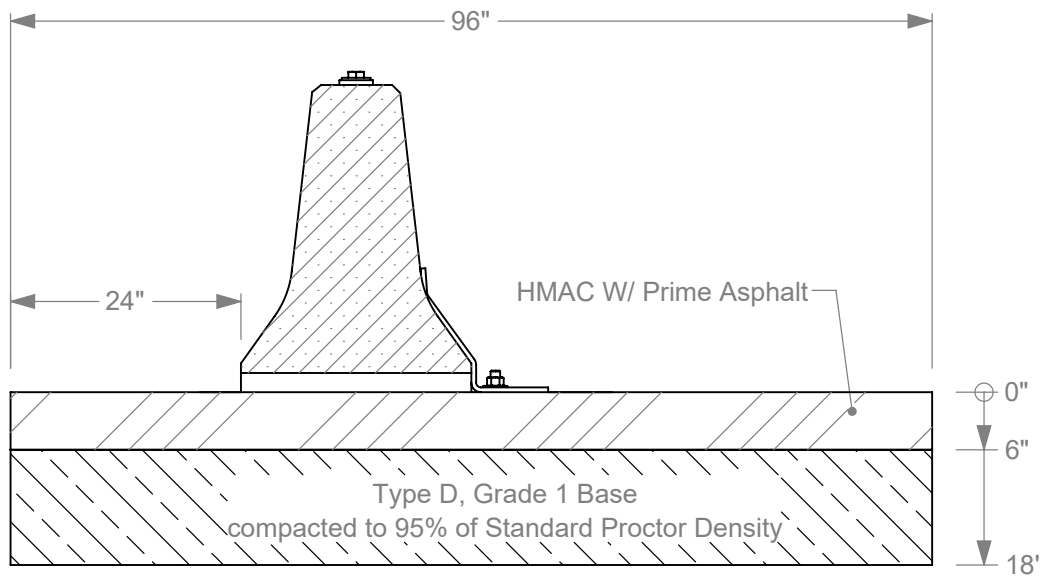
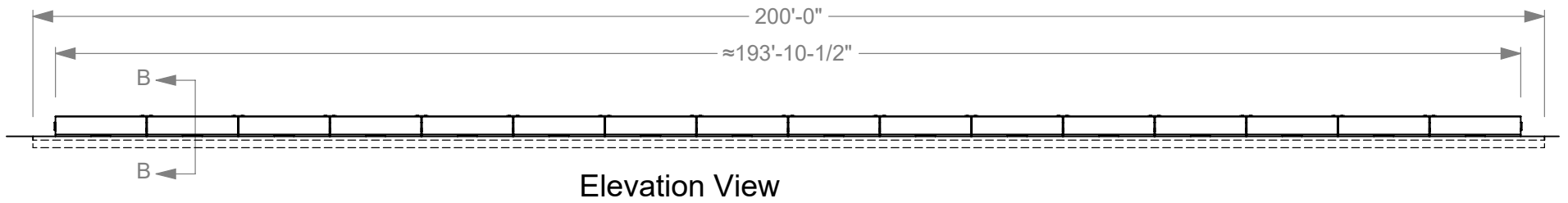
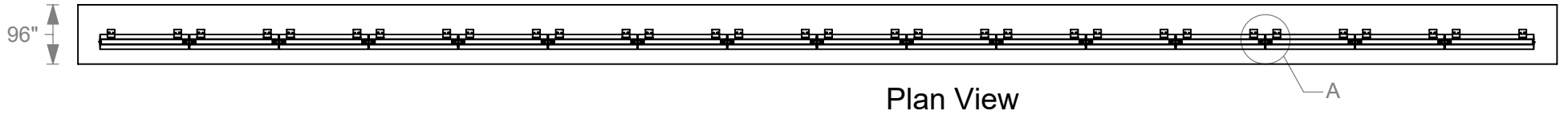


