



## SECTION 02600

### DRAINAGE AND CONTAINMENT

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Trench drain forming system. (EconoDrain).
- B. Extra Heavy Duty trench drain forming system. (EconoDrain PT-2).
- C. Metal trench drain system. (MultiDrain).
- D. Polymer concrete trench drain system. (Alfa Channel).

##### 1.2 RELATED SECTIONS

- A. Section 02630 - Storm Drainage.
- B. Section 02632 - Storm Drainage Pipe.
- C. Section 02620 - Surface Drainage.
- D. Section 03100 - Concrete Forms and Accessories.
- E. Section 03150 - Concrete Accessories.
- F. Section 05500 - Metal Fabrications.
- G. Section 05530 - Gratings.
- H. Section 05530 - Gratings and Floor Plates.
- I. Section 05532 - Gratings, Trench Covers.
- J. Section 05560 - Metal Castings.
- K. Section 15160 - Storm Drainage Piping.

##### 1.3 REFERENCES

- A. AASHTO M306-FAA - Standard Specification for Drainage, Sewer, Utility and Related Castings.

- B. American Welding Society (AWS):
  - 1. AWS D1.1 - Welding Code.
  - 2. AWS D1.6 - Structural Welding Code.
- C. ASTM International (ASTM):
  - 1. ASTM A 36 - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A 48 - Standard Specification for Gray Iron Castings.
  - 3. ASTM A 276 - Standard Specification for Stainless Steel Bars and Shapes.
  - 4. ASTM A 536 - Standard Specification for Ductile Iron Castings.
  - 5. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - 6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. Federal Specification A-A-60005 - Frames, Covers, Gratings, Steps, Sum and Catch Basin, Manhole.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Provide a general layout indicating invert and outlet elevation with slope at each trench section. Locate catch basins required and outlet piping connection locations and details. Provide details at field installed connections and components.

#### 1.5 QUALITY ASSURANCE

- A. Components of the system shall be from one manufacturer.
- B. Expanded Polystyrene Foam (EPS) Formers: Comply with ASTM C 578.
  - 1. Flame Spread and Smoke Developed: ASTM E 84.
- C. Grate Rail Frames: Comply with the following.
  - 1. Steel Angle Rails: ASTM A 36.
  - 2. Stainless Steel Rails: ASTM A 276.
  - 3. Concrete Anchors: AWS D1.1 (steel) and AWS D1.6 (stainless steel).
- D. Gratings: Comply with the following.
  - 1. Federal Specification A-A-60005 (12 inch width and larger).
  - 2. AASHTO M306 (12 inch width and larger), H20 and HS25 load performance.
  - 3. Cast Gray Iron: ASTM A48, Class 35B.
  - 4. Ductile Iron: ASTM A 536, 60-45-12.
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Install sections designated by Architect.
  - 2. Do not proceed with remaining work until workmanship and performance are approved by Architect.
  - 3. Rework mock-up area as required to produce acceptable work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

## 1.7 PROJECT CONDITIONS

- A. Protect insulating forms from damage.

## 1.8 WARRANTY

- A. Provide manufacturer's standard one (1) year limited warranty covering material and manufacturing defects.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MultiDrain Systems, Inc. which is located at: 1405 Industrial Drive; Statesville, NC 28625; ASD. Toll Free Tel: 800-433-1119; Tel: 704-508-1010; Fax: 704-508-1011; Email: [request info \(steve.born@multidrainssystems.com\)](mailto:steve.born@multidrainssystems.com); Web: [www.multidrainssystems.com](http://www.multidrainssystems.com).
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

### 2.2 TRENCH DRAINS

- A. Product: #4 EconoDrain 4.5 inch (114 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms, grating/cover seat, grating and/or covers and system accessories.
  - 1. Construction: The trench drain system shall be EconoDrain #4 consisting of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, pre-welded grate frames anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  - 2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  - 3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together and pre-welded to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the

surrounding concrete. Rail pull out resistance shall not be less than 2,480 lb/lineal foot (36 kN/m).

