- F. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes. Color: As indicated
- G. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.
- 1. Color: As indicated.
- 2.4 MIXES A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction: designed according to procedures in AI MS-2. "Mix Design Methods for
- Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements: 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located. PART 3 - EXECUTION
- 3.1 EXAMINATION
- A. Verify that subgrade is dry and in suitable condition to begin paving. 3. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. 1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph. 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15
- 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- Proceed with paying only after unsatisfactory conditions have been corrected. . Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.
- PATCHING A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- . Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces. .3 REPAIRS
- A. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch. 1. Clean cracks and joints in existing hot-mix asphalt pavement.
- 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess
- 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess. SURFACE PREPARATION
- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving. . Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure
- 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated. Protect primed substrate from damage until ready to receive paving
- Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 dal./sd. vd. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
- 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces. HOT-MIX ASPHALT PLACING
- M. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when I. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
- Spread mix at minimum temperature of 250 deg F
- 3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
- 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
- 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course. Promptly correct surface irregularities in paving course behind paver. Use suitable hand
- tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface. 6 JOINTS
- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course 1. Clean contact surfaces and apply tack coat to joints.
- . Offset longitudinal joints, in successive courses, a minimum of 6 inches.
- Offset transverse joints, in successive courses, a minimum of 24 inches. 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations." Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement. 5. Compact asphalt at joints to a density within 2 percent of specified course density. COMPACTION
- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
- Complete compaction before mix temperature cools to 185 deg F. B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown. grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
- 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still
- Edge Shaping: While surface is being compacted and finished, trim edges of pavement to
- proper alignment Bevel edges while asphalt is still hot: compact thoroughly Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked INSTALLATION TOLERANCES
- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances: 1. Base Course: Plus or minus 1/2 inch.
- 2. Surface Course: Plus 1/4 inch, no minus
- . Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas: I. Base Course: 1/4 inch.
- 2. Surface Course: 1/8 inch.
- .9 PAVEMENT MARKING A. Allow paving to age for 30 days before starting pavement marking.
- . Sweep and clean surface to eliminate loose material and dust.
- C. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

.10 WHEEL STOPS

- Install wheel stops in bed of adhesive as recommended by manufacturer. 3. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-guarter to one-third points. Securely install dowels into payement and bond to wheel stop. Recess head of dowel beneath top of wheel stop. .11 FIELD QUALITY CONTROL
- . Testing Agency: Testing to be done by owner.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined
- according to ASTM D 3549. C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances. D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and
- compacted pavement according to ASTM D 979 or AASHTO T 168. 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
- 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726. a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement,
- with no fewer than 3 cores taken. b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D
- Replace and compact hot-mix asphalt where core tests were taken. Remove and replace or install additional hot-mix asphalt where test results or
- measurements indicate that it does not comply with specified requirements. 3.12 DISPOSAL A. Except for material indicated to be recycled, remove excavated materials from Project site
- and legally dispose of them in an EPA-approved landfill. 1. Do not allow milled materials to accumulate on-site. END OF SECTION 321216