# Test Installation

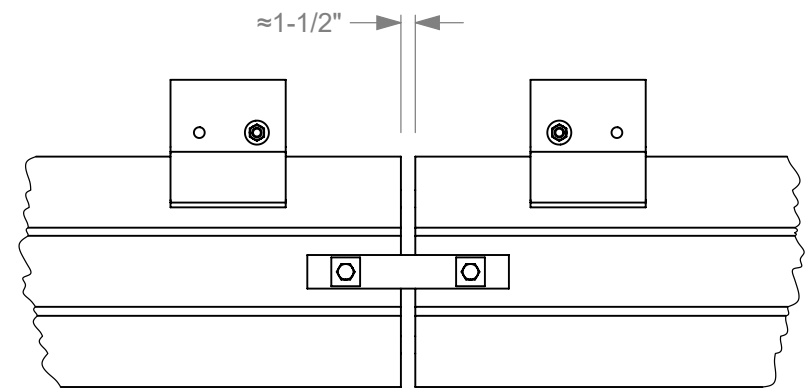
Barrier Numbers

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1



Section B-B

Scale 1 : 20



Detail A

Scale 1 : 20

1a. See attached sponsor-provided drawings and instructions for all other details.



Roadside Safety and  
Physical Security Division -  
Proving Ground

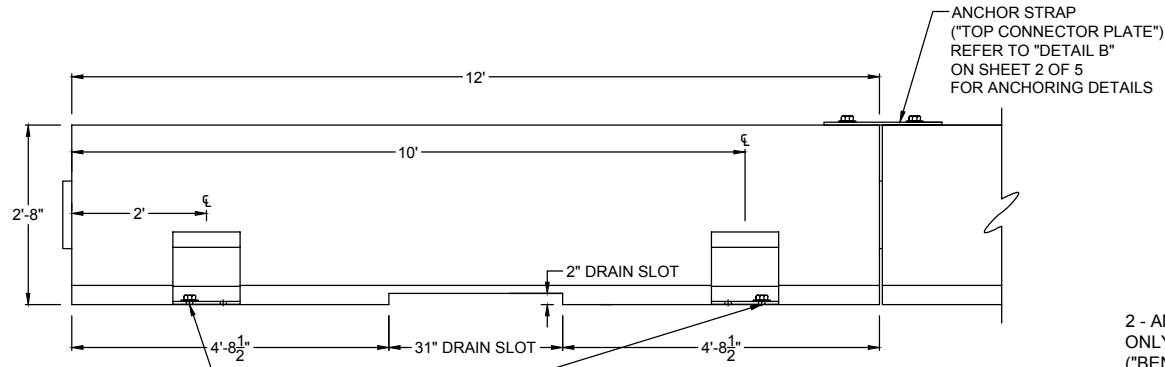
Project #690900-SBK-14 S&K Anchored Barriers on Asphalt 2019-08-29

Drawn by GES

Scale 1:250

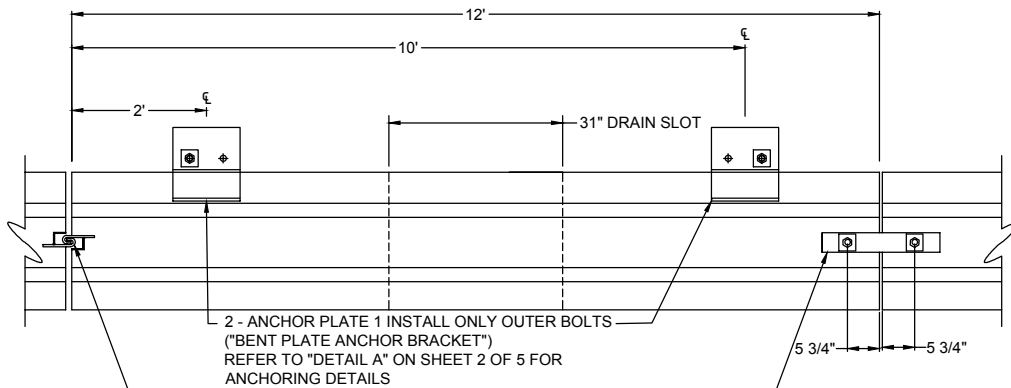
Sheet 1 of 1 Test Installation

# PENNDOT F SHAPE JJ-HOOK



2 - ANCHOR PLATE 1 INSTALL ONLY OUTER BOLTS ("BENT PLATE ANCHOR BRACKET") REFER TO "DETAIL A" ON SHEET 2 OF 5 FOR ANCHORING DETAILS