4. Grate: EG-0424-1DI-B – 5 1/4 inch by 24 inch (133mm x 610mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Ductile iron.
  - b. Open Area: 64.1 percent.
  - c. Load Rating: HS25.
5. Grate: EG-0424-1DI-ADA – ADA Compliant 5 1/4 inch by 24 inch (133mm x 610mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Ductile iron.
  - b. Open Area: 30.4 percent.
  - c. Load Rating: HS25.
6. Grate: EG-0424-1DI-A – 5 1/4 inch by 24 inch (133mm x 610mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Ductile iron.
  - b. Open Area: 51.9 percent.
  - c. Load Rating: H20 & HS25.
7. Grate: EG-0424-1CI-B2 – 5 1/4 inch by 24 inch (133mm x 610mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Cast iron.
  - b. Open Area: 55 percent.
  - c. Load Rating: H20.
8. Grate: EG-0448-RGSC – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04-1.
  - a. Material: Reinforced galvanized steel.
  - b. Open Area: 0 percent (Closed).
  - c. Load Rating: H20.
9. Grate: EG-0448-RSSC – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04-1.
  - a. Material: Reinforced stainless steel.
  - b. Open Area: 0 percent (Closed).
  - c. Load Rating: H20.
10. Grate: EG-0448-RGSB – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Reinforced galvanized steel - Slotted.
  - b. Open Area: 17 percent.
  - c. Load Rating: H20.
11. Grate: EG-0448-RSSB – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Reinforced stainless steel - Slotted.
  - b. Open Area: 17 percent.
  - c. Load Rating: H20.
12. Grate: EG-0448-GSB – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Galvanized steel - Slotted.
  - b. Open Area: 17 percent.
  - c. Load Rating: Pedestrian.
13. Grate: EG-0448-SSB – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04.
  - a. Material: Stainless steel - Slotted.
  - b. Open Area: 17 percent.
  - c. Load Rating: Pedestrian.
14. Grate: EG-0448-GSP – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04-1.
  - a. Material: Galvanized steel - Perforated.
  - b. Open Area: 8.5 percent.

- c. Load Rating: Pedestrian.
  - 15. Grate: EG-0448-SSP – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04.
    - a. Material: Stainless steel - Perforated.
    - b. Open Area: 8.5 percent.
    - c. Load Rating: Pedestrian.
  - 16. Grate: EG-0448-RGSP – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD040-1.
    - a. Material: Reinforced galvanized steel - Perforated.
    - b. Open Area: 8.5 percent.
    - c. Load Rating: H20.
  - 17. Grate: EG-0448-RSSP – 5 1/4 inch by 48 inch (133mm x 1219mm); Secured to steel rails with locking device assembly ELD04-1.
    - a. Material: Reinforced stainless steel - Perforated.
    - b. Open Area: 8.5 percent.
    - c. Load Rating: H20.
  - 18. Catch Basins:
    - a. ECB0424: 4.5 inch by 24 inch by 24 inch (114 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24 inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate rail and grate.
    - e. ECB3360: 32.625 inch by 32.625 inch by up to 60 inch (828 mm by 828 mm by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - 19. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- B. Product: #6 EconoDrain 6 inch (152 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms, grating/cover seat, grating and/or covers and system accessories.
- 1. Construction: The trench drain system shall be EconoDrain #6 consisting of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, pre-welded grate frames or Bolt-In-Place grate rail spacer bars anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  - 2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  - 3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with pre-welded spacer rods or Bolt-In-Place grate rail spacer bars to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.

- f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
  - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  - 4. Grate: EG-0824-1DI-A – 8 inch by 24 inch (203mm x 610mm); Secured to steel rails with locking device assembly ELD06.
    - a. Material: Ductile iron.
    - b. Open Area: 63.5 percent.
    - c. Load Rating: HS25.
  - 5. Grate: EG-0824-1DIADA – ADA Compliant 8 inch by 24 inch (203mm x 610mm); Secured to steel rails with locking device assembly ELD06.
    - a. Material: Ductile iron.
    - b. Open Area: 38.1 percent.
    - c. Load Rating: HS25.
  - 6. Grate: Banded Bar Grate: EG-0836-HPBG.
    - a. Material: Steel Shop Black.
    - b. Open Area: 66 percent.
    - c. Square Inches per Linear Foot: 63.3.
  - 7. Grate: Banded Bar Grate: EG-0836-HGBG.
    - a. Material: Steel Galvanized Coated.
    - b. Open Area: 66 percent.
    - c. Square Inches per Linear Foot: 63.3.
  - 8. Grate: Banded Bar Grate: EG-0836-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 66 percent.
    - c. Square Inches per Linear Foot: 63.3.
  - 9. Catch Basins:
    - a. ECB0624: 6 inch by 24 inch by 24 inch (152 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, pre-welded grate frame or Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24 inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 mm by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - 10. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- C. Product: #8 EconoDrain 8 inch (203 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.
- 1. Construction: The trench drain system shall be EconoDrain #8 consisting of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, pre-welded grate frames or Bolt-In-Place grate rail spacer bars anchored securely in concrete, common rebar used for form stability and anti-flotation

