



TOWN OF COLLIERVILLE
GENERAL SERVICES DEPARTMENT
500 POPLAR VIEW PARKWAY
COLLIERVILLE, TENNESSEE 38017

DIVISION 3

SECTION 03100 – CONCRETE FORMWORK

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section includes furnishing materials and installation of concrete formwork as indicated on the Drawings and/or specified herein.
- B. Related Work: The following items of related work are specified in other sections.
 - 1. Section 03200: Concrete Reinforcement
 - 2. Section 03300: Cast – In – Place Concrete
- C. Work Included: This Section of these specifications includes only the fabrications and erection of the concrete formwork for the cast-In-Place Concrete – of these Specifications; all requirements of Part 1 – General – Section 03300 govern all materials and work specified in this Sections.
- D. General: Formwork shall comply with ACI standards publication 347.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Design and Construction: Forms shall conform to the types, shapes, lines, and grades shown on the Drawings. Forms shall be securely tied braced in position, and shored to support safely all construction loads, sufficiently tight to prevent appreciable leakage of mortar and be clean of all debris at time of concreting. Responsibility for adequacy and safety shall be the Contractor's responsibility but design shall be subject to approval.
- B. Form ties shall be such type that when forms are removed, no metal shall be left within 1 – ½ inch of any surface.
- C. Smooth surface forms shall be used for all exposed surfaces and shall consist of the following:
 - 1. Concrete Exterior Form Plywood, resin overlay face on fir plywood backup 5-veneer plies, 5/8" thick by 4' x 8' sheet size, factory oiled and edges sealed.
 - 2. Use plywood boards, except as noted, for all exterior exposed concrete. Minimize all joints between sheets, and prevent any bulging or pillowing of large sheets by back-up lumber at open spaces with a maximum distance between supports of 8".
 - 3. Forms for exposed concrete must be treated as finished woodwork or cabinetwork. Surface material shall be laid out in as large as practicable and shall be laid out in regular and symmetrical pattern as approved. Edges of units shall be tight-butted together with clean, straight joints; any appreciable space at joints shall be filled. Maximum variation in alignment of surfaces at a joint shall be 1/16". There shall be no bulges or defects higher or lower respectively than 3/16" in four feet.

4. Unfinished surface forms may be used for all unexposed surfaces, such as surfaces to be in contact with earth, in unfinished spaces, areas to receive finishes, and such other locations as indicated on the Drawings. For these surfaces, wood NO 2 Common or Better lumber, metal or other type of forms shall be used for all surfaces that are to be plastered.
5. Temporary openings shall be provided at the base of wall forms and at other necessary points to facilitate cleaning and inspection before concreting.
6. The contact face of forms shall be coated with non staining mineral oil or other approved coating or in the case of wood forms may be thoroughly wetted (except in freezing weather). Oil coatings shall be applied and excess wiped off before placing reinforcement. Release agent shall be of a type that will not affect the rubbing, sealing or painting of the exposed concrete surface.
7. Side forms for footings may be omitted with the approval of the Engineer where soil conditions are suitable.
8. Forms and form lumber may be reused if in good condition after being cleaned and reconditioned, if approved.
9. Corners of exposed concrete should have $\frac{3}{4}$ " chamfers unless shown otherwise.

D. Lightweight forming material

1. Lightweight forming material, Expanded Polystyrene (EPS) Board, shall conform to the requirement of ASTM Standard C-578. The EPS material shall have a minimum density of 1.25 lbs/cu ft. and a maximum density of 20 lbs/cu. ft. EPS boards shall be manufactured by PERMA "R" Products, Inc. of Grenada, MS or approved equal.
2. Lightweight forming materials shall be designed to be left in place after the pouring of concrete as a permanent fixture of the structure.

E. All exposed corners or edges of columns, piers, walls, etc. shall be framed with a $\frac{3}{4}$ inch chamfer, unless shown or noted otherwise on the plans.

PART 3 – EXECUTION

3.01 INSPECTION

- A. The Owner's Representative shall be notified when the concrete is ready for inspection. The formwork and/or excavation shall have the approval of the Owner's Representative before placing of the concrete.

3.02 PREPARATION

- A. Surface material shall be laid out in as large units as practicable and shall be laid out in regular and symmetrical pattern as approved. Edges of units shall be tight-butted together with straight, clean joints: any appreciable space at joints to be $\frac{1}{16}$ ". There shall be no bulges or defects deeper or higher respectively than $\frac{3}{16}$ " in four feet.

3.03 INSTALLATION OF EMBEDDED ITEMS

- A. Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use settings

drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

- B. Edge Forms and Screed Strips for Slabs: set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

3.04 REMOVAL OF FORMS

- A. Formwork not supporting concrete, such as sides of walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 10° C (50° F) for 24 hours after placing concrete, provided concrete is sufficiently hard and not be damaged by form removal operation, and provided that curing and protection operations are maintained.
- B. Reshores shall be placed as soon as practicable after stripping operations are complete but in no case later than practicable after stripping operations are complete and in no case later than the end of the day on which stripping occurs. Reshores shall be tightened to carry their required loads without overstressing the construction. Reshores shall remain in place until tests representative of the concrete being supported have reached the specified strength, and heavy loads due to construction operations have been removed.
- C. Form facing material may be removed four days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 DESCRIPTION

- A. This Section includes furnishing materials and installation of concrete reinforcement as indicated on the Drawings and/or specified herein.
- B. Related Work: The following items of related work are specified in other sections.
 - 1. Section 03100: Concrete Formwork
 - 2. Section 03300: Cast-In-Place Concrete
- C. Work Included: This Section of these Specifications includes only the fabrication and erection of the concrete reinforcement for the cast-in-place concrete for this project. The Contractor's attention is directed to Section 03300 (Cast-In-Place Concrete) of these Specifications; all requirements of Part 1 – General – of Section 03300 govern all materials and work specified in this Section.
- D. General: All reinforcing including welded wire fabric (WWF), shall be detailed, bolstered and supported to comply with ACI 315 "Manual of Standard Practice for Detailing Reinforcing Concrete Structures" and the Concrete Reinforcing Steel Institute (CRSI) recommendations.

