



ej

Self Leveling Manhole Technology

Protecting the Integrity of Your Roadways and Minimizing Maintenance Costs



Components

Upper Frame

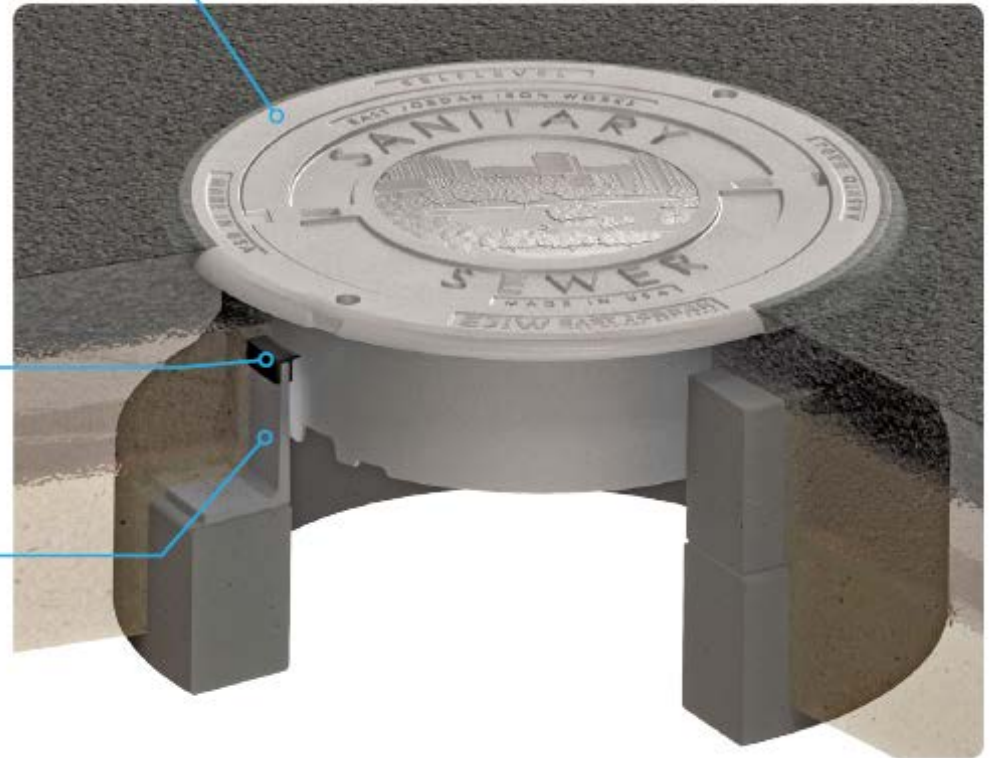
The upper frame of the SELFLEVEL assembly is supported by and moves with the surrounding road surface. This allows it to remain level with the road surface. This “floating” affect helps prevent road damage and protects the infrastructure underground by dispersing traffic vibrations and shock throughout the road surface, rather than into the structure below.

Multi-functional Seal

The multi-functional seal helps keep the upper frame centered within the guide frame, which prevents the two pieces from touching.

Guide Frame

This frame facilitates self-centering. The guide frame comes with a multi-functional seal. It reduces water infiltration and protects against excess debris and material from entering the manhole.





Impact stress transferred to road surface instead of the hammering effect on the manhole


What Does It Accomplish/Solve?

- Flush Installation with graded road surface
- Protects below grade manhole structure
- Moves with the asphalt road surface during frost heave/settling
- Can be installed to match the road with up to 5° slope
- Significant reduction in maintenance cost for unnecessary road repairs



What Does It Accomplish/Solve?



 NEW YORK STATE OF OPPORTUNITY.	Department of Transportation	ENGINEERING INSTRUCTION	EI 17-007
Approved:		Date	
<u>/s/ Richard D. Wilder</u> Richard D. Wilder, P.E. Deputy Chief Engineer, Design		<u>8/3/17</u> Date	

ADMINISTRATIVE INFORMATION:

- **Effective Date:** This Engineering Instruction (EI) is effective beginning with projects submitted for the lettings on or after January 1, 2018.
- **Superseded Issuances:** This EI does not supersede any other issuances.

PURPOSE: The purpose of this EI is to issue a Main Office special specification for an Asphalt Pavement Supported Manhole Frame and Approved Cover.

TECHNICAL INFORMATION:

- This EI establishes a new product with enhanced capabilities of flush fittings to pavement surfaces before and after installation.
- All the provisions of section 655 – Frames, Grates, and Covers shall apply.
- Currently the specification is proprietary and needs justification for use.
- Any additional manufacturers' products will be added to the special specification after NYSDOT's evaluation of the design and successful proof load testing.
- Any manhole cover on the approved list may be used.
- Asphalt Pavement Supported Manhole Frames shall not be installed on pavement grades greater than five percent.
- The upper frame and cover portion of the manhole frame shall only rest on the road surface, not on the guide frame or concrete slab/wall of the manhole.
- By eliminating differences between the cover elevation and the pavement elevation, ride quality is maintained and damage to the asphalt pavement surrounding the manhole frame is minimized.
- The top portion of the Asphalt Pavement Supported manhole frame has a broad lip that allows it to rest on the pavement and distribute the vehicle load. This method of support allows it to move up and down with frost heave cycles. The design also allows convenient adjustment of the top elevation when overlays are done.
- The lip will be clearly marked with the words "Pavement Supported" or something similar on the top.
- Asphalt Pavement Supported Manhole frame may be considered as an alternative in areas where there is expected to be a high frequency and magnitude of freeze/thaw cycles or where frost heave has been a problem.
- Manufacturer shall cast a slightly raised, upright triangle into the inner surface of the lower frame. This triangle shall project 1/16" from the inside face of the frame. In addition, the triangle shall have a base width of 1" - 1 ¼" and an apex width of ¼". The apex shall be 2" below the top edge

- of the lower frame, i.e. its height shall be 2" smaller than the frame height.
- The triangle serves as a gauging mark to determine if a pavement overlay is permissible before the upper, floating barrel has been raised to its full extent.
- The lower frame shall be oriented so that the gauging mark is on the low side of the surrounding pavement when the frame is set.
- The extent to which the triangular marking on the inner surface of the lower frame is covered will be checked when an overlay is considered. The bottom edge of the upper frame should not be set above the apex of the triangle when the overlay is done. At that point the floating frame can still accommodate up to 1 ½" of frost heave, with ½" of freeboard left.