- during pour and gratings.
2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with pre-welded spacer rods or Bolt-In-Place grate rail spacer bars to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  - 4A. Grate: EG-1024-1DI-A2 – 10 inch x 24 inch (254mm x 610mm); secured to steel rails with locking device assembly ELD08.
    - a. Material: Ductile Iron
    - b. Open Area: 66.3 percent
    - c. Load Rating: HS25
  4. Grate: EG-1016-1DI-ADA – ADA Compliant 10 inch by 16 inch (254mm x 406mm); secured to steel rails with locking device assembly ELD08-1.
    - a. Material: Ductile iron.
    - b. Open Area: 48 percent.
    - c. Load Rating: HS25/FAA.
  5. Grate: Banded Bar Grate: EG-1036-HPBG.
    - a. Material: Steel Shop Black.
    - b. Open Area: 68.4 percent.
    - c. Square Inches per Linear Foot: 82.
  6. Grate: Banded Bar Grate: EG-1036-HGBG.
    - a. Material: Steel Galvanized Coated.
    - b. Open Area: 68.4 percent.
    - c. Square Inches per Linear Foot: 82.
  7. Grate: Banded Bar Grate: EG-1036-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 68.4 percent.
    - c. Square Inches per Linear Foot: 82.
  8. Catch Basins:
    - a. ECB0824: 8 inch by 24 inch by 24 inch (204 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, pre-welded grate frame or Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate rail and grate.

- e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 mm by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - 9. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- D. Product: #10 EconoDrain 10 inch (254 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.
- 1. Construction: The trench drain system shall be EconoDrain #10 consisting of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bars anchored securely in concrete. Common rebar used for form stability and anti-flotation during pour and gratings.
  - 2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  - 3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with Bolt-In-Place grate rail spacer bars to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  - 4. Grate: EG-1224-1-DI-A – 12 inch by 24 inch (305mm x 610mm); secured to steel rails with locking device assembly ELD10.
    - a. Material: Ductile iron.
    - b. Open Area: 64.8 percent.
    - c. Load Rating: HS25.
  - 5. Banded Grate: EG-1236-HPBG.
    - a. Material: Steel, Shop Black.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Foot: 97.3.
  - 6. Banded Bar Grate: EG-1236-HGBG.
    - a. Material: Steel Galvanized Coated.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Foot: 97.3.
  - 7. Banded Bar Grate: EG-1236-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Foot: 97.3.
  - 8. Catch Basins:
    - a. ECB1024: 10 inch by 24 inch by 24 inch (250 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.



- c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
9. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- E. Product: #12 EconoDrain 12 inch (305 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including grating/cover seat, grating and/or covers and system accessories.
1. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, pre-welded grate frames or Bolt-In-Place grate rail spacer bar, anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together and pre-welded or Bolt-In-Place grate rail spacer bar to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  4. Grate: EG-1424-1DI-A2P – 14 inch by 24 inch (355mm x 610mm); secured to steel rails with locking device assembly ELD12.
    - a. Material: Ductile iron.
    - b. Open Area: 67 percent.
    - c. Load Rating: HS25.
  5. Grate: EG-1424-1DI-ADA – ADA Compliant 14 inch by 24 inch (355mm x 610mm); secured to steel rails with locking device assembly ELD12.
    - a. Material: Ductile iron.
    - b. Open Area: 33.1 percent.
    - c. Load Rating: HS25.
  6. Grate: Banded Bar Grate – EG-1436-HPBG.
    - a. Material: Steel, Shop Black.
    - b. Open Area: 67 percent.
    - c. Square Inches per Linear Foot: 112.5.
  7. Grate: Banded Bar Grate – EG-1436-HGBG.
    - a. Material: Steel Galvanized Coated.