- SECTION 321313 CONCRETE PAVING
- 1.1 RELATED DOCUMENTS A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. 1.2 SUMMARY
- A. Section Includes
- 1 Streets 2. Parking Lots
- 3. Driveways 4. Entrances
- 5. Sidewalks 6. Concrete Curbs
- 7. Concrete Curb & Gutter B. Related Sections:
- 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of 1.3 DEFINITIONS
- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace 1.4 QUALITY ASSURANCE
- A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems. B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for
- testing indicated. 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program. C. Concrete Testing Service: Owner will employ a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- D. ACI Publications: Comply with ACI 301unless otherwise indicated.
- 1.5 PROJECT CONDITIONS A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities. PART 2 - PRODUCTS
- 2.1 FORMS A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type
- materials to provide full-depth, continuous, straight, and smooth exposed surfaces. 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms B. Form-Release Agent: Commercially formulated form-release agent that will not bond with,
- stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces. 2.2 STEEL REINFORCEMENT A. Plain-Steel Welded Wire Reinforcement: Welded wire fabric shall conform to the
- requirements of AASHTO M 55 and ASTM A 185/A 185M, fabricated from steel wire into flat B. Zinc Repair Material: ASTM A 780.
- C. Reinforcing Bars: Reinforcement bars, including epoxy coated reinforcement bars, shall conform to the requirements of AASHTO M 31M (M 31) or 53M (M 53), Grade 300 (40) or 400 (60), or AASHTO M 42M (M 42), Grade 400 (60) deformed bars. D. Epoxy Coated Reinforcement Bars: Epoxy coated reinforcement bars shall conform to the
- requirements of AASHTO M 284M (M 284), except that the maximum thickness of epoxy coating on spiral reinforcement, coated after fabrication, shall be 0.5 mm (20 mils) E. Pavement Longitudinal Metal Joint, Pins and Bar Supports: Longitudinal metal joint for pavement, pins for installing the joint and supports for bars in pavement shall be as
- F. Dowel Bars: Dowel bars shall be plain, round bars conforming to the requirements of AASHTO M 227M Grades 485 through 555 (M 227 Grades 70 through 80). The finished bars shall be saw cut and free from burrs or out-of-round ends which prevent their slipping easily in the concrete. The bars shall be epoxy coated according to the requirements of AASHTO M 254.
- EXPANSION JOINTS A. The expansion joints material shall be cut to the exact cross section of the gutter, curb or combination curb and gutter.
- 2.4 CONCRETE MATERIALS A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
- 1. Portland Cement: ASTM C 150, gray portland cement Type I. B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
- 1. Maximum Coarse-Aggregate Size: 1-1/2 inches. 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement. 2. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260. 2.5 CURING MATERIALS
- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene B. Membrane Curing: Membrane curing compound shall be Type III for streets, parking lots, driveways, entrances, driveways, sidewalks, curbs and curb and gutter. It shall contain finely divided white pigment and vehicle, premixed for immediate use without alteration. When applied to concrete at the specific rate of application, the compound shall exhibit a daylight reflectance of not less than 60 percent of that of magnesium oxide. Membrane Curing: Clear, waterborne, membrane forming curing compound for parking lots,
- entrances, driveways, sidewalks, concrete curb and concrete curb and gutter shall meet ASTM C 309 Type 1, Class A & B. Membrane curing compound shall be Kure-N-Seal manufactured by Sonneborn or approved equal. C. Water: Potable. 2.6 RELATED MATERIALS
- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips. B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene
- 2.7 DETECTABLE WARNING MATERIALS A. Detectable Warning Stamp: Semirigid polyurethane mats with formed underside capable of imprinting detectable warning pattern on plastic concrete; perforated with a vent hole at each
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following
- a. Advanced Surfaces Inc. b. Matcrete Precision Stamped Concrete Tools.
- c. Southern Color N.A., Inc.
- d. Stampcrete International Ltd . Superior Decorative by Dayton Superior.
- B. Liquid Release Agent: Manufacturer's standard, clear, evaporating formulation designed to facilitate release of stamp mats. 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
- a. Advanced Surfaces Inc.: Liquid Release
- b. Matcrete Precision Stamped Concrete Tools; Liquid Release Agent. c. Southern Color N.A., Inc.; SCC Clear Liquid Release.
- d. Stampcrete International Ltd.; Stampcrete Liquid Release. e. Superior Decorative by Dayton Superior; Pro Liquid Release.
- 2.8 CONCRETE MIXTURES A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field
- experience. 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method. B. Proportion mixtures to provide normal-weight concrete with the following properties:
- 1. Compressive Strength (28 Days): 4000 psi. Minimum 6 sack cement content per cubic yard. 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
- 3. Slump Limit: 4 inches. plus or minus 1 inch. C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows: 1. Air Content: 5-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum
- aggregate size. D. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of
- E. Cementitious Materials: Limit percentage by weight of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals
- 2.9 CONCRETE MIXING
- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work. 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas

2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit

C. Proceed with installation only after unsatisfactory conditions have been corrected.

A. Remove loose material from compacted subbase surface immediately before placing

B.Clean forms after each use and coat with form-release agent to ensure separation from

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required

lines, grades, and elevations. Install forms to allow continuous progress of work and so forms

PART 3 - EXECUTION 3.1 EXAMINATION

vehicle speed to 3 mph.

3.2 PREPARATION

concrete

not less than 15 tons.

concrete without damage

of excess vielding.

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances

3.3 EDGE FORMS AND SCREED CONSTRUCTION

according to requirements in Division 31 Section "Earth Moving."

can remain in place at least 24 hours after concrete placement.

supporting reinforcement.

sealant is indicated

sides of ioint.

and alignment.

concrete after testing.

3.7 FLOAT FINISHING

uniform granular texture.

traffic in streets.

temperatures

means

1. Elevation: 3/4 inch.

inches of tie bar.

5. Joint Spacing: 3 inches

specimens at 28 days.

3.5 JOINTS

continuous laps in either direction.

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and

- B.Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials. C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement. D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent
- A. General: Form construction, isolation, and contraction joints and tool edges true to line unless other method is indicated on drawings, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated
- 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated. B.Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving
- terminates at isolation joints. 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not
- continue reinforcement through sides of paving strips unless otherwise indicated. Provide tie bars at sides of paving strips where indicated 3.Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against
- hardened or partially hardened concrete surfaces. C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated. 1. Locate expansion joints at locations shown on the drawings.
- 2.Extend joint fillers full width and depth of joint. 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint 4.Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
- 5.Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together 6.During concrete placement, protect top edge of joint filler with metal, plastic, or other
- temporary preformed cap. Remove protective cap after concrete has been placed on both D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas
- as indicated. Construct contraction joints for a depth equal to at least one-third of the concrete thickness, as follows, to match jointing of existing adjacent concrete paying: 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after
- applying surface finishes. Eliminate grooving-tool marks on concrete surfaces. 2.Contraction joints may be wet sawed, after concrete is hard enough to support power equipment. Care should be made that the new joint does not close up after sawing.
- 3. Contraction joints may also be dry sawed no later than 24 hours after placing the concrete. Contractor shall saw joints before any shrinkage cracks start to show up in the pavement. Care should be made to prevent spalling of the joints.
- E.Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.
- 3.6 CONCRETE PLACEMENT A. Before placing concrete, inspect and complete formwork installation, steel reinforcement and items to be embedded or cast-in.
- B.Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces. C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do
- not place concrete around manholes or other structures until they are at required finish elevation D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E.Do not add water to concrete during delivery or at Project site. Do not add water to fresh F.Deposit and spread concrete in a continuous operation between transverse joints. Do not push
- or drag concrete into place or use vibrators to move concrete into place. G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. H. Screed paving surface with a straightedge and strike off. Screed street with a power screed and straight edge street with a 10 foot straight edge at right angles to line of traffic. I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform
- surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments. J Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the
- 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement
- 2.Do not use frozen materials or materials containing ice or snow. 3.Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- K.Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided
- water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option. 2.Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
- 3.Fog-spray forms, steel reinforcement and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
- A. General: Do not add water to concrete surfaces during finishing operations. B Float Finish. Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish
- surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to 1. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished
- concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of 2. For streets, provide a course finish by dragging an astro-turf carpet drag parallel to the line of
- 3.8 DETECTABLE WARNINGS A. Cast in Place Detectable Warnings: Furnish and install cast in place detectable warning per
- manufacturers recommendations B.Products: Armor-Tile Herculite Series Replaceable Cast in Place or approved equal.
- 3.9 CONCRETE PROTECTION AND CURING A. General: Protect freshly placed concrete from premature drying and excessive cold or hot
- B.Comply with ACI 306.1 for cold-weather protection. C. Begin curing after finishing concrete but not before free water has disappeared from concrete
- D. Curing Methods: Cure concrete by moisture-retaining-cover curing as follows: 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during
- installation or curing period using cover material and waterproof tape 2.Membrane curing methods: The streets shall be sprayed with equipment consisting of a container having a capacity of 25 gallons in which constant pressure can be maintained by mechanical means or by a suitable pumping arrangement in order that a constant pressure at
- the spray nozzles will be maintained so that the membrane curing compound will be applied uniformly at the specific rate. The spray unit shall be rigid attached and shall be equipped with mechanical devices providing constant agitation of the membrane curing compound and continuous circulation of the compound between the container and the spray nozzles. The spray nozzles shall be attached to a distributor pipe so the spray will be applied vertically from not more than 2 foot above the surface of the pavement and their horizontal spacing shall be that uniform coverage of the pavement surface will be obtained. The parking lots, driveways, entrances, sidewalks, curbs and curb & gutter shall be an equipped container having not less
- than 5 gallons of capacity in which constant pressure shall be maintained by mechanical 3.10 PAVING TOLERANCES
- A. Comply with tolerances in ACI 117 and as follows:
- 2. Thickness: Plus 3/8 inch. minus 1/4 inch. 3. Surface: Gap below 10-foot long, unleveled straightedge not to exceed 1/2 inch. 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12
- 6. Contraction Joint Depth: Plus 1/4 inch, no minus.
- 7. Joint Width: Plus 1/8 inch. no minus. 3.11 FIELD QUALITY CONTROL
- Testing Agency: Owner will employ testing agency.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements: 1. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests
- when concrete consistency appears to change. 2. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture. 3. Concrete Temperature: ASTM C 1064/C 1064M: one test hourly when air temperature is 40
- deg F and below and when it is 80 deg F and above, and one test for each composite sample. 4. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
- 5. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number. date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect

- G. Concrete paying will be considered defective if it does not pass tests and inspections. H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- Prepare test and inspection reports 3.12REPAIRS AND PROTECTION
- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect B. Drill test cores, where directed by Architect, when necessary to determine magnitude of
- cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement or when concrete has reached design strength. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections. END OF SECTION 321313
- SECTION 321373 CONCRETE PAVING JOINT SEALANTS PART 1 - GENERA
- 1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. 1.2 SUMMARY
- A. Section Includes: Cold-applied joint sealants.
- Hot applied joint sealants
- B. Related Sections 1. Division 07 Section "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section. 2. Division 32 Section "Concrete Paving" for constructing joints in concrete pavement. 1.3 QUALITY ASSURANCE
- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project. B. Source Limitations: Obtain each type of joint sealant from single source from single
- manufacturer. 1.4 PROJECT CONDITIONS
- A. Do not proceed with installation of joint sealants under the following conditions: 1. When ambient and substrate temperature conditions are outside limits permitted by ioint-sealant manufacturer or are below 40 deg F. 2. When joint substrates are wet
- 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated. 4. Where contaminants capable of interfering with adhesion have not yet been removed
- from joint substrates. PART 2 - PRODUCTS
- 2.1 MATERIALS A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- 2.2 COLD-APPLIED JOINT SEALANTS
- A. Joint Sealants: Single-Component, Self-Leveling, Polyurethane or Silicone. . Polyurethane, Self-Leveling, Joint Sealant for Concrete: ASTM C920 Type S, Grade NS, Vulkem 116 or approved equal.
- C. Single-Component, Self-Leveling, Silicone Joint Sealant for Concrete: ASTM 5893, Type SL, Dow Corning 888 or approved equal
- D. Cold applied joint sealer for pavements shall comply with the requirements of ASTM D 1850-74
- Joint Sealants: Sawed contraction joints to be sealed as noted on the drawings.
- 2.3 HOT-APPLIED JOINT SEALANTS A. Hot-poured filled joints for pavements shall comply with the requirements of ASTM D 3405
- 2.4 JOINT-SEALANT BACKER MATERIALS A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing. B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of
- sealant. PART 3 - EXECUTION
- 3.1 FXAMINATION
- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting ioint-sealant performance. B. Proceed with installation only after unsatisfactory conditions have been corrected.
- PREPARATION A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- 3.3 INSTALLATION OF JOINT SEALANTS A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- dations in ASTM C 1193 f Joint-Sealant Installation Standard Comply with rec of joint sealants as applicable to materials, applications, and conditions indicated. C. Install joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability
- 1. Do not leave gaps between ends of joint-sealant backings. 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
- 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials. Install joint sealants using proven techniques that comply with the following and at the same
- time backings are installed: 1. Place joint sealants so they directly contact and fully wet joint substrates. 2. Completely fill recesses in each joint configuration 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow
- optimum sealant movement capability. E. Sidewalk Sealants: Sidewalk expansion joints that are to sealed shall have a ¼ inch high tear-off top strip that can be removed to allow the sealant to be applied.
- F. Paving Sealant: Paving contraction joints are to be thoroughly cleaned of all foreign material, including membrane curing compound and the joint faces shall be clean and surface dry when the sealant is applied. Joints may be sealed with polyurethane, silicone,
- cold-poured joint sealer or hot-poured joint seale G. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated 3.4 CLEANING
- A. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur. 3.5 PROTECTION
- A. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work. END OF SECTION 321373
- CTION 334100 STORM UTILITY DRAINAGE PIPING
- PART 1 GENERAL 1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. 12 SUMMARY

1. Manholes: Include plans, elevations, sections, details, frames, and covers.

spatial relationship between manholes, piping, and proximate structures.

Handle manholes according to manufacturer's written rigging instructions.

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

2. Catch basins and storm water inlets: Include plans, elevations, sections, details,

. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in

same trench and clearances from storm drainage system piping. Indicate interface and

Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

D. Handle catch basins and stormwater inlets according to manufacturer's written rigging

occupied by Owner or others unless permitted under the following conditions and then only

1. Notify Architect no fewer than two days in advance of proposed interruption of service.

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities

after arranging to provide temporary service according to requirements indicated:

2. Do not proceed with interruption of service without Architect's written permission.

- A. Section Includes:
- 1. Pipe and fittings. Backwater valves.
- 3. Cleanouts.
- 4. Encasement for piping 5. Catch basins.
- 6. Stormwater inlets. 7. Stormwater manholes
- 8. Riprap 9. Filter Fabric
- 1.3 SUBMITTALS

Field quality-control reports.