IMPLEMENTATION: A designer may choose to use the item for any project scheduled to be let after January 1, 2018, ~~subject to the above guidelines.~~

TRANSMITTED MATERIALS: This EI transmits one attached U.S. Customary Special Specification - 655.13000015 – Pavement Supported Manhole Frame and Approved Cover.

BACKGROUND: Traditional manhole frames/covers are not designed to move with the road surface during freeze/thaw cycles. These conditions make traditional manhole frame susceptible to road grade separations creating cracking and pothole formations around the edges of the manhole frame. This weakens the integrity of the road surface leading to frequent maintenance service, repairs, and increased costs to maintain a smooth road surface.

Unlike traditional manhole frame/cover units, Asphalt Pavement Supported frame/cover systems are supported by and move with the road surface regardless of the season. This helps minimize damage to the infrastructure underground by dispersing traffic vibrations and shock throughout the road surface rather than concentrating them into the structure below.

It is anticipated that a smoother road surface and improved ride quality will result with reduced maintenance costs.

VENDORS: Vendors desiring to have their Asphalt Pavement Supported frame/cover products appear on the Approved List (currently only a single vendor named within the special specification) will be required to submit an Approval Request and Materials Details, for review, to the Materials Bureau as per [established procedures](#). Following a successful review, representative samples will need to be submitted to the Materials Bureau for proof-load testing.

CONTACT: For additional information, contact Neil Sergott of the Design Quality Assurance Bureau at (518)-485-5106, neil.sergott@dot.ny.gov