- b. Open Area: 67 percent.
    - c. Square Inches per Linear Foot: 112.5.
  - 8. Grate: Banded Bar Grate – 1436-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 67 percent.
    - c. Square Inches per Linear Foot: 112.5.
  - 9. Catch Basins:
    - a. ECB1224: 12 inch by 24 inch by 24 inch (305 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, pre-welded grate frame or Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - 10. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- F. Product: #15 EconoDrain 15 inch (381 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.
  - 1. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bar. grate frames anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  - 2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  - 3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with Bolt-In-Place grate rail spacer bar to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  - 4. Grate: EG-1724-CI-A - 17 inches (432 mm) by 24 inches (609 mm) by 1-1/2 inch (38 mm)
    - a. Material: Cast Iron
    - b. Open Area: 35.8%

- c. Load: H20
  - 5. Grate: Banded Bar Grate – EG-1736-HPBG.
    - a. Material: Steel, Shop Black.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Linear Foot: 137.3.
  - 6. Grate: Banded Bar Grate – EG-1736-HGBG.
    - a. Material: Steel Galvanized Coated.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Linear Foot: 137.3.
  - 7. Grate: Banded Bar Grate – EG-1736-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 67.5 percent.
    - c. Square Inches per Linear Foot: 137.3.
  - 8. Catch Basins:
    - a. ECB1524: 15 inches by 24 inches by 24 inches (305 mm by 610 mm by 610 mm) Inline catch basin assembly consisting of EPS former, Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inches by 24 inches by 24 inches (610 mm by 610 mm by 610 mm) Catch Basin Assembly consisting of EPS Former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inches by 24 inches by 42 inches (610 mm by 610 mm by 1067 mm) Catch Basin Assembly consisting of EPS Former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  - 9. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- G. Product: #18 EconoDrain 18 inch (457 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms, grating/cover seat, grating and/or covers and system accessories.
- 1. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bar grate rail anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  - 2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  - 3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with Bolt-In-Place grate rail spacer bar to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the

surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).

4. Grate: EG-2024-DI-A - 20 inch (508 mm) by 24 inch (609 mm) by 1-1/2 inch (38 mm).
    - a. Material: Cast Iron
    - b. Open Area: 37 percent
    - c. Load: H20
  5. Grate: Banded Bar Grate – EG-2036-HPBG.
    - a. Material: Steel, Shop Black.
    - b. Open Area: 68.8 percent.
    - c. Square Inches per Linear Foot: 165.2.
    - d. Light Duty.
  6. Grate: Banded Bar Grate – EG-2036-HGBG.
    - a. Material: Steel galvanized coated.
    - b. Open Area: 68.8 percent.
    - c. Square Inches per Linear Foot: 165.2.
    - d. Light Duty.
  7. Grate: Banded Bar Grate – EG-2036-HSBG.
    - a. Material: Stainless Steel.
    - b. Open Area: 68.8 percent.
    - c. Square Inches per Linear Foot: 165.2.
    - d. Light duty.
  8. Catch Basins:
    - a. ECB1824: 18 inch by 24 inch by 24 inch (457 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, Bolt-In-Place, field assembled grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 mm by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  9. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- H. Product: #24 EconoDrain 24 inch (610 mm) Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.
1. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bars and grate rails anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together and Bolt-In-Place spacer bars to assure proper symmetry and planar accuracy.

- b. Material: Mild steel rails - Black, Polyester powder coating.
  - c. Material: Mild steel rails - Galvanized.
  - d. Material: Stainless steel.
  - e. Alignment clips shall be provided at the rail end welded to the angle frame.
  - f. Eight anchor stands shall be provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
  - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
4. Grate: MG-2624-CI-A - 26 inch (660 mm) by 24 inches (609 mm) by 1-1/2 inch (38 mm).
    - a. Material: Cast Iron
    - b. Open Area: 38 percent
    - c. Load: H20
  5. Grate: Banded Bar Grate – EG-2636-HPBG.
    - a. Material: Steel, Shop Black.
    - b. Open Area: 70 percent.
    - c. Square Inches per Linear Foot: 218.
    - d. Light Duty.
  6. Grate: Banded Bar Grate – EG-2636-HGBG.
    - a. Material: Steel galvanized coated.
    - b. Open Area: 70 percent.
    - c. Square Inches per Linear Foot: 218.
    - d. Light Duty.
  7. Grate: Banded Bar Grate – EG2636-HSBG.
    - a. Material: Steel galvanized coated.
    - b. Open Area: 70 percent.
    - c. Square Inches per Linear Foot: 218.
    - d. Light duty.
  8. Catch Basins:
    - a. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, Bolt-In-Place grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate rail and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  9. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.