instructions

1.5 PROJECT CONDITIONS

A. Product Data: For each type of product indicated. B. Shop Drawings:

frames, covers, and grates

1.4 DELIVERY, STORAGE, AND HANDLING

 smooth waterway for coupling joints. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings. PVC pipe and fittings meeting ASTM 3034 - SRD 35 with gasketed joints and fittings. PVC pipe and fittings meeting ASTM D 1785, ASTM D 2665} - Schedule 40 PVC with 	 3.6 CONNECTIONS A. Connect non-pressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping." B. Make connections to existing piping and underground manholes. 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6- overlap, with not less than 6 inches of concrete with 28-day compressive 	REPRESENTED HERE ARE FOR THE SOLE USE OF THIS PROJECT AND SHALL NOT BE REPRODUCED OR ALTERED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF MICHAEL E. NEIKIRK, PE.
 plain ends for solvent-cemented joints. D. Reinforced concrete pipe meeting AASHTO M 170M (M 170) Classes I to V, in the Standard Specifications for Road and Bridge Construction latest addition. E. HDPE Pipe shall have a smooth interior and angular exterior corrugation and meeting 	 strength of 3000 psi. 2.Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi. 	REVISIONS
ASTM F 2648. Bell and Spigot joints shall be soil-tight and gaskets shall meet the requirement of ASTM F 477. Fittings shall conform to ASTM F 2306. F. Corrugated Metal Pipe shall be Aluminized Steel Type 1 and shall conform with	3.Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering	NO. DESCRIPTION DATE
AASHTO M 274 and M 36. 2.2 VITRIFIED CLAY PIPE AND FITTINGS	connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On	
 A. Vitrified clay pipe and joints for direct burial shall conform to ASTM C 700 requirement for extra strength clay pipe and ASTM C 425. For clay pipe 18 inches in diameter and 	outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from	
smaller, conform to requirements for compression couplings for plain-end pipe.1. Compression couplings: The PVC collar material for compression couplings of	connection to undisturbed ground. a.Use concrete that will attain a minimum 28-day compressive strength of 3000 psi	
plain-end pipe shall conform to requirements of ASTM D 1784, Class 12454-B. 2.3 CLEANOUTS A. Plastic Cleanouts:	unless otherwise indicated. b.Use epoxy-bonding compound as interface between new and existing concrete and piping materials.	
 A. Plastic Cleanouts: 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited 	 4.Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material 	
to, the following: a. Canplas LLC.	that may accumulate. 3.7 CLOSING ABANDONED STORM DRAINAGE SYSTEMS	
b. IPS Corporation. c. NDS Inc.	A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth	
d. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.e. Sioux Chief Manufacturing Company, Inc.	pressures that may result after ends of abandoned piping have been closed. Use either procedure below:	
 f. Zurn Light Commercial Products Operation; Zurn Plumbing Products Group. 2. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping. 	 Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs. Abandoned Manholes and Structures: Excavate around manholes and structures as 	
 2.4 CATCH BASINS A. Standard Precast Concrete Catch Basins: 	 required and use one procedure below: 1. Remove manhole or structure and close open ends of remaining piping. 	
 Description: ASTM C 478, precast, reinforced concrete, size and depth as indicated, with provision for sealant joints. 	 C. Backfill to grade according to Division 31 Section "Earth Moving." 3.8 IDENTIFICATION 	
Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section	A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of	
with integral floor.Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.	underground structures. 1. Use warning tape or detectable warning tape over ferrous piping. 2.Use detectable warning tape over nonferrous piping and over edges of underground	
 Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings. 	structures. 3.9 FIELD QUALITY CONTROL	CONSTRUCTION DOCUMENTS 11/29/22
 Joint Sealant: ASTM C 990, bitumen or butyl rubber. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and 	A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at	
shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.	completion of Project. 1. Submit separate reports for each system inspection.	
 Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting 	 2.Defects requiring correction include the following: a.Alignment: Less than full diameter of inside of pipe is visible between structures. b.Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of 	
 B. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section. B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, 	size not less than 92.5 percent of piping diameter. c. Damage: Crushed, broken, cracked, or otherwise damaged piping.	
structural loading. Include flat grate with small square or short-slotted drainage openings. See frame and grates indicated on the Construction Documents.	d.Infiltration: Water leakage into piping. e.Exfiltration: Water leakage from or around piping.	
 2.5 STORMWATER INLETS A. See inlets as indicated on the Construction Documents. 1. Description: ASTM C 478 proceed reinforced congrets size and donth as 	 3.Replace defective piping using new materials, and repeat inspections until defects are within allowances specified. 4. Reinspect and repeat procedure until results are satisfactory. 	
 Description: ASTM C 478, precast, reinforced concrete, size and depth as indicated. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum 	 Reinspect and repeat procedure until results are satisfactory. B.Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects. 	
 Base Section: 6-Inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor. 	 Do not enclose, cover, or put into service before inspection and approval. Test completed piping systems according to requirements of authorities having 	
 Top Section: Flat-slab-top type unless otherwise indicated. B. Nyloplast Drainage Inlets, size and depth as indicated. 	jurisdiction. 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours'	_