Installation Procedures – Retrofit Application





Install the Frame





Backfill Guide Frame



Compact Around Frame



Install Upper Frame





Fill Remaining Asphalt



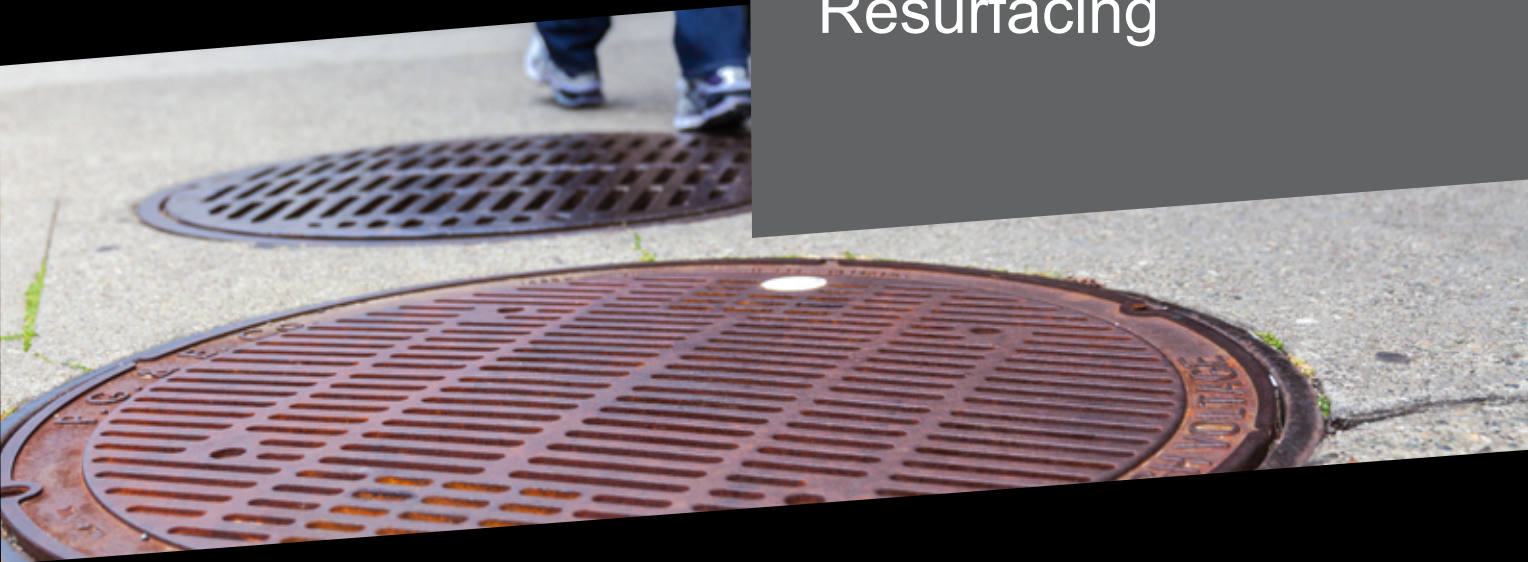


Compact Asphalt

One Year Later



Installation Procedures – Total Resurfacing











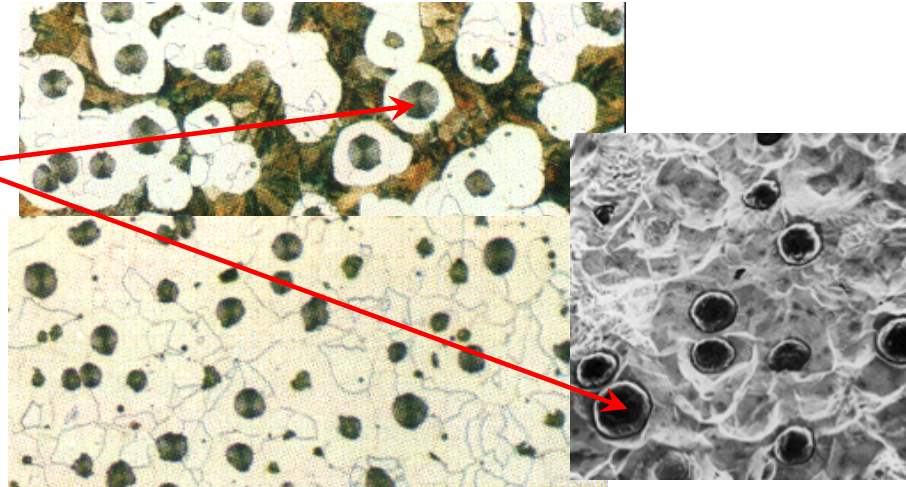
Materials

Gray & Ductile Iron

Pictures of: nodular (ductile) iron and flake (gray) iron.

DUCTILE IRON

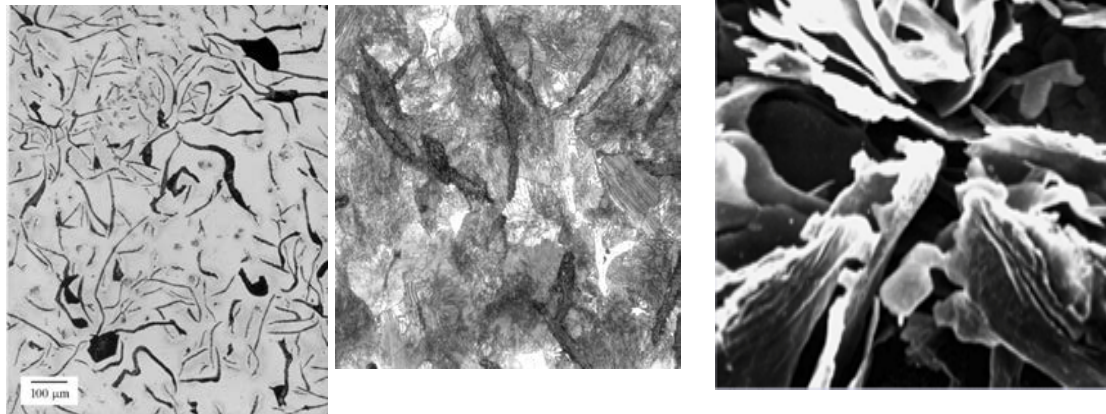
Low Sulphur plus Magnesium changes Ductile iron's surface tension as it solidifies resulting in ball shaped carbon within the iron



Gray Iron

During Gray iron solidification the graphite solidifies as a flake.

Visualization: a bowl of "Wheaties" filled with molten wax helps visualize the flake structure of Gray iron



ASTM Standard: Material

Materials

- Gray Iron:
 - ASTM A48 Class 35B
 - AASHTO M105 Class 35B
 - Tensile Strength: 35,000 psi
- Ductile Iron:
 - ASTM A 536 Grade 80-55-06 (Ardmore)
 - ASTM A 536 Grade 70-50-05 (East Jordan)
 - Tensile Strength: 70,000 psi
 - Yield Strength: 50,000 psi
 - Elongation: 5%

AASHTO Standard: M306-10

- AASHTO M306-10
 - AASHTO - American Association of State Highway & Transportation Officials
 - “Standard Specification for Drainage, Sewer, Utility, and Related Castings”
 - Scope 1.1
 - This specification is applicable to frames, grates, rings, and covers for inlet, manholes, and other structures for civil engineering use where items may be placed in traffic service and load bearing is a consideration.



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EJ SELFLEVEL® Installs in New York State



Installation

- 700, plus EJ SELFLEVEL® units have been installed in New York State since 2013 – (170 in 2016, 231+ in 2017, 328 in 2018)
- Retrofit installations
 - Usually take between 1-2 hours
 - The hardest part is removing existing asphalt
- SELFLEVEL® units save time when being installed on a surface that is sloped, because when being paved the top frame will match the slope of the surrounding.

Fall 2013 – Watertown, NY

- Retrofit Installation
- 1 unit installed



Before



2015



2017

2016 – Watertown, NY Factory Street



2016 – Watertown, NY Factory Street



Fall 2014 – Cortland, NY

- Retrofit Installation
- 1 unit installed
- Note: Condition of asphalt not under our control



Fall 2017 – Cortland, NY



Summer 2015 – Elmira, NY

- New Installation
- 7 units installed



2016 – Elmira, NY

- City installed 30 units on their own, no assistance from the manufacturer.



2017– Elmira, NY

- City purchased an additional 95 units.



Summer 2015 – Syracuse, NY Onondaga County Harbor Brook

- New Installation
- 12 units installed
- Emerson Ave
6 units installed on steep slope



Fall 2015 – D262787 Tupper Lake, NY

- New Installation, Installed retrofit style
- 2 units installed
- NYS DOT Project



2016 – D262787 Tupper Lake, NY



Summer 2016 D263034 – Baldwinsville, NY

- New Installation
- 49 units installed
- NYS DOT project



Summer 2016 D263034 – Baldwinsville, NY



Summer 2016 D263034 – Baldwinsville, NY

- SL & Standard



Winter 1/31/18 D263034 – Baldwinsville, NY



SELFLEVEL
Performing great after 2 years



Traditional Frame & Cover
Road damage after 2 years

Summer 2016 D263127 – Fulton, NY

- New installation
- 14 units installed
- NYS DOT project



Fulton NY 2017 – 20 units installed by City



NYS DOT D263209 – Elbridge 2017



Sackets Harbor - 2017



Sackets Harbor - 2017



NYS DOT D263337 Oswego RT. 104



Auburn NY – 95 units



Con Edison Installations

2008 – 25 units installed

2015 - 95 units installed

2016 - 120 units installed





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EJ SELFLEVEL® Installs in New England