### 2.3 EXTRA HEAVY DUTY TRENCH DRAINS

- A. Product: #8 EconoDrain PT-2 Extra Heavy Duty Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.

1. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bars and grate rails anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
  2. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  3. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with Bolt-In-Place rail spacer bars to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  4. Grate: EG-10162-DIA – 10 inch by 16 inch (254 mm x 406 mm) secured to steel rails with center locking device ELD08 or, secured to steel rails with two point shoulder bolt assembly.
    - a. Material: Ductile Iron (Standard - Uncoated)  
Ductile Iron (Hot Dip Galvanized – Optional)
    - b. Open Area: 54 percent
    - c. Load Rating: ASHTO M306 - H20 and HS25 and FAA AC 150 5320-6D Load Conditions
  5. Catch Basins:
    - a. ECB0824: 8 inch by 32 inch by 24 inch (204 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, Bolt-In-Place grate rail spacer bars, grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  6. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.
- B. Product: #12 EconoDrain PT-2 Extra Heavy Duty Trench Drain Forming System as manufactured by MultiDrain Systems, including EPS forms grating/cover seat, grating and/or covers and system accessories.
7. Construction: The trench drain system shall consist of non-CFC Expanded Polystyrene Foam (EPS) interlocking pre-sloped removable forms having a

- minimum slope of 0.5 percent (1/16 inch per lineal foot of trench) and installed in standard eight foot (2438 mm) sections, Bolt-In-Place grate rail spacer bars and grate rails anchored securely in concrete, common rebar used for form stability and anti-flotation during pour and gratings.
8. Expanded Polystyrene Foam (EPS):
    - a. EPS shall be non-CFC foam with a flame spread of less than 25 and Smoke Developed rating of less than 450 per ASTM E-84 test method.
  9. Grate Seat Rails:
    - a. Left and right rail shall be affixed together with Bolt-In-Place rail spacer bars to assure proper symmetry and planar accuracy.
    - b. Material: Mild steel rails - Black, Polyester powder coating.
    - c. Material: Mild steel rails - Galvanized.
    - d. Material: Stainless steel.
    - e. Alignment clips shall be provided at the rail end welded to the angle frame.
    - f. Eight anchor stands provided per eight foot (2438 mm) length to aid installation stability; allow simple grade adjustment and provide grate rail pull out resistance. The anchor stands shall be fully welded to the angle frame.
    - g. Each rail shall provide a means to mechanically lock itself into the surrounding concrete. Rail pull out resistance shall not be less than 5,526 lb/lineal foot (80 kN/m).
  10. Grate: EG-14162-DIA – 14 inch by 16 inch (356 mm x 406 mm) secured to steel rails with center locking device ELD12 or, secured to steel rails with two point shoulder bolt assembly.
    - a. Material: Ductile Iron (Standard - Uncoated)  
Ductile Iron (Hot Dip Galvanized – Optional)
    - b. Open Area: 49 percent
    - c. Load Rating: ASHTO M306 - H20 and HS25 and FAA AC 150 5320-6D Load Conditions
  11. Catch Basins:
    - a. ECB1224: 12 inch by 32 inch by 24 inch (305 mm by 610 mm by 610 mm) inline catch basin assembly consisting of EPS former, Bolt-In-Place grate rail spacer bars, grate rail and grate.
    - b. ECB2424: 24 inch by 24 inch by 24 inch (610 mm by 610 mm by 610 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - c. ECB2436: 24inch by 24 inch by 36 inch (610 mm by 610 mm by 915 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - d. ECB2442: 24 inch by 24 inch by 42 inch (610 mm by 610 mm by 1067 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
    - e. ECB3360: 32.626 inch by 32.625 inch by up to 60 inch (828 mm by 828 by up to 1,524 mm) catch basin assembly consisting of EPS former, pre-welded grate frame and grate.
  12. Form Release: EconoDrain Form Release Part Number RA1G or RA5G.