C. Frames and Grates: Heavy duty, according to utility standards and as indicated on the	advance notice. 4.Submit separate report for each test. 5.Gravity Eleve Storm Drainage Pining: Test according to requirements of authorities.	MICHAEL E. NEIKIRK PE
Construction Documents. 2.6 STORMWATER MANHOLES A. See manholes as indicated on the Construction Documents.	 Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following: a.Exception: Piping with soiltight joints unless required by authorities having 	
 A. See manholes as indicated on the Construction Documents. 4. Description: ASTM C 478, precast, reinforced concrete, size and depth as indicated, with provision for sealant joints. 	jurisdiction. b. Option: Test plastic piping according to ASTM F 1417.	<i>Civil Engineer</i> 306 North Market Street, Ste 101
 Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section 	c. Option: Test concrete piping according to ASTM C 924. d.Option: Text Clay piping according to ASTM C1091.	Mt. Carmel, IL 62863
with integral floor. 6. Riser Sections: 4-inch minimum thickness, 36-inch, 48-inch or 60-inch diameter,	 C. Leaks and loss in test pressure constitute defects that must be repaired. D. Replace leaking piping using new materials, and repeat testing until leakage is within 	Phone: (618) 263-4100
and lengths to provide depth indicated.7. Top Section: Box or Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of one of size that matches grade ringe.	allowances specified. 3.10 CLEANING A. Clean interior of piping of dirt and superfluous materials. Flush with water.	SCALE: NTS
type is indicated. Top of cone of size that matches grade rings.8. Joint Sealant: ASTM C 990, bitumen or butyl rubber.9. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and	END OF SECTION 334100	DRAWN BY: RM
shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.	<u>SECTION 334600 - SUBDRAINAGE</u> PART 1 - GENERAL	DESIGNER: TJL,RM
10. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.	1.1 SUMMARY A. This Section includes subdrainage systems.	CHECKED BY: TJL ENGINEER: Michael E. Neikirk
 Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section. Frames and Grates: Heavy duty, according to utility standards and as indicated on 	PART 2 - PRODUCTS 2.1 PIPING MATERIALS A. Refer to the "Piping Applications" Article in Part 3 for applications of pipe, fitting, and	ARCHITECT: IDesign
 B. Frames and Grates: Heavy duty, according to utility standards and as indicated on the Construction Documents. 	 initial price of the second sec	OWNER: Bluegrass Hospitality Group
2.7 RIPRAPA. Stone for erosion protection or sediment control shall meet requirements.	A. Perforated PE Pipe and Fittings: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.	
Gradation and thickness shall be as indicated on plans. 2.8 FILTER FABRIC	 Couplings: Manufacturer's standard, band type. SOLID-WALL PIPES AND FITTINGS 	Concession of the second
A. The weight of the filter fabric shall weigh 6 oz/sq yd and meet ASTM D 3776 (Mod), Burst Strength of 250 psi and meet ASTM D 3786, Trapezoidal Tear Strength of 60 lb and meet ASTM D 1117, Grab Tensile Strength of 160 lb and meet ASTM D 4632 and	 A. PE Drainage Tubing and Fittings: AASHTO M 252, Type S, corrugated, with smooth waterway, for coupled joints. 1. Couplings: AASHTO M 252, corrugated, band type, matching tubing and fittings. 	SE OF MISSOL
Grab Elongation of 20% and meet ASTM D 4632.	 2.4 SPECIAL PIPE COUPLINGS A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, 	MICHAEL E. CH
PART 3 - EXECUTION		(a) A set of the se
PART 3 - EXECUTION 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth	for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant metal tension band and tightening mechanism on	* NEIKIRK
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION 	be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal	* NUMBER
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS 	*(NEIKIRK)*
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 	* NUMBER
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS 	* NEIKIRK * NUMBER PE-2005010805
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 	* NEIKIRK NUMBER PE-2005010806
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate 	* NEIKIRK * NUMBER PE-2005010805
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: Install piping pitched down in direction of flow. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: At Grade in Earth: PVC cleanouts. 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sever is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or anchors. Install piping with 12-inch minimum cover. Install PE corrugated sewer piping according to ASTM D 2321. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: 1. Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: 1. At Grade in Earth: PVC cleanouts. 2. At Grade in Paved Areas: Cast-iron cleanouts. 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 SARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. Install gravity-flow, nonpressure drainage piping according to the following: Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping ecording to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: A. Ferforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS In Underground Subdrainage Piping: At Grade in Earth: PVC cleanouts. HPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 SARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. Install gravity-flow, nonpressure drainage piping according to the following: Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. Install piping with 12-inch minimum cover. Install piping according to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321. 	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: At Grade in Earth: PVC cleanouts. At Grade in Paved Areas: Cast-iron cleanouts. 3.4 PIPING INSTALLATION Install piping beginning at low points of system, true to grades and alignment 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 EARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. Install gravity-flow, nonpressure drainage piping according to the following:	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: At Grade in Earth: PVC cleanouts. At Grade in Earth: PVC cleanouts. 3.4 First Piping and Areas: Cast-iron cleanouts. 3.4 PIPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 S.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 2. PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: 1. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. 3. Install Piping with 12-inch minimum cover. 4. Install Piping with 12-inch minimum cover. 3. Install Piping with 22-inch minimum cover. 3. Install Piping with 22-inch minimum cover. 3. Install Piping with 22-in	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: A Grade in Earth: PVC cleanouts. A I PIPING INSTALLATION A Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited. 	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 S.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 2.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sever is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: 1. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. 3. Install piping with 12-inch minimum cover. 4. Install PE corrugated sewer piping according to ASTM D 2321. 5. Install piping with 2-inch minimum cover. 3. PIPE JOINT CONSTRUCTION A. Join corrugated PE, PVC an	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Ar Grade in Earth: PVC cleanouts. Ar Grade in Paved Areas: Cast-iron cleanouts. 3.4 In Underground Subdrainage Piping: At Grade in Paved Areas: Cast-iron cleanouts. 3.4 IPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited. Install PE piping according to ASTM	* NEIKIRK * NUMBER PE-2005010806 * PE-2005010806 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-200501000 * PE-2005010000 * PE-2005010000 * PE-20050100000 * PE-20050000000000000000000000000000000000
 3.1 EARTHWORK A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING INSTALLATION A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. F. Install gravity-flow, nonpressure drainage piping according to the following: 1. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. 3. Install Piping with 12-inch minimum cover. 4. Install Piping with 12-inch minimum cover. 3. Install Piping with 2-inch mi	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3 - EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: At Grade in Paved Areas: Cast-iron cleanouts. 4 PIPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited. I. tay perforated pipe with	CERTIFIED BY
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 EARTHWORK EXcavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sever is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors. Install piping with 12-inch minimum cover. Install piping with extensions. Install piping with extensions of ADT 2221 for push-on joints or glue PVC schedule 40 pipes. Join corrugated PE, PVC and HDPE piping according to ASTM D 3212 for push-on joints or glue PVC schedule 40 pipes. Join corrugatet metal swith nonpressure-type flexib	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOIL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 2.7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3. EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: At Grade in Earth: PVC cleanouts. PIPING INSTALLATION 4. PIPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with urbroken continuity of invert. Bed piping with full bearing in filtering matterial. Install gaskets, seals, sleeves, and couplings taccording to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for beil ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited. Install	JOB TITLE DRAKE'S RESTAURANT 900 HIGHWAY K O'FALLON, MO DRAWING TITLE
 EARTHWORK EXcavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sever is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling. Install piping head down in direction of flow. Install piping nubre down in direction of flow. Install piping with 12-inch minimum cover. Install piping with 2-inch minimum cover. Install piping with 2-inch minimum cover. Install piping with 2-inch minimum cover. Joint and manufacturer's recommendations. Orio dissimilar pipe materials with nonpressure-type flexible couplings. Cold applied bituminous sealer for reinforced concrete pipe should achere to the concrete and make a watertight seal and shall not flow, crack or become b	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 6. SOLI MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 7 GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 303 ogm/sd, ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3. EXECUTION 3.1 EARTHWORK A. Execvating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: PRIT 6.4 Creavesting, trenching, and backfilling, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: PRITOR APPLICATIONS A. In Underground Subdrainage Piping: A Grade in Earth: PVC denouts. A PIPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated Pipe and With perforations down. 2. Excavate receases in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spipot end entered fully into adjacent bell. B. Use increasers, reducers, and couplings acd for different sizes or materials of pipes and fittings with couplings fo	CERTIFIED BY
 EARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install menholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtrunneling. Install piping with 2000 down in direction of flow. Install piping with 2000 down in direction of flow. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install vitrified clay piping according to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321 for pushon joints or glue PVC schedule 40 pipe. Join carvity-flow, nonpressure drainage piping according to ASTM D 3212 for pushon joints or glue PVC schedule 40 pipe. Join carvity-flow, n	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2. CLEANOUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 6. SOL MATERIALS A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 7. GEOTEXTILE FILTER FABRICS A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 303 gpm/sci, ft. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Flat. PART 3. EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 2. PIPING APPLICATIONS A. Underground Subdrainage Piping: 1. Perforated PE pipe and fittings, couplings, and coupled joints. 3. CLEANOUT APPLICATIONS A. In Underground Subdrainage Piping: A. Grade in Earth: PVC cleanouts. A. HOR GINZ CLATION A. In Underground Subdrainage Sizeves, and coupling according to manufacturer's written instructions and other requirements indicated. Lay perforated pipe with perforations down. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell. B. Use increasers, reducers, and couplings according to flow is prohibited. Cast-Iron Soil Pipe and Fittings. Hub and spigot, with rubber compression gaskets according to CISPI's 'Cast Iron Soil Pipe and Fittings with couplings for soil-tight joints according to AASHTO's 'Standard Specifications for Highway Bridges,' Division II, Section 28.4, 'Joint Properties.' Join PC pipe, tubing	JOB TITLE DRAKE'S RESTAURANT 900 HIGHWAY K O'FALLON, MO DRAWING TITLE
 EARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install menholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtrunneling. Install piping with 2000 down in direction of flow. Install piping with 2000 down in direction of flow. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install vitrified clay piping according to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321 for pushon joints or glue PVC schedule 40 pipe. Join carvity-flow, nonpressure drainage piping according to ASTM D 3212 for pushon joints or glue PVC schedule 40 pipe. Join classimilar pip	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. CLEANOUTS A PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. GOIM ATTERIALS Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." GEOTEXTILE FILTER FABRICS Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 303 gpm/sq. ft. when tested according to ASTM D 4491. Structure Type: Nonwoven Style(s): Fial. PART 3 - EXECUTION EARTHWORK Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving". PIPING APPLICATIONS A Underground Subdrainage Piping: A Grade in Earth: PVC cleanouts. A Grade in Earth: PVC cleanouts. A Grade in Earth: PVC cleanouts. PIPING INSTALLATION A Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. Lay perforated Pipie with spigot end entered fully into adjacent bell. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibided. Install PE piping according to ASTM D 2321. FPIED JOINT CONSTRUCTION A Cast-Iron Soil Pipe and fittings with couplings for soil-tight	JOB TITLE DRAKE'S RESTAURANT 900 HIGHWAY K O'FALLON, MO DRAWING TITLE
 EARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install menholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtrunneling. Install piping with 2000 down in direction of flow. Install piping with 2000 down in direction of flow. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install vitrified clay piping according to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321 for pushon joints or glue PVC schedule 40 pipe. Join carvity-flow, nonpressure drainage piping according to ASTM D 3212 for pushon joints or glue PVC schedule 40 pipe. Join classimilar pip	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 25 CLEANOUTS A PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 26 SolL MATERIALS A Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving." 27 GEOTEXTILE FILTER FABRICS A Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gmr/sq. t. when tested according to ASTM D 4491. 1. Structure Type: Nonwoven 2. Style(s): Fild. PRRT 3 - EXECUTION 3.1 EARTHWORK A Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 2. PIPING APPLICATIONS A. Underground Subdrainage Piping: 1. A Grade in Earth: PVC cleanouts. 2. At Grade in Pave Areas: Cast-iron cleanouts. 3.4 IGrade in Pave Areas: Cast-iron cleanouts. 3.4 PIPING INSTALLATION A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated. 1. Lay perforated pipe with perforations down. 2. Excavate recesses in trench bottom for beil ends of pipe. Lay pipe with bells facing upsipe and fittings. Hub and spigot, with rubber compression gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings. Hub and spigot, with rubber compression gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings. Hub and spigot, with rubber compression gaskets according to ASTM D 2321. 3.5 PIPE JOINT CONSTRUCTION 4. Cast-Iro	JOB TITLE DRAKE'S RESTAURANT 900 HIGHWAY K O'FALLON, MO DRAWING TITLE SPECIFICATIONS
 EARTHWORK Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving." PIPING INSTALLATION General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Install menholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtrunneling. Install piping with 2000 down in direction of flow. Install piping with 2000 down in direction of flow. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install piping with 12-inch minimum cover. Install vitrified clay piping according to ASTM D 2321. Install vitrified clay piping according to ASTM D 2321 for pushon joints or glue PVC schedule 40 pipe. Join carvity-flow, nonpressure drainage piping according to ASTM D 3212 for pushon joints or glue PVC schedule 40 pipe. Join classimilar pip	 be joined and corrosion-resistant metal tension band and tightening mechanism on each end. 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end. 2.5 CLEANQUTS A. PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub. 2.6 SOL MATERIALS 2.7 GEOTEXTILE FLITER FABRICS 2.7 GEOTEXTILE FLITER FABRICS 2.8 Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq, ft when tested according to ASTM D 4491. 1. Structure Type: Nomwoven 2. Style(s): Flat. PART 3. EXECUTION 3.1 EARTHWORK A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving." 3.2 PIPING APPLICATIONS A. Underground Subdrainage Piping: 1. Perforated PE pipe and fittings, couplings, and coupled joints. 3.3 CLEANOUT APPLICATIONS A. Inderground Subdrainage Piping: 1. At Grade in Paved Areas: Cast-iron cleanouts. 3.4 PIPING INSTALLATION A. Install gatest, seals, seeves, and coupling a according to manufacturer's written instructions and other requirements indicated. 4. Linstall gatest, seals, seeves, and coupling according to manufacturer's written instructions and other requirements indicated. 4. Lipper forated pipe with peforiations down. 2. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upsiope and with spigot end entered fully into adjacent bell. 4. Cast-Inton Soll Pipe and Fittings: Hub and spigot, with rubber compression gaskets according to ASTM D 2321. 5. PIPE JOINT CONSTRUCTION 4. Lay perforated pipe with peforiations down. 2. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upsiope and with spigot end entered fully into adjacent bell.	JOB TITLE DRAKE'S RESTAURANT 900 HIGHWAY K O'FALLON, MO DRAWING TITLE SPECIFICATIONS
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