CLA roots Brown, lean CLA organics	Y, with grass an	nd										
_	_ 5 —	X	SS-1		Brown to light gra trace sand (91% passing No.	Brown to light gray, fat CLAY (CH), trace sand (91% passing No. 200 sieve) SHALE, brown to light gray, highly weathered, trace sand				2 2 4				22	54	21	33
_	_		ST-2		weathered, trace	sand	ny	89				1.12	113	16			
1 1  	 0	X	SS-3					94		11 22 36				14			
- -1 -	-  - -	X	SS-4		- gray below 16.0	ft.		100		20 42 50				14			
ENGLEWOOD GINT.GPJ 10/26/15	02	X	SS-5 SS-6					80		14 50/6" 30 50/4"				8			
	25     25     Completion Depth:     Date Boring Started:     Date Boring Completed:     Engineer/Geologist:     Project No.:		38.00 7/25/15 d: 7/25/15 JJ 20152010	Remarks: Bol Gro ST- Aug	arks: Boring drilled with CME-75 using HSA and auto SPT. Groundwater not encountered during drilling. ST-2 refusal at 7.5 ft. Auger refusal at 38.0 ft.												

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.



The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

F	L <b>C</b> Pro	) <b>G</b> ject	<b>OF</b> Desc	<b>BO</b> criptio	RING NO. B-02 on: Englewood Road Kansas City, Miss	ר 1 <b>ו</b> (	TSi Geotechnical 1322 Adams Street Kansas City, KS 66103 (913) 749-4010 (913) 749-4011 FAX							TSI geotechnical, inc		
Douth foot	nepiti, leet	Samples	Sample #	Graphic Log	Surface El.: <b>896.0</b> Location: <b>Northing</b> <b>Easting:</b> MATERIAL DE	: <b>1102884.51</b> <b>2763208.07</b> SCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_	_				Brown, lean CLAY, with grass and roots Gray, lean CLAY (CL) with sand and shale pieces (FILL)											
- - {	5 -		ST-1		- brown below 6.0 ft						0.51	118	13			
_	-		ST-2		- gray below 8.0 f	i.	92				0.32	114	17			
1 	0		CT 2		☑ Gray, lean CLAY - brown and gray	☑ Gray, lean CLAY (CL)					2 12	107	22	20	10	21
-  -  -1			51-5								2.12	107		39	10	21
_			ST-4		Gray, fat CLAY (C	<i>.</i> н)					0.20	94	32			
NGLEWOOD GINT.GPJ 10/26/15	.0 — — — —				Boring terminated	at 20.0 ft.										
Date Boring Started: Date Boring Completed: Date Boring Completed: Engineer/Geologist: Project No.:			n Dept ng Star ng Com Geolog	h: ted: plete ist:	20.00 8/28/15 d: 8/28/15 AB 20152010	Remarks: Boring drilled using hand auger equipment. Boring offset 10.0 ft. south. Groundwater encountered at 10.0 ft. during drilling.										

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

	<b>OG</b>	OF Desc	BO		ך 1	TSi Geotechnical 1322 Adams Street									
		. DC30		Kansas City, Miss	souri	۲ (	(ansas 913) 74	City, k 49-401	(91) 0 (91)	03 3) 749-	4011 F.	AX		otechnica	al, inc.
Depth, feet	Samples	Sample #	Graphic Log	Surface El.: <b>894.0</b> Location: <b>Northing</b> <b>Easting:</b> MATERIAL DE	: 1103027.16 2763210.57 ESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_				Brown, lean CLA	Y, with grass and										
_ _ _ 5 _		ST-1		Gray and brown, with sand and sha	ean CLAY (CL), ale pieces (FILL)	100					100	25			
- -10 -	-	ST-2				100				0.60	120	13			
-	-			Brown, lean CLA	(CL), with sand										
_ _ _15 _	_	ST-3		Brown, lean CLAY (CL), with sand - gray and brown, trace sand below 13.1 ft.		100					104	20	33	17	16
_ _ 	-	ST-4				100				0.64	104	22			
s ENGLEWOOD GINT.GPJ 10/26/1	-			Boring terminated	at 20.3 ft.										
25 Completion Depth: Date Boring Started: Date Boring Completed: Engineer/Geologist: Project No.:			ted: npleteo jist:	20.30 8/28/15 d: 8/28/15 AB 20152010	Remarks: Boring drilled using hand auger equipment. Groundwater not encountered during drilling.										

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

	LC Pro	<b>)</b> G	<b>OF</b>	<b>BO</b>		onts	TSi Geotechnical 1322 Adams Street										
			Dest	, ipuc	Kansas City, Miss	souri	,	K (!	ansas 913) 74	49-401	(S 661 0 (91)	103 3) 749-	4011 F	AX	ge ge	otechnic	al, inc.
	Depth, feet	Oepth, feet Samples Graphic Log			Surface El.: 895.4 Location: Northing Easting: MATERIAL DE	: <b>1102798.8</b> <b>2762889.94</b> SCRIPTION	<b>:4</b>	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
					Brown, lean CLA	Y, with grass	s and										
-					Brown, lean CLA	Y (CL)	/			2							
-	- 5		SS-1					100		24	1.25			28			
-			ST-2					58			3.50	0.95	104	21			
-	- 10- 		SS-3		Top and apply fat			89		4 5 6	2.00			18			
			SS-4		Tan and gray, fat CLAY (CH) (92% passing No. 200 sieve)			100		5 6 10	>4.00			21	50	20	30
		X	SS-5		SHALE, tan, mod	erately wea	thered	100		18 29 50/5"	>4.00			13			
B ENGLEWOOD GINT.GPJ 10/26/15	  				Boring terminated	at 20.0 ft.											
Completion Depth: Date Boring Started: Date Boring Completed: Engineer/Geologist:				h: ted: ipleteo ist:	20.00 7/24/15 d: 7/24/15 AB 20152010	Remarks:	Boring drille Groundwate	ed wi er no	th CI t enc	ME-7 count	5 usii ered	ng F <i>I</i> durin	A and Ig drill	auto ing.	) SP⁻	Г.	

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.


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					Souri		(	913) 7	49-401	0 (91	5) 749-	4011 F	~~	ge	otecnnic	ai, inc.
Depth, feet	Samples	Sample #	Graphic Log	Surface EI.: 874.6 Location: Northing Easting:	: 1102944.6 2762776.72	64 2	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
	-		P 6 4	Portland cement		0")										
				Gray, lean CLAY concrete pieces (	(CL), with FILL)	,			1							
- 5 -		SS-1					67		3 4				23			
		OT 0		Brown, lean CLA	Y (CL)					0.00	0.70	101	0.1			
		51-2					42			3.00	0.73	101	24			
		SS-3		Gray, fat CLAY (C	CH)		72		1 2 3				25			
 - 15-  		SS-4					78		4 5 5				24	54	20	34
		SS-5		SHALE, greenish weathered	brown, hig	hly	67		7 15 13				15			
	_			Boring terminated	l at 20.0 ft.											
THE Date Date Date Date Date Date Date	npletio e Bori e Bori ineer/ ect N	on Dept ng Star ng Con 'Geolog o.:	th: ted: npleteo gist:	20.00 8/28/15 d: 8/28/15 NC 20152010	Remarks:	Boring drille Groundwate offset appro	ed wi er no ox. 10	th Cl ot end 00 ft.	ME-7 count East	5 usi ered due	ng F <i>I</i> durin to uti	A and ig drill ility co	auto ing. onflic	o SP⁻ Bori ts.	T. ing	

L(	0G	OF Desc	<b>BO</b>	RING NO. B-06	SA Improveme	nts	T 1	Si Ge 322 A	otechi dams S	nical Street	102				<i>W</i>	
	- <b>j</b>			Kansas City, Miss	souri		r (!	913) 7	49-401	0 (91	3) 749-	4011 F	٩X	geo	otechnica	al, inc.
Depth, feet	Samples	Sample #	Graphic Log	Surface El.: 838.0 Location: Northing Easting: MATERIAL DE	1: 1102987.5 2762351.66	6	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Asphaltic concrete	e (6.0")		_									
  - 5 - 		SS-1		Dark brown, silty	lean CLAY (	CL)	67		2 2 3				23			
 - 10- 		SS-2					100		2 2 3				27			
  - 15-		SS-3		Brown, fat CLAY	(CH) elow 14.5 ft		100		3 3 6				23			
s enciemono ginti chi 				LIMESTONE, gra weathered Boring terminated	y, highly I at 16.8 ft.	/										
Eng Proj	npletic e Bori e Bori ineer/ ect No	on Dept ng Star ng Com Geolog o.:	h: ted: pleteo ist:	16.80 10/8/15 d: 10/8/15 KH 20152010	Remarks: I	Boring drille Groundwate Auger refus	ed wi er no al at	th CN t end 16.8	ME-4 count 5 ft.	5 usii ered	ng H durin	SA an Ig drill	d au ing.	ito SI	PT.	

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Depth, feet	Samples	Sample #	Graphic Log	Surface El.: <b>850.7</b> Location: <b>Northing: 1103018.35</b> <b>Easting: 2761926.58</b> MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_				Brown, lean CLAY, with grass and										
_				Brown, lean CLAY (CL), with organics										
- - 5 -		SS-1		(89% passing No. 200 sieve)	94		1 2 2				24	48	17	31
_	_	ST-2		- red-brown, trace sand below 7.0 ft.	75				0.51	97	26			
10  		SS-3			100		1 2 2				27			
_ _ 15 _ _		SS-4		Σ	100		2 1 3				23			
-20		SS-5			100		1 2 3				25			
				Boring terminated at 20.0 ft.										
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<b>L</b> ( Pr	OG oject	OF Desc	<b>BO</b> criptio	RING NO. B-08 on: Englewood Road Improvements Kansas City, Missouri	-	TSi Ge 1322 A Kansas (913) 7	eotechi dams S City, F 49-401	nical Street (S 66 <sup>-</sup> 0 (91	103 3) 749-	-4011 F.	AX			al, inc.
Depth, feet	Samples	Sample #	Graphic Log	Surface El.: <b>867.9</b> Location: <b>Northing: 1103019.47</b> <b>Easting: 2760877.98</b> MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown, lean CLAY, with grass, roots, and gravel										
				- trace organics from 3.5 to 5.0 ft.	100		2							
- 5 - 		55-1		- red-brown below 6.0 ft.	100		24				23			
 		ST-2		(92% passing No. 200 sieve)	100		2		0.69	101	24	48	15	33
- 10  							4				24			
- 15· 		SS-4			100		2 2				25			
		SS-5			_100		2				21			
-20-				SHALE, tan and light gray, highly weathered			7							
3 ENGLEWOOD GINT.GPJ 10/26	_			LIMESTONE, gray, highly weathered Boring terminated at 20.0 ft.										
Con Date Date Date Date Con Date Date Date	npletic e Bori e Bori ineer/ ect No	on Dept ng Star ng Com Geolog o.:	h: ted: ipleteo ist:	20.00 Remarks: Boring drill 7/25/15 Groundwat d: 7/25/15 JJ 20152010	ed w er no	ith CI ot end	ME-7 count	5 usi ered	ng F <i>i</i> durin	A and ng dril	auto ling.	) SP⁻	Г.	

	LC	)G	OF	BO	RING NO. B-09			T	Si Ge	otechr	nical						
	Pro	ject	Desc	riptic	on: Englewood Road	Improvem	ents	ı لا	SZZ A	City, K	Sireel (S 661	03	4044 5	A \/		ſSI	l
┢					Kansas City, Miss	Souri		(	913) 74	49-401	0 (91)	3) 749-	4011 F	4X	geo	otechnica	al, inc.
	Depth, feet	Samples	Sample #	Graphic Log	Surface El.: 856.8 Location: Northing Easting: MATERIAL DE	: 1103011.3 2760028.55	30 5	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
					Brown, lean CLA roots	/, with gras	s and										
					Brown, lean CLA	(CL)											
	· _	Y	SS-1		Brown, fat CLAY	(CH)	eam	89		5	2.00			33			
	5				at 4.0 ft.					5							
	· _	Å	SS-2		weathered to wea	thered	ny	100		17 50/5"				4			
		×	SS-3					80		50/5"				3			
B ENGLEWOOD GINT.GPJ 10/26/15	·				Boring terminated	at 10.0 ft.											
<u> <c lab<="" log="" u="" with=""></c></u>	Com Date Date Engir Proje	5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5															



LOG	OF	BO	RING NO. B-10		T	Si Ge	otech	nical						
Projec	t Desc	criptio	on: Englewood Road Improvements	;	1 K	322 A	City, F	Street (S 661	103				rsi	I
			Kansas City, Missouri		()	913) 74	49-401 	0 (91)	3) 749- I	-4011 F.	AX	ge	otechnica	al, inc.
Depth, feet Samples	Sample #	Graphic Log	Surface El.: 852.2 Location: Northing: 1103060.42 Easting: 2759771.18		Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		<u></u> .	Brown, lean CLAY, with grass ar	nd										
			roots Brown, lean CLAY (CL), with limestone pieces											
	SS-1				44		1 2 2	0.75			19			
	SS-2				100		8 12 3	>4.5			25			
-10-	SS-3		SHALE, brown and gray, blocky, highly weathered	,	100		3 3	3.25			17			
15-   	SS-4		- gray, not blocky below 17.5 ft.		89		9 9 8	>4.5			15			
	SS-5				100		32 50/2"				10			
-20- -20- 			Boring terminated at 19.2 ft.											
Completi Date Bor Date Bor Date Bor Date Bor Project N	on Dept ing Star ing Con /Geolog o.:	:h: ted: nplete jist:	19.20 Remarks: Bor 8/11/15 Gro d: 8/11/15 KH 20152010	ring drille oundwate	ed wi er no	th CI t enc	ME-7 count	5 usi ered	ng F <i>i</i> durin	A and Ig drill	auto ling.	SP1		

	LC	)G	OF	BO	RING NO. B-1'	1		T	Si Ge	otechi	nical						
F	Pro	ject	Desc	riptio	on: Englewood Road	Improveme	nts	۱ ۲	322 A	City, k	Street	03				ſSI	
					Kansas City, Mis	souri		(!	913) 74 	49-401 	0 (91:	3) 749-	4011 F	AX	ge	otechnica	al, inc.
	ueptn, reet	Samples	Sample #	Graphic Log	Surface EI.: 807.5 Location: Northing Easting: MATERIAL DI	g: <b>1103058.28</b> 2758752.49 ESCRIPTION	3	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_					Red-brown, lean and roots	CLAY, with g	jrass /										
					Red-brown, lean	CLAY (CL)											
_	_				SHALE, light brow highly weathered	wn to light gra	ay,										
_	5 -	X	SS-1		(90% passing No	. 200 sieve)		100		4 6 5				15	61	27	34
_	-		ST-2					67						17			
_	_	X	SS-3					100		10 16				17			
- 1 - -	0									21							
-	_		00.4		LIMESTONE, gra	iy, moderatel	у										
-	_		SS-4		Boring terminated	d at 13.5 ft.				50/0"							
-1	5-																
_	_																
-2	- 20-																
3PJ 10/26/1	_																
NGLEWOOD GINT.(	-																
	25 omp ate ate ngir roje	oletic Borii Borii neer/ ct No	on Dept ng Star ng Com Geolog o.:	h: ted: pleteo ist:	13.50 7/25/15 d: 7/25/15 JJ 20152010	Remarks: E C S A	Boring drille Broundwate BT-2 refuse Auger refus	ed wi er no al at 7 sal at	th CN t enc 7.0 ft 13.5	ME-7 count	5 usii ered	ng F <i>I</i> durin	A and Ig drill	auto ing.	SP1	Γ.	

	_0	G	OF	BO	RING NO. B-12	-	TSi Ge	eotechi	nical					Ŵ	
F	Proj	ect	Desc	riptio	on: Englewood Road Improvements	I	Kansas	cams a City, F	Street (S 661	103	=			<b>rs</b> i	
					Kansas City, Missouri	(	913) 7 	49-401 	0 (91)	3) 749- 	-4011 F.		ge	otechnic	al, inc.
Danth faat		Samples	Sample #	Graphic Log	Surface El.: 789.8 Location: Northing: 1103058.78 Easting: 2758327.38	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
-	-+	_		N 14. N											
					and roots										
_			00.4		Brown, lean CLAY (CL), trace sand	100		3							
- 5 -	5 -		55-1			100		4 5			100	24			
_			ST-2			46			1.00	0.83	102	24			
1 	0-	X	SS-3		∑ ∑	100		1 1 2				24			
- -1 - -	5	X	SS-4 SS-5		(92% passing No. 200 sieve)	100		1 2 3 WH				27	43	16	27
2-ا	o-				Boring terminated at 20.0 ft			1							
AB ENGLEWOOD GINT.GPJ 10/26/1	5	lotia	n Der-	h:	20.00				5				. 60-	F	
CC TOG MITH I' Di Di Di Er Pr	ate E ate E ngin ojec	Borir Borir Borir eer/0	ng Star ng Com Geolog	n: ted: npletee ist:	7/25/15 Groundw d: 7/25/15 JJ 20152010	ater er	ncour	vi⊏-7 ntereo	d at 1	3.0 f	t. duri	ng d	rilling	].	