**FRONT VIEW**



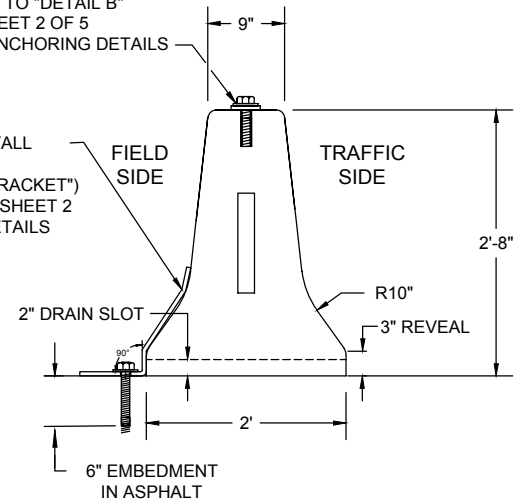
PLACE BARRIER WITH MAXIMUM SPACE BETWEEN THEM (NO SLACK IN HOOKS)

ANCHOR STRAP ("TOP CONNECTOR PLATE") REFER TO "DETAIL B" ON SHEET 2 OF 5 FOR ANCHORING DETAILS

**PLAN VIEW**

ANCHOR STRAP ("TOP CONNECTOR PLATE") REFER TO "DETAIL B" ON SHEET 2 OF 5 FOR ANCHORING DETAILS

2 - ANCHOR PLATE 1 INSTALL ONLY OUTER BOLTS ("BENT PLATE ANCHOR BRACKET") REFER TO "DETAIL A" ON SHEET 2 OF 5 FOR ANCHORING DETAILS



**ELEVATION VIEW**

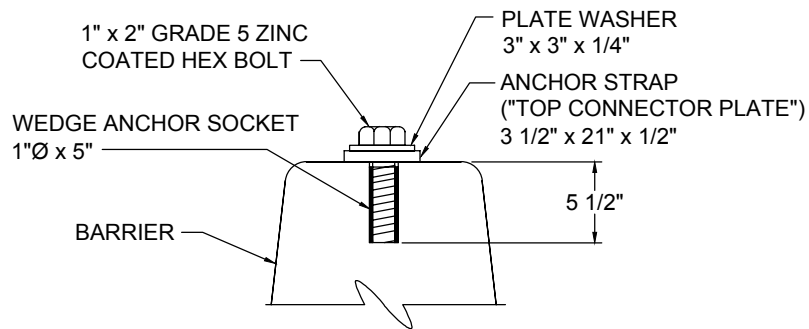
**NOTE: REFER TO SHEET 5 OF 5 FOR GENERAL NOTES, INSTALLATION NOTES AND PARTS LIST**

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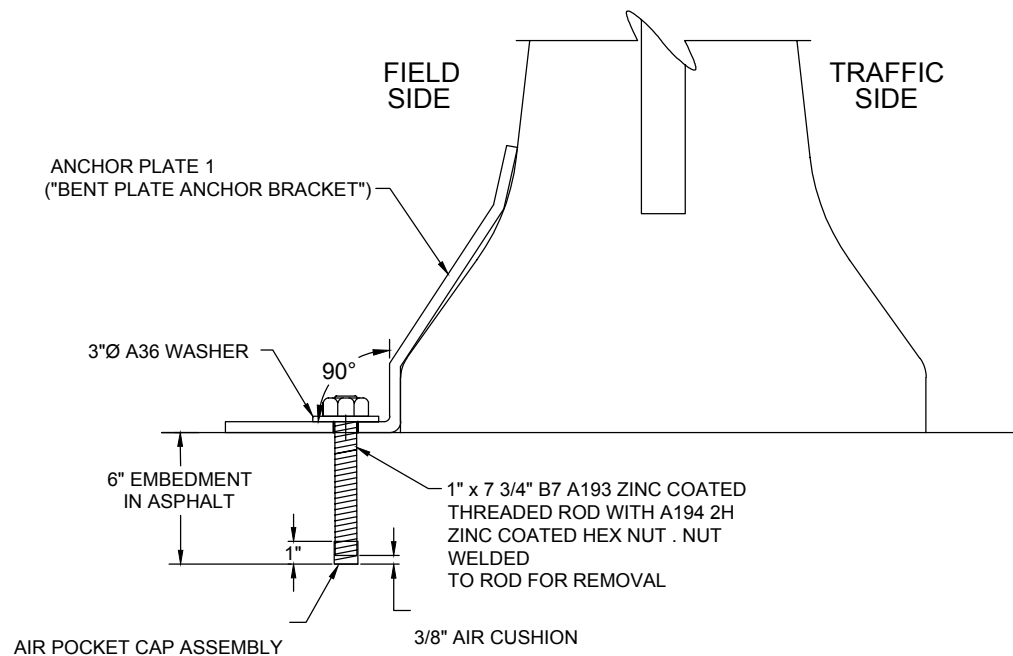
**STRONGSTOWN'S B&K  
JJ HOOK RETRO FIT V3  
FRONT, PLAN & ELEVATION VIEW  
ASPHALT PAVEMENT ANCHORING  
2 PLATE SYSTEM 6" EMBEDMENT**