Self-Level Installations, New England

- 20 + EJ SELFLEVEL® units have been installed in New England since 2018
- Braintree, MA
- Bellingham, MA
- Manchester, NH
- Salem, NH
- Scarborough, ME
- Portland, ME

Summer 2018 – Braintree, MA

- Retrofit Installation
- 3 units installed



Before



Summer 2018 – Bellingham, MA

15 units – new construction – Depot Street



Summer 2018 – Manchester, NH

2 Retrofit Units installed



Summer 2018 - Scarborough ME

1 retrofit unit



Summer 2018 – Salem, NH

1 retrofit unit



Portland ME - 2019

1 retrofit unit

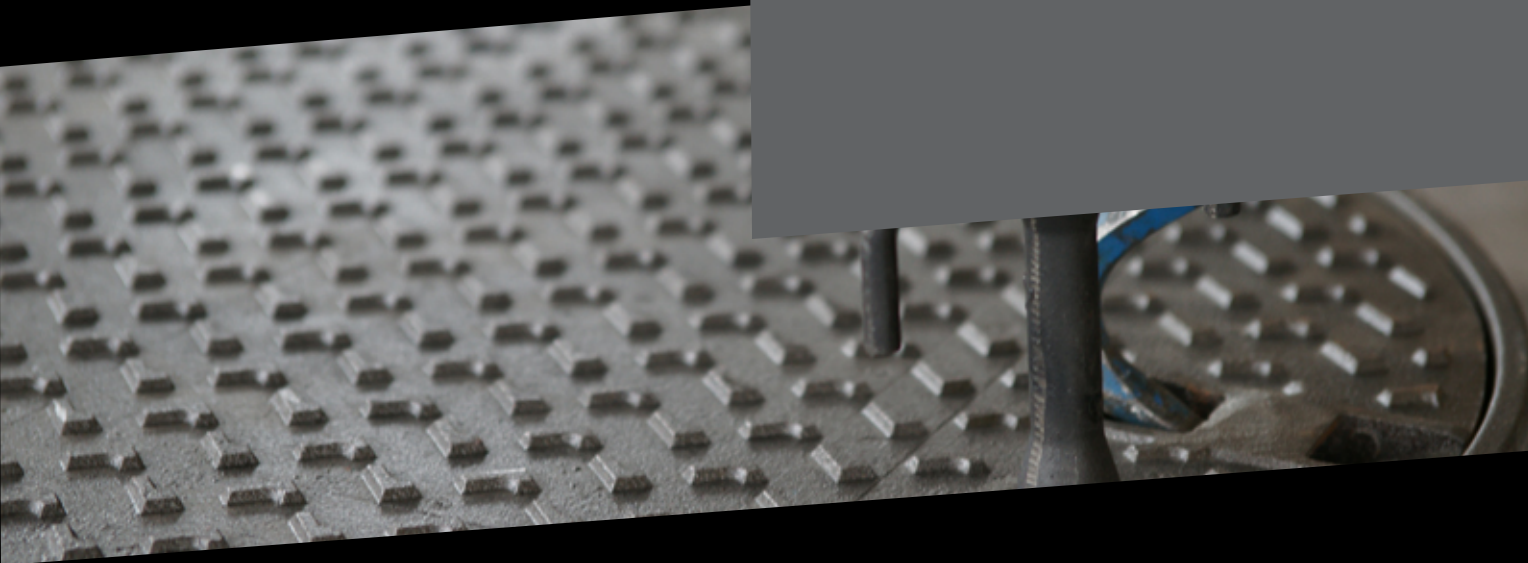


Portland ME - 2019

1 retrofit unit



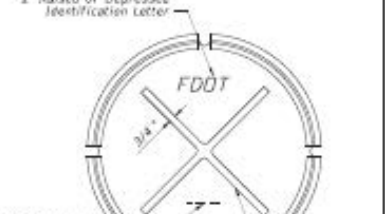
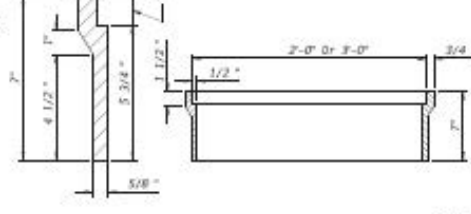
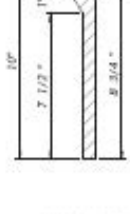
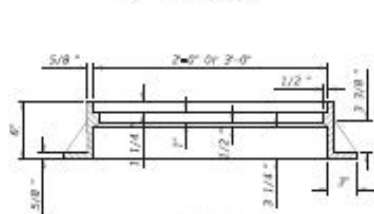
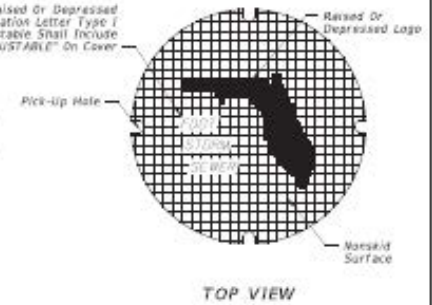
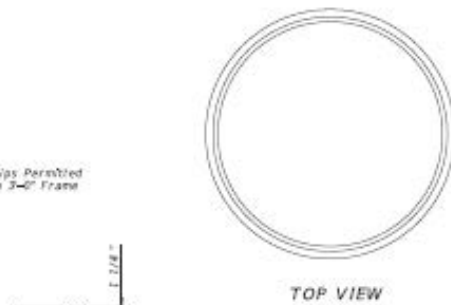
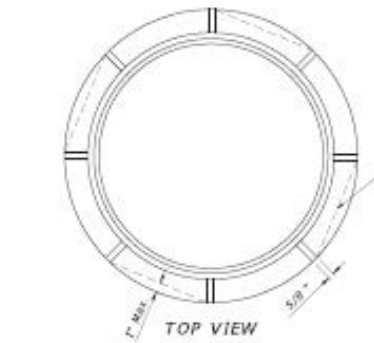
Not New Technology



Wide Spread Use Globally

- The Self Leveling technology has been in use for approximately 20 to 25 years
 - Europe
 - Canada
 - Upstate, NY. & NYC.
 - Kansas City, MO., etc.