L	.0G	OF	BO	RING NO. B-13			٦	Si Ge	otech	nical					Ŵ	
F	rojec	t Desc	riptio	on: Englewood Road	Improvem	ents	1 	322 A	dams S City, F	Street	103	1011 5			<b>rs</b> i	<u>i</u>
					SOURI		(	913) 74	49-401 	0 (91)	3) 749- 	-4011 F.		ge	otechnic	al, inc.
Denth feet	Samples	Sample #	Graphic Log	Surface El.: 871.2 Location: Northing Easting:	: 1103091.2 2760965.45	20 5	Recovery %	RQD	Penetration Slows Per 6 inches	land Penetrometer TSF	Undrained shear Strength, TSF	Unit Dry Weight, Ib/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
_				MATERIAL DE	SCRIPTION				ш	Т	0					
				Brown, lean CLA	, with roots	s and										
_				Brown, lean CLA	( (CL)											
- 5 -		SS-1					89		4				23			
-		ST-2					67			2.50	0.89	102	23			
-  -1(  -		SS-3					100		234				24			
1:  		SS-4					100		2 3 4				22	43	18	25
F		SS-5		- shaley below 19	.0 ft.		89		3				20			
B ENGLEWOOD GINT.GPJ 10/26/15			Y/////	Boring terminated	at 20.0 ft.											
KC LOG WITH LAI	mpletion te Bori te Bori gineer oject N	on Dept ing Star ing Com /Geolog o.:	h: ted: iplete ist:	20.00 8/28/15 d: 8/28/15 NC 20152010	Remarks:	Boring drille Groundwate	ed wi er no	th CI ot end	ME-7 count	5 usi ered	ng F <i>i</i> durin	A and Ig dril	auto ing.	o SP⁻	Г.	



## **GENERAL NOTES**

The number of borings is based on: topographic and geologic factors; the magnitude of structure loading; the size, shape, and value of the structure; consequences of failure; and other factors. The type and sequence of sampling are selected to reduce the possibility of undiscovered anomalies and maintain drilling efficiency. Attempts are made to detect and/or identify occurrences during drilling and sampling such as the presence of water, boulders, gas, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation in resistance to driving split-spoon samplers, unusual odors, etc. However, lack of notation regarding these occurrences does not preclude their presence.

Although attempts are made to obtain stabilized groundwater levels, the levels shown on the Logs of Boring may not have stabilized, particularly in more impermeable cohesive soils. Consequently, the indicated groundwater levels may not represent present or future levels. Groundwater levels may vary significantly over time due to the effects of precipitation, infiltration, or other factors not evident at the time indicated.

Unless otherwise noted, soil classifications indicated on the Logs of Boring are based on visual observations and are not the result of classification tests. Although visual classifications are performed by experienced technicians or engineers, classifications so made may not be conclusive.

Generally, variations in texture less than one foot in thickness are described as layers within a stratum, while thicker zones are logged as individual strata. However, minor anomalies and changes of questionable lateral extent may appear only in the verbal description. The lines indicating changes in strata on the Logs of Borings are approximate boundaries only, as the actual material change may be between samples or may be a gradual transition.

Samples chosen for laboratory testing are selected in such a manner as to measure selected physical characteristics of each material encountered. However, as samples are recovered only intermittently and not all samples undergo a complete series of tests, the results of such tests may not conclusively represent the characteristics of all subsurface materials present.

## NOTATION USED ON BORING LOGS

a

APPROXIM	ATE PROPORTIONS			PARTICLE SIZE
TRACE	<15%	BOULI	DERS	>12 Inches
WITH	15-30%	COBBI	LES	12 Inches – 3 Inches
MODIFIER	>30%	GRAV	EL	
			Coarse	3 Inches – <sup>3</sup> / <sub>4</sub> Inch
			Fine	<sup>3</sup> ⁄ <sub>4</sub> Inch – No. 4 Sieve (4.750 mm)
		SAND		
Clay or clayey r	nay be used as major		Coarse	No. 4 – No. 10 Sieve (2.000 mm)
material or mod	ifier, regardless of		Medium	No. 10 – No. 40 Sieve (0.420 mm)
relative proporti	ons, if the clay content is		Fine	No. 40 – No. 200 Sieve (0.074 mm)
sufficient to dor	ninate the soil properties.	SILT		No. 200 Sieve - 0.002 mm
		CLAY		< 0.002 mm

### **PENETRATION – BLOWS**

n

Number of impacts of a 140-pound hammer falling a distance of 30 inches to cause a standard split-barrel sampler, 1 3/8 inches I.D., to penetrate a distance of 6 inches. The number of impacts for the first 6 inches of penetration is known as the seating drive. The sum of the impacts for the last 12 inches of penetration is the Standard Penetration Test Resistance or "N" value, blows per foot. For example, if blows = 6-8-9, "N" = 8+9 or 17.

### **OTHER NOTATIONS**

Recovery % – length of recovered soil divided by length of sample attempted.

- 50/2" Impacts of hammer to cause sampler to penetrate the indicated number of inches
- WR Sampler penetrated under the static loading of the weight of the drill rods
- WH Sampler penetrated under the static loading the weight of the hammer and drill rods
- HSA Hollow stem auger drilling method
- FA Flight auger drilling method
- RW Rotary wash drilling methods with drilling mud
- AH Automatic hammer used for Standard Penetration Test sample
- SH Safety hammer with rope and cathead used for Standard Penetration Test sample

#### **GRAPHIC SYMBOLS**

- $\nabla$  Depth at which groundwater was encountered during drilling
- ▼ Depth at which groundwater was measured after drilling
- Standard Penetration Test Sample, ASTM D1586
  - 3-inch diameter Shelby Tube Sample, ASTM D1587
- **G** Sample grabbed from auger





## UNIFIED SOIL CLASSIFICATION SYSTEM, (ASTM D-2487)

Мај	ior Divi.	sions	Gra Sym	oup bols	Typical Names		L	ab	oratory Classification C	riteria
	on is	gravels r no fines)	G	W	Well-graded gravels, gravel- sand mixtures, little or no fines	-narse-	leb da	) SI	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{10}}{D_{10}}$	$\frac{30^2}{x}$ between 1 and 3
ize)	rse fractio ieve size)	Clean (Little or	G	Р	Poorly graded gravels, gravel- sand mixtures, little or no fines	e size). C	al evenho	al symbo	Not meeting all gradation req	uirements for GW
200 sieve s	Gravels half of coa han No. 4 s	h fines : amount s)	GM <sup>a</sup>	d	Silty gravels, gravel-sand-silt	curve. In 200 siev		equiring au	Atterberg limits below "A" line or P 1 less than 4	Above "A" line with P.1. between 4
lls tan No.	ore than larger 1	vels wit reciable of fine		u		ain-size	SW, SP SM, SC	cases 1		and 7 are <i>borderline</i> cases requiring use
ined soi larger th	(Mc	Grav (Appı	G	С	Clayey gravels, gravel-sand- clay mixtures	from gr smaller	W, GP, S M, GC, S Macrime		Atterberg limits below "A" line with P.1. greater than 7	of dual symbols
oarse-gra terials is	tion is ze)	sands no fines)	S	W	Well-graded sands, gravelly sands, little or no fines	nd gravel s (fraction	lows: GP B-	, P	$C_u = \underline{D}_{60}$ greater than 6; $C_c = (\underline{D}_{20})$	$\frac{30}{60}^2$ between 1 and 3
C half of ma	s oarse fract 4 sieve siz	Clean (Little or	S	Р	Poorly graded sands, gravelly sands, little or no fines	of sand at or of fines	fied as fol	1	Not meeting all gradation requir	ements for SW
fore than	Sand 1 half of c than No.	fines amount	SM <sup>a</sup>	d	Silty sands, sand-mix mixtures	rcentages	are classi er cent		Atterberg limits about "A"	Limits plotting in hatched zone with
Ś	ore than smaller	ds with sciable of fines		u	-	nine pe	ban 5 p than 5 p than 12	z per ce	fine of P.1. less than 4	P.I. between 4 and 7 are <i>borderline</i>
	(Wo	Sanc (Appre	S	С	Clayey sands, sand-clay mixtures	Deterr	Graine Graine Less th More	101 C	Atterberg limits about "A" line with P.I. greater than 7	of dual symbols
	lays	It less ()	М	L	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity					
00 sieve size	Silts and c	(Liquid IIII) than 50	C	L	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		60 For c	lassi fine-gi	fication of fine-grained sails	
1 No. 20			0	L	Organic silts and organic silty clays of low plasticity		(I 50 Equat Horizon Horizon Horizon	<u>s</u> tion of contal n PI=	f "A'-line 1 of PI=4 to LL=25.5, 0.73 (LL-20) OH of	
tined soils smaller that	ays	reater	М	Н	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		Equat Verti L 30- L	tion o ical at n PI=	of "U"-line t LL =16 to PI=7 0.9 (LL-8) OL	
Fine-gra materials is	Silts and cla	quia mmi g than 50)	C	H	Inorganic clays of medium to high plasticity, organic silts		10 7 4		ML or OL	Н
half of	Ę	LT)	0	H	Organic clays of medium to high plasticity, organic silts		00 1	10 1	16 20 30 40 50 60 70 LIQUID LIMIT (LL)	80 90 100 110
(More than	Highly organic	soils	Р	't	Peat and other highly organic soils					

<sup>a</sup>Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 26 or less and the P.1. is 6 or less; the suffix u used when L.L. is greater than 28.

<sup>b</sup>Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

T:\Geotechnical Group\Notes for Geotech Reports\Unified Soil Classifications System2.doc

# **APPENDIX C**

Laboratory Test Results



Braun Intertec Corporation 11529 W. 79th Street BRAUN Lenexa, Kansas 66214 INTERTEC Phone: 913.962.0909 Report No: PTR:W15-006013-S1 **Proctor Report** Issue No: 1 **Client:** Alan Rau Laboratory Results Reviewed by: TSi Engineering 1322 Adams Street teve Kansas City, KS, 66103 Project: B1506400 ISO/IE( TSI On-Call 2015 17025 Steve Tanguary Local on-call laboratory testing Senior Technician Shawnee Mission, KS, 66214 TR: Joel Partridge, jpartridge@braunintertec.com Date of Issue: 8/19/2015 Sample Details Sample ID: Alternate Sample ID: 15-1235 W15-006013-S1 **Date Sampled:** 8/3/2015 **Date Submitted:** 8/3/2015 Sampled By: Contractor Sampling Method: Grab Source: On-Site Material: Lean Clay Specification: Location: Englewood: On-Site **Date Tested:** 8/3/2015 **Test Results Dry Density - Moisture Content Relationship** ASTM D 698 - 07^ Maximum Dry Density 101.6 Dry Density (lbf/ft3) (lbf/ft<sup>3</sup>): 102.0 **Corrected Maximum Dry** 101.6 101.0 Density (lbf/ft<sup>3</sup>): **Optimum Moisture Content** 18.8 100.0 (%): 99.0 **Corrected Optimum Moisture 18.8** Content (%): 98.0 Method: А Preparation Method: Moist 97.0 Retained Sieve No 4 (4.75mm) (%): 0 Passing Sieve No 4 (4.75mm) (%): 100 96.0 Visual Description: Lean Clay, Brown 95.0 94.0 93.0 92.0 91.0 90.0 12 14 16 18 20 22 24

#### Comments

^ Only ASTM and AASHTO equivalent test methods are covered by our current AAP accreditation.

Moisture Content (%)

## **APPENDIX D**

Pavement Core Photographs



<u>Material</u>	Thickness (in)	<u>Notes</u>
Asphalt	4.25	
Concrete	6.75	Drilled in traffic lane



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<u>Notes</u>

and the second second		
6-2 2 m		
and the second	The and the	135 20
<u>Material</u>	<u>Thickness (in)</u>	
Asphalt	1.5	
Concrete	8.0	



# 

Project Number

Project Title

KANSAS CITY MISSOURI

NOTE: IN THE EVENT OF DISCREPANCY, UNIT PRICE SHALL GOVERN.

Item No.	Unit	Quantity	Item Description:	Unit	Extension
	KANS	SAS CITY N	MISSOURI STREET CONSTRUCTION		
4			Miscellaneous		
1	L.S.	1	Mobilization		
2	L.S.	1	Construction Staking		
3	Ac.	13.48	Clearing & Grubbing		
4	Ac.	6.51	Tree Removal (No Burning)		
5	C.Y.	6,740	Pavement & Curb Removal		
6	S.F.	503	Signing		
7	Ea.	9	Type 3 Moveable Barricade		
8	Ea.	1	Field Office		
			Grading		
9	Ac.	19.99	Topsoil Removal, Stockpile and Distribution		
10	C.Y.	82,693	Unclassified Excavation		
11	C.Y.	71,472	Embankment		
12	S.Y.	36,897	Subgrade Stabilization (9" Flyash Treatment)		
13	S.Y.	36,897	Rock Subbase ( 6" MoDOT Type 5)		
14	S.Y.	36,897	Fine Grading (Subgrade)		
15	S.F.	1,261	Modular Block Retaining Wall		
			Erosion Control		
16	L.F.	14000	Silt Fence		
17	Ea.	91	Inlet Protection		
18	Ea.	1	Vehicle Tracking Device		
19	S.Y.	25730	Soil Stability Blanket		
			Pavement		
20	S.Y.	277	2" Mill and Overlay		
21	S.Y.	21,384	2" Asphalt Surface		
22	S.Y.	1,847	6" Asphalt Base		
23	S.Y.	3,615	7" Asphalt Base		
24	S.Y.	15,923	9" Asphalt Base		
25	S.Y.	6,964	Asphalt Extension Under Curb		
26	S.Y.	223	6" Concrete		
27	S.Y.	6,786	8" Concrete		
28	S.Y.	792	4" Concrete ( Colored and Textured )		
29	S.Y.	748	8" Concrete ( Colored and Textured )		
			Curbs & Sidewalks		
30	L.F.	14,834	Curb & Gutter (Type CG-1)		

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31	L.F.	947	Curb & Gutter ( Type CG-2)		
32	L.F.	8,864	Curb ( Type C-1)		
33	L.F.	264	Mountable Curb & Gutter		
34	L.F.	211	Concrete Sidewalks ( 4' Wide, 4" Thick )		
35	L.F.	5,111	Concrete Sidewalks ( 5' Wide, 4" Thick )		
36	L.F.	89	Concrete Sidewalks ( 6' Wide, 4" Thick )		
37	L.F.	536	Concrete Sidewalks ( 8' Wide, 6" Thick )		
38	L.F.	4,484	Concrete Sidewalks ( 10' Wide, 6" Thick )		
39	S.F.	7,641	ADA Curb Ramps ( 6" Thick w/ Detectable Warning		
			Pavement Marking and Signage		
40	Ea.	123	Street Sign (Includes Post & All Attached Signs)		
41	Ea.	2	School Zone Flasher Sign		
42	L.F.	56	4" Thermoplastic Solid White Pavement Marking		
43	L.F.	19	4" Thermoplastic Solid Yellow Pavement Marking		
44	L.F.	1,255	4" Thermoplastic Double Solid Yellow Pavement		
45		1,200	Marking		
40	L.F.	74	Marking		
46	L.F.	7,620	6" Thermoplastic Solid White Pavement Marking		
47	L.F.	944	6" Thermoplastic Dotted White Pavement Marking		
48	L.F.	339	8" Thermoplastic Solid White Pavement Marking		
49	L.F.	172	8" Thermoplastic Dotted White Pavement Marking		
50	L.F.	74	24" Thermoplastic Solid White Stop Bar		
51	L.F.	348	24" Thermoplastic Solid White Crosswalk Line		
52	S.Y.	274	12" Thermoplastic Yellow Diagonal Hatch (12' O.C.)		
53	Ea.	11	Thermoplastic White Turn Arrow Pavement Marking		
54	Ea.	3	Thermoplastic White "ONLY" Pavement Marking		
55	Ea.	12	Thermoplastic White Bike Lane Symbol & Arrow Pavement Marking		
56	L.F.	60	4" Epoxy Dashed White Pavement Marking		
57	L.F.	172	4" Epoxy Dotted White Pavement Marking		
58	L.F.	93	4" Epoxy Solid Yellow Pavement Marking		
59	L.F.	80	4" Epoxy Double Solid Yellow Pavement Marking		
60	L.F.	593	6" Epoxy Solid White Pavement Marking		
61	L.F.	598	6" Epoxy Dotted White Pavement Marking		
62	L.F.	269	8" Epoxy Solid White Pavement Marking		
63	L.F.	1,014	12" Epoxy Solid White Pavement Marking		
64	L.F.	110	12" Epoxy Dotted White Pavement Marking		
65	L.F.	180	24" Epoxy Solid White Stop Bar		
66	Ea.	13	Epoxy White Turn Arrow Pavement Marking		
67	Fa	1	Epoxy White Bike Lane Symbol & Arrow Pavement		
	∟а.	I	Marking		
68		254	Storm Sewers		
69		351			
09	L.F.	71	18" HUPE		

70	L.F.	560	24" HDPE	
71	L.F.	99	30" HDPE	
72	L.F.	169	36" HDPE	
73	L.F.	65	42" HDPE	
74	L.F.	2133	15" RCP	
75	L.F.	314	18" RCP	
76	L.F.	1204	24" RCP	
77	L.F.	328	30" RCP	
78	L.F.	101	36" RCP	
79	L.F.	133	4'x5' RCB	
80	L.F.	74	8'x8' RCB	
81	L.F.	178	Dual 13'x15' RCB	
82	Ea.	3	15"-18" HDPE End Section	
83	Ea.	3	24"-36" HDPE End Section	
84	Ea.	1	42"-48" HDPE End Section	
85	Ea.	4	24"-36" RCP End Section	
86	Ea.	1	4'x5' RCB End Section and Wing Walls	
87	Ea.	1	8'x8' RCB End Section and Wing Walls	
88	Ea.	1	Dual 13'x15' RCB End Section and Wing Walls	
89	S.Y.	682	Type II Rock Blanket	
90	S.Y.	2448	Type IV Rock Blanket	
91	Ea.	22	4' Curb Cut Flume	
92	Ea.	1	Std. Junction Box (4' x 4' Inside)	
93	Ea.	1	Std. Junction Box (5' x 4' Inside)	
94	Ea.	2	Std. Junction Box (5' x 5' Inside)	
95	Ea.	1	Std. Junction Box (4' x 11' Inside)	
96	Ea.	1	Doghouse Junction Box (4' x 4' Inside)	
97	Ea.	2	Doghouse Junction Box (5' x 5' Inside)	
98	Ea.	2	Std. Manhole (5' Dia.)	
99	Ea.	3	Std. Curb Inlet (4' x 4' Inside)	
100	Ea.	12	Std. Curb Inlet (5' x 3' Inside)	
101	Ea.	26	Std. Curb Inlet (5' x 5' Inside)	
102	Ea.	1	Std. Curb Inlet (6' x 6' Inside)	
103	Ea.	3	Std. Curb Inlet (7' x 7' Inside)	
104	Ea.	4	Std. Field Inlet (4' x 4' Inside)	
105	Ea.	1	Connect to Existing Structure	
106	Ea.	2	Connect to Existing Box Culvert	
107	Ea.	2	Modify Existing Junction Box	
108	C.Y.	510	BMP Engineered Soil Matrix	
109	L.F.	625	BMP Drain Tile	
			Sanitary Sewers	
110	VF	36	Std. Manhole ( 4' dia. ) Adjustment	
111	L.F.	225	Cured In Place Pipe Lining (18" Pipe )	
112	L.F.	272	Cured In Place Pipe Lining ( 21" Pipe )	
113	VF	40	Std. Manhole ( 4' dia. ) Lining	

			Water Lines - Non-Participating	
114	LF	979	36" DIP CL 54 waterline (Unrestrained Joint)	
115	LF	1442	42" DIP CL 54 waterline (Unrestrained Joint)	
116	LF	120	4" DIP CL 52 waterline (Restrained Joint)	
117	LF	242	6" DIP CL 52 waterline (Restrained Joint)	
118	LF	663	8" DIP CL 52 waterline (Restrained Joint)	
119	LF	812	12" DIP CL 52 waterline (Restrained Joint)	
120	LF	120	16" DIP CL 54 waterline (Restrained Joint)	
121	LF	40	24" DIP CL 54 waterline (Restrained Joint)	
122	LF	20	30" DIP CL 54 waterline (Restrained Joint)	
123	LF	1262	36" DIP CL 54 waterline (Restrained Joint)	
124	LF	2085	42" DIP CL 54 waterline (Restrained Joint)	
125	LF	50	60" Steel Casing Pipe w/Spacers & End Seals	
126	EA	1	42" CL 54 - 11.25 Degree Bend	
127	EA	5	42" CL 54 - 45 Degree Bend	
128	EA	1	42" CL 54 - 90 Degree Bend	
129	EA	2	36" CL 54 - 11.25 Degree Bend	
130	EA	1	36" CL 54 - 22.5 Degree Bend	
131	EA	7	36" CL 54 - 45 Degree Bend	
132	EA	2	16" CL 54 - 45 Degree Bend	
133	EA	4	12" CL 52 - 45 Degree Bend	
134	EA	4	12" CL 52 - 90 Degree Bend	
135	EA	1	8" CL 52 - 11.25 Degree Bend	
136	EA	1	8" CL 52 - 22.5 Degree Bend	
137	EA	7	8" CL 52 - 45 Degree Bend	
138	EA	5	8" CL 52 - 90 Degree Bend	
139	EA	6	6" CL 52 - 45 Degree Bend	
140	EA	4	4" CL 52 - 45 Degree Bend	
141	EA	2	4" Solid Sleeve Coupling	
142	EA	3	6" Solid Sleeve Coupling	
143	EA	9	8" Solid Sleeve Coupling	
144	EA	3	12" Solid Sleeve Coupling	
145	EA	3	16" Solid Sleeve Coupling	
146	EA	2	24" Solid Sleeve Coupling	
147	EA	1	30" Solid Sleeve Coupling	
148	EA	7	36" Solid Sleeve Coupling	
149	EA	2	42" Solid Sleeve Coupling	
150	EA	2	24" PCCP to DIP Adaptor	
151	EA	2	36" PCCP to DIP Adaptor	
152	EA	3	36"x12" Reducer	
153	EA	1	36"x24" Reducer	
154	EA	1	42"x36" Reducer	
155	EA	2	42"x12" Reducer	
156	EA	1	16"x8" Reducer	
157	EA	1	12"x8" Reducer	

158	EA	1	8"x6" Reducer	
159	EA	1	6"x4" Reducer	
160	EA	6	8"Plug	
161	EA	1	12" Plug	
162	EA	1	24" Plug	
163	EA	2	36" Plug	
164	EA	1	42" Plug	
165	EA	1	Concrete Backing Block for 36" Plug	
166	EA	26	6" Gate Valve	
167	EA	13	8" Gate Valve	
168	EA	5	12" Gate Valve	
169	EA	1	16" Butterfly Valve	
170	EA	5	36" Butterfly Valve	
171	EA	1	42" Butterfly Valve	
172	EA	3	2" Air Release Assembly & Vault	
173	EA	1	3" Air Release Asssembly & Vault	
174	EA	4	8"x6" DIP Tee	
175	EA	2	8"x8" DIP Tee	
176	EA	1	12"x8" DIP Tee	
177	EA	3	12"x6" DIP Tee	
178	EA	1	16"x6" DIP Tee	
179	EA	2	36"x36" DIP Tee	
180	EA	1	36"x12" DIP Tee	
181	EA	5	36"x6" DIP Tee	
182	EA	1	36"x8" DIP Tee	
183	EA	7	42"x6" DIP Tee	
184	EA	2	42"x8" DIP Tee	
185	EA	1	42"x12" DIP Tee	
186	EA	1	42"x8" DIP Cross	
187	EA	1	36"x16" DIP Cross	
188	EA	1	42"x42" DIP Wye	
189	EA	2	Straddle Block on 4" Main	
190	EA	4	Straddle Block on 6" Main	
191	EA	10	Straddle Block on 8" Main	
192	EA	6	Straddle Block on 12" Main	
193	EA	1	Straddle Block on 16" Main	
194	EA	1	Straddle Block on 24" Main	
195	EA	1	Straddle Block on 36" Main	
196	EA	1	Water Service Transfer (Reg 51506)	
197	EA	14	Fire Hydrant Assembly	
198	EA	1	Flushing Assembly for 16-inch Pipe	
199	EA	6	Flushing Assembly for 12-inch Pipe	
200	EA	7	Flushing Assembly for 8-inch Pipe	
201	EA	3	Flushing Assembly for 6-inch Pipe	
202	EA	1	Flushing Assembly for 4-inch Pipe	

203	EA	13	Pipeline Markers	
		MODO	T STREET CONSTRUCTION	
			Grading	
204	C.Y.	1,776	Pavement, Curb, and Sidewalk Removal	
205	C.Y.	4,281	MoDOT Class A Excavation	
206	C.Y.	1,966	MoDOT Class C Excavation	
207	C.Y.	2,317	MoDOT Compacting Embankment	
208	S.Y.	2,818	Rock Subbase ( 4" MoDOT Type 5)	
209	S.Y.	5,374	Rock Subbase ( 6" MoDOT Type 5)	
			Pavement	
210	S.Y.	512	5.75" MoDOT Type A Shoulder (CONC)	
211	S.Y.	6,881	9" Concrete Pavement	
212	TON	124	2" Asphalt Pavement (Englewood Overlay)	
213	S.Y.	333	4" Concrete (Colored and Textured)	
214	S.Y.	1,103	2" Milling	
			Curbs, Sidewalks, & Drives	
215	L.F.	1,129	Curb & Gutter ( Type CG-1 )	
216	L.F.	1,357	Curb & Gutter ( Edge Curb, Type DC-2)	
217	S.Y.	108	Concrete Sidewalks (MoDOT Concrete Median Strip)	
218	S.Y.	760	Concrete Sidewalks ( 5' Wide )	
219	S.Y.	271	Concrete Shared Use Path ( 10' Wide )	
220	S.Y.	118	ADA Curb Ramps	
			Pavement Marking & Signage	
221	Ea.	42	Street Signs (Includes Post & All Attached Signs)	
222	Ea.	2	Relocate Existing Signs (Includes Posts and Footings)	
223	L.F.	1,440	4" Solid White Thermoplastic	
224	L.F.	302	4" Dashed White Thermoplastic	
225	L.F.	188	4" Dotted White Thermoplastic	
226	L.F.	780	4" Double Solid Yellow Thermoplastic	
227	L.F.	1,038	6" Solid White Edge Line	
228	L.F.	975	6" Solid White Lane Line	
229	L.F.	1,133	6" Solid Yellow Edge Line	
230	L.F.	376	12" Solid White Thermoplastic	
231	L.F.	140	24" Solid White Thermoplastic	
232	Ea.	31	16"x24" White Thermoplastic Yield Triangle	
233	Ea.	26	White Thermoplastic Turn Arrow	
234	Ea.	2	White Thermoplastic "ONLY"	
			Storm Sewers	
235	L.F.	25	15" RCP	
236	L.F.	197	18" RCP	
237	L.F.	48	21" RCP	
238	L.F.	174	24" RCP	
239	L.F.	15	30" RCP	
240	Ea.	2	18" RCP End Section	

241	Ea.	1	24" RCP End Section with Concrete Toe Wall	
242	Ea.	6	Culvert Cleanout	
243	Ea.	3	Std. Curb Inlet (5' x 3' Inside) (0' - 6' deep)	
244	V.F.	3.2	Extra Depth on Curb Inlet (5' x 3')	
245	Ea.	1	Std. Curb Inlet (5' x 4' Inside) (0' - 6' deep)	
246	Ea.	1	Std. Curb Inlet (8' x 4' Inside) (0' - 6' deep)	
247	Ea.	4	MODOT - Precast Drop Inlet (5' x 4') (Type S) (0'-6' deep)	
248	Ea.	1	Std. Manhole (4' Inside Diameter) (0' - 6' deep)	
249	Ea.	2	Adjust Existing Drainage Structure	
			Miscellaneous	
250	L.S.	1	Demolition	
251	Ac.	0.3	Tree Clearing (no burning)	
252	L.F.	445	Gutter (MoDOT Type B Gutter)	
253	S.Y.	472	Slope Protection (MoDOT Concrete Slope Protection)	
254	L.F.	575	MGS Guardrail, 8' Posts	
255	Ea.	1	MASH Approved Crashworthy End Terminal	
256	Ea.	2	MGS End Anchor Section	
257	Ea.	1	MGS to Type A Guardrail Transition	
			Temporary Traffic Control	
258	S.F.	1018	Signing	
259	Ea.	150	Channelizers	
260	Ea.	30	Type 3 Moveable Barricade	
261	Ea.	3	Flashing Arrow Panel	
262	Ea.	20	Tubular Marker	
263	L.F.	220	Traffic Barrier	
264	Ea.	3	Changeable Message Sign	
265	Ea.	2	Barrier Height Transition	
266	L.F.	4860	4" Temp. Solid White	
267	L.F.	5260	4" Temp. Solid Yellow	
268	L.F.	60	24" Temp. Solid White	
269	L.F.	9970	Pavement Marking Removal	
270	L.S.	1	Traffic Signal No. 1 - Summit/Englewood	
271	L.S.	1	Traffic Signal No. 2 - Western Ramps/Englewood	
272	L.S.	1	Traffic Signal No. 3 - Eastern Ramps/Englewood	
273	S.F.	11785	Retaining Wall beneath 169 Hwy	
			Street Lighting	
274	Ea.	52	LED Luminaire, 35' Mounting Height, 8" arm w/ Pole	
275	Ea.	4	400 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole	
276	Ea.	8	250 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole	
277	Ea.	1	150 Watt HPS Luminaire, 30' Mounting Height, 6' Bracket Arm, w/ Pole	
278	Ea.	1	Screw In Base - Small	
279	Ea.	64	Screw In Base - Large	

280	Ea.	1	6" Anit-Theft Device	
281	Ea.	64	8" Anit-Theft Device	
282	Ea.	72	KCMO ID Labels	
283	Ea.	4	Ground Rod	
284	Ea.	6	Pull Box	
285	Ea.	2	Lighting Controller, 1ckt	
286	Ea.	2	Lighting Controller, 2ckt	
287	Ea.	65	Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses	
288	Ea.	130	Unfused Breakaway Fuse Kits	
289	L.F.	9740	2#4, 1#6 RHH/RHW/USE	
290	L.F.	765	2#8, 1#8 RHH/RHW/USE	
291	L.F.	2984	3#10 RHW/USE (Internal Pole Wiring)	
292	L.F.	400	3#1, USE	
293	L.F.	10505	2" PVC	
294	L.F.	400	3" PVC	
295	Ea.	4	KCPL Services	
296	Ea.	7	Remove Existing Luminaries: NMF0612 - NMF 0618	
297	Ea.	4	Remove Existing Luminaries: NLF0040 - NLF0043	
298	Ea.	2	Remove Existing Luminaries: NLF0001 - NLF0002	
299	Ea.	11	Remove Existing Luminaries: NMG1001 - NMG1011	
300	Ea.	5	Remove Existing Luminaries: NMG1520 - NMG1524	
			LANDSCAPING	
0.0.1			Trees	
301	EA.	279	Street Trees - 2.5" caliper; B&B	
302	EA.	110	RPM's	
			Shrubs	
303	EA.	1,877	Shrubs - 5 gallon	
			Perennials	
304	EA.	4,056	Perennials - 1 gallon	
			Seeding / Sodding	
305	AC.	6.70	Fescue Seeding	
306	S.Y.	55,176	Bonded Fiber Matrix	
307	S.Y.	21,900	Fescue Sodding	
308	AC.	4.7	Native Seed Mix	
309	AC.	4.7	Temporary Seeding	
			Materials	
310	EA.	10,505	Tree Gator Bags	
311	L.F.	2,435	Steel Edging	
312	S.Y.	4,366	Erosion Blanket	
313	L.F.	3,850	Shovel Cut Edging	
314	SF	925	Decorative Aggregate	
315	C.Y.	8,452	Topsoil	

316	EA.	2	Benches (KC Parks standard)		
317	C.Y.	55.0	CIP Concrete (reinforced)		
318	S.F.F.	797	Native Stone Veneer		
			Entry Monuments and Landscaping		
319	EA.	1	Landscaping at Harden Avenue (re-use existing rock)		
320	EA.	1	Landscaping at North Ames Avenue		
321	EA.	1	Landscaping at North Wyoming Avenue		
322	EA.	1	Landscaping at West Englewood Elementary (remove, store and re-install existing sign)		
323	EA.	1	Landscaping and stonework at North Mercier Drive		
			Total Unit Prices:	TOTAL \$	

BASE BID ITEMS	
LED Luminging 35' Mounting Height 8" Arm	)
LED Lumindire, 33 Mounting Height, 8 Ann	
LED (250 Watt Equivalent) Luminaire 35' Mounting Height 6' Bracket Arm 8	
LED (150 Watt Equivalent) Luminaire, 30' Mounting Height, 6' Bracket Arm 1	
Screw In Base – Small 1	
Screw In Base – Large 64	F
PELCO 6" Anti-theft Device 1	
PELCO 8" Anti-theft Device 64	F
KCMO ID Labels 72	) 
Ground Rod 4	
Pull Box, Type II	
Lighting Controller, 1 Ckt.	
Lighting Controller, 2 Ckt.	
Unfused Breakaway Euse Kits / IOA ruses	$\frac{1}{3}$
$\frac{1}{2#4} \frac{1}{46} \frac{1}{6} \frac$	$\frac{10}{70'}$
2#8 1#86 RHH/RHW/USE 64	<u>/0</u>  2
3#10 RHW/USE (Internal Pole Wiring)	984
3#1, USE 400	)()
2" PVC 10.	),34
3" PVC 400	)()
KCPL Service 4	
ADD ALTERNATE ITEMS	

# REMOVALS

Remove Existing Luminaires:	NMF0612 – NMF0618	7
Remove Exisitng Luminaires:	NLF0040 - NLF0043	4
Remove Existing Luminaires:	NLF0001 – NLF0002	2
Remove Existing Luminaires:	NMG1001 - NMG1011	11
Remove Existing Luminaires:	NMG1520 – NMG1524	5

TOT	TAL
QTY	UNIT
	Fa.
	Fa.
	Ea.
	Fa.
	Fa.
	Fa.
	Fa.
	Ea.
2	L.F.
	L.F.
4	L.F.
	L.F.
44	L.F.
	L.F.
	Ea.

TOT	TAL
QTY	UNIT
	Ea.

GENERAL NOTES: All work shall comply with the Kansas City, MO, Department of Public Works Standard Construction and materials Specification,

- 3. NW Englewood Blvd: Philips Gardco (CA22L-96L-650 N. Waukomis: AEL Autobahn ATB2 (ATB2-80BLEDE85 (RFL-241W112LED4KT-R2M-UNIV-DMG-RCD7-S (ERL2-0-27-C3-40-D-GRAY-A- R(20KV/20k
  - N. Summit: AEL Autobahn ATB2 (ATB2-60BLEDE70-(RFL-145W64LED4KT-R2M-UNIV-DMG-RCD7-SF (ERL2-0-18-C3-40-D-GRAY-A- R(20KV/20k
  - N. Mercier Dr: AEL Autobahn ATBO (ATBO-30BLEDE (RFM-72W32LED4KT-R2M-UNIV-DMG-RCD7-SP (ERLH-0-10-C3-40-D-GRAY-A-R(20KV/20kA Signal Poles (Sheet L6): Philips Gardco (CA22L-96

DRIVE SOUTH OF ROUNDABOUT DESIGN CRITERIA: IES Classification: Major/Intermediate Illuminance Average: 1.2 (City Multiplier) x 13 Lux Illuminance Average: 1.2 = 15.6 Lux (Min)Illuminance Ave/Min: 3 to 1 Luminance Average: 0.9 cd/m<sup>2</sup> Luminance Ave/Min: 3 to 1 Luminance Max/Min: 5 to 1 Veiling Luminance Ratio: 0.3 to 1 LLF = 0.54Pole Arm: 8 inches or 6ft Wattage: 400 Watt Equivalent LED Pole height: 35ft Pole Setback: 3ft

ENGLEWOOD BOULEVARD & WAKOMIS

IES Classification: Major/ = 10.8 Lux (Min) or Illuminance Ave/Min: 3 to Luminance Average: 0.6 Luminance Ave/Min: 3.5 Luminance Max/Min: 6 Veiling Luminance Ratio: LLF = 0.68Pole Arm: 6ft Wattage: 400 Watt Equivalent LED Pole height: 35ft Pole Setback: 3ft

Division II Section 2800, Divis	ion V Section 5800, and any additional supplem	nents.
<ol> <li>Contractor shall field veri engineer of descrepancies wit contractors expense.</li> </ol>	ify feed location prior to installation of controlle In locations shown. All adjustments necessary t	r when necessary. Contractor shall notify to provide feed point connection shall be at the
2. Area and Raodway classif roundabout. Pavement classi classification is Major/Resider Collector/Intermediate with a	fication is Major/Intermediate on Englewood Bou ification is R2 with a LLF of .54. On Wakomis ntial with a LLF of 0.68. For N Summit Street, LLF of 0.54.	levard and on Wakomis Drive south of the Drive north of the roundabout, Area and Roadway Area and Roadway classification is
<ul> <li>3. NW Englewood Blvd: Philip</li> <li>N. Waukomis: AEL Autobe (RFL-241W112LED4 (ERL2-0-27-C3-4)</li> <li>N. Summit: AEL Autobah (RFL-145W64LED4K (ERL2-0-18-C3-4)</li> <li>N. Mercier Dr: AEL Auto (RFM-72W32LED4KT (ERLH-0-10-C3-4)</li> </ul>	ps Gardco (CA22L-96L-650-NW-G2-AR1-2-UN ahn ATB2 (ATB2-80BLEDE85-MVOLT-R2-20-P7- KT-R2M-UNIV-DMG-RCD7-SP2-GY3), GE Evolve 0-D-GRAY-A- R(20KV/20kA)), or approved equ n ATB2 (ATB2-60BLEDE70-MVOLT-R2-20-P7-D T-R2M-UNIV-DMG-RCD7-SP2-GY3), GE Evolve 0-D-GRAY-A- R(20KV/20kA)), or approved equ obahn ATBO (ATB0-30BLEDE85-MVOLT-R2-20-P T-R2M-UNIV-DMG-RCD7-SP2-GY3), GE Evolve E 0-D-GRAY-A-R(20KV/20kA)), or approved equa	V-DD-SP2-BZ) or approved equal. -DM-SH-NL), Philips Lumec RFL al. M-SH-NL), Philips Lumec RFL ERL2 al. 7-DM-SH-NL), Philips Lumec RFM RLH I.
<ul><li>4. Poles shall meet APWA S</li><li>(N. Mercier) poles in sheet L</li></ul>	Section 2802.15 for 35ft steel (NW Englewood), 10 (Single Arm Pole Details).	35ft aluminum (N. Summit) and 30ft galvanized
5. All distribution cable shal runs shall be placed 1ft from	I be installed in Schedule 40, 2" PVC conduit on back of curb where possible and at a minimu	or in preassembled "cable—in—duct." All conduit um depth of 24".
6. Per APWA Section 5800,	all street light poles, materials and controller n	nust be installed within the City's "Right-of-Way."
7. For controller 5, distribut coded black, red (or black) o	ion cable shll be $2\#8$ and $1\#8$ G, Type RHH/R and green (APWA 2802.8) for a grounded 240 V	HW/USE, 600 Volt, copper stranded and color /olt system (single phase).
For the remaining controllers black, red (or black) and gre	cable shall be 2#4 and 1#6 G, Type RHH/RHW een (APWA 2802.8) for a grounded 240 Volt sys	/USE, 600 Volt, copper stranded and color coded stem (single phase).
8. Cable used within the po color-coded red, black and c	lles shall be 3 — #10, Type RHW/USE, 600 Volt green according to the NEC.	s rated, copper stranded, U.L. listed and
9. Provide and install in eac Ferraz Shawmut (or approved conductors, place a 10 Amp	ch pole base, 3 single-pole, set-screw, in-line, I equal) Model No. HEB-JW-RYC and HEB-JW-F KTK fuse in each breakaway fuseholder and a	breakaway, fuseholders. Use Bussman, Littlfuse, RLC—J (last pole). For the 2 "hot" breakaway NNB Copper Slug in the system ground fuseholder.
10. Individual and system gro Grounding shall comply with S	ounds shall be installed on all circuits (pole gro Section 2808 of standards noted above.	unding rods and a ground rod from pole to pole).
11. All conduit crossings sha and installed by the contract	ll be indicated with an aluminum marker in the or.	top of curb. Aluminum markers to be furnished
12. The contractor is respons utilities as may be necessary structures and overhead lines	sible for making his own determination as to ty to avoid damage. The contractor shall verify by contacting the owners of the utilities.	pe and location of underground and overhead location of underground pipelines, conduits,
13. All workmanship and mat Coordinate a final joint inspe	erials shall be subject to inspection and approv ction with our Maintenance Supervisor, Carolyn A	al by the Streetlighting, Public Works Department. Adkins at (816) 513-9874.
14. Luminaire and Controller identification labels according in vertical orientation with the black characters on silver ret highways signs in the FHWA I the Streetlighting Section at	Cabinet Labels: The Contractor shall furnish ar to the construction plans. Identification labels e letters at the top so as to read downward. tro-reflective sheeting with pressure sensitive ac Manual of Uniform Traffic Control Devices. Labe (816) 513-9874.	nd install luminaire and controller cabinet shall consist of three letters and four numerals Legend shall be 2 inch series "C" upper case Ihesive backing, as prescribed for use on standard els for decorative poles must be coordinated with
Steel poles shall be labeled b axis of the pole facing the s the top of the door adjacent	by affixing self-adhesive decal directly on the p street and 8-10 feet above the pavement surfa to the door hinge.	ole. The label shall be position on the vertical ce. Labels on cabinets shall be positioned near
15. The contractor shall insta The retainer is designed to s	all a cable retainer assembly mounted between ecure the electrical conductors to prevent cond	a luminaire type pole and foundation anchor. uctor theft. Use PELCO or Hubble or approved equal.
16. Existing equipment that i	s removed shall be returned to the City of Kan	sas City.
17. Refer to Magellan Pipeline	e Company General Encroachment Requirements	when working near the pipeline easement.
& WAKOMIS Dabout design criteria:	WAKOMIS DRIVE NORTH OF ROUNDABOUT DESIGN CRITERIA:	N SUMMIT STREET DESIGN CRITERIA:
pr/Intermediate	IES Classification: Major/Residential	IES Classification: Collector/Intermediate
.2 (City Multiplier) x 13 Lux to 1 9 cd/m <sup>2</sup> to 1	Illuminance Average: 1.2 (City Multiplier) x 9 = 10.8 Lux (Min) or 18 Lux (Max Illuminance Ave/Min: 3 to 1 Luminance Average: 0.6 cd/m <sup>2</sup> Luminance Ave/Min: 3.5 to 1	Lux Illuminance Average: 1.2 (City Multiplier) x 9 Lux = 10.8 Lux (Min) Illuminance Ave/Min: 4 to 1 Luminance Average: 0.9 cd/m <sup>2</sup> Luminance Ave/Min: 4 to 1 Luminance Ave/Min: 5 to 1
6ft	Luminance Max/Min: 6 to 1 Veiling Luminance Ratio: 0.3 to 1 LLF = 0.68 Pole Arm: 6ft	Veiling Luminance Max/Min: 5 to 1 Veiling Luminance Ratio: 0.4 to 1 LLF = 0.54 Pole Arm: 12'

Wattage: 250 Watt Equivalent LED

Pole height: 40ft

Pole Setback: 3ft

9 - 1 - 1 - F  $\stackrel{\bigcirc}{\bowtie}$ NOTES VARD JPGRADE 89008121 ounties, MC







New 8 Water Main (Line 8)	=Sta.: 3 NW Englewood BI N: 11 E: 2	xd. 37.10' €) vd. 37.10' R 102980.4890 762007.6112	<u>.</u>		=Sta.: NW En N: 110	35+69.45 (4) Iglewood Blvd. 50 3073.3159 62021 1908	6.00' L	
	Connect to Existing 6" W/ 6" CL52 DIP After Testing & See Connection Detail M	Water Main W/ Polywrap Chlorination Sheet K172			Conne W/ 4" After	ct to Existing 4' CL52 Dip W/Pc Testing & Chlori	"Water Main Nywrap nation	
		Water Line 12	15825 81451	<u> </u>	<u>∔</u> See C	onnection Detail	M, Sheet K17	
	34+00 <u>- </u> ≱ ⊖₩₩1 <b>E</b> ₩	=====================================	- 24" PCCI	6 <del>†00</del> EW	+	W ENGLEWO		-
	8 P	EK		P	<u>E</u> W		<u>EW<sup>L</sup></u>	
+00		37+00	2 2		39-	+00	40+00	*
				<u> </u>	<del></del>	<u>New</u>	<u>8" Wate</u> (Isine™	
		Existing Building		COGM Existing Building	2    Sta.    =St	: 10+00.00 (Wa a.: 37+94.50 (V	ter Line 12) Nater Line 1)	
		Be Removed		. 64		Englewood Blvd, 1102956.6686 2762031.9952	<sup>′</sup> 60.49' R	
	Sta.: N: 11 E: 27	11+45.76 (Water Lir 02945.8012 '61852.0101	ne 8) Wator Main		/ ↓ 4 Inst	all 1—42"x8" Tee W/Backing Bl 1—8" Gate V	e lock alve	
	After See C	Testing & Chlorinati Connection Detail F,	ion This Sheet.					<u> </u>
Sta.: 11+99.84 (Water Line 12) N: 1102964.7176								
Install 8"x12" Increaser. =Connect to Existing 12" Gate Valve After Testing &		g 12" DIP		Troct C				
Chlorination. See Connection Detail F, This Sheet.				_No_Acquisiti	on 			
					$\mathbf{)}$			/
					Note mair tran	e: A utility free ntained in perpe smission main a	corridor shall tuity for the distance of	t 1
SCALE 0' 50' 100'					mini mair Note	mum both sides n. e: Coordinate wit	of transmiss	ic 1
0' 1"=50' HORIZ.					inste utilit reloc	alling line 8. Exis ties in alignment cated.	sting telephon may need	e
(for 24"x36" sheet)								
Main B Main B Ma		12)	e ine 1 d 12)	e 12) e 12)	12)	<b>a</b> 12,	e 12)	רע
High Line High Line Hine B)	920	910 te	(Water L later Lir 90° Be	diter Lin Mater Lin Mater Lin	oter L	Kater Lir	later Lin	190° Be
5.22 (W Instruction Bend D" PCS S Main D" PCS S Main D" PCS Sting 12 Sting 12			H 94.47 18.45 (M prizantal	<u>4.45 (N</u> x8" Tee <u>0.45 (N</u> x8" Tee	x6" Tee <u>5.15 (W</u> x6" Tee	Vert. E		srizantal
	910	900 <del>t</del>	ta.: 37- .: 10+0  stall Hc	International State Stat	stall 8" 	11.25°		istall Ho
Sta = Sta = Sta = Ba = Ba = Ba = Sta = Sta Sta Sta Sta Sta Sta Sta Sta Sta Sta	900	890				VPI Str =Instal TP: 86	Ste	
	890	880				-Proposed Gro	und	
Proposed Ground- over Water Main								
	880	870					-Existing Ground	
	870	860						_
					-New 8	»		
Water Main	860	850			water	Main		
Restrain Throughput ————————————————————————————————————					Re	strain Throughou		
WATER LINE 8	850	840			WAT	ER LINE	12	
145.76 L.F. x 8" Class 52 DIP with Polywrap	840	830			199.84	L.F. x 6" Class with Polywrap	52 DIP	
870.17 870.17 382.09 371.46 872.64 872.64 872.64 872.64 175.00 175.00 179.83	<u>ن</u> ي ت	 čiči	с С С С С С С С С С С С С С С С С С С С	558.62 5580 100	102-20 172-61		365.73 378.29	
	830 12+00	₽ 820				11±00		
							I	4

Sta.: 10+38.85 (Water Line 12

New 8" Water

Sta.: 10+25.26 (Water Line 12)









DATE: NO.: REVISIONS/APPROVALS:	03 07 3016 Barnowd far City Barnithal	05-01-2016 Frepared for Comments & Resubmitted	12-20-2016 Revised Per Comments & Resubmitted	08-28-2017 Revised Per Comments & Resubmitted		
Reviewed By:	A.K.H.	Designed By:	Drafted By:	G.S. I Ittian Prniact No -	15013	ADAM HILGEDICK P.E. MO# 2014016961
x24\WIR - 15013 - Water Plan and Profile.dw	1301 Burlington, #100 North Konners Chr. MO 64116	NULLI ARIISAS CIIY, MU 04 110 816.587 4320 816.587 4303 fay	www.lutjen.com	surveying	LUTJEN engineering landscape architecture	MO State Certificate of Authority #: 2007022824
ion: L: \Projects\12141-03\Plans\Construction Documents\Right of Way 36x	WAIER MAIN FLAN & FROFILE		NGLEWOOU BOULEVARD COMPLEIE	STREETS UPGRADE	STP 3311 (402) / KCMO 89008121	Kansas City, Clay & Platte Counties, MO

DRAWN BY	CHECKED BY							
A.K.H.	A.K.H.							
			DATE COMPLETED			ED		
CONTRACT NO.	CONTRACT DATE	DATE	WSD 80	PROJECT N 0001953	0.	). <b>DRAWING NO</b> 20343		
PROJECT NO.		-						

<u>Notes:</u>

1.) Install Straddle Block On 8" DIP Main and Cut In 8" Gate Valve To Isolate Main As Needed To Construct Connections To 36" PCCP Mains.

2.) Contractor To Provide 2 Crews To Construct Connections To 36" PCCP Mains, See Detail J.

				-				
PROFESSIONAL EN	IGINEER SEAL	KANSAS CIT	Y, MISSOURI,	WATER SEF	RVICES DEF	·ARTN	IENT	
AD HILG	MISSOCIE	M	<i>I</i> ATER N	IAIN EX	KTENS	30)	N	
PE-2014	AD EN CITATION	en Nv	IGLEWO V WAUK	) od B( Iomis I	DULEV DR. TC	'AR ) N'	XD W	
ADAM HILO Civil Engi MO# 20140	GEDICK ineer 016961	55TH TER. KANSAS CITY, CLAY &					TTE	3 3
FOR WSD	USE:		COUNI	ies, Mi	15500	RI		
		drawn by A.K.H.	CHECKED BY A.K.H.					
		CONTRACTOR			D	ATE CO	MPLET	ED
	Ī	CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT 8000195	г <b>NO.</b> 53	DRAW 20	<b>ING N</b> 343
	-	PROJECT NO. STP 3311 (40 PW-89008121	12) (	K168) Sł	HEET 01	3 OI	F 02	:1






D.E. (Water Line 1) ((i) Nd, 11.15' L Bend 0+00 58 EW						DATE: NO.: REVISIONS/APPROVALS:	03-07-2016 Prepared for City Permit Submittal 05-06-2016 Revised Per Comments & Resubmitted	12-20-2016 Revised Per Comments & Resubmitted	0.: 08-28-2017 Revised Per Comments & Resubmitted	CP.E.
ER/W					Drofilo dura		y, M0 64116 Designed By:	Drafted By:	Lutjen Project N 15013	acure ADAM HILGEDICK MO# 20140169
free corridor sh perpetuity for th aain a distance o oth sides.	all be ne of 10'				ants/Richt of Work 36,04/WTB _ 15013 _ Water Dian					es, MO State Certificate of Authority #: 2007022824
Sta.: \59+10.00 (C) Water\Line 1 =Match Line See Next Sheet	880 870	NOTE: Contractor shall fill to to 95% standard density to Minimum above the top of excavation for the pipe.	and compo a point 4 pipe prior	act 12" to	notev 10141_03/ Diane/ Construction			VOUD BOULEVARD C	SIREE IS UPGRAUE	as City, Clay & Platte Counti
	850							ENGLE	Ŭ	Kans
<b>D</b>	840	PROFESSIONAL ENGINEER SEAL	KANSAS CIT	7, MISSOURI, VATER N	<b>WATER SEF</b>	RVICE	s dep Ens		<b>Ment</b>	
	830	HILGEDICK NUMBER PE-2014016961	er Nv	NGLEW( V WAUK	DOD B( (OMIS	DU DR	LEV . TC	ar N	RD W	
	820	ADAM HILGEDICK Civil Engineer MO# 2014016961 FOR WSD USE:	KAN	5 ISAS CI COUNT	5TH TE TY, CL⁄ IES, M	ER. Ay ISS	& P ;0U	LA' RI	TE	3 3 3
	810									
2: 867.10 2: 878.53 5: 878.53 867.94	849.55 849.55		DRAWN BY A.K.H. CONTRACT NO.	CHECKED BY A.K.H. CONTRACTOR CONTRACT DATE	DATE	WSD 80	DA PROJECT 000195	ATE CO	DMPLETE DRAW 203	ed Ing no. 343
부운 Ê 59+00 59-1	ピ 790 ⊦50		PROJECT NO. STP 3311 (40 PW-89008121	2) I	(K166) SI	HEE	T 01	10	F 02	1



Propose Class 54 DIF

Sta.: 51+25.00 2-V

	D::       REVISIONS/APPROVALS:         Prepared for City Permit Submittal         Revised Per Comments & Resubmitted         Revised Per Comments & Resubmitted         Revised Per Comments & Resubmitted
	DATE: N( 03-07-2016 05-06-2016 12-20-2016 12-20-2016 08-28-2017
	Reviewed By: A.K.H. Designed By: A.K.H. Drafted By: G.S. Lutjen Project No.: 15013 ADAM HILGEDICK P.E. MO# 2014016961
6" DIP CL 52 8"x 6" Tee w/ Backing Block 1-8" MJ Plug 8" Gate Valve 42"x 8" Tee	<ul> <li>WTR - 15013 - Water Plan and Profile.dwg</li> <li>1301 Burlington, #100</li> <li>1301 Burlington, #1</li></ul>
Proposed 42" 54 DIP Main 2-Valve Hydrant On 42" Restrain Throughout Not to Scale 1. Provide two isolation valves. 2. Provide 5' bury hydrant & utilize restrained fittings to meet grade (anchoring "S" bends, locking 90° bends, 45° bends). NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.	Location: L: \Projects\12141-03\Plans\Construction Documents\Right of Way 36x2 WATER MAIN PLAN & PROFILE ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE STREETS UPGRADE STP 3311 (402) / KCM0 89008121 Kanses City, Clay & Platte Counties, MO
PROFESSIONAL ENGINEER SEAL	ERVICES DEPARTMENT EXTENSION BOULEVARD BOR. TO NW FER. LAY & PLATTE MISSOURI
DRAWN BY A.K.H. CHECKED BY A.K.H. A.K.H. CONTRACTOR CONTRACT NO. CONTRACT DATE DATE PROJECT NO. STIP 3311 (402) PML 8000 8121 (K165) S	DATE COMPLETED DATE COMPLETED WSD PROJECT NO. 80001953 DRAWING NO. 20343 SHEET 010 OF 021













NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

PROFESSIONAL ENGINEER SEAL	KANSAS CIT	Y, MISSOURI, '	WATER SER	VICES DEPART	MENT
ADAM HILGEDICK	M	VATER N	iain ex	KTENSIO	N
PE-2014016961	er Nv	NGLEWO WWAUK	) od B( Komis I	DULEVAR DR. TO N	RD IW
		5	51H IE	:R.	
Civil Engineer	KAN	ISAS CI	FY. CLA	AY & PLA	
MO# 2014016961			ieq Mi		
FOR WSD USE:				ISSUURI	
				<u> </u>	
	drawn by A.K.H.	CHECKED BY A.K.H.			
		CONTRACTOR		DATE C	OMPLETED
	CONTRACT NO.	CONTRACT DATE	DATE	U WSD PROJECT NO. 80001953	DRAWING NO. 20343
	PROJECT NO. STP 3311 (40 PW-8900812	)2) 1 (	K162) SH	<b>IEET 007 C</b>	<b>F 021</b>



![](_page_77_Figure_1.jpeg)

![](_page_78_Figure_0.jpeg)

## ANTI-COLLUSION STATEMENT

STATE OF MISSOURI CITY/COUNTY OF						
being first duly sworn, deposes and says that he is						
Title of Person Signing						
of						
Name of Bidder						

that all statements made and facts set out in the proposal for the above project are true and correct; and the bidder (The person, firm, association, or corporation making said bid) has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with said bid or any contract which may result from its acceptance.

Affiant further certifies that bidder is not financially interested in, or financially affiliated with, any other bidder for the above project.

I	BY
I	BY
I	ВҮ
<i>SWORN</i> to before me this	day of 20
My Commission Expires	Notary Public

![](_page_80_Figure_0.jpeg)

![](_page_81_Figure_0.jpeg)

Image: Size of a contract of the model	<b>.e</b> Location: L: \Proj	jects\1214	41–03\Plans\Construction Documents\Right of Way 36x24\TYP - 15013.dwg TYPICAL SFCTIONS	1301 Burlington, #100	Reviewed By: A.K.H.	and the second s	DATE:	D.: REVISIONS/APPROVALS:	
Image: Single indication in the indication indication indicated predict in the indindication indication ind		SI		North Kansas City, MO 64116	Designed Bv:	BOSSIN IO BLOCK	09-04-2015	Submitted to the MoDOT for Review	-
Participand       Drafted By: G.S.       Drafted By: G.S.       Drafted By: G.S.       Protect Point (1:3-2015)       Revised per Agency Comments and Resubmitted.         Providence       2       2.5.       Switch format from Sta/Off to Bearing and Distance.         Providence       01-12-2016       Switch format from Sta/Off to Bearing and Distance.         Providence       15013       15013       01-12-2016       Revised per Agency Comments and Resubmitted.         Providence       05-06-2016       Revised per Agency Comments and Resubmitted.       05-06-2016       Revised per Agency Comments and Resubmitted.         Providence       06-06-2016       Revised per Agency Comments and Resubmitted.       06-06-2016       Revised per Agency Comments and Resubmitted.         MO#: 2014016961       MO#: 2014016961       06-07-2017       Revised per Agency Comments and Resubmitted.		ne		816.587.1393 fax	A.K.H.	Ball more and	10-27-2015	Revised per Agency Comments and Resubmitted.	
Z       SIRELS UPGRADE       surveying planning       Lutjen Project No.:       Old       Suitch format from Sta/Off to Bearing and Distance.         No       SIRELS UPGRADE       UPGRADE       01-12-2016       Switch format from Sta/Off to Bearing and Distance.         No       STP 3311 (402) / KCMO 89008121       LUTJE N       No       15013       05-06-2016       Final Plan Submittal         No       State Certificate of Authority #: 200702824       MO#: 2014016961       MO#: 2014016961       09-07-2017       Revised per Agency Comments and Resubmitted.		et		www.lutjen.com	Drafted By:	HILGEDICK N. A	11-30-2015	Revised per Agency Comments and Resubmitted.	
Contraction in the second and the second activities in the second activ		N	SIREEIS UPGRADE	surveying planning	Lutien Project No.:	A Marine Bar	01-12-2016	Switch format from Sta/Off to Bearing and Distance.	
Kansas City, Clay & Platte Counties, MO       Mo State Certificate of Authority #: 200702824       Adam K. Hilgedick, P.E.       December Agency Comments and Resubmitted.         MO State Certificate of Authority #: 200702824       MO State Certificate of Authority #: 200702824       09-07-2017       Revised per Agency Comments and Resubmitted.	2	0.:	STP 3311 (402) / KCMO 89008121		15013	PE-2014016961	03-07-2016	Final Plan Submittal	
Moltane Could a State Certificate of Authority #: 200702824 Moltane 2010 Moltane Certificate of Authority #: 200702824 Moltane 2014016961 Certificate of Authority #: 200702824 Moltane 2014016961 Certificate of Authority #: 200702824 Certificate of Authority #: 20070284 Certificate of Authority #: 200702	)		Kancac City, Clay & Dlatta Countiac MO		Adam K. Hilgedick, P.E.	AND ALL PLAN	05-06-2016	Revised per Agency Comments and Resubmitted.	
			railada Oiry, Cidy & Lidire COULILES, MO	MO State Certificate of Authority #: 2007022824	MO#: 2014016961	and and a second	09-07-2017	Revised per Agency Comments and Resubmitted.	

All Pavement Sections Shall be Constructed With 9" Fly Ash Stabilized Subgrade Under Granular Subbase

![](_page_82_Figure_0.jpeg)

Item No.	Unit Unit	Quantity SCITY M	Item Description: ISSOURI STREET CONSTRUCTION Miscellaneous
1	L.S.	1	Mobilization
2	L.S.	1	Construction Staking
3	Ac.	13.48	Clearing & Grubbing
4	Ac.	6.51	Tree Removal (No Burning)
5	C.Y.	6,740	Pavement & Curb Removal
6	S.F.	503	Signing
/ 	Ea.	9	Type 3 Moveable Barricade
0	Ea.	1	Field Office
9		10 00	Topsoil Removal. Stockpile and Distribution
10		82 693	
11	C.Y.	71,472	Embankment
12	S.Y.	36,897	Subgrade Stabilization ( 9'' Flyash Treatment )
13	S.Y.	36,897	Rock Subbase ( 6" MoDOT Type 5)
14	S.Y.	36,897	Fine Grading ( Subgrade )
15	S.F.	1,261	Modular Block Retaining Wall
10			Erosion Control
16	L.F.	14000	Silt Fence
17	Ea.	91	Inlet Protection
19	Ea.	1	Venicle Tracking Device
10	5.1.	25730	
20	SY	277	2" Mill and Overlav
21	S.Y	21.384	2" Asphalt Surface
22	S.Y.	1,847	6" Asphalt Base
23	S.Y.	3,615	7" Asphalt Base
24	S.Y.	15,923	9" Asphalt Base
25	S.Y.	6,964	Asphalt Extension Under Curb
26	S.Y.	223	6" Concrete
27	S.Y.	6,786	8" Concrete
28	S.Y.	792	4" Concrete ( Colored and Textured )
23	<u> </u>	748	8" Concrete ( Colored and Textured )
30		1/ 02/	Curb & Cutter (Type CC 1)
31		14,034 017	Curb & Gutter (Type CG-1)
32	L.F.	्रम् । 8 864	Curb (Type C-1)
33	L.F.	264	Mountable Curb & Gutter
34	 L.F.	211	Concrete Sidewalks ( 4' Wide, 4" Thick )
35	L.F.	5,111	Concrete Sidewalks ( 5' Wide, 4" Thick )
36	L.F.	89	Concrete Sidewalks ( 6' Wide, 4'' Thick )
37	L.F.	536	Concrete Sidewalks ( 8' Wide, 6'' Thick )
38	L.F.	4,484	Concrete Sidewalks ( 10' Wide, 6'' Thick )
39	S.F.	7,641	ADA Curb Ramps ( 6" Thick w/ Detectable Warning ) Pavement Marking and Signage
40	Ea.	123	Street Sign (Includes Post & All Attached Signs)
41	Ea.	2	School Zone Flasher Sign
42	L.F.	56	4" Thermoplastic Solid White Pavement Marking
43	L.F.	19	4" Thermoplastic Solid Yellow Pavement Marking
	L.F.	1,255	Marking
45	L.F.	74	4" Thermoplastic Double Dashed Yellow
46		7 620	Pavement Marking
47	L.F.	7,020	6" Thermoplastic Solid White Pavement Marking
4-	L.F.	944	Marking
48	L.F.	339	8" Thermoplastic Solid White Pavement Marking
49	L.F.	172	8" Thermoplastic Dotted White Pavement
50		74	24" Thermoplastic Solid White Stop Bar
51	L.F.	348	24" Thermoplastic Solid White Crosswalk Line
52	sv	274	12" Thermoplastic Yellow Diagonal Hatch (12'
53		<u> </u>	O.C.)
	Ea.	11	Marking
54	Ea.	3	Thermoplastic White "ONLY" Pavement Marking
55	Ea.	12	Thermoplastic White Bike Lane Symbol & Arrow
56		60	4" Epoxy Dashed White Pavement Marking
57	<u> </u>	172	4" Epoxy Dotted White Pavement Marking
58	L.F.	93	4" Epoxy Solid Yellow Pavement Marking
59	L.F.	80	4" Epoxy Double Solid Yellow Pavement Marking
60	L.F.	593	6" Epoxy Solid White Pavement Marking
61	L.F.	598	6" Epoxy Dotted White Pavement Marking
62	L.F.	269	8" Epoxy Solid White Pavement Marking
63	L.F.	1,014	12" Epoxy Solid White Pavement Marking
65	L.F.	110	12" Epoxy Dotted White Pavement Marking
60 66	L.F.	180	24" Epoxy Solid White Stop Bar
67	Ea.	13	Epoxy White Turn Arrow Pavement Marking Epoxy White Bike Lane Symbol & Arrow Pavement Marking
68	L.F.	351	Storm Sewers 15" HDPE
69	L.F.	71	18" HDPE
70	L.F.	560	24" HDPE
71	L.F.	99	30" HDPE
72	 L.F.	169	36" HDPE
/3	L.F.	65	42" HDPE
75	L.F.	2133	15" RCP
76		314	18" RCP
		1204 200	24 KUK 30" RCP
		320	
78			

80 81 82		400	41 51 DOD
0 1 2		133	
	L.F.	/4	
	L.F.	178	Dual 13'x15' RCB
- <u> </u>	Ea.	3	15"-18" HDPE End Section
	Ea.	3	24"-36" HDPE End Section
	Ea.	1	42"-48" HDPE End Section
	Ea.	4	24"-36" RCP End Section
3	Ea.	1	4'x5' RCB End Section and Wing Walls
7	Ea.	1	8'x8' RCB End Section and Wing Walls
8	Ea.	1	Dual 13'x15' RCB End Section and Wing Walls
39	S.Y.	682	Type II Rock Blanket
90	S.Y.	2448	Type IV Rock Blanket
1	Ea.	22	4' Curb Cut Flume
2	Ea.	1	Std. Junction Box (4' x 4' Inside)
3	Ea.	1	Std. Junction Box (5' x 4' Inside)
)4	Ea.	2	Std. Junction Box (5' x 5' Inside)
95	Ea.	1	Std. Junction Box (4' x 11' Inside)
16	Ea.	1	Doghouse Junction Box (4' x 4' Inside)
97	Ea.	2	Doghouse Junction Box (5' x 5' Inside)
	Ea.	2	Std. Manhole (5' Dia.)
9	Ea.	3	Std. Curb Inlet (4' x 4' Inside)
	Ea.	12	Std. Curb Inlet (5' x 3' Inside)
	Ea.	26	Std. Curb Inlet (5' x 5' Inside)
102	Ea.	1	Std. Curb Inlet (6' x 6' Inside)
103 	Ea.	3	Std. Curb Inlet (7' x 7' Inside)
04 05	Ea.	4	Std. Field Inlet (4' x 4' Inside)
	Ea.	1	Connect to Existing Structure
07	Ea.	2	Connect to Existing Box Culvert
07 108	Ea.	2	IVIOAITY Existing Junction Box
<u>00</u>	C.Y.	510	BIVIP Engineered Soil Matrix
	L.F.	625	
10			Sanitary Sewers
11	VF	36	Std. Manhole (4' dia.) Adjustment
12	L.F.	225	
		2/2	Curea in Place Pipe Lining (21" Pipe )
		40	Stu. Iviannoie (4 dia.) Lining
114		070	36" DIP CL 54 waterling (Uprostrained Using)
115		9/9	42" DIP CL 54 waterline (Unrestrained Joint)
116		144Z	4" DIP CL 52 waterline (Unrestrained Joint)
117		242	6" DIP CL 52 waterline (Restrained Joint)
118		242 662	8" DIP CL 52 waterline (Restrained Joint)
119		2003 812	12" DIP CL 52 waterline (Restrained Joint)
120		120	16" DIP CL 54 waterline (Restrained Joint)
121		40	24" DIP CL 54 waterline (Restrained Joint)
122	LF	20	30" DIP CL 54 waterline (Restrained Joint)
123	LF	1262	36" DIP CL 54 waterline (Restrained Joint)
101		2085	42" DIP CL 54 waterline (Restrained Joint)
24	<u>-</u> '	-	
124	LF	50	60" Steel Casing Pipe w/Spacers & End Seals
24 25 26	LF EA	50 1	60" Steel Casing Pipe w/Spacers & End Seals 42" CL 54 - 11.25 Degree Bend
24 25 26 27	LF EA EA	50 1 5	60" Steel Casing Pipe w/Spacers & End Seals 42" CL 54 - 11.25 Degree Bend 42" CL 54 - 45 Degree Bend
24 25 26 27 28	LF EA EA EA	50 1 5 1	60" Steel Casing Pipe w/Spacers & End Seals 42" CL 54 - 11.25 Degree Bend 42" CL 54 - 45 Degree Bend 42" CL 54 - 90 Degree Bend
24 25 26 27 28 29	LF EA EA EA EA	50 1 5 1 2	60" Steel Casing Pipe w/Spacers & End Seals 42" CL 54 - 11.25 Degree Bend 42" CL 54 - 45 Degree Bend 42" CL 54 - 90 Degree Bend 36" CL 54 - 11.25 Degree Bend
124 125 126 127 128 128 29 30	LF EA EA EA EA EA	50 1 5 1 2 1	60" Steel Casing Pipe w/Spacers & End Seals 42" CL 54 - 11.25 Degree Bend 42" CL 54 - 45 Degree Bend 42" CL 54 - 90 Degree Bend 36" CL 54 - 11.25 Degree Bend 36" CL 54 - 22.5 Degree Bend
24 25 26 27 28 29 30 31	LF EA EA EA EA EA EA	50 1 5 1 2 1 7	60" Steel Casing Pipe w/Spacers & End Seals         42" CL 54 - 11.25 Degree Bend         42" CL 54 - 45 Degree Bend         42" CL 54 - 90 Degree Bend         36" CL 54 - 11.25 Degree Bend         36" CL 54 - 22.5 Degree Bend         36" CL 54 - 45 Degree Bend         36" CL 54 - 45 Degree Bend
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124         125         126         127         128         129         130         131         132         133         134         135         136         137         138         139         140         141         142         143         144         145         146         147         148         149         150         151         152         153         154         155         156         157         158         159         160         161         162         163         164	LF         EA         EA	50         1         5         1         2         1         7         2         4         1         7         2         4         1         7         5         6         4         2         3         9         3         9         3         9         3         9         3         1         7         2         3         1         7         2         2         1      1	60" Steel Casing Pipe w/Spacers & End Seals42" CL 54 - 11.25 Degree Bend42" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 22.5 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend16" CL 54 - 45 Degree Bend12" CL 52 - 45 Degree Bend12" CL 52 - 45 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 45 Degree Bend4" CL 52 - 45 Degree Bend4" CL 52 - 45 Degree Bend4" Solid Sleeve Coupling6" Solid Sleeve Coupling12" Solid Sleeve Coupling12" Solid Sleeve Coupling12" Solid Sleeve Coupling24" Solid Sleeve Coupling36" Solid Sleeve Coupling24" Solid Sleeve Coupling24" PCCP to DIP Adaptor36" X12" Reducer42" X36" Reducer42" X36" Reducer8" Aft Reducer8" Plug24" Plug24" Plug24" Plug24" Plug24" Pl
124         125         126         127         128         129         130         131         132         133         134         135         136         137         138         139         140         141         142         143         144         145         146         147         148         149         150         151         152         153         154         155         156         157         158         159         160         161         162         163         164         165	LF         EA         EA	50         1         5         1         2         1         7         2         4         1         7         5         6         4         2         3         9         3         9         3         9         3         2         1         7         2         3         9         3         1         7         2         1         7         2         3         1 <td>60" Steel Casing Pipe w/Spacers &amp; End Seals42" CL 54 - 11.25 Degree Bend42" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 22.5 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend12" CL 52 - 45 Degree Bend12" CL 52 - 45 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 45 Degree Bend4" Solid Sleeve Coupling6" Solid Sleeve Coupling6" Solid Sleeve Coupling12" Solid Sleeve Coupling12" Solid Sleeve Coupling36" Solid Sleeve Coupling24" Solid Sleeve Coupling36" X12" Reducer36" X24" Reducer42"X36" Reducer42"X36" Reducer16"x8" Reducer8"x6" Reducer8"Y6" Reducer8"Y6" Reducer8"Y6" Reducer8"Y6" Reducer8"Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plu</td>	60" Steel Casing Pipe w/Spacers & End Seals42" CL 54 - 11.25 Degree Bend42" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 22.5 Degree Bend36" CL 54 - 45 Degree Bend36" CL 54 - 45 Degree Bend12" CL 52 - 45 Degree Bend12" CL 52 - 45 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 11.25 Degree Bend8" CL 52 - 45 Degree Bend4" Solid Sleeve Coupling6" Solid Sleeve Coupling6" Solid Sleeve Coupling12" Solid Sleeve Coupling12" Solid Sleeve Coupling36" Solid Sleeve Coupling24" Solid Sleeve Coupling36" X12" Reducer36" X24" Reducer42"X36" Reducer42"X36" Reducer16"x8" Reducer8"x6" Reducer8"Y6" Reducer8"Y6" Reducer8"Y6" Reducer8"Y6" Reducer8"Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plug36" Plu