1.02 SUBMITTALS

- A. General: Comply with pertinent provisions of Section 01340.
- B. Shop Drawings: Make shop drawings in accordance with Section 03300, paragraph 1.03, Shop drawings. No reproduction of Contract Drawings for use as shop drawings will be permitted.
- C. Mill Certificates: Accompanying the shop drawings, submit steel producer's certificates of mill analysis, tensile, and bend test for reinforcing steel, when requested.

1.03 PRODUCT HANDLING

- A. Delivery: reinforcement to the job site bundled, tagged and marked. Use metal tags indicating bar size, lengths and other information corresponding to markings shown on placement diagrams.
- B. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: Comply with ASTM A 305, Deformed Bars. Conforming to ASTM 615, Grade 60, or ASTM 706, Grade 60 as indicated on the plans.
- B. Steel Wire: Comply with ASTM A 82.
- C. Welded Wire Fabric: Comply with ASTM A 185.
- D. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place:
 - 1. Use wire bar type supports or plastic chairs or supports complying with CRSI recommendations unless otherwise indicated. Do not use wood, brick or other unacceptable materials.
 - 2. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 3. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized, stainless steel or plastic protected legs. For footings or other concrete that will be in direct contact with earth, provide supports with either hot-dipped galvanized, stainless steel, plastic protected steel legs, or supports made entirely of plastic or other acceptable, inert polymer. Do not use wood, brick or other unacceptable materials.

2.02 FABRICATION

- A. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with ACI Manual. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material. If clearances for reinforcing require hooks shorter than standard hooks, fabricator shall be responsible for providing shorter hooks, as required.
- B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the Work:
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bends or kinks not indicated on Drawings or Final Shop Drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine the substrate, formwork, and the conditions under which concrete reinforcement is to be placed, and correct conditions with would prevent proper and timely completion

of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected.

- B. Inspection: Before placement of concrete, a representative of the Owner shall observe the placement of all reinforcing and give his approval.

3.02 INSTALLATION

A. General:

1. Standards for details and methods of reinforcement placement and supports shall be in accordance with ACI requirements, CRSI Recommended Practices for Placing Reinforcing Bars, and as herein specified.
 2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials, which reduce or destroy bond with concrete.
 3. Position, support and secure reinforcement and embedment against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal or plastic chairs, runners, bolsters, spacers, and hangers, as required and recommended by CRSI.
 4. Place reinforcement to obtain the minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
 5. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces minimum of 8 inches. Welded wire fabric shall be continuously supported at 36" on center (O.C.) maximum.
 6. Provide sufficient numbers of supports and of strength to carry reinforcement. Do not place reinforcing bars more than 2" beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
 7. All vertical reinforcing shall be doweled to footings or the structure below. Dowels shall be the same size and at the same spacing as the vertical reinforcing scheduled or detailed for the element above, unless otherwise indicated on the plans.
 8. Dowels extending into footings shall terminate with a 90° standard ACI hook and shall extend to within 4-inches of the bottom of the footing.
 9. All embedments and dowels shall be securely tied to formwork or the adjacent reinforcing prior to the placement of concrete.
- B. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly tying wire. Reinforcement shall be spliced only as shown or noted in the plans or specifications. Splices at other locations shall be approved in writing by the structural engineer.
 1. Horizontal wall reinforcing shall terminate at ends of walls and openings into the far end of the jamb column with a 90-degree hook plus a 6 bar diameter extension, unless otherwise shown on the Plans.
 2. Lap horizontal bars as noted above or as shown on the Plans. Horizontal wall reinforcing shall be continuous through construction and control joints. Splices in horizontal reinforcement shall be staggered so that the splice laps do not occur along

a single line. Splices in two curtains of reinforcing, where used, shall not occur in the same location. Splice laps shall not overlap other splices.

- C. Welding: Reinforcing bars shall not be welded unless specifically indicated on the plans.
- D. Place reinforcement as follows with the following clear cover, unless noted otherwise on the drawings:

1. Below Grade
 - a. Unformed 3"
 - b. Formed 2"
2. Walls/Joists 3/4"
3. Columns 1 1/2"
4. Beams/Girders 1 1/2"
5. Slabs 3/4"
6. Exposed Columns 2"
7. Exposed Beam/Girders 2"
8. Exposed Slabs #5 and smaller, 2" or otherwise.
 - a. Top 1 1/2"
 - b. Bottom 1 1/2"

E. Detailing:

1. Wall openings 6' to 8' wide: Place (2) #5 bars or (1) #7 bar in 10" walls and thinner around all openings 6' or larger in any direction, and extend the reinforcing bars a minimum of 24" beyond the corner of the openings, unless specifically indicated otherwise. Where 24" beyond the opening is not available, extend bars as far beyond the opening as practical and terminate them with a 90-degree standard ACI hook.
2. Provide (2) #6 x 4'-0" long, diagonal bars or (1) #7 x 4'-0" long bar in 10" walls and thinner at the corner of all openings and reentrant corners, unless specifically indicated otherwise. Diagonal bars shall be centered on the corner of the opening. All recesses in concrete walls that interrupt the reinforcing steel shall be reinforced as if the recess were an opening.
3. All openings in slabs that are not shown on the structural Plans must be approved by the engineer, in writing.
4. Embedded pips, ducts, or conduits: The maximum diameter for embedded pipes, ducts, or conduits shall be 1/3 of the slab or wall thickness, spaced at a minimum of 3 conduit diameters on center.
5. Concrete Columns: All tied and spiral reinforced columns shall have ties or spirals spaced at one-half the required tie spacing for a distance of one-sixth of the column height above and below all floor (or beam) and roof (or beam) levels or any other point of lateral support, unless specifically indicated otherwise on the structural Plans.

END OF SECTION

SECTION 3300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

- A. This Section includes furnishing materials and installation of cast-in-place concrete as indicated on the Drawings and/or specified herein.
- B. Full cooperation shall be given to other trades to install embedded items. Suitable templates, inserts and sleeves shall be provided for setting items not placed in the forms.
- C. Related Work: The following items of related work are specified in other Sections.
 - 1. Section 03100: Concrete Formwork
 - 2. Section 03200: Concrete Reinforcement
- D. All concrete work shall conform to the requirements of ACI 318-95 and CRSI Standards, unless specifically noted otherwise.