DRAWING BY: DAVID WAGNER  
DATE: 6-19-17  
REVISED 2-26-19 (WJB)

SHEET: 1 OF 5



**DETAIL B**  
**ANCHOR STRAP**  
**("TOP CONNECTOR PLATE")**  
**ANCHORING DETAIL**



**DETAIL A**  
**ANCHOR PLATE**  
**("BENT PLATE ANCHOR BRACKET")**  
**ANCHORING DETAIL**

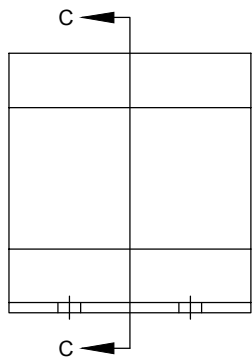
**NOTE: REFER TO SHEET 5 OF 5 FOR GENERAL NOTES,  
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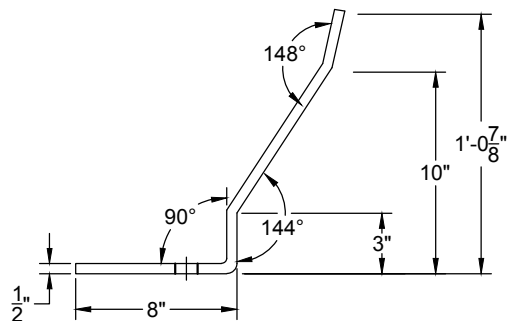
**STRONGSTOWN'S B&K**  
**JJ HOOK RETRO FIT V3**  
**ANCHORING DETAILS**  
**ASPHALT PAVEMENT ANCHORING**  
**2 PLATE SYSTEM 6" EMBEDMENT**

DRAWING BY: DAVID WAGNER  
 DATE: 8-19-17  
 REVISED 2-26-19 (WJB)

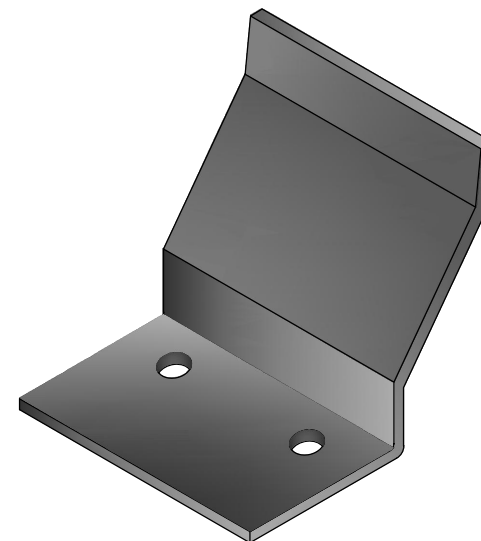
SHEET: 2 OF 5



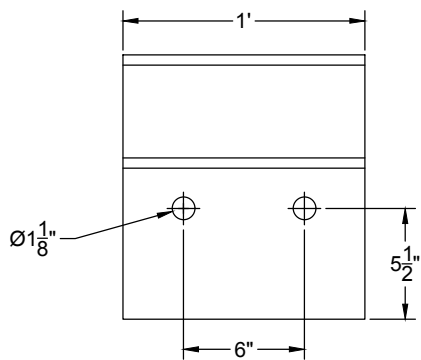
ELEVATION VIEW



SECTION C-C



ISOMETRIC VIEW



PLAN VIEW

**ANCHOR PLATE 1  
("BENT PLATE ANCHOR BRACKET")**

1/2" THICK A36 GRADE STEEL  
SHEARED, LASER OR PLASMA CUT TO SIZE  
ALL ANGLES BENT IN PRESS BRAKE  
ANCHOR HOLES DRILLED, LASER OR PLASMA CUT