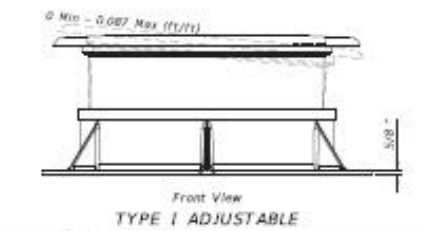
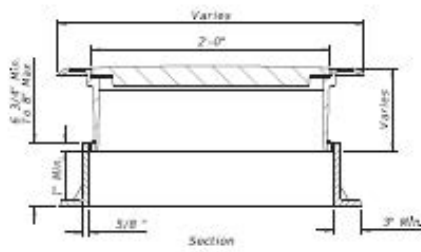


SECTION For Manholes TYPE I

WALL SECTION For Curb Inlets Types 1, 2, 3, & 4 TYPE II

WALL SECTION For Curb Inlets Types 7 & 8 TYPE III

BOTTOM VIEW



Frame Type	WEIGHT OF CASTINGS (lb)					
	2" OPENING		3" OPENING			
	Frame	Cover (Std.)	Frame	2-Piece Cover		Total
I *	155	190	220	190	220	410
II	145	190	255	190	220	410
III	90	190	180	190	220	410

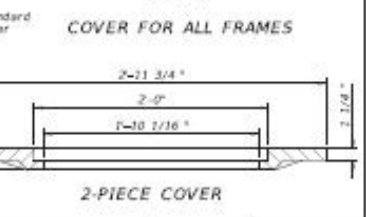
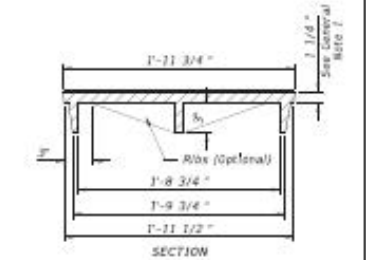
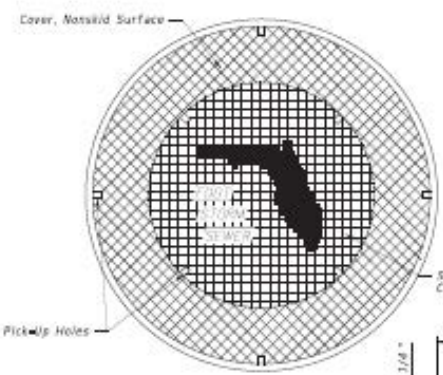
* Includes Type I Adjustable

NOTES (FRAMES, AND COVER)

- The standard cover is to be used for all frames Types I, (I, III) and the 2-piece cover, and is the replacement cover for all previous frames with 1 1/2" deep seats (traffic type). The 185 lb. cover (nontraffic type), 1984 Roadway and Traffic Design Standards Index No. 201, is the replacement cover for existing frames with 1/2" deep seats. Installation of frame with 1/2" deep seats is not permitted.
- Use the 2-0" cover, unless the 2-piece cover is called for in the plans, except at inlets and manholes with sump bottoms use the 2-piece cover when the sump depth exceeds 2', unless otherwise noted.

DESIGNER NOTE:

Consider using the 2-piece cover where depths exceed 5' and manual entry may be required for cleaning. Clearly note the requirement for a 2-piece cover, on the Drainage Structure sheets in the plans.



2-PIECE COVER

2-PIECE COVER

3/20/04 PW

LAST REVISION 01/01/12	DESCRIPTION	2015 DESIGN STANDARDS	SUPPLEMENTARY DETAILS FOR MANHOLES & INLETS	INDEX NO. 201	SHEET NO. 1 of 5
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Smooth Streets Solution for Kansas City

- Smooth Streets Initiative
- SELFLEVEL
 - Test install in 2009
 - First permanent units installed fall 2010
- Current specification:
 - Use SELFLEVEL whenever a manhole cover is being repaired



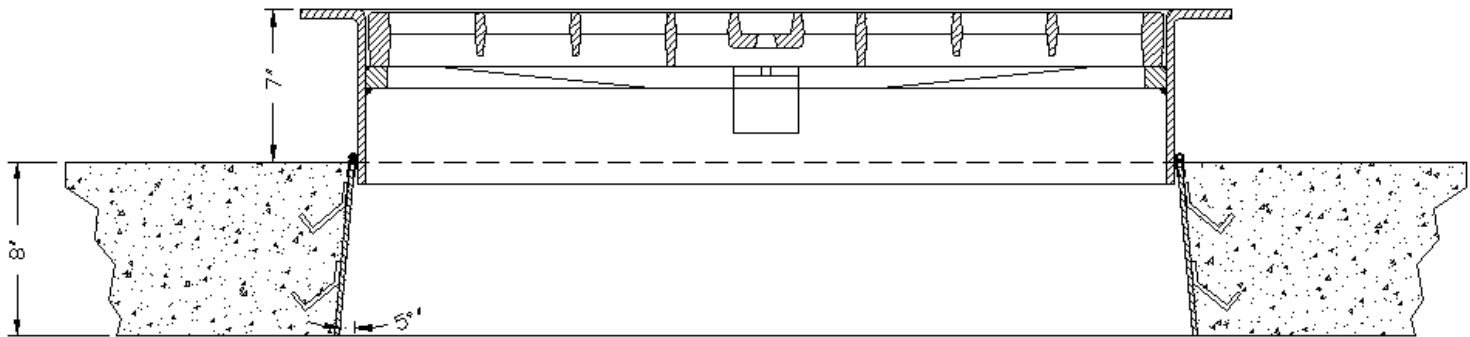
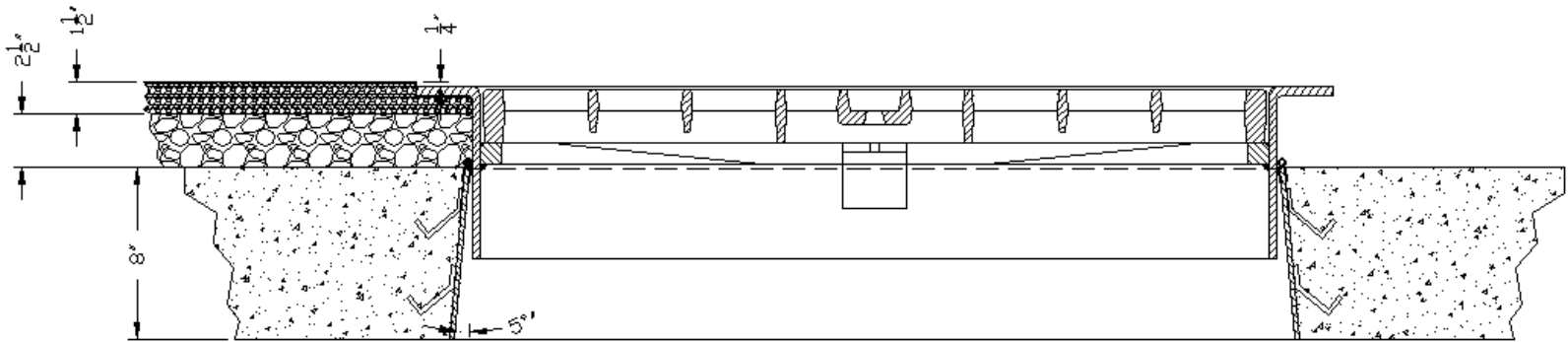
Smooth Streets Solution for Kansas City

On the level: New manholes keep Kansas City streets smoother



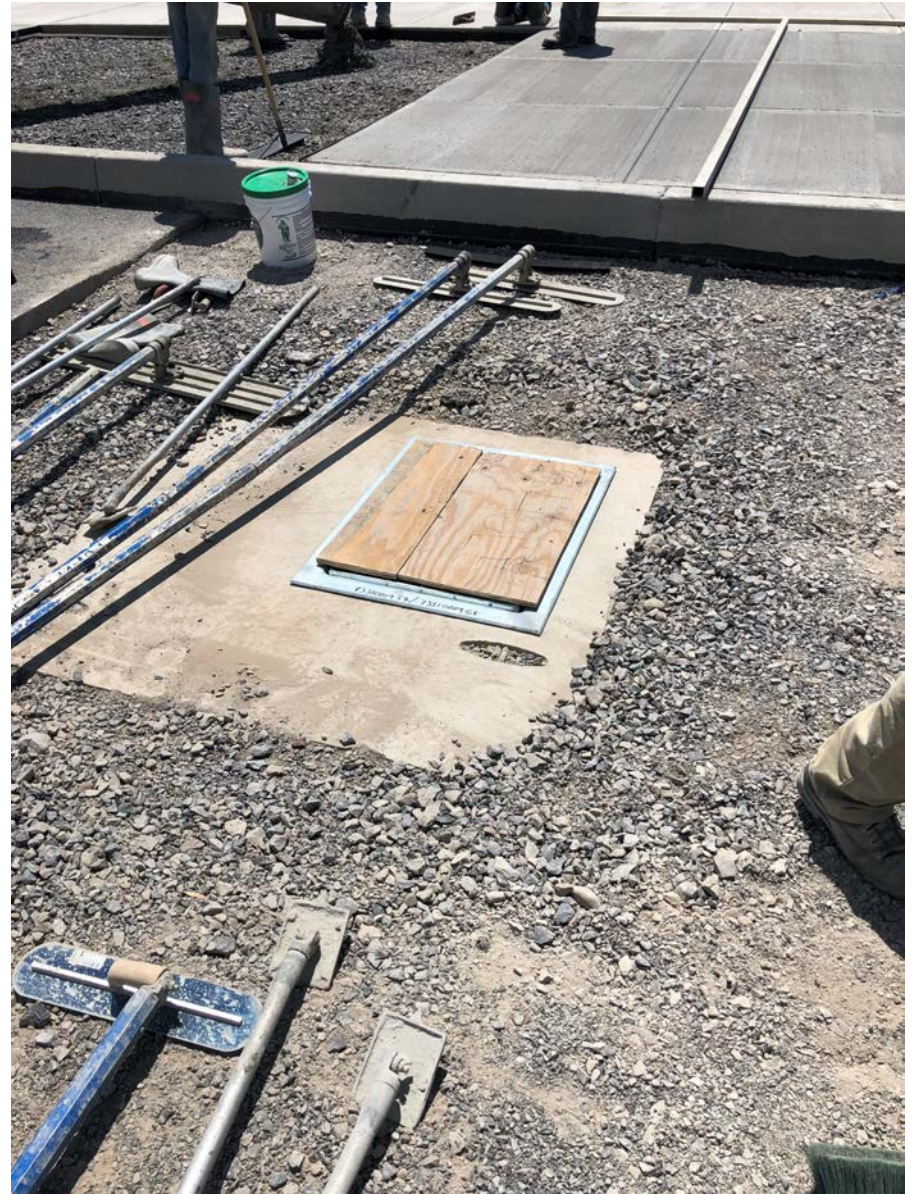
Traditionally designed manhole covers or other street castings can contribute to problems such as bumpier streets, affecting the quality of life in cities for pedestrians, cyclists and vehicle occupants. The SELFLEVEL® access assembly by EJ is an innovative solution, with easy installation, providing infrastructure coverage that remains aligned with the surface over time. Its unique design allows a range of movement and continuous alignment with the finished road surface.

The city of Kansas City, Mo., has the SELFLEVEL specified to be used whenever an existing manhole is being repaired, as part of its Smooth Streets Initiative. Likewise, any and all other utilities with a manhole in the street are required to do the same, including Kansas City Power & Light, AT&T, Time-Warner (fiber-optic cable) and Qwest/CenturyLink. The product is viewed as meeting two key criteria of the



NYSDOT #11 Ductile Iron Grate



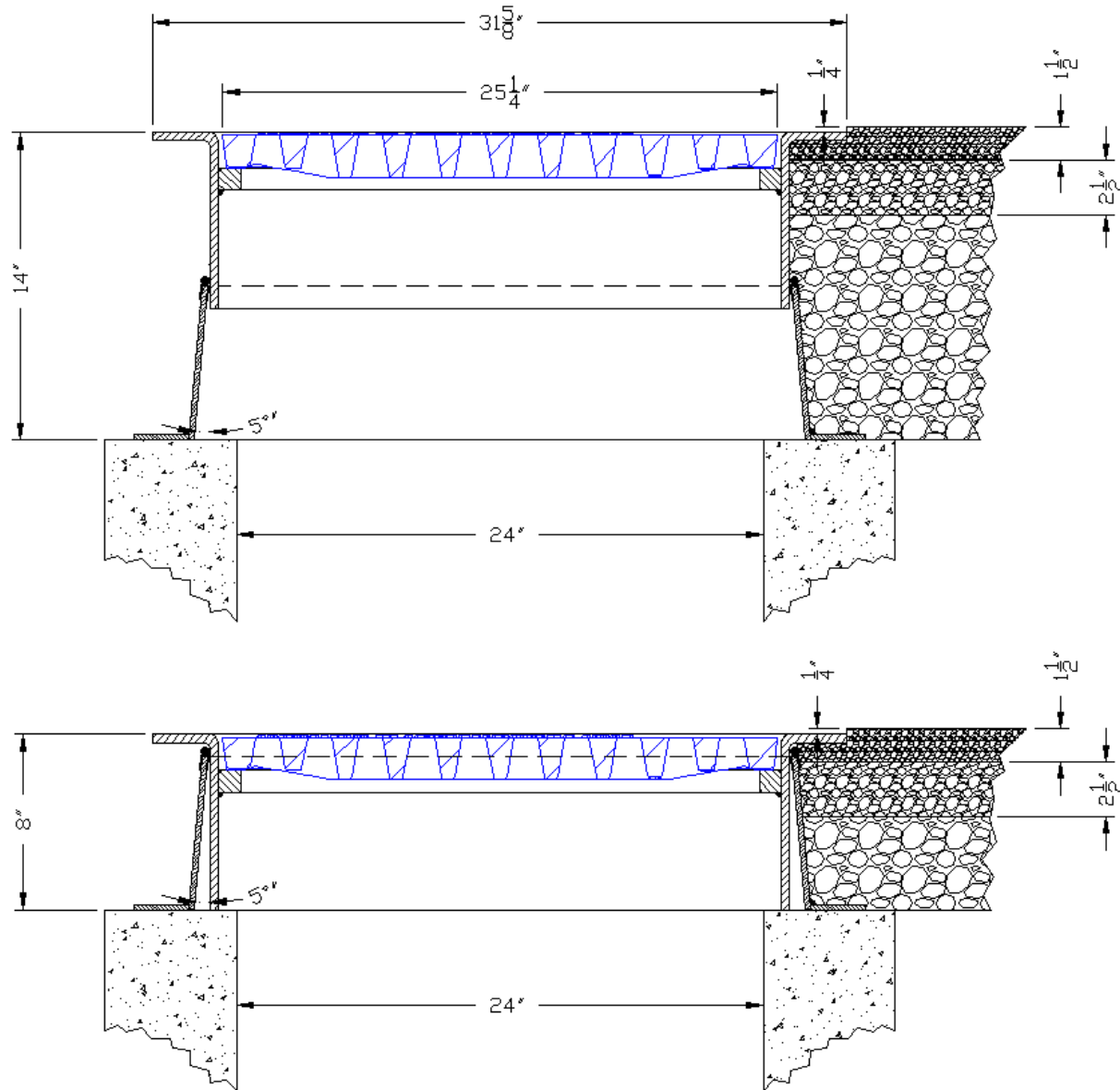




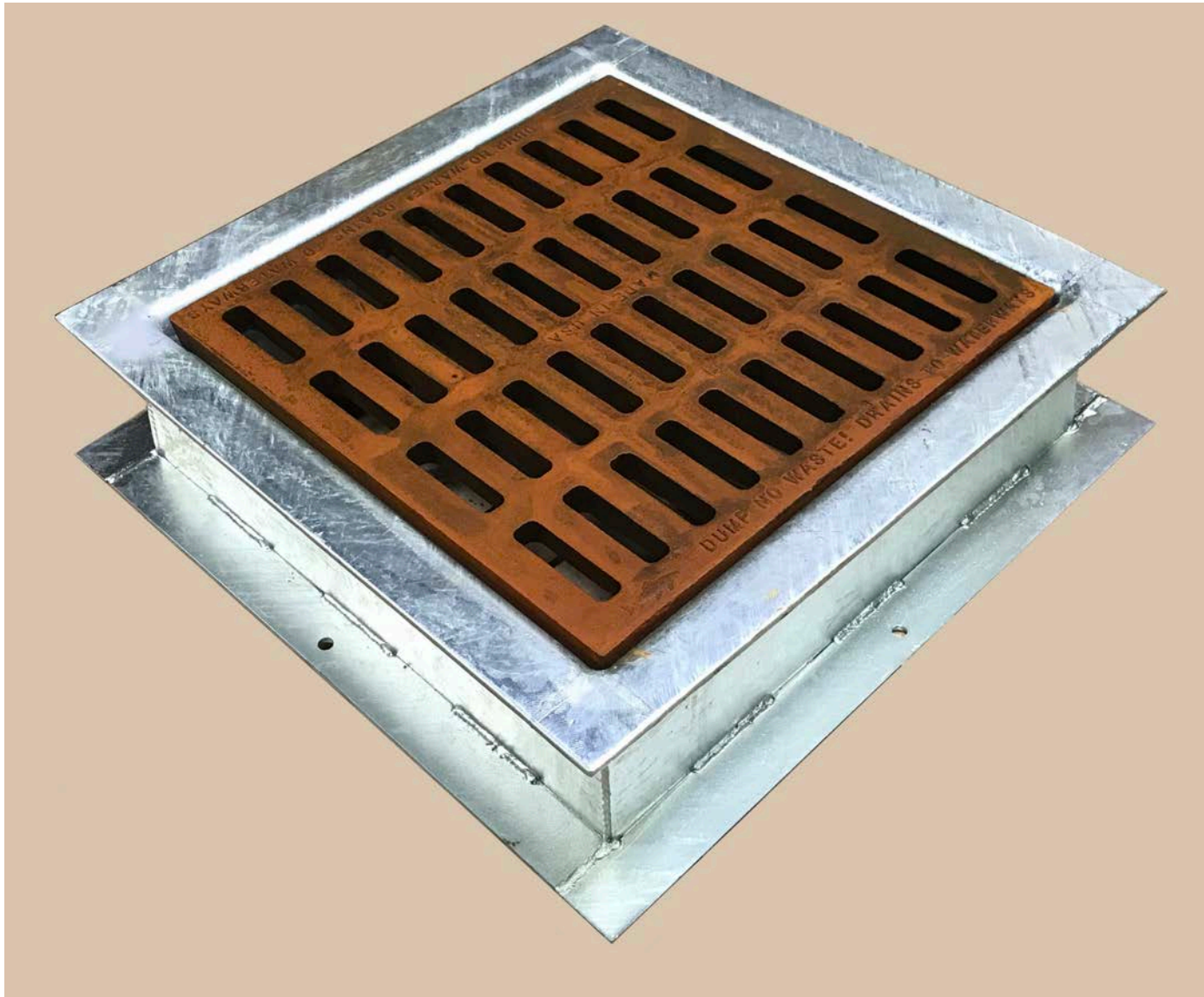




2 x 2 Self Level Frame & Ductile Iron Grate



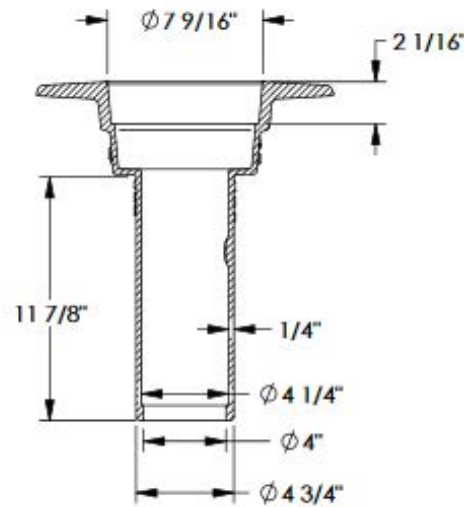
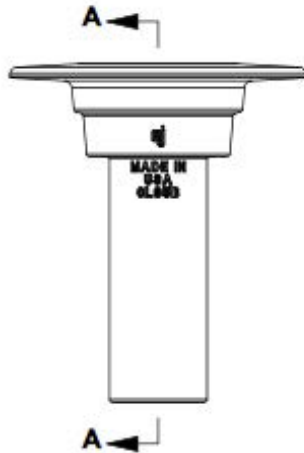