1.02 QUALITY ASSURANCE

- A. Prior to starting concrete operations the Contractor shall name his source of supply for concrete materials and shall submit representative samples and reports of quality tests for approval.
- B. The Contractor will engage the services of a recognized independent testing laboratory, approved by the Owner, to perform the following services, (in accordance with ASTM E 329-77) the cost of which shall be paid by the Contractor:
 - 1. Design the concrete mixtures specified, make quality tests of materials, inspect the proportioning and mixing of all concrete for this project.
 - 2. Slump Test, ASTM C-143, shall be taken as often as required to provide the specified consistency to concrete.
 - 3. Cast and test of at least 6 cylinders for each day's pour or for each 100 cubic yards or fraction thereof. Cylinders shall be cured and tested in accordance with ASTM specifications for control tests. Cylinders shall be tested at 7 and 28 days. The Contractor shall provide insulated storage room with heat when necessary to store control cylinders, and a protected, fenced-in space for storage of field cylinders, which approximates the condition of curing of the concrete being sampled.
- C. In the event that concrete fails to meet strength requirements of these Specifications, the Engineer may require at no additional cost to the Owner, tests in accordance with the "Standard Methods of Securing, Preparing and Testing Specimens of Hardened Concrete for Compressive and Flexural Strengths", ASTM C42, or order load tests in accordance with Chapter 20 of the ACI Building Code 318-95, to be made on the portions of the structure containing questionable concrete. Suitable appliances and methods of loading

and measuring shall be provided by the Contractor. The portions of the structure which are found by the Architect/Engineer to contain defective concrete shall be removed and reconstructed in a satisfactory manner at the Contractor's expense. Concrete strength tests are to conform to Chapter 4 of the ACI Building Code 318-95.

- D. The laboratory shall have free access to material stockpiles, batching and mixing plants, and job site. The Contractor shall provide adequate assistance to the laboratory in securing specified samples for tests.
- E. Contractor shall give the Owner and laboratory reasonable notice before beginning any pours (at least 24 hours).
- F. The laboratory shall supply a daily report of concrete and materials testing and inspection to the Architect, Engineer, Design/Builder, Contractor and Owner.
- G. Concrete batched away from the job and delivered in mixer or agitator trucks shall conform to requirements of ASTM C94.

H. Authority and Duties of Laboratory Personnel:

Inspectors shall inspect the materials and the manufacture of concrete as specified and shall report to the Owner's Representative, Contractor, Architect and the Engineer the progress thereof. Also, when it appears that the material furnished and the work performed by the Contractor fail to fulfill the specification requirements and contract, the inspector shall direct the attention of the Contractor to such failure or infringement. Such inspection shall not relieve the Contractor of any obligation to furnish acceptable materials or to provide the concrete quality in the structure that is in strict accord with plans and specifications. The inspector are not authorized to revoke, alter, relax, enlarge, or release any portion of the work, but in case of any dispute arising between the inspector and the Contractor as to materials furnished or in the manner of performing the work the inspector shall have the authority to reject materials or suspend the work until the question at issue can be referred to the Engineer. The inspector shall not act as foreman or perform other duties for the Contractor. In no case shall any advice or omission on the part of the inspector relieve the Contractor of responsibility for completing the work in accordance with the plans and specifications and the fulfillment of the contract. The work will be inspected as it progresses, but failure to reject any defective work or materials shall not in any way prevent later rejection when such defect is discovered or obligate the Engineer for final acceptance. Any expense incidental to the investigation and determination of actual quality of any questionable material shall be borne by the Contractor.

I. Sampling and Testing:

1. All materials shall be sampled, tested in accordance with appropriate ASTM Standards, and approved before inclusion in any work on this project.
2. Samples for testing shall be furnished by the Contractor.
3. Rejected material shall be immediately removed from the site.
4. Reinforcing steel shall be tested by heat in shops and by random sampling in the field when required by the Architect/Engineer or Owner.

1.03 SUBMITTALS

- A. Shop Drawings: The Contractor is to include as a part of his expense the cost of completely dimensioned concrete shop drawings embracing plans and details, bending diagrams, steel order list, placing diagrams, which service shall be furnished by a structural engineer licensed in the State of the project. No portion of the contract documents shall be reproduced and submitted as shop drawings. The shop drawings shall include the following:
1. Foundation Plan – fully dimensioned, foundation schedule and details, wall sections, mechanical pad details, and related miscellaneous details. All details, plans and sections shall show reinforcing.
 2. Pier Details and Pier Schedule.
 3. Wall Elevations – fully dimensioned showing all thicknesses, reinforcing sections, form joints and all items that will leave visible marks or interruptions in the finished surfaces.
 4. Necessary Floor Plans – fully dimensioned plans with all depressions, rises, reinforcing steel, to include placement and accessories.
 5. Miscellaneous Items – All other reinforced concrete items shall be drawn at such scale as to give full dimensions, details and reinforcing with accessories as required.
- B. All reinforcing shall be detailed, ordered, and fabricated in accordance with the latest ACI Manual of Standard Practice for Detailing Concrete Structures and the CRSI Manual of Standard Practice.
- C. Submit Shop Drawings to the Architect for review, prior to release to field. Fabrication of reinforcing steel shall not be started until Drawings have been reviewed and stamped.
- D. Prior to the placement of any concrete, design mixes for each type of concrete shall be submitted and approved by the testing laboratory. Mix designs shall include all required and shall include each type of aggregate and admixture to be used.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Concreting shall not be started during rain, sleet or snow and shall not be continued during such weather after having been started except long enough to come to a suitable cutoff point. Concrete placed during rain shall have the cement content increased in the amount of one sack of cement per cubic yard of concrete. All forms and earth forms shall be free of ice and frozen surfaces.
- B. No concrete shall be poured unless temperature is 40 degrees and rising or unless special precautions are taken (approved by the Architect). Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing and near freezing weather. All concrete shall have a temperature of between 50 degrees and 90 degrees F when depositing, and shall be maintained within this temperature range for at least 72 hours or for as much time as is required to insure the proper rate of curing. No salt or other chemicals shall be added to prevent freezing. The covering or other method used for temperature protection shall remain in place 24 hours after artificial heat is discontinued. The recommended Practice for Cold Weather

Concreting" (ACI 306) and the "Recommended Practice for Hot Weather Concreting" (ACI 305) shall be accepted as good practice.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be subject to approval. Any change of materials specified shall be submitted for approval and such change, if acceptable, shall be used only when specifically authorized in writing.
- B. Cement shall conform to the following specifications:
 - 1. Coarse and fine aggregate shall conform to requirements of ASTM C33 or Federal Specification SS-S-281a.
 - 2. All coarse aggregates shall be crushed limestone.
 - 3. The maximum size of coarse aggregate shall not be larger than 1", 1/5 of the narrowest dimension between forms of the member for which the concrete is to be used, nor larger than 3/4 the minimum clear spacing between reinforcing bars. Coarse aggregate for all concrete exposed to the weather shall be crushed limestone with a #57 gradation.
 - 4. Absorption in coarse aggregate shall not exceed 5%.
 - 5. The fineness modulus for fine aggregate used shall not vary more than 0.2 from the approved sample without approval. Fineness modulus to be 2.9.
- C. All concrete shall be normal weight unless specifically noted otherwise.
 - 1. Normal weight concrete shall be approximately 145 to 155 pounds per cubic foot.
 - 2. Lightweight concrete shall not exceed 110 pounds per cubic foot and shall be made of normal and normal weight fines.
- D. Water shall be clean, fresh, and free from injurious amounts of oils, acids, alkali or organic material or other substances that may be deleterious to concrete or steel.
- E. Non-shrink grout shall be factory pre-mixed non-shrink, non-metallic grout containing mineral aggregate and shall require only the addition of water at the site. Grout shall be "EUCO NS" (non-metallic) as manufactured by the Euclid chemical company. "Masterflow 713" (non-metallic) as manufactured by Master Builders or approved equal. The grout shall conform to ASTM C-1107 and CRD-621, "Corps of Engineers Specifications for Non-Shrink Grout," and shall be tested in accordance with ASTM C-827.
- F. Waterstops shall be 9" Dumbbell type, Model No. 751 as manufactured by Greenstreak, at locations shown on drawings.

2.02 QUALITY AND PROPORTIONING

- A. It shall be the Contractor's responsibility to furnish concrete which will conform to the quality and strength specified.
- B. Strengths, unless otherwise indicated on plans or in specifications or in the table below, shall be 3000 psi minimum 28 day compressive strength.

1. Columns	4000psi
2. Slabs above ground floor	3000psi
3. Concrete Beams	4000psi
4. Footing and Piers	3000psi
5. Pilasters, Walls	4000psi
6. Slabs on Grade	4000psi
7. Tilt Panels	4000psi
8. Exterior Concrete	4000psi (5% Air Entrained)

- C. Proportioning shall follow the limiting factors in the following table:

	Concrete Class	
	3000#	4000#
1. Minimum allowable compressive strength at 28 days (psi)	3000	4000
2. Maximum allowable water per sack of cement: (gal/sack):		
a. Non-air entrained:	6-1/2	5-1/2
b. Air entrained:	5-1/4	5
3. Slump, range in inches:	3-5	3-5
4. Minimum sacks of cement per cu. yd.	5-1/4	6-1/4
5. Water reducing agent oz./100# cement:	3	3
6. Proportioning on the basis of field experience shall conform to Section 5.3 of ACI 318-89 or the maximum water/cement ratio in Section 5.4 of ACI 318-89.		

- D. Design mixes shall be established to produce average strengths higher than specified by the amounts specified in Chapter 5 of ACI 318-95.
- E. Admixtures:
 - 1. Calcium Chloride shall not be used.
 - 2. An approved air-entraining agent (ASTM C260) shall be added at the mixer with accurate dispenser to produce entrained air 4-6% by volume in all concrete subject to weathering conditions.
 - 3. An approved water-reducing agent equal to those manufactured by mixer with an accurate dispenser.
 - 4. These and other admixtures shall be used only with specific approval. Tests for design mixes shall be made with the admixtures included.
 - 5. Fly ash shall not be permitted.
- F. The concrete shall be of such consistency and composition that it can be worked readily into the corners and angles of the forms and around reinforcement without permitting

materials to segregate or free water to collect on the surfaces. Within the limiting requirements the Contractor shall adjust the consistency of the concrete as may be necessary to produce mixtures which will be placeable with reasonable methods of placing and compacting. The Contractor shall maintain on the job at all times adequate extra cement to be used at the rate of ½ sack cement per cubic yard concrete for each 2" slump increase for corrections due to wetness desired or obtained. No water shall be added to concrete except under the direct supervision of the engineer or his appointed representative. Under no circumstances will the addition of more than 2 gallons of water per cubic yard of concrete be allowed at the site.

G. Measurement of Materials:

1. Cement shall be measured by the sack or half-sack unless cement is weighed for each batch.
2. Aggregates shall be proportioned separately by weight with proper compensation for weight of moisture; weighing equipment shall be accurate within 1%.
3. Water shall be measured by an approved device capable of accurate measurement to one pint.

H. Concrete shall be from a single source for each major pour.

2.03 FORMS

- A. Refer to Section 03100 for requirements for concrete forms.

2.04 REINFORCEMENT

- A. Refer to Section 03200 for requirements for reinforcement.

2.05 EXPANSION MATERIALS

- A. Verify compatibility of joint filler with sealant specified.
- B. All expansion joints on grade shall be pre-formed non-extruding resilient type, bituminous or bonded cork (ASTM D994 or ASTM D1751).
- C. Other expansion joints may comply with ASTM D1752 – "Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction."
- D. Manufacturer's certification and material submittal are required.

2.06 CURING, SEALING AND HARDENING COMPOUNDS

- A. Liquid Curing and Sealing Compounds – General requirements

1. Curing Compounds: Comply with ASTM C 309, Type 1, Class B.
 - a. Non-yellowing formulation where subject to ultra violet light.

- b. Curing and Sealing Compound: Where indicated, providing curing and sealing formulation with long-lasting finish that is resistant to chemicals, oil, grease, deicing salts, and abrasion.
- 2. Curing and Hardening Compound: Free of waxes, resins or oils; meet water retention requirements of ASTM C 309; penetrate concrete to change free lime to calcium silicate forming a permanently dense, hard surface.
- 3. The curing compound shall have test data from an independent laboratory indicating a maximum moisture loss of 0.030 grams per square cm. When applied at a coverage rate of 300 square feet per gallon. Manufacturer's certification is required.
 - a. Provide L&M "dress & Seal 30" or Master Builders "Masterseal 66."
 - b. Dissipating Resin Curing Compound: The compound shall be a dissipating resin type compound, conforming to ASTM C309, Type I, "Kurez DR" by The Euclid Chemical Company or approved equal. The film must chemically break down in a two to four week period after application.
- 4. Curing compounds shall not be used on any surface against which additional concrete or other cementitious material are to be bonded.

2.07 VAPOR RETARDERS (BARRIERS)

An approved vapor barrier shall be placed as called for in the Contract Documents. Supply a vapor barrier that complies with one of the following:

- A. ASTM E 1745, Class A: A three-ply, nylon- or polyester-cord reinforced, high-density polyethylene sheet; laminated to a nonwoven geotextile fabric, 30 mils (0.76 mm) thick.
- B. ASTM E 1745, Class B: A five-ply nylon- or polyester cord-reinforced, high-density polyethylene sheet; 10 mils (0.25 mm) thick.
- C. ASTM E 1745, Class C: One of the following materials, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick:
 - 1. Nonwoven, polyester-reinforced, polyethylene coated sheet; 10 mils (0.25 mm) thick.
 - 2. Three-ply, nylon- or polyester-cord-reinforced, laminated, high-density polyethylene sheet; 7.8 mils (0.18 mm) thick.
- D. Submittal is required.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until satisfactory conditions have been corrected.

3.02 CONDUITS, HANGERS, SUPPORTS, ANCHORS, ETC.

- A. The Contractor shall see that all necessary bolts and anchors of all other trades employed on this structure including conduits, sockets, inserts, sleeves, etc., will be placed by their respective trades or shall himself place them to details before concreting a given section of work. He shall see that these items do not interfere with the reinforcement.
- B. No aluminum conduit or product containing aluminum or any other material detrimental to concrete shall be embedded in concrete.
- C. All openings in slabs, beams, columns, and footings, which are not shown on the structural plans, must be approved by the Engineer. The maximum diameter of embedded pipes or conduit shall be 1/3 times the slab or wall thickness. The minimum center-to-center spacing of embedded pipes or conduits shall be three times the outside diameter. For pipes or conduits of different diameters, the minimum edge-to-edge spacing shall be two times the smaller diameter.
- D. All pipes and conduits providing flow able material conveyance which penetrate beams, footings, or walls shall be provided with sleeves of an appropriate size and material to provide movement for expected settlements or deflections.

3.03 PREPARATION

- A. Concrete placing shall not be started until all necessary preparations have been completed and approval has been given. Preparations shall consist of completing all form work involved, placing all reinforcing steel, pipes, conduits, sleeves, hangers, anchors, fastening devices, waterproofing and such other work to be built into the concrete in the section to be poured, and any other preparations herein required for the concreting operations. Free water and any mud or debris shall be removed from forms and excavations to be occupied by concrete. Approved equipment shall be available on the job site for heating and/or protecting the concrete whenever freezing temperatures are likely to occur within the curing period. Ice or chilled water may be required to control concrete temperature in hot weather to below 90 degrees F.
- B. Slabs-on-grade shall be placed on a properly leveled and thoroughly compacted sub grade, equal to 93% maximum dry density. All subsoil's for slabs shall be approved before placing concrete.
- C. Approved equipment shall be provided for heating concrete materials and/or protecting the concrete whenever freezing temperatures are likely to occur within curing period.

3.04 INSTALLATION

- A. Concrete shall be conveyed from the mixer or transporting vehicle to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of materials or displacement of the reinforcing steel and which will avoid rehandling. For ready-mix concrete in an agitator truck, the elapsed time from mixer to placement shall not exceed 1-1/2 hours.

- B. Concrete shall be deposited as nearly as practicable in its final position and shall have the qualities required. Concrete shall be deposited continuously in layers or sections of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause seams or planes of weakness. If sections cannot be placed continuously, proper construction joints shall be provided.
- C. Concrete during and immediately after depositing shall be thoroughly compacted and worked around reinforcing and embedded fixtures and into all parts of forms by means of spades, rods and approved mechanical vibrators.

For thin walls or inaccessible portions, concrete shall be worked into place by vibrating or other approved method: Care shall be taken so as not to work concrete to the point where segregation occurs.

3.05 CONSTRUCTION AND CONTROL JOINTS

- A. All horizontal and vertical construction joints shall be intentionally roughened to a full $\frac{1}{4}$ " \pm amplitude, or have a continuous 2"x 4" keyway along the joint at contractor's option.
- B. Provide reinforcing dowels to match the member reinforcing at the joint, unless noted otherwise.
- C. Unless indicated otherwise, slabs-on-grade shall have construction or control joints spaced not to exceed 30 times the slab thickness in any direction. All discontinuous control or construction joints shall be reinforced with two (2) #4 x 48". See structural details. Construction joints shall not exceed a distance of 15'-0" O.C. in any direction.
- D. Control joints shall be installed in slabs-on-grade so the length-to-width ratio of the slab is not more than 1.25:1. Control joints shall be completed within 12 hours of concrete placement. Control joints may be installed by:
 - 1. Saw Cut to a depth of $\frac{1}{4}$ the thickness of the slab.
 - 2. Tooled joints shall be made to a depth of $\frac{1}{4}$ the thickness of the slab.
- E. Control joints in visually exposed walls, unless noted otherwise (shall line up with masonry and architectural joints, see drawings):
 - 1. Vertical control joints at 10'-0" O.C.
 - 2. Reinforcing shall be continuous through control and construction joints, unless noted otherwise.
 - 3. Control joints in foundation walls shall line up with masonry control joints.
- F. Control joints shall be installed in suspended slabs over steel decking by saw cutting along all interior grid lines. Joints centered above the purlins shall be $\frac{3}{4}$ " deep and shall have #4x5'-0" at 16" O.C. reinforcing placed perpendicular to (and centered on) the purlin. Joints centered above the girders shall be $\frac{3}{4}$ " deep and shall have #4x16'-0" O.C. reinforcing placed perpendicular to (and centered on) the girder. The #4 bar reinforcing centered above the grid lines shall be in addition to the specified WWF,

which is continuous throughout the suspended slabs over steel decking. Reinforcing shall be placed 1" below the top of the slab.