282     L.S.     4.1     Demotion       283     L.F.     4.44     Guar (MbDOT Type B Cutter)       284     L.F.     4.75     NGS Cuardral, P Oasts       284     L.F.     4.75     NGS Cuardral, P Oasts       284     L.F.     4.75     NGS Cuardral, P Oasts       284     E.B.     1     NGS End Anchor Section       284     E.B.     1.0     NGS End Anchor Section       284     E.B.     1.00     Channolecers       285     E.B.     1.00     Channolecers       286     E.B.     1.00     Channolecers       287     E.B.     1.00     Channolecers       288     E.B.     1.00     Channolecers       284     E.B.     1.00     Channolecers       284     E.B.     2.00     Trafic Barrier       285     E.B.     2.00     Trafic Signal No.1-Nammit Engewood       286     L.F.     9.00     Parement Marking Removal       287     E.B.     1.00     Trafic Signal No.1-Nammit Engewood       288     L.F.     9.00     Parement Marking Removal       289     L.F.     9.00     Parement Marking Removal       280     L.F.     1.00     Trafic Signal No.1-Nammit Engewood				Miscellaneous	
Ab.         Q. 0.3         Tree Clearing (no burming)           253         L.F.         445         Sturk (MODOT Type Stude)           254         L.F.         575         MOS Stuarment, P Posts           254         L.F.         575         MOS Stuarment, P Posts           254         E.a.         1         MOS Io Type A Council (MDOT Type Stude)           254         E.a.         1         MOS Io Type A Council (Trains Ston)           254         E.a.         100         Channekas           256         E.a.         30         Type 3 Moveable Baricade           257         L.E.         200         Tradits Barner           258         E.a.         30         Channekas           258         T.E.         200         Tradits Stuarment           258         E.B.         30         Channekas           258         T.E.         200         Tradits Stude Maker           258         T.E.         200         Tradits Stuarment Parale           258         T.E.         500         Tradits Stuarment Parale           259         T.E.         500         Tradits Stuarment Parale           258         L.F.         400         Yee Parale	250	L.S.	1	Demolition	
Ame I. F. 445         Cutter (MaDOT Type B cutter)           Sy. 4         Protection, MOOT Concrete Stope           Partice Construction, MOOT Concrete Stope         Ea.           Faile         1         MSIs to Type A Surrothy End Terminal           Partice Construction, MOOT Concrete Stope         Ea.         1018           Str. 1         MSIs to Type A Surrothy End Terminal           Partice Control         Str. 1         Termporty Traffic Control           Str. Ea.         130         Type 3 Moveable Barlcade           Str. Ea.         30         Type 3 Moveable Barlcade           Str. Ea.         20         Traffic Barler           Str. Ea.         20         Traffic Barler           Str. Ea.         20         Traffic Signal No.1           Str. Ea.         22         Barler Height Transloin           Str. E.         1         Traffic Signal No.1         Str. 1           Str. Ea.         1 <td< td=""><td>251</td><td>Ac.</td><td>0.3</td><td>Tree Clearing (no burning)</td></td<>	251	Ac.	0.3	Tree Clearing (no burning)	
S.Y.         472         Side Protection (NoLO Conclus Support Protection)           254         L.F.         575         MGS Guatola, 6 Posts           254         L.F.         575         MGS Countrol, 6 Posts           256         E.a.         1         MGS In Prope A Guardial Transition           256         S.F.         1018         Signing           258         S.F.         1018         Signing           258         L.F.         220         Industry Arrow Pamel           258         L.F.         220         Industry Arrow Pamel           258         L.F.         220         Industry Arrow Pamel           258         L.F.         220         Traffic Damostocia           259         L.F.         6200         Traffic Signal No.1         Normal Marking Removal           270         L.S.         1         Traffic Signal No.1         Normal Marking Removal           271         L.S.         1         Traffic Signal No.1         Normal Marking Removal           271         L.S.         1         Traffic Signal No.1         Normal Marking Height, M. Pole           272         L.S.         1         Traffic Signal No.1         Summarking Height, M. Pole           273	252	L.F.	445	Gutter (MoDOT Type B Gutter)	
254         L.F.         575         MCS Countral, P Pasts           278         E.a.         1         MASI Approved Crashworthy End Terminal           278         E.a.         1         MCS to Type A Countral Transition           279         E.a.         100         Charabacters           280         E.a.         300         Type 3 Weveable Baricade           281         E.a.         300         Type 3 Weveable Baricade           283         E.a.         300         Type 3 Weveable Baricade           284         E.a.         200         Totubur Marker           283         L.F.         200         Totubur Marker           284         E.a.         3         Charge Segin           285         T.F.         2000         4" Termp. Sold White           286         L.F.         400         24" Termp. Sold White           287         L.F.         400         24" Termp. Sold White           288         S.F.         11< Traffic Signal No.1.3. Eastern Ramp/Englewood	255	S.Y.	472	Protection (MoDOT Concrete Slope	
255     Ea.     1     MASH Approved Crashworthy End Terminal       757     Ea.     1     MSS to Type A Cauraful Transition       758     S.F.     1018     Signing       758     S.F.     1018     Signing       758     S.F.     1018     Signing       758     Ea.     100     Type A Moveable Barinade       758     S.F.     1120     Traffic Control       758     S.F.     1200     Traffic Baring       758     S.F.     1200     Traffic Baring       758     E.A.     200     Traffic Baring       758     E.A.     200     Parmer Hight Transition       758     E.A.     200     4" Temp. Soid White       759     E.A.     1     Traffic Signal No.2 - Western RamspicEnglewood       771     L.S.     1     Traffic Signal No.2 - Western RamspicEnglewood       773     S.F.     1728     Retaining Wall beneath 169 Havit       774     E.A.     1     Eardine Signal No.2 - Western RamspicEnglewood       777     E.A.     1     Taffic Signal No.2 - Western RamspicEnglewood       774     E.A.     1     Eardine Signal No.3 - Earisern RamspicEnglewood       773     E.A.     1     Signal No.1 - Summitic Signal No.1 - Summitic Signal N	254	L.F.	575	MGS Guardrail, 8' Posts	
989     Ea.     1     MSS End Anchor Section       987     Ea.     1     MSS to Type A Quartal Transition       188     S.F.     1018     Signing       189     Ea.     100     Channelizers       180     Ea.     30     Type 3 Moveable Baricade       181     Ea.     30     Table 3       182     Ea.     20     Traffic Barrier       184     Ea.     3     Changeable Message Sign       183     L.F.     2400     4" Temp. Solid White       184     Ea.     1     Traffic Signal No. 1       185     L.F.     9900     Pawement Marking Removal       187     L.S.     1     Traffic Signal No. 1       188     L.F.     9900     Pawement Marking Removal       177     L.S.     1     Traffic Signal No. 1       189     L.F.     1500     Value breach field Huy       180     S.F.     1175     Retaining Walue breach field Huy       181     L.S.     1     Traffic Signal No. 1       182     L.S.     1     Traffic Signal No. 1       183     S.F.     1175     Retaining Walue breach field Huy       183     L.S.     1     Traffic Signal No. 1       184 <t< td=""><td>255</td><td>Ea.</td><td>1</td><td>MASH Approved Crashworthy End Terminal</td></t<>	255	Ea.	1	MASH Approved Crashworthy End Terminal	
287         Ea.         1         MCS to Type A Guardrall Transition           788         S.F.         1018         Signing           788         Ea.         105         Channelizers           789         Ea.         30         Type 3 Moveable Baricide           781         Ea.         30         Type 3 Moveable Baricide           783         Ea.         30         Type 3 Moveable Baricide           784         Ea.         30         Transition           784         Ea.         30         Changeable Message Sign           784         Ea.         2         Barine Height Transition           787         L.F.         2500         4" Temp. Solid White           787         L.F.         970         Pawment Marking Removal           789         L.F.         1         Traffic Signal No. 2 - Western Ramps/Englewood           781         Ea.         1         Traffic Signal No. 2 - Western Ramps/Englewood           781         Ea.         1         Street Lighting           783         Ea.         1         Street Lighting           784         Ea.         1         Street Lighting           784         Ea. <th1< th=""> <th2< th=""></th2<></th1<>	256	Ea.	2	MGS End Anchor Section	
Interm         Temporary Traffic Control           Perm         Interm         Signa           Perm         Interm         Signa           Perm         Interm         Signa           Perm         Signa         Teal           Perm         Signa         Teal         Signa           Perm         Signa         Teal         Teal         Signa           Perm         Signa         No.         Signa         No.         Signa </td <td>257</td> <td>Ea.</td> <td>1</td> <td>MGS to Type A Guardrail Transition</td>	257	Ea.	1	MGS to Type A Guardrail Transition	
Abs         S.F.         1018         Signing           385         E.a.         150         Channelizers           386         E.a.         150         Channelizers           387         E.a.         20         Tubular Marker           388         E.a.         20         Trafic Barner           384         E.a.         2         Barner Height Transition           387         L.F.         2600         4" Temp. Solid Volte           388         L.F.         2600         24" Temp. Solid Volte           388         L.F.         2600         24" Temp. Solid Volte           389         L.F.         2600         24" Temp. Solid Volte           389         L.F.         2970         Pavement Marking Removal           380         L.F.         2970         Pavement Marking Removal           381         T.S.         1< Trafic Signal No.1 - Summt/Englewood	259			Temporary Traffic Control	
Factor         Ed.         Totol         Channelizer's           200         Ea.         30         Types Move Banel           211         Ea.         30         Traffic Barrier           213         Ea.         30         Changeable Message Sign           213         L.F.         220         Traffic Barrier           214         Ea.         30         Changeable Message Sign           215         L.F.         5200         4" Temp. Solid White           216         L.F.         500         4" Temp. Solid White           217         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           217         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           217         E.a.         52         LED Luminaire, 35' Mounting Height, W Pole           216         E.a.         52         LED Luminaire, 35' Mounting Height, 6'           217         E.a.         64         Screw In Base         Screw In Base           218         E.a.         1         Screw In Base         Screw InBase           218         E.a.         1         Screw In Base         Screw InBase           219         E.a.         1         Screw In Base	258	S.F.	1018	Signing	
Lat         Control         Type 3 Movember Barnada           211         Ea.         3         Flashing Arrow Panel           212         Ea.         20         Tubular Warker           213         L.F.         220         Traffic Barnier           214         Ea.         3         Changaable Message Sign           215         Ea.         2         Barnier Height Transition           216         L.F.         6500         24" Termp. Solid White           217         L.S.         1         Traffic Signal No.1 - Summit/Englewood           217         L.S.         1         Traffic Signal No.2 - Western Ramps/Englewood           217         L.S.         1         Traffic Signal No.2 - Western Ramps/Englewood           218         Ea.         1         Traffic Signal No.2 - Western Ramps/Englewood           217         Ea.         1         Traffic Signal No.2 - Western Ramps/Englewood           218         Ea.         1         Traffic Signal No.2 - Western Ramps/Englewood           217         Ea.         1         Street Lighting           218         Ea.         1         Street Lighting           219         Ea.         1         Street Lighting           218	209	Ea.	150	Channelizers	
Ea.         Tability Article Parist           Ea.         20         Tubility Marker           283         L.F.         200         Traffic Barnier           284         Ea.         2         Barrier Height Transition           285         Ea.         2         Barrier Height Transition           286         L.F.         4800         4" Temp. Solid White           286         L.F.         600         24" Temp. Solid Volte           286         L.F.         907         Pawement Marking Removal           270         L.S.         1         Traffic Signal No. 1 Summit/Englewood           271         L.S.         1         Traffic Signal No. 2 Western Ramps/Englewood           272         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           273         Ea.         4         400 Watt HPS Lummaine, 35 Mounting Height, 6"           276         Ea.         1         Screw In Base Small           277         Ea.         1         Screw In Base Small           278         Ea.         1         Screw In Base Small           279         Ea.         1         Screw In Base Small           279         Ea.         1         Screw In Base Small <td>260</td> <td>Ea.</td> <td>30</td> <td>Type 3 Moveable Barricade</td>	260	Ea.	30	Type 3 Moveable Barricade	
Lat         Lat         Cata Mathem           284         Lef.         220         Traffic Barrier           284         Ea.         3         Changeable Message Sign           285         Lef.         520         4' Temp. Solid White           287         Lef.         520         4' Temp. Solid White           287         Lef.         520         4' Temp. Solid White           289         Lef.         100         24' Temp. Solid White           289         Lef.         11         Taffic Signal No. 1: Summt/Englewood           271         LS.         1         Taffic Signal No. 2: Western Ramps/Englewood           272         LS.         1         Taffic Signal No. 2: Western Ramps/Englewood           273         S.F.         11758         Retaining Wall beneath 169 Hwy           274         Ea.         12         Left Mounting Height, 0' Bracked Arm, W Pole           277         Ea.         15         Statt HFS Lummaine, 35' Mounting Height, 0' Bracked Arm, W Pole           277         Ea.         1         Statt HFS Lummaine, 35' Mounting Height, 0' Bracked Arm, W Pole           278         Ea.         14         Ground Rod           280         Ea.         14         Ground Rod     <	262	⊑a. ⊑a	20	Flashing Arlow Panel	
84         E.1.         2.1.         Changeable Message Sign           265         Ea.         2         Barrier Heijkr Transilion           276         L.F.         560         4" Temp. Solid Vhite           278         L.F.         900         24" Temp. Solid Vhite           279         L.S.         1         Traffic Signal No. 1 - Summit/Englewood           271         L.S.         1         Traffic Signal No. 2 - Western Ramps/Englewood           272         L.S.         1         Traffic Signal No. 2 - Western Ramps/Englewood           273         S.F.         11785         Retaining Wall beneath 169 Hwy           274         E.S.         LED Luminaire, 37 Mounting Height, 9°           275         E.B.         400 Watt HPS Lumnaire, 37 Mounting Height, 9°           276         E.B.         1         Sorew In Base Smail           277         E.B.         1         Sorew In Base Smail           278         E.B.         1         Sorew In Base Smail           279         E.B.         1         Sorew In Base Smail           279         E.B.         1         Sorew In Base Smail           279         E.B.         1         Sorew In Base Smail           280         E	263	La.	20		
Base         Date of the second s	264	Fa	3	Changeable Message Sign	
286         L.F.         4860.         4" Temp. Solid Velice           287         L.F.         690.24" Temp. Solid Velice           288         L.F.         690.24" Temp. Solid Velice           288         L.F.         697.04" Temp. Solid Velice           278         L.S.         1         Traffic Signal No. 1 - Summittenglewood           271         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           273         S.F.         11783         Retaining Wall beneath 169 Hwy           274         Ea.         52         LED Luminaire, 35' Mounting Height, will Pole           276         Ea.         4         400 Walt PS Luminaire, 30' Mounting Height, sill           277         Ea.         1         150 Watt HPS Luminaire, 30' Mounting Height, sill           278         Ea.         1         Screw In Base - Small           279         Ea.         64         Screw In Base - Small           279         Ea.         1         Grant Radek Arm, Wole           280         Ea.         1         Grant Radek Arm, Wole           281         Ea.         1         Grant Radek Arm, Wole           282         Ea.         7         KCNO ID Labols           283 <td< td=""><td>265</td><td>Ea.</td><td>2</td><td>Barrier Height Transition</td></td<>	265	Ea.	2	Barrier Height Transition	
287         L.F.         5260         4" Temp. Solid Yellow           288         L.F.         600         24" Temp. Solid White           289         L.F.         9970         Payment Marking Removal           271         L.S.         1         Traffic Signal No. 2- Western Ramps/Englewood           271         L.S.         1         Traffic Signal No. 3- Eastern Ramps/Englewood           273         S.F.         11786         Retaining Wall beneath 169 Hwy           274         Ea         52         LED Luminaire. 35 Mounting Height, W Pole           276         Ea         4         400 Watt HPS Luminaire. 35 Mounting Height, W Pole           277         Ea         1         15 Corew In Base - Large           280         Ea         1         Sorew In Base - Small           278         Ea         64         Sorew In Base - Small           281         Ea         64         Ground Rod           283         Ea         2         Lighting Controler, 1ekt           284         Ea         100         Untused Breakaway Fuse Kits           285         Ea         2         Lighting Controler, 2ckt           286         Ea         100         Untused Breakaway Fuse Kits <td< td=""><td>266</td><td>L.F.</td><td>4860</td><td>4" Temp. Solid White</td></td<>	266	L.F.	4860	4" Temp. Solid White	
288         L.F.         900         24" Temp. Solid White           289         L.F.         9070         Pavament Marking Removal           270         L.S.         1         Traffic Signal No. 2 - Western Ramps/Englewood           271         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           273         S.F.         11788         Relaing Wall beneath 169 Hwy           274         E.a.         52         LED Luminaire. 35 Mounting Height, 6'           275         E.a.         4         400 Watt HPS Luminaire. 35 Mounting Height, 6'           276         E.a.         8         250 Watt HPS Luminaire. 35 Mounting Height, 6'           277         E.a.         1         Strew In Dase - Small           278         E.a.         1         Screw In Dase - Large           280         E.a.         1         Screw In Dase - Small           279         E.a.         1         B' Anil-Theft Device           281         E.a.         6         Paul Box           283         E.a.         1         Ughting Controller, 1okt           284         E.a.         100         Unfrased Traekaway Fuse Kits           286         E.a.         12         Lift Horized Traekaway Fus	267	L.F.	5260	4" Temp. Solid Yellow	
289         L.F.         9970         Pavement Marking Removal           270         L.S.         1         Traffic Signal No. 1 - Sumit/Englewood           271         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           272         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           273         S.F.         11785         Retaining Wall beneath 169 Hwy           274         Ea.         52         LED Lumnaire, 35 Mounting Height, with Pole           276         Ea.         4         400 Watt HPS Luminaire, 35 Mounting Height, 6'           277         Ea.         1         50 Watt HPS Luminaire, 30 Mounting Height, 6'           278         Ea.         1         Screw In Base - Small           279         Ea.         64         Screw In Base - Small           280         Ea.         1         Grand Rod           281         Ea.         1         Unfused Breakaway Fuse Kits w/ 10A           282         Ea.         1         Unfused B	268	L.F.	60	24" Temp. Solid White	
270         L.S.         1         Traffic Signal No. 1 - SummWEnglewood           271         L.S.         1         Traffic Signal No. 2 - Westem Ramps/Englewood           272         L.S.         1         Traffic Signal No. 2 - Seatem Ramps/Englewood           273         S.F.         11785         Retaining Wall beneath 169 Hwy           274         E.S.         52         LED Luminaire, 35 Mounting Height, W Pole           276         E.S.         4         400 Watt HPS Luminaire, 30 Mounting Height, 6' Bracket Am. W Pole           277         E.S.         1         Screw In Base - Small           278         E.S.         1         Screw In Base - Large           279         E.S.         64         Screw In Base - Large           278         E.S.         64         Screw In Base - Large           279         E.S.         64         Screw In Base - Large           278         E.S.         64         Ground Rod           279         E.S.         64         Screw In Base - Small           270         E.S.         64         Screw In Base - Small           278         E.S.         100         Large           280         E.S.         100         Screw In Base - Small	269	L.F.	9970	Pavement Marking Removal	
271         L.S.         1         Traffic Signal No. 2 - Western Ramps/Englewood           272         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           274         E.S.         11786         Retaining Wall beneath 169 Hwy           274         E.a.         52         LED Luminaire, 35 Mounting Height, 6' Bracket Arm, w. Pole           276         E.a.         8         250 Watt HPS Luminaire, 35 Mounting Height, 6' Bracket Arm, w. Pole           277         E.a.         1         50 Watt HPS Luminaire, 35 Mounting Height, 6' Bracket Arm, w. Pole           278         E.a.         1         Screw In Base - Small           279         E.a.         64         Screw In Base - Large           280         E.a.         64         Screw In Base - Small           278         E.a.         64         Screw In Base - Marge           281         E.a.         64         Screw In Base - Screw In Base           283         E.a.         64         Screw In Base - Screw HEB           284         E.a.         65         Bracket Arm, WPole           285         E.a.         2         Lighting Controller, 1ckt           286         E.a.         7         Retarward Ared Ared Ared Ared Ared Ared Ared Ar	270	L.S.	1	Traffic Signal No. 1 - Summit/Englewood	
272         L.S.         1         Traffic Signal No. 3 - Eastern Ramps/Englewood           273         S.F.         11785         Retaining Wall beneath 169 Hwy           274         Ea.         52         LED Luminare, 35 Mounting Height, 6° Bracket Arm, w Pole           276         Ea.         4         400 Watt HPS Luminare, 35 Mounting Height, 6° Bracket Arm, w Pole           277         Ea.         1         50 Watt HPS Luminare, 30 Mounting Height, 6° Bracket Arm, w Pole           277         Ea.         1         Screw In Base - Small           278         Ea.         1         Screw In Base - Large           279         Ea.         64         Screw In Base - Small           279         Ea.         64         Screw In Base - Small           278         Ea.         64         Screw In Base - Small           278         Ea.         6         Pull Box           280         Ea.         6         Pull Box           281         Ea.         6         Pull Box           282         Ea.         100         Unfused Breakaway Fuse Kits w/ 10A           283         Ea.         120         Unfused Breakaway Fuse Kits           284         Ea.         140         Strews	271	L.S.	1	Traffic Signal No. 2 - Western Ramps/Englewood	
4/4     S.F.     11785     Retaining Wall beneath 169 Hwy       274     E.     52     LED Luminarie, 35 Mounting Height, W Pole       275     E.a.     4     Hoo Watt HPS Luminarie, 35 Mounting Height, 6' Bracket Arm, W Pole       277     E.a.     1     150 Watt HPS Luminarie, 30 Mounting Height, 6' Bracket Arm, W Pole       277     E.a.     1     6' Crew In Base - Small       278     E.a.     1     6' Arni-Theft Device       279     E.a.     64     Screw In Base - Small       279     E.a.     64     Screw In Base - Large       280     E.a.     64     Ground Rod       281     E.a.     62     Large Machine Rod       283     E.a.     63     Brackat Arm, Wrouse       284     E.a.     65     Brackat Arm, Wrouse       284     E.a.     65     Brackat Arm, Wrouse       285     E.a.     64     Screw Raser, Screw HEB Fuse Kits Wr 10A       284     E.a.     65     Brackat Arm, Wrouse       284     L.F.     9760     24.146       284	272	L.S.	1	Traffic Signal No. 3 - Eastern Ramps/Englewood	
Image: street Lighting           274         Ea.         52         LED Luminaire, 35' Mounting Height, w/ Pole           276         Ea.         8         260 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, wr Pole           277         Ea.         1         Strown In Base - Small           278         Ea.         1         Screw In Base - Large           280         Ea.         1         6' Anit-Theft Device           281         Ea.         1         6' Anit-Theft Device           282         Ea.         1         6' Anit-Theft Device           283         Ea.         1         6' Anit-Theft Device           284         Ea.         1         6' Anit-Theft Device           285         Ea.         1         2' Anit-Theft Device           286         Ea.         1         2' Lighing Controller, 1ckt           286         Ea.         1         2' Lighing Controller, 1ckt           287         Ea.         1         2' Lighing Controller, 1ckt           288         Ea.         1         2' Lighing Controller, 1ckt           289         L.F.         9' Co.         2' Hat RH-HYRHWUSE           280         L.F.         4' CO         3' PvC	273	S.F.	11785	Retaining Wall beneath 169 Hwy	
4'4         Ea.         52         LED Luminaire, 35' Mounting Height, 9'           276         Ea.         4         400 Watt HPS Luminaire, 36' Mounting Height, 6'           277         Ea.         1         Bracket Arm, w/ Pole           277         Ea.         1         Bracket Arm, w/ Pole           277         Ea.         1         Strew In Base - Small           278         Ea.         1         Strew In Base - Large           278         Ea.         1         Strew In Base - Large           278         Ea.         1         Strew In Base - Large           281         Ea.         64         Strew In Base - Large           282         Ea.         72         KCMO ID Labels           283         Ea.         2         Lighting Controller, 1ckt           284         Ea.         100 Unfused Braskaway Fuse Kits           285         Ea.         100 Unfused Braskaway Fuse Kits           286         L.F.         9740         2#4, 1#6 RH/RHW/USE           287         L.F.         1000 3# 1/ USE           288         Ea.         100 Unfused Braskaway Fuse Kits           289         L.F.         100 3# 1/ USE           280         L.F.	074			Street Lighting	
Ea.         4         HOU Watt HPS Luminaries, 35 Mounting Height, 6' Bracket Am, w/ Pole           276         Ea.         8         Bracket Am, w/ Pole           277         Ea.         1         150 Watt HPS Luminare, 35 Mounting Height, 6' Bracket Am, w/ Pole           278         Ea.         1         Screw In Base - Small           279         Ea.         64         Screw In Base - Small           279         Ea.         64         8' Anit-Theft Device           280         Ea.         64         8' Anit-Theft Device           281         Ea.         64         8' Anit-Theft Device           282         Ea.         60         Pull Box           283         Ea.         6         Pull Box           284         Ea.         6         Breakaway, Sec-Screw HEB Fuse Kits w/ 10A           285         Ea.         10         Unfused Breakaway Fuse Kits           286         Ea.         10         S'PVC           281         L.F.         9740         274, 1#8 RH-WRW/USE           281         L.F.         10505         2'PVC           284         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0043           285         Ea.         7	275	Ea.	52	LED Luminaire, 35' Mounting Height, w/ Pole	
250         Ea.         250 Watt IPS Lumiare, 36 Mounting Height, 6           77         Ea.         1         Brackel Arm, w/ Pole           77         Ea.         1         Screw In Base - Small           279         Ea.         64         Screw In Base - Large           280         Ea.         1         6' Ant-Theft Device           281         Ea.         64         Screw In Base - Large           283         Ea.         4         Ground Rod           284         Ea.         6         Pull Box           285         Ea.         2         Lighting Controller, 1okt           286         Ea.         12         Lighting Controller, 1okt           287         Ea.         6         Pull Box           288         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits w/ 10A           289         L.F.         9740         2#4, 1#6 RH-H/RHW/USE         1040           281         L.F.         1050         2*P VC         2           282         L.F.         400         3*P VC         2           283         L.F.         1050         2*P VC         2           284         REN we Existing Luminaries: NMF0612 · NMF 0613<	210	Ea.	4	Bracket Arm. w/ Pole	
L.         U         Bracket Am, w/ Pole           277         Ea.         1         50 Watt HPS Luminaire, 30' Mounting Height, 6' Bracket Am, w/ Pole           278         Ea.         1         Screw In Base - Small           279         Ea.         1         6' Anit-Theft Device           280         Ea.         1         6' Anit-Theft Device           281         Ea.         4         Ground Rod           282         Ea.         2         Lighting Controller, 1ckt           283         Ea.         2         Lighting Controller, 2ckt           284         Ea.         6         Pull Box           285         Ea.         2         Lighting Controller, 2ckt           286         Ea.         100 fullysed Breakaway Fuse Kits           287         Ea.         100 St/1 USE           288         Ea.         100 St/1 USE           299         L.F.         1050S         2''PVC           291         L.F.         1050S         2''PVC           293         L.F.         100 St/1 USE         100           294         L.F.         100 St/1 USE         100           295         Ea.         7         Remove Existing Luminaries:	276	Fo	Q	250 Watt HPS Luminaire, 35' Mounting Height, 6'	
Ea         1         DUWRIT HIPS Luminaries, 30 Mounting Height, 6' Fracket Arm, Wole           273         Ea.         1         Screw In Base - Small           274         Ea.         1         Screw In Base - Small           278         Ea.         1         Screw In Base - Small           278         Ea.         1         G* Anit-Theft Device           281         Ea.         64         Screw In Base - Small           282         Ea.         72         KCMO ID Labels           283         Ea.         6         Puil Box           284         Ea.         6         Puil Box           285         Ea.         2         Lighting Controller, 1ckt           286         Ea.         2         Lighting Controller, 2ckt           287         Ea.         65         Breakaway, Stack Screw HEB Fuse Kits w/ 10A           288         Ea.         130         Unfused Breakaway Fuse Kits           290         L.F.         9740         274. (176 RH-IR-RHW/USE           291         L.F.         10505         2' PVC           292         L.F.         400         3'' PVC           293         L.F.         10055         2' PVC           <	277	<b>⊏d</b> .	0	Bracket Arm, w/ Pole	
Product String LP - Index           Product String LP - Small           Product String LP - Small <td>211</td> <td>Ea.</td> <td>1</td> <td>ו ויסט אמת ארט נעשווחמויפ, 30' Mounting Height, 6'   Bracket Arm. w/ Pole</td>	211	Ea.	1	ו ויסט אמת ארט נעשווחמויפ, 30' Mounting Height, 6'   Bracket Arm. w/ Pole	
279         Ea.         64         Screw In Base - Large           280         Ea.         1         6"Ant-Theft Device           281         Ea.         44         "Ant-Theft Device           282         Ea.         72         KCMO ID Labis           283         Ea.         4         Ground Rod           284         Ea.         6         Pull Box           284         Ea.         2         Lighting Controller, 1ckt           286         Ea.         2         Lighting Controller, 2ckt           287         Ea.         65         Breakaway, Set-Screw HEB Fuse Kits w/ 10A           288         Ea.         130         Unfused Breakaway, Fuse Kits           289         L.F.         9740         2#4, 1#8 RH+/RHW/USE           280         L.F.         765         2#8, 1#8 RH+/RHW/USE           281         L.F.         1000         3*P/C           282         L.F.         400         3*P/C           283         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF           284         L.F.         400         3*P/C           285         Remove Existing Luminaries: NMG1001 - NMF0012 - NMF           70618 <t< td=""><td>278</td><td>Ea.</td><td>1</td><td>Screw In Base - Small</td></t<>	278	Ea.	1	Screw In Base - Small	
280         Ea.         1         6" Anit-Theft Device           281         Ea.         64         8" Anit-Theft Device           282         Ea.         4         Ground Rod           284         Ea.         6         Pull Box           285         Ea.         2         Lighting Controller, Tokt           286         Ea.         2         Lighting Controller, Tokt           287         Ea.         12         Lighting Controller, Tokt           288         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses           289         L.F.         9740         2#4, 1#6 RH-I/RHW/USE           290         L.F.         9740         2#4, 1#6 RH-I/RHW/USE           291         L.F.         10505         2" PVC           292         L.F.         10505         2" PVC           291         L.F.         10505         2" PVC           292         E.A.         4         KCPL Services           293         E.F.         100         3" PVC           294         E.A.         7         Remove Existing Luminaries: NLF0001 - NLF002           298         Ea.         1         Remove Existing Luminaries: NLF0001 - NLF002	279	Ea.	64	Screw In Base - Large	
Ea.         64         8" Anit-Theft Device           282         Ea.         72         KCMO ID Labels           283         Ea.         4         Ground Rod           284         Ea.         6         Pull Box           285         Ea.         2         Lighting Controller, 1ckl           286         Ea.         2         Lighting Controller, 2ckt           287         Ea.         65         Breakaway, Set-Screw HEB Fuse Kits w/ 10A           288         Ea.         130         Untused Breakaway Fuse Kits           289         L.F.         9740         2#4, 1#6 RH-I/RHW/USE           280         L.F.         10055         2" PVC           281         L.F.         10055         2" PVC           282         L.F.         400         3" PVC           283         L.F.         10055         2" PVC           284         K         Remove Existing Luminaries: NMF0612 - NMF           0618         8" Remove Existing Luminaries: NMF0612 - NMF           0618         Remove Existing Luminaries: NMG1001 - NLF0002           288         Ea.         2         Remove Existing Luminaries: NMG1001 - NMK51011           100         Ea.         5 <t< td=""><td>280</td><td>Ea.</td><td>1</td><td>6" Anit-Theft Device</td></t<>	280	Ea.	1	6" Anit-Theft Device	
282         Ea.         72         KCMO ID Labels           283         Ea.         4         Ground Rod           284         Ea.         2         Lighting Controller, 1okt           285         Ea.         2         Lighting Controller, 2okt           286         Ea.         12         Lighting Controller, 2okt           287         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses           288         Ea.         130         Unfused Breakaway Fuse Kits           289         L.F.         760         2#4, 1#6 RH-H/R-HW/USE           281         1E, F.         760         3#10 RHW/USE           281         L.F.         400         3#10 RHW/USE           283         L.F.         400         3"PVC           284         Ea.         4         KCPL Services           286         Ea.         7         Remove Existing Luminaries: NLF0001 - NLF0003           287         Ea.         4         Remove Existing Luminaries: NLF0001 - NLF0002           288         Ea.         7         Remove Existing Luminaries: NMG101 - NMG101           301         Ea.         110         Remove Existing Luminaries: NLF0001 - NLF0002           288	281	Ea.	64	8" Anit-Theft Device	
Pain         Fain         A Coround Rod           284         Ea.         6 Pull Box           285         Ea.         2 Lighting Controller, 1ckt           286         Ea.         2 Lighting Controller, 2ckt           287         Ea.         65         Breakaway, Set-Screw HEB Fuse Kits w/ 10A           288         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits w/ 10A           289         L.F.         9740         2#4, 1#6 RH-I/R-HW/USE           290         L.F.         765         2#8, 1#8 RH-I/R-HW/USE           291         L.F.         400         3#1, USE           292         L.F.         400         3"PVC           293         L.F.         400         3"PVC           294         Ea.         4         KCPL Services           295         Ea.         7         Remove Existing Luminaries: NLF0001 - NLF002           296         Ea.         7         Remove Existing Luminaries: NLF0001 - NLF002           297         Ea.         11         Remove Existing Luminaries: NLF0001 - NLF002           298         Ea.         11         Remove Existing Luminaries: NLF001 - NLF003           299         Ea.         11         Remove Existing Luminaries: N	282	Ea.	72	KCMO ID Labels	
284         Ea.         6         Pull Box           285         Ea.         2         Lighting Controller, 1ckt           286         Ea.         2         Lighting Controller, 2ckt           287         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses           288         Ea.         130         Unfused Breakaway Fuse Kits           289         L.F.         9740         2#4, 1#6 RHH/RHW/USE           280         L.F.         9750         2#8, 1#8 RHH/RHW/USE           281         L.F.         2984         3#10 RHW/USE (Internal Pole Wining)           282         L.F.         10505         2"PVC           283         L.F.         10505         2"PVC           284         L.F.         400         3"PVC           285         Ea.         4         KCPL Services           286         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0002           289         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524           289         Ea.         110         RPMs           301         EA	283	Ea.	4	Ground Rod	
Basel         Ea.         2         Lighting Controller, Tokt           286         Ea.         2         Lighting Controller, Tokt           287         Ea.         65         Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses           288         Ea.         130         Unfused Breakaway, Set-Screw HEB Fuse Kits           289         L.F.         9740         2#4, 1#6 RH/RHW/USE           280         L.F.         765         2#8, 1#8 RH/RHW/USE           281         L.F.         400         3#10 RHW/USE (internal Pole Wiring)           292         L.F.         400         3#10 RHW/USE           293         L.F.         400         3" PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF           0618         Remove Existing Luminaries: NMF0612 - NMF         0618           298         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1021           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1524           290         Ea.         11         Remove Existing Luminaries: NMG1520 - NMG1524	284	Ea.	6	Pull Box	
1         2         Lighting Controlling, 20xit           287         Ea.         65         Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses           288         Ea.         130         Unfused Breakaway, Fuse Kits           289         L.F.         9740         2#4, 1#8 RHH/RHW/USE           290         L.F.         755         2#3, 1#8 RHH/RHW/USE           291         L.F.         2984         3#10 RHW/USE (Internal Pole Wiring)           292         L.F.         400         3" PVC           293         L.F.         10505         2" PVC           294         L.F.         400         3" PVC           294         L.F.         400         3" PVC           296         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         11         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         11         Remove Existing Luminaries: NMG102 - NMG101 - NMG101           300         Ea.         5         Remove Existing Luminaries: NLF0001 - NMG1524           UNDSOAPING         Trees           301         EA         17.07           84         10.8         Perennials	285 286	Ea.	2	Lighting Controller, 1ckt	
Ea.         65         Fuses           288         Ea.         130         Unfused Breakaway Fuse Kits           289         L.F.         9740         2#4, 1#6 RHH/RHW/USE           290         L.F.         2943         #10 RHW/USE           291         L.F.         2943         #10 RHW/USE           292         L.F.         400         3#10 RHW/USE           293         L.F.         10505         2" PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         2         Remove Existing Luminaries: NLF001 - NLF002           299         Ea.         11         Remove Existing Luminaries: NMG1520 - NMG1524           VHDSCAPING           Trees           301         EA         279           Street Trees - 2.5" caliper; B&B         303           202         EA         110         RPM's           Trees           301         EA         1,877           Shrubs         5 gallon         Street Trees - 2.5" ca	287	⊏a.	2	Breakaway, Set-Screw HEB Fuse Kits w/ 10A	
288         Ea.         130         Unfused Breakaway Fuse Kits           289         L.F.         9740         2#4, 1#8 RHHRHW/USE           290         L.F.         765         2#8, 1#8 RHHRHW/USE           291         L.F.         400         3#1, USE           293         L.F.         10505         2"PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF 0618           297         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         11         Remove Existing Luminaries: NMG1001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NLF0002           290         Ea.         110         Remove Existing Luminaries: NMG1001 - NLF0002           291         Ea.         110         RPMVE           202         EA         110         RPMVE           2030         EA         1,877         Shrubs           301         EA <t< td=""><td></td><td>Ea.</td><td>65</td><td>Fuses</td></t<>		Ea.	65	Fuses	
289         L.F.         9740         2#4, 1#6 RH-I/RHW/USE           280         L.F.         765         2#8, 1#8 RH-I/RHW/USE           281         L.F.         2984         3#10 RHW/USE (Internal Pole Wiring)           282         L.F.         10505         2" PVC           284         L.F.         10505         2" PVC           284         L.F.         400         3" PVC           285         Ea.         4         KCPL Services           286         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF 0618           287         Ea.         4         Remove Existing Luminaries: NLF0001 - NLF0003           288         Ea.         1         Remove Existing Luminaries: NMG1501 - NMG1524           289         Ea.         1         Remove Existing Luminaries: NMG1520 - NMG1524           301         EA         279         Street Trees - 2.5" caliper, B&B           302         EA         110         RPMos           303         EA         1,877         Shrubs - 5 gallon           304         EA         4,056         Perennials           305         AC         6.70         Fescue Seeding           306         S.Y.         55,176	288	Ea.	130	Unfused Breakaway Fuse Kits	
290         L.F.         765         2#8, 1#8 RH-I/RHW/USE           291         L.F.         2984         3#10 RHW/USE (Internal Pole Wiring)           282         L.F.         400         3" PVC           293         L.F.         400         3" PVC           284         L.F.         400         3" PVC           285         Ea.         4         KCPL Services           286         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0002           287         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0002           288         Ea.         11         Remove Existing Luminaries: NLF0040 - NLF0002           289         Ea.         11         Remove Existing Luminaries: NLF001 - NMG1524           VEXPONDEATION           VEXPONDEATION           NMG1524           VEXPONDEATION           Street Trees - 2.5" caliper; B&B           301         EA         170         Strubs           302         EA         110         RPMs           VEXPONDEATION           VEXPONDEATION           Struet Trees - 2.5" caliper; B&B           303         EA	289	L.F.	9740	2#4, 1#6 RHH/RHW/USE	
291         L.F.         2984         3#10 RHW/USE (Internal Pole Wiring)           292         L.F.         400         3#1, USE           293         L.F.         10505         2" PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0043           297         Ea.         2         Remove Existing Luminaries: NLF0001 - NLF0002           298         Ea.         11         Remove Existing Luminaries: NMG1001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1520 - NMG1524           LANDSCAPING           Trees           301         EA.         279         Street Trees - 2.5" caliper; B&B           302         EA.         110         RPMs           Shrubs 5 gallon           Perennials           304         EA.         4,056         Perennials           305         AC.         6.70         Fescue Seeding           306         S.Y.         55,176         Bonded Fiber Matrix           307         S.Y.         21,900 <td>290</td> <td>L.F.</td> <td>765</td> <td>2#8, 1#8 RHH/RHW/USE</td>	290	L.F.	765	2#8, 1#8 RHH/RHW/USE	
292         L.F.         400         3#1, USE           293         L.F.         10505         2" PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NLF0040 - NLF0043           297         Ea.         4         Remove Existing Luminaries: NLF0001 - NLF0043           298         Ea.         2         Remove Existing Luminaries: NLF0001 - NLF0043           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1524           LANDSCAPING           Trees           301         EA.         279           Street Trees - 2.5" caliper; B&B         303           302         EA.         100           Perennials - 1 gallon           Materials           Materials           304         EA.         4,056           Perennials - 1 gallon         Secting J Sodding           305         AC.         6.70           S.Y.         21,900         Fescue Sodding           306         S.Y.         55,176           307 </td <td>291</td> <td>L.F.</td> <td>2984</td> <td>3#10 RHW/USE (Internal Pole Wiring)</td>	291	L.F.	2984	3#10 RHW/USE (Internal Pole Wiring)	
233         L.F.         10505         2"PVC           294         L.F.         400         3" PVC           295         Ea.         4         KCPL Services           296         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF 0618           297         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         2         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524            Ea.         11         Remove Existing Luminaries: NMG1520 - NMG1524            Ea.         110         RPM's            Kreet Trees - 2.5" caliper; B&B           301         EA.         1,877         Shrubs           303         EA.         1,877         Shrubs           304         EA.         1,056         Perennials           305         AC.         6.70         Fescue Seeding           306         S.Y. <td< td=""><td>292</td><td>L.F.</td><td>400</td><td>3#1, USE</td></td<>	292	L.F.	400	3#1, USE	
Zvi         L.F.         400         3 PVC           285         Ea.         4         KCPL Services           286         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF 0618           287         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0023           288         Ea.         2         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524           LANDSCAPING           Trees           301         EA.         279         Street Trees - 2.5" caliper; B&B           302         EA.         110         RPM's           Teres           303         EA.         1,877         Shrubs           304         EA.         1,877         Shrubs         Shrubs           305         AC.         6.70         Fescue Seeding         Sodding           306         S.Y.         55,176         Bonded Fiber Matrix         Materials           307         S.Y.         21,900         Fescue Seeding         Materials           308	293	L.F.	10505		
Particle         Particle         Particle           296         Ea.         7         Remove Existing Luminaries: NMF0612 - NMF 0618           297         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0002           298         Ea.         2         Remove Existing Luminaries: NMG1001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524           LANDSCAPING           LANDSCAPING           Trees           301         EA.         279         Street Trees - 2.5" caliper; B&B           302         EA.         110         RPMs           Shrubs - 5 gallon           Trees           303         EA.         1,877         Shrubs - 5 gallon           Shrubs - 5 gallon           Seeding / Sodding           304         EA.         4,056         Perennials           305         AC.         6.70         Fescue Seeding           306         S.Y.         21,900         Fescue Seeding           306         AC.         4.7         Native Seed Mix	295	L.F.	400		
Ea.         7         Interest String Lumination Num Conc. Num 2012           297         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0002           298         Ea.         2         Remove Existing Luminaries: NMG1001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524           LANDSCAPING           Trees           301         EA.         279         Street Trees - 2.5" caliper; B&B           302         EA.         110         RPMs           Shrubs           303         EA.         1,877         Shrubs - 5 gallon           Shrubs - 5 gallon           Shrubs           304         EA.         4,056         Perennials           304         EA.         4,056         Perennials           306         AC.         6.70         Fescue Seeding           306         S.Y.         21,900         Fescue Sodding           308         AC.         4.7         Native Seed Mix           309         AC.         4.7         Temporary Seeding	296	a.	4	Remove Existing Luminaries' NME0612 - NME	
297         Ea.         4         Remove Existing Luminaries: NLF0040 - NLF0043           298         Ea.         2         Remove Existing Luminaries: NLF0001 - NLF0002           299         Ea.         11         Remove Existing Luminaries: NMG1001 - NMG1011           300         Ea.         5         Remove Existing Luminaries: NMG1520 - NMG1524           LANDSCAPING           Trees           301         EA         279         Street Trees - 2.5" caliper; B&B           302         EA         110         RPMs           Street Trees - 2.5" caliper; B&B           303         EA         1,877         Shrubs           304         EA         1,877         Shrubs - 5 gallon           Perennials           304         EA         4,056         Perennials           305         AC.         6.70         Fescue Seeding           306         S.Y.         25,176         Bonded Fiber Matrix           307         S.Y.         21,900         Fescue Sodding           308         AC.         4.7         Native Seed Mix           309         AC.         4.7         Temporary Seeding           310         EA         <		Ea.	7	0618	
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321     EA.     1     Landscaping at North Wyoming Avenue       322     EA.     1     Landscaping at West Englewood Elementary (remove, store and re-install existing sign)       323     EA.     1     Landscaping at Store and re-install existing sign)       323     EA.     1     Landscaping at Store and re-install existing sign)	320	F۵	1	Landscaping at North Ames Avenue	
322     EA.     1     Landscaping at West Englewood Elementary (remove, store and re-install existing sign)       323     EA.     1     Landscaping and stonework at North Mercier Drive	321	EA	1	Landscaping at North Wyoming Avenue	
Image: Second	322		1	Landscaping at West Englewood Elementary	
EA. 1 Landscaping and stonework at North Mercier	303			(remove, store and re-install existing sign)	
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