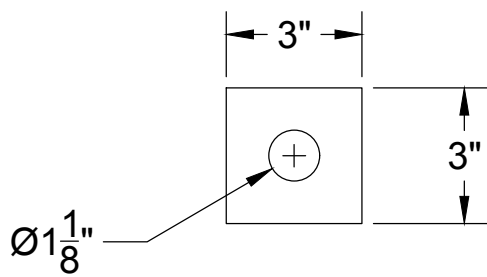
**NOTE: REFER TO SHEET 5 OF 5 FOR GENERAL NOTES,  
INSTALLATION NOTES AND PARTS LIST**

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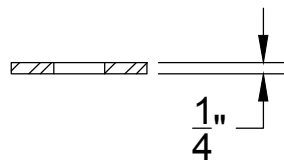
**STRONGSTOWN'S B&K  
JJ HOOK RETRO FIT V3  
ANCHOR CLIP  
("BENT PLATE ANCHOR BRACKET")  
ASPHALT PAVEMENT ANCHORING  
2 PLATE SYSTEM 6" EMBEDMENT**

DRAWING BY: DAVID WAGNER  
DATE: 6-19-17  
REVISED 2-26-19 (WJB)

SHEET: 3 OF 5



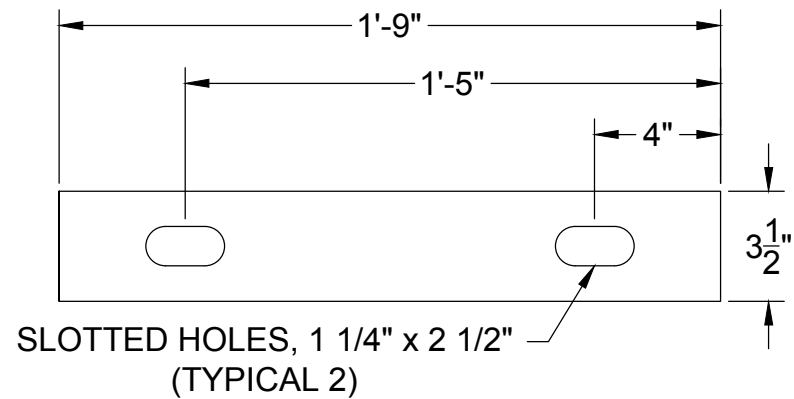
PLAN VIEW



ELEVATION VIEW

**PLATE WASHER**

1/4" THICK A36 GRADE STEEL  
 SHEARED, LASER OR PLASMA CUT TO SIZE  
 ANCHOR HOLES DRILLED, LASER OR PLASMA CUT



SLOTTED HOLES, 1 1/4" x 2 1/2"  
 (TYPICAL 2)

PLAN VIEW



ELEVATION VIEW

**ANCHOR STRAP  
 ("TOP CONNECTOR PLATE")**

1/2" THICK A36 GRADE STEEL  
 SHEARED, LASER OR PLASMA CUT TO SIZE  
 SLOTTED HOLES DRILLED, LASER OR PLASMA CUT

**NOTE: REFER TO SHEET 5 OF 5 FOR GENERAL NOTES,  
 INSTALLATION NOTES AND PARTS LIST**

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**STRONGSTOWN'S B&K  
 JJ HOOK RETRO FIT V3  
 ANCHOR STRAP  
 ("TOP CONNECTOR PLATE")  
 CONCRETE PAVEMENT ANCHORING  
 2 PLATE SYSTEM 6" EMBEDMENT**

DRAWING BY: DAVID WAGNER  
 DATE: 6-19-17  
 REVISED 2-26-19 (WJB)

SHEET: 4 OF 5

## GENERAL NOTES

1. THIS RETROFIT IS ONLY APPROVED FOR USE WITH STANDARD PRECAST F-SHAPE BARRIER WITH J-J HOOK CONNECTIONS ON EACH END. EACH BARRIER SEGMENT IS TO BE 12 FOOT LONG WITH THE F-SHAPE DIMENSIONING SHOWN ON THIS DRAWING.
2. THE ANCHORING DETAILS ON THIS DRAWING APPLIES TO INSTALLATIONS ON CONCRETE PAVEMENT, CONCRETE PAVEMENT WITH ASPHALT OVERLAY OR ASPHALT PAVEMENT.
3. BARRIER SEGMENTS ARE HORIZONTALLY RESTRAINED ON ASPHALT PAVEMENT USING CUSTOM FABRICATED ANCHOR PLATE 1 ("BENT PLATE ANCHOR BRACKET") AND ANCHOR STRAP ("TOP CONNECTOR PLATE"). BOTH ANCHOR PLATES ARE A36 GRADE STEEL, SHEARED, LASER OR PLASMA CUT TO SIZE WITH HOLES DRILLED, LASER OR PLASMA CUT. ANCHOR PLATE 1 ("BENT PLATE ANCHOR BRACKET") ANGLES ARE BENT IN PRESS BRAKE.
4. BENT PLATE ANCHOR BRACKET CONFORMS TO THE PROFILE OF STANDARD F-SHAPE BARRIER AS SHOWN ON THE DRAWING.
5. BENT PLATE ANCHOR BRACKET IS LOCATED ON THE PROTECTED, NON-TRAFFIC SIDE OF EACH BARRIER SEGMENT. SEE STEP 3 BELOW FOR INSTALLATION NOTES.
6. EACH BENT PLATE ANCHOR BRACKET IS SECURED TO THE ASPHALT PAVEMENT USING ONE, 1 INCH DIAMETER X 7 3/4 INCH LONG ASTM A193 GRADE B7 ZINC COATED RODS, COATED WITH A RELEASE AGENT, INSTALLED IN VERTICALLY DRILLED HOLES 8 INCHES DEEP AND SECURED WITH RED HEAD EPCON A7 ACRYLIC. BENT PLATE ANCHOR BRACKET IS SECURELY TIGHTENED TO THE PAVEMENT USING A 3 INCH DIAMETER A36 FLAT WASHER, AND A 1 INCH DIAMETER A194-2H ZINC COATED HEX NUT ON EACH ROD. THE NUT IS WELDED TO THE ROD FOR REMOVAL.
7. NO BOLTS OR ADHESIVES ARE USED TO SECURE THE BENT PLATE ANCHOR BRACKET TO THE BARRIER. THE PLATE RESTS FLUSH AGAINST THE BARRIER.
8. TOP CONNECTOR PLATE SPANS THE TOP JOINT BETWEEN BARRIER SEGMENTS AND IS BOLTED TO EACH BARRIER SEGMENT USING 1 INCH DIAMETER X 5 INCH LONG X 8 UNC THREADED WEDGE ANCHOR SOCKET INSERT LOCATED 5 3/4 INCHES FROM THE END FACE OF EACH BARRIER SEGMENT. A SINGLE 1 INCH DIAMETER X 2 INCH LONG UNC SAE J429 GRADE 5 ZINC COATED HEX BOLT, EACH WITH A 3 INCH SQUARE X 1/4 INCH THICK PLATE A36 WASHER SECURES TOP CONNECTOR PLATE TO EACH BARRIER END.
9. THE MASH CRASH TESTED "DYNAMIC DEFLECTION" FOR THIS RETROFIT BARRIER IS TBD

## INSTALLATION NOTES

### INSTALLATION OF ANCHOR PLATE 1 ("BENT PLATE ANCHOR BRACKET")

1. PLACE J-J HOOK BARRIERS ("BARRIER(S)") IN THE DESIRED LOCATION.
2. TO ENSURE MAXIMUM DEFLECTION RESISTANCE, THE BARRIER IS TO BE PLACED WITH MAXIMUM SPACE BETWEEN BARRIER SEGMENTS (NO SLACK IN THE J-J HOOK CONNECTIONS).
3. PLACE BENT PLATE ANCHOR BRACKET ON THE PROTECTED NON-TRAFFIC SIDE OF EACH BARRIER SEGMENT. BRACKETS WILL BE LONGITUDINALLY CENTERED AT THE 2 FOOT AND 10 FOOT POINTS ALONG EACH 12 FOOT LONG SEGMENT.
4. BENT PLATE ANCHOR BRACKET SHOULD FOLLOW THE CONTOUR OF THE BARRIER AND BE PLACED TIGHTLY AGAINST THE BARRIER SURFACE.
5. DRILL A 1 1/8 INCH HOLE THROUGH BOTH HOLES IN BENT PLATE ANCHOR BRACKET INTO THE ASPHALT SURFACE TO A DEPTH OF 6 INCHES. THIS CAN BE DONE WITH AN ELECTRIC HAMMER DRILL OR COMPRESSED AIR DRILL. CLEAR DEBRIS FROM ANCHOR HOLE WITH COMPRESSED AIR.
6. FILL BOTH ANCHOR HOLES WITH APPROXIMATELY 3 INCHES OF RED HEAD A7 CONSTRUCTION ADHESIVE. ADHESIVE SHOULD RISE TO THE TOP OF THE DRILL ANCHOR HOLE WHEN ANCHOR ROD IS FULLY INSERTED. RED HEAD A7 CAN BE SUBSTITUTED WITH AN ADHESIVE THAT MEETS OR EXCEEDS THE PROPERTIES OF THE TESTED ADHESIVE.
7. ANCHOR HARDWARE FOR BENT PLATE ANCHOR BRACKET WILL BE 7 3/4 INCHES LONG, 1 INCH DIAMETER ASTM A193 GRADE B7 THREADED ROD. THE THREADED ROD WILL HAVE AN ASTM A194 GRADE 2H NUT WELDED TO THE TOP OF THE THREADED ROD. THE WELDED NUT IS ONLY NECESSARY TO SECURE THE NUT TO THE ANCHOR ROD TO AID IN REMOVAL WHEN BARRIERS ARE REMOVED. ANCHOR ROD AND NUT ARE BOTH ZINC COATED.
8. PLACE AIR POCKET CAP ASSEMBLY ON TO THE BOTTOM OF THE ANCHOR ROD AND COAT THE ANCHOR ROD THREADS WITH KELI SLIP RELEASE AGENT.
9. INSERT THE ANCHOR ROD INTO THE DRILLED ANCHOR HOLE MAKING SURE THAT THE ADHESIVE RISES TO THE TOP OF THE ANCHOR HOLE.
10. REPEAT STEPS 1-8 UNTIL ALL HOLES ARE COMPLETE.
11. TIGHTEN ANCHOR ROD ASSEMBLY AFTER ADHESIVE HAS CURED FOR 1-2 HOURS. ANCHOR ROD ASSEMBLY SHOULD BE HAND TIGHTENED TO NO SPECIFIC TORQUE VALUE.
12. FIELD ADJUSTMENTS MAY BE NECESSARY WHEN LOCATING AND/OR INSTALLING ANCHOR PLATE 1 WHERE PLATE LOCATIONS INTERFERE WITH DRAINAGE INLETS, PAVEMENT JOINTS, VARIATIONS IN PAVEMENT CONTOURS, ETC.

### INSTALLATION OF ANCHOR PLATE 2 ("TOP CONNECTOR PLATE")

1. TOP CONNECTOR PLATE CAN BE INSTALLED IN CONJUNCTION WITH THE INSTALLATION OF BENT PLATE ANCHOR BRACKET. THE ONLY REQUIREMENT PRIOR TO INSTALLATION ON TOP CONNECTOR PLATE IS THAT ALL SLACK IS REMOVED FROM THE J-J HOOK CONNECTORS AS DESCRIBED IN "INSTALLATION OF BENT PLATE ANCHOR BRACKET" STEP 2.
2. IF TOP CONNECTOR PLATE IS BEING INSTALLED FOR THE FIRST TIME ON THE BARRIERS, THE ANCHORS NECESSARY FOR ATTACHING THE PLATE MUST FIRST BE INSTALLED. IF THIS IS A REINSTALLATION, SKIP TO SECTION 8.
3. PLACE TOP CONNECTOR PLATE ON THE TOP OF THE BARRIERS. THE SLOTTED HOLES IN THE TOP CONNECTOR PLATE SHOULD BE AS CLOSE AS POSSIBLE TO AND EQUAL DISTANCE BETWEEN THE JOINTS OF THE BARRIERS.
4. MARK THE SLOTTED HOLES IN TOP CONNECTOR PLATE WITH A CONSTRUCTION CRAYON OR MARKING PAINT.
5. DRILL INTO THE TOP OF THE BARRIERS IN A LOCATION THAT IS CENTERED IN THE MARK(S) THAT WERE MADE IN STEP 4. THE DRILLED HOLE SHOULD BE 1 1/4 INCH IN DIAMETER AND DRILLED TO A DEPTH OF 5 1/2 INCHES. AS IN "INSTALLATION OF BENT ANGLE ANCHOR BRACKET" STEP 5, THIS CAN BE DONE WITH AN ELECTRIC HAMMER DRILL OR COMPRESSED AIR DRILL. CLEAR DEBRIS FROM ANCHOR HOLE WITH COMPRESSED AIR.
6. ANCHOR HARDWARE FOR TOP CONNECTOR PLATE WILL BE A DROP IN WEDGE ANCHOR 1 INCH IN DIAMETER AND 5 INCHES LONG WITH A GRADE 5 ZINC PLATED HEX CAP SCREW 1 INCH IN DIAMETER AND 2 INCHES LONG.
7. INSERT THE DROP IN WEDGE ANCHOR INTO THE DRILLED HOLES MAKING SURE THE ANCHOR IS SEATED AT THE BOTTOM OF THE DRILLED HOLE.
8. ATTACH TOP CONNECTOR PLATE TO THE BARRIER BY INSERTING THE HEX CAP SCREWS THROUGH THE SLOTS IN THE ANCHOR PLATE AND TIGHTENING THEM INTO THE DROP IN WEDGE ANCHORS. HAND TIGHTEN BOTH HEX CAP SCREWS TO NO SPECIFIC TORQUE VALUE.

## ADDITIONAL NOTES

- ★ UPON REMOVAL OF THE BARRIERS AND RETROFIT SYSTEM, SURFACE HOLES WILL BE FILLED WITH A BULLETIN 15 APPROVED NON SHRINK GROUT.



## PARTS LIST

ANCHOR PLATE 1 ("BENT PLATE ANCHOR BRACKET") (PER BRACKET)	
QTY	DESCRIPTION
1	ANCHOR PLATE 1, 1/2 INCH THICK, A36 GRADE STEEL, SHEARED, LASER OR PLASMA CUT TO SIZE, ALL ANGLES BENT IN PRESS BRAKE, ANCHOR HOLES DRILLED, LASER OR PLASMA CUT.
1	THREADED ROD, 1 INCH DIAMETER X 7 3/4 INCH LONG ASTM A193 B7 ZINC COATED.
1	WASHER, 3 INCH DIAMETER A36 FLAT WASHER.
1	HEX NUT, 1 INCH DIAMETER ASTM A194-2H ZINC COATED HEX NUT.
1	AIR POCKET ASSEMBLY, 1 INCH DIAMETER VINYL RUBBER TUBING CAP
1	CONCRETE ANCHORING ADHESIVE, RED HEAD EPCON A7 ACRYLIC.

ANCHOR PLATE 2 ("TOP CONNECTOR PLATE") (PER PLATE)	
QTY	DESCRIPTION
1	ANCHOR PLATE 2, 1/2 INCH THICK, A36 GRADE STEEL, SHEARED, LASER OR PLASMA CUT TO SIZE, ANCHOR HOLES DRILLED, LASER OR PLASMA CUT.
2	WEDGE ANCHOR SOCKET, 1 INCH DIAMETER X 5 INCH LONG X 8 UNC THREADED WEDGE ANCHOR SOCKET INSERT.
2	HEX BOLT, 1 INCH DIAMETER X 2 INCH LONG UNC SAE J429 GRADE 5 ZINC COATED HEX BOLT
2	PLATE WASHER, 3 INCH X 3 INCH X 1/4 INCH THICK, A36 GRADE STEEL, SHEARED, LASER OR PLASMA CUT TO SIZE, ANCHOR HOLES DRILLED, LASER OR PLASMA CUT.

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**STRONGSTOWN'S B&K  
JJ HOOK RETRO FIT V3  
GENERAL NOTES, INSTALLATION  
AND PARTS LIST  
ASPHALT PAVEMENT ANCHORING  
2 PLATE SYSTEM 6" EMBEDMENT**

DRAWING BY: DAVID WAGNER  
DATE: 6-19-17  
REVISED 2-26-19 (WJB)

SHEET: 5 OF 5