2 x 2 Self Level Frame & Ductile Iron Grate



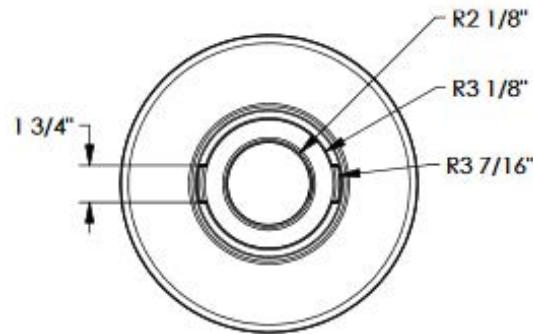
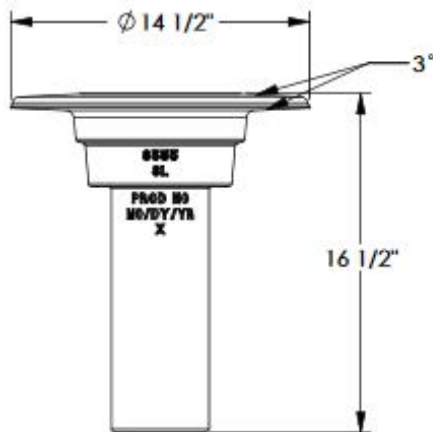




8555 SELFLEVEL Valve Box Riser



SECTION A-A



Product Number

85558008

Design Features

- Materials
Gray Iron (CL35B)
- Design Load
Heavy Duty
- Open Area
n/a
- Coating
Dipped
- √ Designates Machined Surface

Certification

- ASTM A48
-
- Country of Origin: USA

Drawing Revision

2/3/2017 Designer: DJH
2/22/2017 Revised By: MAH

Disclaimer

Weights (lb/kg), dimensions (inch/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

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We are EJ.