3.06 FINISHING

- A. **Rough Form Finish:** For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding ¼" in height rubbed down or chipped off.
- B. **Smooth Form Finish:** For formed concrete surfaces exposed-to-view, or surfaces that are covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. **Smooth Rubbed Finish:** Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. **Related Unformed Surfaces:** At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
- E. **Scratch Finish:** Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, terrazzo, stone and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to a tolerance not exceeding ½" in 10' when tested with a 10' straightedge. Slope surfaces uniformly to drains where required. After leveling; roughen surface before final set, with stiff brushes, brooms or rakes.
- F. **Float Finish:** Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, and as otherwise indicated. After screening, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding ¼" in 10' when tested with a 10' straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth granular texture.

- G. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating system. After floating, begin final trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge. Grind smooth surface defects, which would telegraph through applied floor covering system.
- H. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect and Owner's Representative before application. See Section 02528 – Concrete Paving and Curbs.
- I. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water, and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.07 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- B. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repair of Formed Surfaces: Remove and replace concrete having defective surface if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

- D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
- F. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- H. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- I. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same material to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finish concrete. Cure in same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact-dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours. Use epoxy-based mortar for structural repairs, where directed by the testing laboratory.
- K. Repair methods not specified above may be used, subject to acceptance of Architect.

3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

- B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curings, by curing compound, and by combinations thereof, as herein specified.
- C. Provide moisture curing by following methods:
1. Keep concrete surface continuously wet by covering with water.
 2. Continuous water-fog spray.
 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- D. Provide moisture-cover as follows:
1. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- E. Provide curing compound to slabs as follows:
1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp proofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Architect.
- F. Curing Formed Surfaces: Cure formed concrete surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing compound. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.09 MISCELLANEOUS

- A. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

END OF SECTION

SECTION 03575

CONTROLLED LOW STRENGTH FLOWABLE FILL

01 DESCRIPTION:

This work shall consist of furnishing and placing flowable fill as an alternate to compacted soil as approved by the Engineer. Applications for this material include beddings, encasements, and closures for tanks and pipe, and general backfill for trenches and abutments.

02 MATERIALS:

All materials shall meet the requirements of the following Specifications:

- * Fine Aggregate..... TDOT SS Subsection 901-01
- Portland Cement Type 1 TDOT 901.01
- Fly Ash Class C or Class A..... AASHTO MO295
- ** Air Entraining Admixtures..... TDOT 918.09
- Water TDOT 918.01
- Chemical Additives TDOT 918.09

03 MIX DESIGN:

Flowable fill is a mixture of Portland cement, fly ash, fine aggregate, air entraining admixtures and water. Flowable fill contains a low cementitious content for reduced strength development.

- A. The Contractor shall submit mix designs for the flowable fill to the Engineer for approval.

The following are suggested mix designs for Excavatable and Non-Excavatable flowable fill:

	Excavatable	Non-Excavatable
Cement Type 1	75-100 lbs/yd	75-100 lbs/yd
Fly Ash		150-600 lbs/yd
**Air	15-35%	5-15%
**28 Day Compressive Strength	Maximum 100 PSI	Minimum 125 PSI
**Unit Weight (Wet)	90-100 lbs/ft	100-125 lbs/ft

*Mix designs shall produce a consistency that will result in a flowable self-leveling product at time of placement.

**The requirements for percent air, compressive strength and unit weight are for Laboratory designs only and are not intended for jobsite acceptance requirements.

04 MANUFACTURING:

Flowable fill will be manufactured at plants that qualify as approved sources in accordance with the Standard Operating Procedure for Ready – Mix Concrete. Mixing and delivering shall be in accordance with the Standard Specifications or other methods approved by the Engineer. Revolution counter requirements are waived.

05 CONSTRUCTION:

When used as backfill for pipe, where flotation or misalignment may occur, correct alignment will be assured by means of straps, soil anchors or other approved means of restraint.

06 JOBSITE ACCEPTANCE:

Acceptance of flowable fill will be based on documentation as outlined in the standard Specifications and a minimum temperature of flowable fill at the point of delivery of 50°F.

07

The above proportions may be adjusted by the Engineer to obtain the consistency required for satisfactory flow. Consistency shall be determined as follows:

Place an open-ended cylinder (pipe) three (3) inches in diameter by six (6) inches in height in an upright position on a smooth, level surface. Fill the cylinder with a representative sample of the flowable mortar proposed for use. Remove the cylinder by lifting it straight up thus allowing the sample to diffuse on the smooth, level surface. The flowable mortar should diffuse into a circular shape having an approximate diameter of not less than a width of eight (8) inches.

08 BACKFILLING:

Flowable Mortar shall be placed at locations as directed by the Engineer. The flowable mortar shall be covered and otherwise protected while in the plastic state. Backfill shall not be placed on the flowable mortar prior to final set or hardening as determined by the Engineer.

GENERAL NOTES

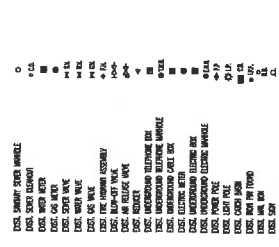
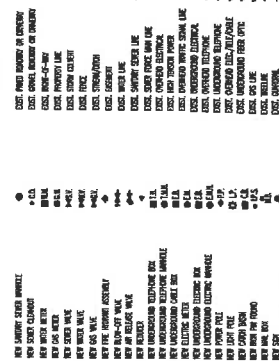
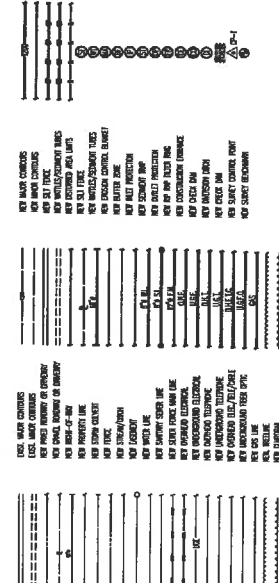
1. THE CONTRACTOR SHALL NOTIFY THE TOWN OF COLLEVILLE ENGINEERING OFFICE, 405-234A, BEFORE COMMENCING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ANY UTILITY COMPANY WHICH MAINTAINS A UTILITY LINE WITHIN THE BOUNDARIES OF THE PROJECT BEFORE THE BEGINNING OF ANY CONSTRUCTION ON THE PROJECT OR IN THE STREETS ADJACENT TO THE PROJECT. THE CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR ANY DAMAGE INCURRED TO ANY UTILITIES DURING THE CONSTRUCTION PROCESS. WHETHER STAYING ON THE CONSTRUCTION PLANS OR NOT, WORKING FROM THE PROJECT.
3. ALL WORK CUT AND FILL BEING LAYING BECAUSE REVISIONS SHALL BE IDENTIFIED, MAINTAINED, SAVED AND/OR STORED TO EFFECTUAL CONTROL SOIL EROSION.
4. FOR INFORMATION CONCERNING THE LIMITS OF NEARBY LIGHT, GAS AND WATER, PLEASE CALL 1-800-341-1111.
5. BEFORE CONSTRUCTION BEGINS, CALL THE COLLEVILLE ENGINEERING OFFICE AT 405-234A.
6. SEVENTY-TWO (72) HOURS BEFORE STARTING ANY EXCAVATION, THE CONTRACTOR SHALL CALL 1-800-341-1111.
7. ALL STREETS UNLESS NOTED OTHERWISE SHALL BE CONSTRUCTED TO BEET WIDE THEN THE FINAL GRADE WILL BE DETERMINED ON CONSTRUCTION DRAWINGS.
8. ALL TRENCHES ARE TO BE BACK-FILLED ACCORDING TO SECTION 0207 OF THE TOWN OF COLLEVILLE STANDARD CONSTRUCTION SPECIFICATIONS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ANY UTILITY COMPANY WHICH MAINTAINS A UTILITY LINE WITHIN THE BOUNDARIES OF THE PROJECT BEFORE THE BEGINNING OF ANY CONSTRUCTION ON THE PROJECT OR IN THE STREETS ADJACENT TO THE PROJECT. THE CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR ANY DAMAGE INCURRED TO ANY UTILITIES DURING THE CONSTRUCTION PROCESS. WHETHER STAYING ON THE CONSTRUCTION PLANS OR NOT, WORKING FROM THE PROJECT.
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11. SEVENTY-TWO (72) HOURS BEFORE STARTING ANY EXCAVATION, THE CONTRACTOR SHALL CALL 1-800-341-1111 FOR THE LOCATION OF UNDERGROUND UTILITIES.
12. THE CONTRACTOR SHALL NOT ENTER UPON ANY CHANCE DAMAGE TO ANY ADJACENT PROPERTIES WITHOUT WRITTEN PERMISSION FROM SAID PROPERTY OWNERS.
13. STANDARD PROTECTIVE DESIGN (ASPH 10-600) WITH SHARPLE FILL MATERIAL ACCEPTABLE TO TESTING LABORATORY. MATERIAL LOOSE LEFT TO BE 6" STRENGTH PERIODS TO TOWN ENGINEER FOR REVIEW AND ACCEPTANCE.
14. ALL CONCRETE SHALL BE 4000 PSI CLASS A LATEST AVAILABLE, AIR ENHANCED, UNLESS APPROVED OTHERWISE BY THE TOWN ENGINEER, ROAD & CO. WORK WILL BE DETERMINED BY THE DESIGN ENGINEER.

SOIL STABILIZATION NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ANY UTILITY COMPANY WHICH MAINTAINS A UTILITY LINE WITHIN THE BOUNDARIES OF THE PROJECT BEFORE THE BEGINNING OF ANY CONSTRUCTION ON THE PROJECT OR IN THE STREETS ADJACENT TO THE PROJECT. THE CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR ANY DAMAGE INCURRED TO ANY UTILITIES DURING THE CONSTRUCTION PROCESS. WHETHER STAYING ON THE CONSTRUCTION PLANS OR NOT, WORKING FROM THE PROJECT.
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7. ALL TRENCHES ARE TO BE BACK-FILLED ACCORDING TO SECTION 0207 OF THE TOWN OF COLLEVILLE STANDARD CONSTRUCTION SPECIFICATIONS.

EROSION CONTROL NOTES

1. EROSION CONTROL MEASURES ARE NOT LIMITED TO THE SPECIFIED AREAS, BUT SHALL BE APPLIED TO ALL AREAS OF THE PROJECT WHERE EROSION IS POTENTIALLY OCCURRING.
2. EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS. MEASURES SHALL BE REMOVED OR MODIFIED AS NECESSARY TO ACCOMMODATE THE PROGRESS OF CONSTRUCTION.
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GENERAL NOTES

COLLEVILLE, TENNESSEE

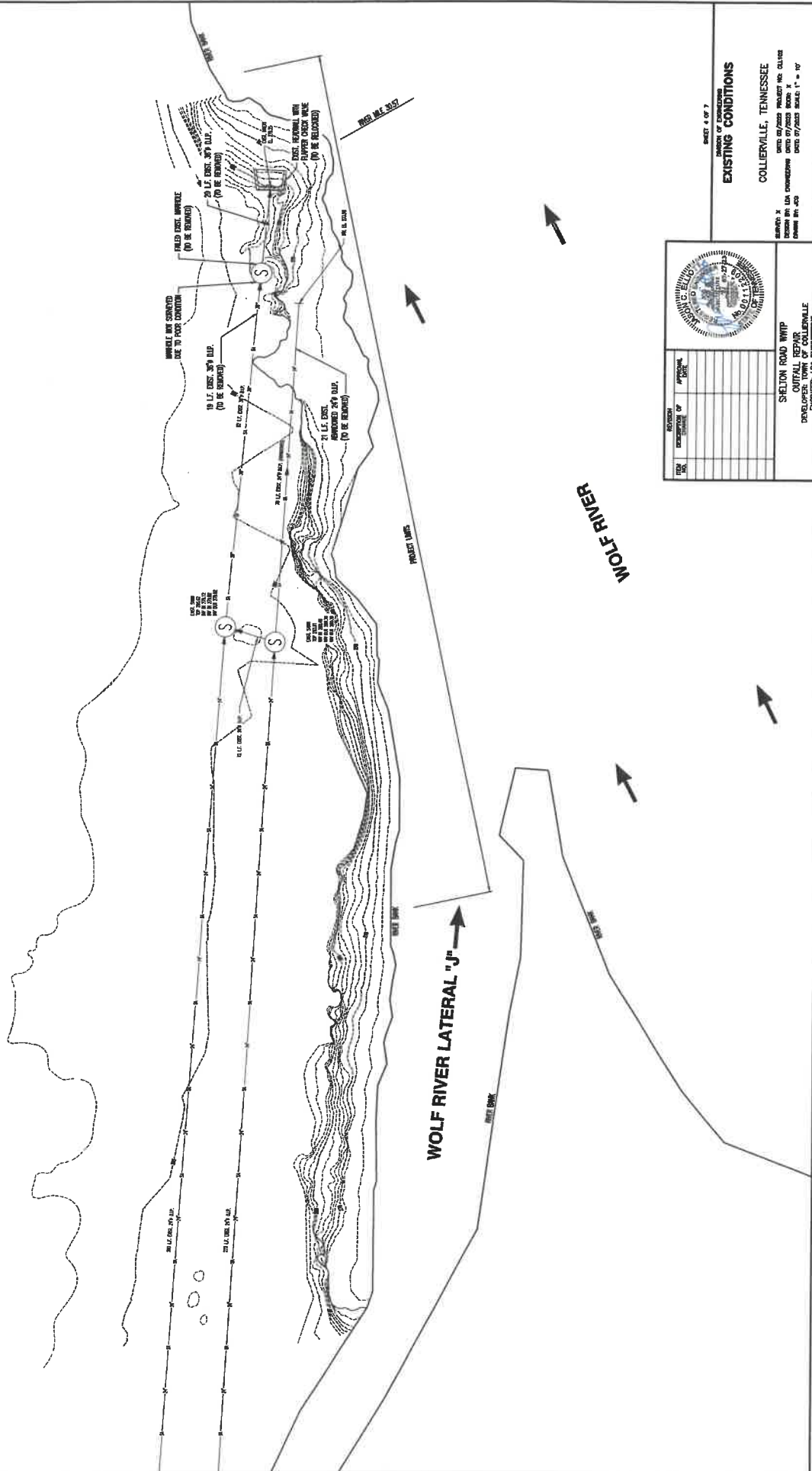
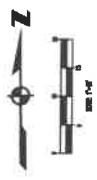
SHEET 2 OF 7

UNIVERSITY OF TENNESSEE

SHELTON ROAD W/PT
OUTFALL REPAIR
DEVELOPER: TOWN OF COLLEVILLE
ENGINEER: LVA ENGINEERING

PROJECT NO. 2023-001
DATE: 07/2023
SCALE: 1" = 20'

1. DO NOT UNNECESSARILY GRADE CANALS; HOWEVER, WHEN NECESSARY, DICES AND SHOULDS SHOULD BE CUT SO THAT THEY FALL FROM THE CANAL.
2. ANY AREA THAT WILL REMAIN UNGRADED FOR MORE THAN 14 CALENDAR DAYS SHALL HAVE APPROPRIATE ANNUAL VEGETATION FOR TEMPORARY SOIL STABILIZATION.
3. VEGETATION SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS AS SOON AS POSSIBLE, BUT NO MORE THAN 14 CALENDAR DAYS AFTER FINAL GRADING.
4. IN ACCORDANCE WITH THE TOWN OF COLLEVILLE WET WEATHER PRACTICES, ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED AND IMPROVED BEFORE START-UP OF ANY CONSTRUCTION ACTIVITIES INCLUDING, BUT NOT LIMITED TO, LAND AND/OR PAVING OPERATIONS.
5. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT OCCUR WITHIN THE SPECIFIED TIME FRAME, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN ADDITIONAL EROSION AND STABILIZATION PLAN. MEASURES SHALL BE IMPROVED TO CONTROL AND/OR TREAT THE EXISTING SOURCE BEFORE LAND AND/OR PAVING OPERATIONS MAY COMMENCE.
6. INSTALL STRIPS AND UNGRADED MATCH LINES AND/OR SILT FENCE ALONG THE BASE OF ALL BOWTIES AND COES ON THE DOWNHILL SIDE OF ANY EXCAVATED SOIL AND AROUND AND WITHIN ALL EXISTING AND NEW TRENCHES. STRIPS SHALL BE PLACED AT 50' INTERVALS ALONG THE LENGTH OF THE TRENCH. STRIPS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF THE TRENCH.
7. IF REQUIRED, PLACE CONTERRAINS CONSISTENT WITH SHAPINGS, PLACING OR NON-DRAINABLE SHELTING ON EITHER SIDE OF PROPOSED LINE CROSSINGS AND EXCEED FROM BANK TO BANK. CONTERRAINS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF THE PROJECT. CONTERRAINS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF THE PROJECT.
8. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS. MEASURES SHALL BE REMOVED OR MODIFIED AS NECESSARY TO ACCOMMODATE THE PROGRESS OF CONSTRUCTION.
9. DO NOT USE EROSION CONTROL MEASURES TO COVER UP OR HIDE ANY DEFICIENCIES IN THE DESIGN OR CONSTRUCTION OF THE PROJECT. EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS.
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REVISION	DATE	DESCRIPTION OF	APPROVAL


JAMES C. GIBSON
 PROFESSIONAL ENGINEER
 STATE OF TENNESSEE
 No. 02113

**SHELTON ROAD WWP
 OUTFALL REPAIR**
 DEVELOPER: TOWN OF COLLIERVILLE
 ENGINEER: LJA ENGINEERING

EXISTING CONDITIONS
 SHEET 4 OF 7
 COLLIERVILLE, TENNESSEE
 DATE: 07/20/2018 PROJECT NO: COLLV18-001
 DRAWN BY: JCG DATE: 07/20/2018 SCALE: 1" = 40'
 TOWN ENGINEER: _____ DATE: _____

WOLF RIVER

WOLF RIVER LATERAL "J"



NO.	DESCRIPTION OF CHANGE	APPROVAL DATE

SHELTON ROAD WWP
 OUTFALL REPAIR
 DEVELOPER: TOWN OF COLLETTVILLE
 ENGINEER: USA ENGINEERS

PROJECT NO. 2023-001
 SHEET 6 OF 7
PROPOSED LAYOUT WITH AERIAL
 COLLETTVILLE, TENNESSEE
 DATE OF PLAN: 07/2023
 DATE OF ISSUE: 07/2023
 SCALE: 1" = 10'