## 2.4 STEEL LINER TRENCH DRAIN SYSTEM

- A. Product: MultiDrain as manufactured by MultiDrain Systems.
  1. Construction: The system consists of metal former liners, grate frame, frame anchorage into the surrounding concrete and grates. Trench depth from 6 inches to a maximum of 24 inches (152 mm to 610 mm) deep with 8 and 12 inches (203 mm and 305 mm) trench widths and a maximum of 36 inches

- (914 mm) deep with 18 and 24 inches (457 mm and 610 mm) trench widths.
- 2. Trench Loading: Pedestrian.
- 3. Trench Loading: H-20.
- 4. Trench Width (Nominal): 6 inches (150 mm)
- 5. Trench Width (Nominal): 8 inches (203 mm).
- 6. Trench Width (Nominal): 12 inches (305 mm).
- 7. Trench Width (Nominal): 18 inches (457 mm).
- 8. Trench Width (Nominal): 24 inches (610 mm).
- 9. Liner (channel): Overlapping sections with adjustable slope from 0 percent to 1 percent.
  - a. Gauge: 16 ga (0.0598 inch) (1.5 mm).
  - b. Gauge: 18 ga (0.0478 inch) (1.2 mm).
  - c. Coating: 304 Stainless steel - mill finish.
  - d. Coating: 316 Stainless steel - mill finish.
- 10. Grate Frame: Rebar anchor stand for grade adjustment of frame.
  - a. Material: Galvanized steel finish
  - b. Material: Ductile iron - hot dipped galvanized finish.
  - c. Material: 304 Stainless steel - mill finish.
  - d. Material: 316 Stainless steel - mill finish.
- 11. Grate: Cast iron.
- 12. Grate: Ductile iron.
- 13. Grate: Cast iron grating with coating.
- 14. Grate: 304 Stainless steel bar grating with mill finish.
- 15. Grate: Galvanized steel bar grate
- 16. Grate: Stainless steel bar grating.
- 17. Grate: FRP grating.

## 2.5 POLYMER CONCRETE TRENCH DRAINS

- A. Product: Alfa Channel Trench Drain as manufactured by MultiDrain Systems, including channels, frame, grating and system accessories.
  - 1. Construction: The system consists of thirty interlocking sloped channels and five non-sloping channels. The non-sloped channels can be inserted at specified intervals in order to extend channel runs. Catch basins, horizontal outlet plates, closed end plates and vertical outlet plate adapters shall be installed at designated locations. Closed end plates terminate channel runs.
  - 2. Type: Channel with frame and grate.
  - 3. Type: Channel with in-lay grate.
  - 4. Drain Trench: Fabricated of polyester polymer concrete, 6.1 inches (155 mm) wide, 4 inches (102 mm ) ID with radius bottom, having the following attributes:
    - a. Length: Nominal 19.6 inches (0.06 meter) and 39.19 inches (1.0 meter).
    - b. Bottoms: Sloped to provide 0.6 percent slope.
    - c. Anchoring Ribs: Full length.
    - d. Grate Locking Slots: Blind, vibration damping, thermoplastic.
    - e. Interlocking ends.
    - f. Maximum of 294 feet (90 m), continuous slope using sidewall extensions.
  - 5. Grate: Perforated heel-proof steel.
  - 6. Grate: Slotted steel.
  - 7. Grate: Ductile Iron anchor frame.
  - 8. Grate: Grey iron anchor frames.
  - 9. Grate: Fiberglass.
  - 10. Accessories:
    - a. End plates.



- b. Outlet plates.
  - c. Strainer.
  - d. Locking devices.
  - e. Sealant.
  - f. Installation devices.
11. Catch Basins:
- a. Top section.
  - b. Bottom section. 4 inches (152 mm) round knock outs each side.
  - c. Ductile iron frame.
  - d. Ductile iron grate.
  - e. Galvanized trash bucket.
  - f. Stainless steel trash bucket.
  - g. Solid steel cover.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### 3.2 PREPARATION

- A. Overall concrete thickness and reinforcement steel shall be per Structural Engineer's specification for the application and service loading.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### 3.3 INSTALLATION

- A. Install trench drain in accordance with manufacturer's instructions.
- B. EPS Formers shall be coated with pigmented Form Release sufficiently ahead of installation to allow the form release to dry.
- C. Provide bracing to assure alignment and stability of formwork during concreting operations.

#### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION