## Pier Removal Details

### Reinforced Concrete Riprap

<table>
<thead>
<tr>
<th>Location</th>
<th>Plot Location: JH OVERS</th>
<th>Each Unit</th>
<th>Sq. Yds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abutment No. 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pier No. 1</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Pier No. 2</td>
<td></td>
<td>15</td>
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<tr>
<td>Subtotal, Total</td>
<td></td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 30 Sq. Yds.

## Deck Patching Sequence and Details

Lump Sum

2-17-2021

MMD

02-17-21

**APPROVED**

MMD

2-17-21

**Lump Sum**

Concrete Riprap Rubblization

KVG

40

**Quantity Each**

Lump Sum

2-17-21

KVG

**02-17-21**

**APPROVED**

MMD

02-17-21

**Lump Sum**

Replacing Modules (Impact Attenuator)

Replacing Modules (IBS)

Inertial Barrier System (TL-3)

Impact Attenuator (TL-3) (Temporary)

Concrete Safety Barrier (Type F3) (Temporary)

**Replacement Modules (Impact Attenuator)**

**Replacement Modules (IBS)**

**Inertial Barrier System (TL-3)**

**Impact Attenuator (TL-3) (Temporary)**

**Concrete Safety Barrier (Type F3) (Temporary)**

## Bridge Summary of Quantities

<table>
<thead>
<tr>
<th>Item</th>
<th>Rebar (Grade 40) (16 GA)</th>
<th>Concrete (Grade 40)</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Concrete (Grade 40)</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Concrete (Grade 40)</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Reinforcing Steel (Impact Attenuator (Grade 60) (Set Price))</th>
<th>Concrete (Grade 40)</th>
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</tr>
</tbody>
</table>

## Bridge Repair Quantities

**Lump Sum**

Concrete Repair Mortarization SQ. YDS. 500

## Bridge Repair Quantities

**Lump Sum**

Concrete Repair Mortarization SQ. YDS. 500

## Summary of Barrier (Temporary)

<table>
<thead>
<tr>
<th>Item</th>
<th>Lin. FT.</th>
<th>EACH</th>
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<tbody>
<tr>
<td>Concrete Safety Barrier (Type F3) (Temporary)</td>
<td>6/0.5</td>
<td></td>
</tr>
<tr>
<td>Impact Attenuator (TL-3) (Temporary)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Inertial Barrier System (TL-3)</td>
<td>1</td>
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</tr>
<tr>
<td>Replacement Modules (IBS)</td>
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**Recapitulation of Road Quantities**

<table>
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<tr>
<th>Item</th>
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<tbody>
<tr>
<td>Mobilization</td>
<td>I.D.</td>
</tr>
<tr>
<td>Mobilization</td>
<td>L.S.</td>
</tr>
<tr>
<td>Removal of Existing Structures</td>
<td>L.B.</td>
</tr>
<tr>
<td>Concrete Safety Barrier (Type F3) (Temporary)</td>
<td>6/0.5</td>
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<tr>
<td>Impact Attenuator (TL-3) (Temporary)</td>
<td>1</td>
</tr>
<tr>
<td>Inertial Barrier System (TL-3)</td>
<td>1</td>
</tr>
<tr>
<td>Replacement Modules (IBS)</td>
<td>10</td>
</tr>
<tr>
<td>Replacement Modules (Impact Attenuator)</td>
<td>15</td>
</tr>
</tbody>
</table>

See Sheet 36 for Traffic Control Quantities.

See Sheet 23 for Pavement Working Quantities.
GENERAL NOTES

TRAFFIC CONTROL: See traffic control sheets for additional details.

PHASE 1 TYPICAL SECTION

† Match Existing Cross-slope (6%/ft.)
*
Multi-layer Polymer Concrete Overlay
**) Raised Median and Barrier to remain in place

PHASE 2 TYPICAL SECTION

† Match Existing Cross-slope (6%/ft.)

KANSAS DEPARTMENT OF TRANSPORTATION
Office of the General Counsel
Planning and Environmental Affairs

Mohawk State Office Building
115 S. 10th
Topeka
Kansas 66612-1593

661-321-2040
www.KDOR.ks.gov

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Sheet No. 5

KDOT Graphics Certified 12-07-2020
ABUTMENT NO. 1 ELEVATION

Location

Removal of any loose, cracked or deteriorated concrete from the top and sides of the Abutment Beam as directed by the Engineer. These areas shall be repaired with Master Builders shot patch or approved equivalent. Prior to placement of shotcrete, areas to be repaired shall be consolidated and any deteriorated reinforcing steel shall be repaired or replaced. Shotcrete shall be placed to match existing surfaces or to provide a minimum of 3" clear to reinforcing bar. The item "Concrete Surface Repair" shall be paid for by the square foot and shall include all the labor, materials and tools necessary to complete the work.

REINFORCING IN THE ABUTMENT BEAM: Care should be exercised to avoid breaking the bond between the reinforcing steel and concrete where bars are partially exposed yet remain embedded in sound concrete. Reinforcing steel damaged, cut or deteriorated shall be replaced as directed by the Engineer. Do not wedge chipping hammer or any other tool against reinforcement. Replacement of bars damaged by the Contractor shall be at no expense to the state.

ABUTMENT REPAIR: This item shall consist of removing all loose, cracked and deteriorated concrete from the top and sides of the Abutment Beam as directed by the Engineer. These areas shall be repaired with Master Builders shot patch or approved equivalent. Prior to placement of shotcrete, areas to be repaired shall be consolidated and any deteriorated reinforcing steel shall be repaired or replaced. Shotcrete shall be placed to match existing surfaces or to provide a minimum of 3" clear to reinforcing bar. The item "Concrete Surface Repair" shall be paid for by the square foot and shall include all the labor, materials and tools necessary to complete the work.

REINFORCING IN THE ABUTMENT BEAM: Care should be exercised to avoid breaking the bond between the reinforcing steel and concrete where bars are partially exposed yet remain embedded in sound concrete. Reinforcing steel damaged, cut or deteriorated shall be replaced as directed by the Engineer. Do not wedge chipping hammer or any other tool against reinforcement. Replacement of bars damaged by the Contractor shall be at no expense to the state.

Notes:

CONCRETE SURFACE REPAIR

<table>
<thead>
<tr>
<th>Location</th>
<th>Abut. Beam</th>
<th>Area</th>
</tr>
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<tbody>
<tr>
<td>Abut. No. 1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
**For Abutment No. 2**

**SECTION A-A**
- Construct concrete curb extension and concrete flume.
- Remove debris and clear area prior to filling void.
- Add approximately 3 cubic yards of flowable fill to void to approximately 4" below groundline.
- Add flowable fill until void is full to existing groundline and as shown in Section A-A. Contractor shall provide support for utilities while placing the flowable fill.
- Cover flowable fill with Slope Protection (Aggregate) to bring aggregate to groundline.

**SECTION D-D**
- Smooth transition of curb down to top of concrete flume.
- Provide Framework such that a Vertical Face is provided at face of exist. Abutment Wingwall and Flowable Fill does not settle under Abutment or Approach Slab.
- Reinforcement into Toe Wall - Bend Welded Wire.
- Horizontal Flume Inlet - Max. (Drill and Grout)
- Void 1 - REPAIR PROCEDURE
  1. Remove debris and clear area prior to filling void.
  2. Construct concrete curb extension and concrete flume.
  3. Add Flowable Fill until void is full to existing groundline and as shown in Section A-A. Contractor shall provide support for utilities while placing the Flowable Fill.
  4. Contractor shall place Flowable Fill around utilities as needed and shall not damage utilities.
  5. Add approximately 3 cubic yards of Flowable Fill to void. After 48 hours, and if necessary, provide more Flowable Fill to fill void to approximately 4" below groundline.

**SECTION C-C**
- Reinforcement into Toe Wall - Bend Welded Wire.
- Horizontal Flume Inlet - Max. (Drill and Grout)
- Void 2 - REPAIR PROCEDURE
  1. Remove debris and clear area prior to filling void.
  2. Construct concrete curb extension and concrete flume.
  3. Add Flowable Fill until void is full to existing groundline and as shown in Section A-A. Contractor shall provide support for utilities while placing the Flowable Fill.
  4. Contractor shall place Flowable Fill around utilities as needed and shall not damage utilities.
  5. Add approximately 3 cubic yards of Flowable Fill to void. After 48 hours, and if necessary, provide more Flowable Fill to fill void to bottom of new Flume inlet.

Notes: Contractor to verify location of all utilities and utility vaults. Contractor to avoid damage to utilities.

All materials and labor necessary to perform void repair is subject to "High Strength Flowable Fill".

All materials and labor necessary to build concrete curb shall be submitted to the bid item "Flume Inlet (Concrete)".

KDOT Graphics Certified
PIER NO. 2 PARTIAL PLAN

** Existing reinforcing to be cleaned and incorporated into new construction. Exist. top mat reinforcing to be used full length. Exist. bottom mat reinforcing must extend a minimum of 4'-2" into new portion of cap before being cut.

** Contractor to make field measurements as necessary to relocate existing bearings at their current location and elevation.

PIE REMOVAL DETAILS

Note: See Sheet No. 12 for jacking process and loads to support girders during removal.

** Removal Limits

COLUMN ELEVATION

(looking North)
PIER REPAIR DETAILS (SHEET 2 OF 2)

SECTION A-A

ANKOR BOLT LOCATION AND BEARING PAD DETAILS

BASE PLATE ELEVATIONS (Motor Excav.)

<table>
<thead>
<tr>
<th>Flange 2</th>
<th>Flange 1</th>
<th>Low S</th>
</tr>
</thead>
<tbody>
<tr>
<td>784.53</td>
<td>783.79</td>
<td>783.03</td>
</tr>
</tbody>
</table>

Elevations from As-Built Plans, Field Verify.

Coupler nut must be sized to achieve the full yield capacity of the anchor. Swaged anchor bolt and nut to be cast-in-place with pier cap. Top of coupler nut to be covered during casting of pier cap concrete.

After placing bearing, turn top anchor bolt into coupler nut until refusal.

SECTION B-B

ELEVATIONS FROM AS-BUILT PLANS. FIELD VERIFY

BASE PLATE ELEVATIONS (Match Exist.)

Pier No. 2

BEAMS & GIRDS

3'-2" (Typ.)

6"

Hallowed Anchor Bolt

Swepted Anchor Bolt

Coupler Nut (Typ.)

Notes: Place repaired bearing base plates to field dimensions and elevations. Field verify dimensions and elevations. Replace anchor bolts with 1 1/2" anchor bolts conforming to KDOT Specifications. Anchor bolts shall be galvanized.

SECTION C-C

ANCHOR BOLT LOCATION AND BEARING PAD DETAILS

ELEVATION

Tapped Anchor Bolt (4 Per Bearing, 12 Total Required)

Coupler Nut (Typ.)

Swedged Anchor Bolt

Notes: Expansion Joint Filler Type B shown in 'Detail 1' shall be submitted to 'Concrete (Grade 4.0) (AE)'.
PIER NO. 1 PARTIAL ELEVATION
(Looking North)

* Clean and paint ahead and back bearings as noted in "Painting Existing Bearings" note.

** In addition to cleaning and painting as noted in "Painting Existing Bearings" note, these bearings are to be lifted to relieve load during partial pier replacement. Materials and labor required for jacking these bearings shall be included in "Temporary Shoring" bid item.

*** Remove, clean, paint, and reinstall ahead and back bearings as noted in "Work at Existing Bearings" note.

PIER NO. 2 PARTIAL ELEVATION
(Looking North)

SUMMARY OF QUANTITIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Units</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Reset Existing Bearing</td>
<td>Each</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: Materials and Labor required to clean and paint the noted bearings at Pier No. 1 & Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to jack and support the girders and stringers 7 thru 9 of Pier No. 2 during Phase 2 Construction are included in the bid item "Temporary Shoring".

Note: Materials and Labor required to jack and support the girders and stringers 5 thru 9 of Pier No. 2 are included in the bid item "Structural Steel (470)" for "367".

Note: Materials and Labor required to jack and support the girders and stringers 5 thru 9 of Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to clean and paint the noted bearings at Pier No. 1 & Pier No. 2 back down and remove jacks.

Note: Materials and Labor required to clean and paint the noted bearings at Pier No. 1 & Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to jack and support the girders and stringers 7 thru 9 of Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to clean and paint the noted bearings at Pier No. 1 & Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to jack and support the girders and stringers 7 thru 9 of Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

Note: Materials and Labor required to clean and paint the noted bearings at Pier No. 1 & Pier No. 2 are included in the bid item "Bridge Painting (Organic Zinc w/Acrylic System)".

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**BRIDGE DRAINAGE SYSTEM DETAILS**

*SECTION A-A* (Bearings not shown for clarity)

**BRIDGE DRAINAGE SYSTEM** The bid item "Bridge Drainage System" lump sum shall include all labor and material needed to construct the bridge drainage system as shown on the plans. Included shall be all catch basins, piping, fittings, support brackets, bolts, hangers, and reducers. Shop drawings shall be submitted for approval. See KDOT Specifications.

**SECTION B-B** (Bearings not shown for clarity)

All material for pipe supports shall conform to the requirements of ASTM A123 (Gr. 36). All material for pipe supports shall conform to the requirements of ASTM A307. The fiberglass components shall be gray with ASTM A709 (Gr. 36). Bolts and nuts shall conform to the requirements of ASTM A123. The fiberglass components shall be gray after fabrication, galvanize the pipe supports in accordance with ASTM A123.

All connections of pipe and fittings shall be made with adhesive bonded joints or other approved method. Provide aggregate splash pad centered under each fiberglass pipe location. All material necessary to construct aggregate splash pad, including aggregate and geotextile fabric, shall be submitting to the bid item "Bridge Drainage System".

**SECTION C-C**

**AGGREGATE SPLASH PAD** (Total of 4 Required)

All material for pipe supports shall conform to the requirements of ASTM A123 (Gr. 36). All material for pipe supports shall conform to the requirements of ASTM A307. The fiberglass components shall be gray after fabrication, galvanize the pipe supports in accordance with ASTM A123.

All connections of pipe and fittings shall be made with adhesive bonded joints or other approved method. Provide aggregate splash pad centered under each fiberglass pipe location. All material necessary to construct aggregate splash pad, including aggregate and geotextile fabric, shall be submitting to the bid item "Bridge Drainage System".

**Notes:**

- All material for pipe supports shall conform to the requirements of ASTM A123 (Gr. 36).
- All material for pipe supports shall conform to the requirements of ASTM A307.
- The fiberglass components shall be gray.
- Provide aggregate splash pad centered under each fiberglass pipe location. All material necessary to construct aggregate splash pad, including aggregate and geotextile fabric, shall be submitting to the bid item "Bridge Drainage System".
REVISIONS

- Median
- 2'-0" KVG
- KBK
- MMD
- Plot Location: BY
- Span 2
- JOVERS O
- MMD 40
- 02-15-21 YEAR
- KBK
- 3" MMD 2
- 1'-0"
- 10-22-2020

PLOTTED BY:

FILE:
c:\pww\working\central01\1898192\K A569501B BR074-15.dgn

PLOT DATE:

- Median Concrete Removal
- 2'-9"

LEGEND
- Median
- 2" Blockout

- Recess
- Removal
- Concrete
- Limits of Median and Bent
- ß /" ft.
- 3" of Median and Bent
- ß /" Recess Between Edge
- @ 60°
- ß /" Recess
- 8" /" ft.
- 2'-0" (Typ.)
- ß /" Blockout

MEDIAN CONCRETE REMOVAL PLAN

- 6'-6"
- Exist. Expansion Joint Gap
- 6'-6"

NEW MEDIAN SECTION

- Between ß 's
- 3"
- 2'-0"

- Blockout
- ß /" Deep (Typ.)

MEDIAN PLAN

- 6'-6"
- 4" Median
- 3"

- 2'-0"

- Blockout
- ß /" Deep

- 4'-0" Median
- 3"

- 2'-0"

SECTION A-A

- 7'-1"
- 1'-4"
- 7" Galv. Tread

- ß /" Bevel (Typ.)

SECTION C-C

- Median Concrete Removal

- 2'-0"

FINANCIAL NOTE

- Structural Steel: Steel for median and sidewalk plates shall be Grade 36 or better. The bolts and anchors for the median and sidewalk plates shall not be painted or galvanized in accordance with KDOT Specifications. All expansion connectors shall be galvanized in accordance with ASTM A123. The bolts and anchors for the median and sidewalk plates shall be galvanized in accordance with KDOT Specifications. The bolts and anchors for the median and sidewalk plates shall not be painted or galvanized in accordance with KDOT Specifications.

- Repair of Epoxy Coated Reinforcing Steel: Replace any epoxy coating that is removed from the reinforcing steel during the concrete removal process. Thoroughly clean damaged areas with a stiff wire brush to remove dirt and damaged coating. Apply an approved patching material in accordance with manufacturer's recommendations. Avoid dripping any patching material onto existing concrete that will have new concrete placed against it. See KDOT Specifications.

- Steel for median and sidewalk plates shall be Grade 36 or better. The bolts and anchors for the median and sidewalk plates shall be galvanized in accordance with KDOT Specifications.

- Note: All existing reinforcing to remain shall be thoroughly cleaned. Reinforcing steel damaged, cut or deteriorated shall be replaced as directed by the Engineer.

- Reinforcing steel during the concrete removal process. Thoroughly clean damaged areas with a stiff wire brush to remove dirt and damaged coating. Apply an approved patching material in accordance with manufacturer's recommendations. Avoid dripping any patching material onto existing concrete that will have new concrete placed against it. See KDOT Specifications.

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- Reinforcing steel during the concrete removal process. Thoroughly clean damaged areas with a stiff wire brush to remove dirt and damaged coating. Apply an approved patching material in accordance with manufacturer's recommendations. Avoid dripping any patching material onto existing concrete that will have new concrete placed against it. See KDOT Specifications.

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GENERAL NOTES

FENCE (CHAIN LINK) SPECIAL: The chain link fence on the sidewalk shall be bid per linear foot as per bid item, "Fence (Chain Link) SPECIAL". This item shall include the furnishing of all materials, fabrication of all parts, and all of the equipment and labor required to erect the fence in accordance with these plans and specifications. All parts shall be galvanized or duplex coated after fabrication and all welds shall be free of slag prior to galvanizing or duplex coating. Galvanization or Duplex coating shall conform to KDOT'S Standard Specifications.

CHAIN LINK FABRIC: All chain link fabric shall be zinc coated (galvanized) and double knuckled.

STRUCTURAL STEEL: Miscellaneous plates, bars, shapes including tension rod shall conform to ASTM A36.

Utility conduit supports, including structural steel tubing, shall be included in the bid quantity for Structural Steel (A709) (Gr. 36). All threaded rods, expansion anchors, conduit clamps and bolts shall be included. All equipment and labor to install the conduit supports in accordance with these plans shall be included in the bid item Structural Steel (A709) (Gr. 36).

The fence on the sidewalk shall be bid per linear foot as per bid item, "Fence (Chain Link) SPECIAL". This item shall include the furnishing of all materials, fabrication of all parts, and all of the equipment and labor required to erect the fence in accordance with these plans and specifications. All parts shall be galvanized or duplex coated after fabrication and all welds shall be free of slag prior to galvanizing or duplex coating. Galvanization or Duplex coating shall conform to KDOT'S Standard Specifications.

STRUCTURAL STEEL: Miscellaneous plates, bars, shapes including tension rod shall conform to ASTM A36.
BILL OF REINFORCING STEEL
Grade 60

<table>
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<th>Work</th>
<th>Size</th>
<th>Number</th>
<th>Length</th>
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<tbody>
<tr>
<td>A2</td>
<td>4</td>
<td>2</td>
<td>6'-9&quot;</td>
</tr>
<tr>
<td>A3</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: These bars are not applicable to the bid item "Flume Inlet (Concrete)". See Sheet No. 7.

BENDING DIAGRAMS
(All Dimensions are Out to Out of Bars)
PARTIAL DEPTH PATCHING

FULL DEPTH PATCHING

DECK PATCHING DETAILS


drainage, including a drainage line for the full depth patch.


cracks, chips, and uneven surfaces. Blot spots with a broom and


crack sealing details

CRACK SEALING

The type of traffic delineator to be used is found in the traffic control sheets.

See Sheet No. 5 for traffic lane and roadway widths.

See KDOT Specifications for the minimum cure time for concrete patching prior to placing Polymer Concrete Overlay.

The rebar splice length corresponding to the grade of the existing reinforcing in the deck, length area, the segments shall be a maximum of 8'-0" parallel to the centerline of bridge with a minimum of 8'-0" parallel to the centerline of bridge between segments. After the initial patches have cured, the areas between the initial segments shall be patched. The segmental patching will not be required if adequate shoring is provided to support the deck, curbs, and beams. (See "SEQUENCE DETAIL" on this sheet).

See KDOT Specifications for the minimum cure time for concrete patching prior to placing Polymer Concrete Overlay.


depth removal of unsound concrete has been removed. See KDOT Specifications.

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.

Rough finish on patch


deck, cleaning reinforcing bars, and filling the removed patched areas with concrete. Quantity shown is an estimate of the areas involved.

Patch shall be at no cost to the State.


deck, cleaning reinforcing bars, and filling the removed patched areas with concrete. Quantity shown is an estimate of the areas involved.

The type of traffic delineator to be used is found in the traffic control sheets.

See Sheet No. 5 for traffic lane and roadway widths.

See KDOT Specifications for the minimum cure time for concrete patching prior to placing Polymer Concrete Overlay.

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.

Rough finish on patch


deck, cleaning reinforcing bars, and filling the removed patched areas with concrete. Quantity shown is an estimate of the areas involved.

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.

Rough finish on patch

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.

Rough finish on patch

The rebar splice length corresponding to the grade of the existing reinforcing in the deck, length area, the segments shall be a maximum of 8'-0" parallel to the centerline of bridge with a minimum of 8'-0" parallel to the centerline of bridge between segments. After the initial patches have cured, the areas between the initial segments shall be patched. The segmental patching will not be required if adequate shoring is provided to support the deck, curbs, and beams. (See "SEQUENCE DETAIL" on this sheet).

See KDOT Specifications for the minimum cure time for concrete patching prior to placing Polymer Concrete Overlay.

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.

Rough finish on patch


deck, cleaning reinforcing bars, and filling the removed patched areas with concrete. Quantity shown is an estimate of the areas involved.

The exact areas shall be determined by tapping, before, during and after abrading operation to ensure that all unsound concrete has been removed. See KDOT Specifications.
**Notes:**
- Use Concrete (Grade 3,000 psi) for the riprap.
- Use 6x6 - W1.4 x W1.4 welded wire fabric conforming to the requirements of ASTM A185.
- Use reinforcing steel conforming to the requirements of ASTM A615, Grade 60.
- Place 1/2" Type B expansion material in the joints caused by any intersection of the riprap with the abutment, columns, and slopes.  
- Measurement of the Reinforced Concrete Riprap shall be in square yards and is based on the outside surface area.  
- The toe walls, 3' sp., Type B expansion material, welded wire fabric, and reinforcing steel are supplemental to the bid item Reinforced Concrete Riprap.

**Reinforced Concrete Riprap**

- Use Concrete (Grade 3.0)(AE) for the riprap.
- Weight = 21 Lbs. per 100 Sq. Ft.
- Welded wire fabric - 6x6 - W1.4 x W1.4 conforming to the requirements of ASTM A185.
- Use reinforcing steel conforming to the requirements of ASTM A615, Grade 60.
- Place 1/2" Type B expansion material in the joints caused by any intersection of the riprap with the abutment, wings, or columns.  
- See Construction Layout for the riprap, abutment section, and wing as shown.
- The toe walls, 3" sp., Type B expansion material, welded wire fabric, and reinforcing steel are supplemental to the bid item Reinforced Concrete Riprap.

**Construction Layout sheet**

- See Construction Layout for thickness.
- See Construction Layout for reinforcement.
- Weight = 21 Lbs. per 100 Sq. Ft.
- Welded wire fabric - 6x6 - W1.4 x W1.4 conforming to the requirements of ASTM A185.
- Use reinforcing steel conforming to the requirements of ASTM A615, Grade 60.
TYPICAL DECELERATION EXIT RAMP

TYPICAL TAPERED EXIT RAMP

TYPICAL ACCELERATION RAMP

TYPICAL LANE DROP

TYPICAL LANE AND EDGE LINE MARKINGS
FOR FOUR LANE AND SIX LANE DIVIDED HIGHWAYS

NOTE:
LONGITUDINAL PAVEMENT MARKING LINES SHALL BE OFFSET A MINIMUM OF 2" FROM LONGITUDINAL PAVEMENT JOINTS.

NOTE:
AT RAMP TERMINALS WITH CROSS-ROADS, WRAP 6" EDGE LINES AROUND 45°.

NOTE:
ON NON I, US, AND K ROUTES, 4" EDGE LINES MAY BE INSTALLED. 6" EDGE LINES ARE NOT REQUIRED ON NON I, US, AND K ROUTES.

NOTE:
FOR DOTTED EXTENSION LINES, UNLESS OTHERWISE NOTED ON PLANS.

NOTE:
FOR LANE DROP, UNLESS OTHERWISE NOTED ON PLANS.

NOTE:
FOR BROKEN LINES UNLESS OTHERWISE NOTED ON PLANS.
TYPICAL MARKING FOR AUXILIARY PASSING LANE

TYPICAL ROAD JUNCTION MARKINGS WITH BYPASS LANES

TYPICAL SPACING FOR LANE DROP, UNLESS OTHERWISE NOTED ON PLANS.

TYPICAL SPACING FOR BROKEN LINES UNLESS OTHERWISE NOTED ON PLANS.

TYPICAL TWO LANE MARKINGS

NOTE: LONGITUDINAL PAVEMENT MARKING LINES SHALL BE OFFSET A MINIMUM OF 2" FROM LONGITUDINAL PAVEMENT JOINTS.

NOTE: ON NON I, US, AND K ROUTES, 6" EDGE LINES MAY BE INSTALLED.
6" EDGE LINES ARE NOT REQUIRED ON NON I, US, AND K ROUTES.
### SUMMARY OF PAVEMENT MARKINGS

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<th>8&quot; BROKEN WHITE LINE</th>
<th>12&quot; WHITE DOUBLE LINE</th>
<th>12&quot; WHITE CHAINLINE</th>
<th>24&quot; WHITE DOUBLE LINE</th>
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<th>6&quot; YELLOW DOTTED LINE</th>
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**TOTALS:**
- 700
- 0
- 700
- 4
- 700
- 175
- 0
- 0
- 0
- 0
- 24
- 24

### SUMMARY OF WORD & SYMBOL MARKINGS

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**TOTALS:**
- 700
- 0
- 700
- 4
- 700
- 175
- 0
- 0
- 0
- 0
- 24
- 24

### RECAPITULATION OF QUANTITIES

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### NOTE:
- Words & symbols shall conform to the latest edition of Standard Alphabets for Highway Signs and Pavement Markings printed by the U.S. Department of Transportation, Federal Highway Administration.
- Prior to commencement of pavement marking work, the engineer will establish the limits for "no passing" zones. These limits shall be used for the location of "no passing" lines and for the computation of actual marking quantities for this line type.
- For specific pavement marking details and dimensions see plan sheets.
- All totals reflect actual quantity of pavement marking materials required.
LEGEND:

- PORTABLE CHANNELIZER
- WORK AREA
- TYPE III BARRICADE WITH LIGHTS
- DETOUR ROUTE
- ARROW DISPLAY
- SIGNS

KANSAS DEPARTMENT OF TRANSPORTATION

PROJECT NO. 169-105 KA-5695-01

YEAR 2021

SHEET NO. 25

TOTAL SHEETS 40

TRAFFIC CONTROL PLAN

EXIT RAMP CLOSURE

WB I-70 TO 7th STREET

LEGEND:

- WORK AREA
- DETOUR ROUTE
- PORTABLE CHANNELIZER
- TYPE III BARRICADE WITH LIGHTS

SCALE

PLAN: Lat. & Long.
100' 200'
Traffic Control Note:

Construction has the option to close one lane of EB I-70. Lane closures will occur from 6:00 AM to 9:00 AM and 10:00 PM to 6:00 PM Monday through Friday. Traffic control associated with these closures will be subsidiary to other items.

PCMS boards shall be posted in accordance with the engineer.
Traffic Control Note:
Contractor has the option to temporarily close both lanes in the same direction of 7th Street at night, pending approval from KDOT. Traffic control associated with this temporary closure will be subordinate to other items.
Contractor to: install any conflicting roadway signs or signal heads.
Subordinate to traffic control items.

PLAN: Lat. & Long.
KANSAS DEPARTMENT OF TRANSPORTATION
PROJECT #:169-105-04-5685-21
YEAR: 2021
SHEETS: 38
TOTAL: 40

Traffic Control Items:
- PORTABLE CHANNELIZER
- WORK AREA
- TYPE III BARRICADE WITH LIGHTS
- DETOUR ROUTE
- ARROW DISPLAY
- SIGNS

Legend:
- PORTABLE CHANNELIZER
- WORK AREA
- TYPE III BARRICADE WITH LIGHTS
- DETOUR ROUTE
- ARROW DISPLAY
- SIGNS

Drawn by: J. JOHNSON
Reflected: D. HOOVER
CHECKED: D. LEWIS

80' Spacing
4" Solid White Edge Line

24"x12" W20-5

48"x48" W4-2R

24"x6" R2-1

24"x30" R11-2

48"x30" R2-1

24"x30" W4-2R

48"x48" W4-2R

48"x24" R11-2

100' R9-9

20' Spacing

4" Solid White Edge Line

80' Spacing

48"x48" W4-10

Traffic Control Plan:
7th Street Over I-70
Phase 2

KANSAS DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL PLAN
7TH STREET OVER I-70
PHASE 2

Legend:
- PORTABLE CHANNELIZER
- WORK AREA
- TYPE III BARRICADE WITH LIGHTS
- DETOUR ROUTE
- ARROW DISPLAY
- SIGNS

Plan is 3rd party product created at 1:600 scale and is an approximation of the actual property. Plan/proposal is subject to change.

© 2021 KSDOT
1) Design Speed: Those items delegated to temporary traffic control should be designed and installed using the posted/legal speed of the roadway prior to work starting.

2) Minimum Lane Width: Lane widths shall be a minimum of 11' (measured between centers of pavement markings) or as shown on the plans, or as directed by the engineer. A lane width less than 11' may require restricted roadway width signing.

3) Consideration should be made to separate pedestrian and, if needed, bicycle movements from both work site activity and vehicular traffic. Unless a reasonable safe route that does not involve crossing the roadway can be provided, pedestrians should be appropriately directed with advance signing that encourages them to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (other than medians) locations so that pedestrians are not confronted with midblock work sites that will induce them to attempt skipping the work site or making a midblock crossing.

4) When existing pedestrian facilities are dismounted, closed, or relocated, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

5) When the driving surface open to traffic is milled or is a temporary surface, the work zone components above.

6) Alternative temporary rumble strip options may be available. Please contact the Temporary Traffic Control Unit for more information at 785-296-1189 or 785-296-1179 or 6) Alternative temporary rumble strip options may be available. Please contact the Temporary Traffic Control Unit for more information at 785-296-1189 or 785-296-1179.

**TYPICAL WORK ZONE COMPONENTS**

- When concrete barrier system is used, portable channelizing devices are not needed along the tangent barrier section.

**TAPER FORMULAS**

- Channelizer Placement:
  1. The spacing between devices in transition area (taper) should not exceed a distance in feet equal to 1/2 the posted speed limit in mph prior to work starting.
  2. The spacing between devices in the advanced warning area and the activity area should not exceed a distance in feet equal to two times the posted speed limit in mph prior to work starting.
  3. Channelizing devices shall be placed for optimum visibility, normally at right angles to the traffic flow.
  4. Place directional indicator barricades in series to direct traffic onto the new path. The arrow sign should not be visible to opposing traffic.
  5. Alternating diagonal orange and white striping must slope downward in the direction traffic is expected to pass.

**BUFFER SPACE**

- Neither work activity nor storage of equipment, vehicles, or material should occur in the buffer space. When a protection vehicle is placed in advance of the work space, only the space upstream of the vehicle constitutes the buffer space.

If temporary concrete safety barrier system is used to separate approaching traffic from the work space, the barrier system shall be considered part of the activity area. A full lane width should be available throughout the length of the buffer space. See typical work zone components above.
The stripes shall slope downward to the traffic side for channelization.

For rails less than 36" long, 4" wide stripes may be used.

The direction indicator barricade shall be used in series to direct the motorist into the intended lane of travel.

1. Support devices shall not project beyond the detection plate or have a slope of 1:21 or steeper.
2. Hand trailing edges and detection plates are optional for continuous walls.
3. Interconnected channelization devices shall have continuous guidance through or around work.
4. Alternate pathways shall be firm, stable, and slip resistant.
5. Treat height differentials > 1/2" in the surfaces of alternate pathways with a firm, stable, and slip resistant temporary ramp.
6. Use alternating orange/white on interconnected devices.

### CHANNELIZING DEVICES

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<tr>
<th>Item</th>
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<th>Fixed</th>
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<tbody>
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<td>Vertical Panes</td>
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</tbody>
</table>

1. Not allowed on centerline delineation along freeways or expressways.
2. The stripes shall slope downward to the traffic side for channelization.
3. May be used upon the approval of the engineer.
4. Daytime operations only.
Note: Signs shown for one approach to work zone.

FIGURE 1: TYPICAL SIGNING FOR ROAD CLOSURE (MAINLINE OR SIDE ROAD)

Complete Closure
Type 3 Barricades

Legend

Work Space

NOTE:

The R11-3A and R11-4 signs should be accompanied with appropriate detour signing, as shown on project traffic control plans.

FIGURE 2: TYPICAL SIGNING FOR SIDE ROAD OPEN

Note: Sign shown for one approach to intersection (work zone).

SIDENTAL BARRICADE

1. Support device shall not project beyond the detection plate into the pathway.
2. Barricades shall be used to close the entire width of the pathway.
3. Do not use warning lights on pedestrian barricades.
4. Do not use warning lights on audible devices.

ROAD CLOSED GENERAL NOTES

As shown in Figure 1, at the point where thru traffic must detour and local traffic can proceed to the location where the roadway is completely closed, the R11-3a (ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY) or R11-4 (ROAD CLOSED LOCAL TRAFFIC ONLY) sign shall be used with Type 3 barricades (winged position), placed on the shoulders of roadway.

As shown in Figure 3, when local traffic must be allowed access into the work zone, Type 3 barricades shall be longitudinally staggered to maintain the appearance of a closed roadway. A second line of end-to-end Type 3 barricades shall be placed just beyond the last access point in the work zone, to completely close the roadway.

The R11-4 (ROAD CLOSED THRU TRAFFIC) or R11-4 (ROAD CLOSED LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is less than 1 mile.

The R11-3a (ROAD CLOSED # MILES AHEAD LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is 1 mile or greater.

The words "BRIDGE OUT" (or BRIDGE CLOSED) may be substituted for the words "ROAD CLOSED" on the R11-3a or R11-4 sign where applicable.
FIGURE 1: SIDE ROAD OR ENTRANCE CLOSED THROUGH WORK AREA

FIGURE 2: SIDE ROAD OR ENTRANCE OPEN THROUGH WORK AREA

FIGURE 3: LOW VOLUME ENTRANCE CONSTRUCTED HALF AT A TIME

Note: Consider large vehicles making right turns into and out of entrance and use figure 4 as needed

FIGURE 4: SIDE ROAD OR ENTRANCE CONSTRUCTED HALF AT A TIME: TWO WAY TRAFFIC REQUIRED

FIGURE 5: SIDE ROAD OPEN THROUGH WORK AREA ON DIVIDED ROADWAY

Note: Consider large vehicles making right turns into and out of entrance and use figure 4 as needed.
### SIGN LAYOUT INFORMATION

#### RURAL
1) Ground-mounted signs shall be mounted at a minimum height of 6’ measured from the bottom of sign to the near edge of the pavement.

2) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7’ above the ground.

3) The height of the secondary sign mounted below another sign may be 4’ measured from the bottom of the sign to the near edge of the pavement. Signs shall not overlap each other.

#### URBAN
1) Signs shall be mounted at a minimum height of 7’ measured from the bottom of sign to the near edge of the pavement.

2) Neither portable nor permanent sign supports should be located on sidewalks or areas designated for pedestrian or bicycle traffic.

3) Signs mounted lower than 7’ should not project more than 4’ into pedestrian facilities.

4) The height from the secondary sign mounted below another sign may be 6’ measured from the bottom of sign to the near edge of the pavement. Signs shall not overlap each other.

5) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7’ above the ground.

6) Pedestrian detour signing shall be a minimum of 2’ measured from the top of the pedestrian pathway to the bottom of the sign and shall not protrude onto the walkway nor shall it project beyond the median of the roadway.

### FINES DOUBLE IN WORK ZONES

#### FINE 1

Dimensions in inches

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<td>Sign width</td>
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<td>Bottom of fine</td>
</tr>
<tr>
<td>2’-0”</td>
<td>Top of fine</td>
</tr>
<tr>
<td>2’-0”</td>
<td>Face of curb</td>
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### LETTER SPACINGS

Spacings are to start of next letter

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</tr>
<tr>
<td>T</td>
<td>3’-0”</td>
</tr>
<tr>
<td>U</td>
<td>3’-0”</td>
</tr>
</tbody>
</table>

### Notes:

- Typically, there are two sets of informational signs installed per project: one for each direction of traffic.

- Install signs a minimum of 500’ in advance of the road work ahead sign. The engineer may designate a more appropriate location if conditions dictate.

- The informational signs are not to interfere with the traffic control signs for the project.

### PROJECT INFORMATION

- **Project No.**: 10718
- **Year**: 06/01/15
- **Signer**: KDOT Graphics Certified
- **Drawing**: 09-09-2018
- **Revision**: 33

### DRAWING INFORMATION

- **Sheets**: 33
- **Total**: 40.3

### SIGN INFORMATION

- **Legend/Border**: Type: Black, Color: White
- **Mounting**: Ground
- **Design by**: KDOT Graphics Certified
- **FHWA Approval**: Yes
PERFORATED SQUARE STEEL TUBE (P.S.S.T.) POST SETUP

WOOD POST SETUP

3 LB/F U-CHANNEL SETUP

Notes:
Place two bolts at both ends of the splice through the holes nearest the ends of the splice.

Use manufacturer recommended spacers over the bolts between the spliced pieces of U-Channel.

See TE710 for Additional Details and Requirements.
SHifting taper detail

Add signs and devices as shown for work inside a closed lane that extends near to (or into) the open traffic lane.

- For left lane closures, use W4-2L and yellow edge line along channelizing devices.

- The W20-5 (Lane Closed) and W7-3A (Next X Miles) signs should be placed at 2-mile increments on a project of 4 miles or longer.

- Left-side signs shall be omitted for a four-lane undivided highway.

- One flagger should be stationed within each multi-lane roadway activity area where work is in a closed lane adjacent to traffic and not separated by a concrete safety barrier system.

- The double reverse curve (W24-1, W24-1a or W24-1b) should be used if the tangent distance between the two reverse curves is less than 600 ft. Only one W24-1 is required to be placed at an "X" distance in advance of the shifting taper.

- Speed to be determined by the Engineer

- Type "A" Low Intensity Warning Light

- Channelizing Device

- Ahead, 1500 ft, or 1 mile

- Ahead, 1000 ft, 1500 ft, or 3/4 mile

- Right or Left

- Type "A" Low Intensity Warning Light
### SUMMARY OF TRAFFIC CONTROL DEVICES

#### Work Zone Sign (Special)

<table>
<thead>
<tr>
<th>Sign No.</th>
<th>Qty.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-01</td>
<td>1</td>
<td>Each</td>
</tr>
<tr>
<td>SP-02</td>
<td>1</td>
<td>Each</td>
</tr>
<tr>
<td>SP-03</td>
<td>18</td>
<td>Each</td>
</tr>
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#### Recapitulation of Quantities

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Zone Signs (Special)</td>
<td>13100</td>
</tr>
<tr>
<td>Work Zone Signs (0 to 9.25 Sq.Ft.)</td>
<td>510</td>
</tr>
<tr>
<td>Work Zone Signs (9.26 to 16.25 Sq.Ft.)</td>
<td>410</td>
</tr>
<tr>
<td>Work Zone Signs (16.26 &amp; Over)</td>
<td>3110</td>
</tr>
<tr>
<td>Work Zone Barricades (6 to 12')</td>
<td>810</td>
</tr>
<tr>
<td>Channelizer (Fixed)</td>
<td>23240</td>
</tr>
<tr>
<td>Channelizer (Portable)</td>
<td>810</td>
</tr>
<tr>
<td>Channelizer (Pedestrian)</td>
<td>3780</td>
</tr>
<tr>
<td>Work Zone Warning Light (Type &quot;A&quot; Low Intensity)</td>
<td>410</td>
</tr>
<tr>
<td>Work Zone Warning Light (Type &quot;B&quot; High Intensity)</td>
<td>540</td>
</tr>
<tr>
<td>Arrow Display</td>
<td>13.5</td>
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<tr>
<td>Portable Changeable Message Sign</td>
<td>100</td>
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<tr>
<td>Pavement Marking (Temporary)</td>
<td>13.6</td>
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<tr>
<td>4&quot; Solid (Type I)</td>
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<tr>
<td>4&quot; Solid (Type II)</td>
<td>94</td>
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<tr>
<td>4&quot; Broken (6.0') (Type I)</td>
<td>19</td>
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<tr>
<td>4&quot; Broken (6.0') (Type II)</td>
<td>18</td>
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<tr>
<td>4&quot; Broken (12.0') (Type I)</td>
<td>18</td>
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<tr>
<td>4&quot; Broken (12.0') (Type II)</td>
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<tr>
<td>4&quot; Dotted Extension (Type I)</td>
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<td>4&quot; Dotted Extension (Type II)</td>
<td>18</td>
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<td>Solid Line Masking Tape</td>
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<td>Broken Line Masking Tape</td>
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<td>Symbols (Type I)</td>
<td>18</td>
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<tr>
<td>Symbols (Type II)</td>
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<td>Flexible Raised Pavement Marker (6&quot; Broken 8.0')</td>
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<td>Flexible Raised Pavement Marker (6&quot; Broken 12.0')</td>
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<td>Flexible Raised Pavement Marker (8&quot; Broken 8.0')</td>
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<td>Flexible Raised Pavement Marker (8&quot; Broken 12.0')</td>
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<td>Pavement Marking Removal</td>
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<tr>
<td>Work Zone Sign (Special) (16.26 &amp; Over)</td>
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<tr>
<td>Traffic Signal Installation (Temporary)</td>
<td>18</td>
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<tr>
<td>Traffic Control (Hot Spot)</td>
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<tr>
<td>Traffic Control (Red Dot)</td>
<td>18</td>
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### SUMMARY OF TRAFFIC CONTROL DEVICES (EACH PER DAY)

#### Work Zone Signs

<table>
<thead>
<tr>
<th>Sign No.</th>
<th>Qty.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V20-7</td>
<td>2</td>
<td>Each</td>
</tr>
<tr>
<td>M1-4</td>
<td>18</td>
<td>Each</td>
</tr>
<tr>
<td>M4-4</td>
<td>18</td>
<td>Each</td>
</tr>
<tr>
<td>M6-9a</td>
<td>1</td>
<td>Each</td>
</tr>
<tr>
<td>M2-2R</td>
<td>6</td>
<td>Each</td>
</tr>
<tr>
<td>M4-2R</td>
<td>4</td>
<td>Each</td>
</tr>
<tr>
<td>M6-3</td>
<td>6</td>
<td>Each</td>
</tr>
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</table>

#### Barricades

<table>
<thead>
<tr>
<th>Type 3 (4' to 12')</th>
<th>Pedestrian</th>
<th>Fixed</th>
<th>Portable</th>
<th>Pedestrian</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>23</td>
<td>6</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>

### NOTE:

Portable Changeable Message Boards shall be in place 7 calendar days before the project begins to allow advance notice to the traveling public. During this time, Working Days will be charged, but no other work can be completed.
GENERAL NOTES:

MATERIAL: Use ASTM A615, Grade 60 reinforcing bars, except for the loop bars (d1, d2, and d3). The loop bars shall be smooth steel bars with a minimum yield strength of 60 ksi, a tensile strength of not less than 135 ksi, a minimum elongation of 16% in 8 inches, and passing a 300 degree bend test using a 5.5 D pin bend diameter. The loop bars shall be installed with a 2" opening in the dimensions shown. Requests for minor variations in section geometry and attachments may be submitted to the Engineer for approval.

LIFTING SLOTS: Lifting slots shall be constructed where specified on the plans to facilitate the drainage of water after installation on the roadway.

TEMPORARY CONCRETE SAFETY BARRIER: Furring and placing of all materials when required. All cut and spliced required to position the temporary barrier shall be included in the Contract unit price bid for "Concrete Safety Barrier (Type F3) (Temporary)." Any relocation of the barrier required for the project shall be paid in accordance with the Special Provisions under the bid item "Concrete Safety Barrier (Type F3) (Temporary)." Unless otherwise noted on the Plans, the Temporary Concrete Safety Barrier shall become the property of the Contractor and shall be removed from the site upon completion of the project.

Approximate weight of one unit equals 2.7 tons.

PLACEMENT: Barrier shall be placed on a paved surface. All loose dirt and sand shall be removed from the roadway surface just prior to placement of the barrier. After the barrier is placed and the connection pin is inserted, tension or pull the barrier such that the installation is taut and the connection pin cannot move vertically. If the connection pin appears to be flush or not tucked, then the process is repeated. It is the responsibility of the Contractor to repair the damaged area or replace the temporary barrier section.

MARKING: The left end (à) of each barrier shall be permanently marked by stamping or forming into the barrier the following information:
- Type F3
- Manufacturer code (as specified by KDOT Bureau of Constr. & Maint.)
- Date (month and year)

DELINEATION: Delineators shall be spaced on 50' centers, except through curves where they shall be spaced on 25' centers. See Standard Drawing RD622B for additional details.

The delineator shall be mounted on the side of the Temporary Concrete Safety Barrier with two delineators at each location. Each delineator shall have a minimum height-to-width ratio of 1.7:1, and a minimum reflective surface area of 8 square inches. The delineators shall be affixed to the Temporary Concrete Safety Barrier as recommended by the manufacturer.

Delineators shall be attached to bridge rail or other structures in construction zones where roadway is narrowed and traffic is subject to the structure. The method and location of placement shall be subject to approval.

When traffic flow is in one direction, the delineators shall be yellow when used on the left, white when used on the right. When traffic flow is in both directions delineators shall be placed back to back and shall correspond to the color of the edge line.

MARKING: The delineator shall be marked with a minimum of 90% reflectivity with 0.3" diameter. The loops shall be installed within minimum 14% elongation in 8 inches, and passing a 180 degree bend test using a 3.5 D pin bend diameter. The loop bars (d1, d2, and d3) shall be installed with a 2" opening in the dimensions shown. Requests for minor variations in section geometry and attachments may be submitted to the Engineer for approval.

CONCRETE SAFETY BARRIER AS RECOMMENDED BY THE MANUFACTURER.

The delineation shall be mounted on the side of the Temporary Concrete Safety Barrier with two delineators at each location. Each delineator shall have a minimum height-to-width ratio of 1.7:1, and a minimum reflective surface area of 8 square inches. The delineators shall be affixed to the Temporary Concrete Safety Barrier as recommended by the manufacturer.

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Delineators shall be attached to bridge rail or other structures in construction zones where roadway is narrowed and traffic is subject to the structure. The method and location of placement shall be subject to approval.

When traffic flow is in one direction, the delineators shall be yellow when used on the left, white when used on the right. When traffic flow is in both directions delineators shall be placed back to back and shall correspond to the color of the edge line.

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Delineators shall be attached to bridge rail or other structures in construction zones where roadway is narrowed and traffic is subject to the structure. The method and location of placement shall be subject to approval.

When traffic flow is in one direction, the delineators shall be yellow when used on the left, white when used on the right. When traffic flow is in both directions delineators shall be placed back to back and shall correspond to the color of the edge line.

MARKING: The left end (à) of each barrier shall be permanently marked by stamping or forming into the barrier the following information:
- Type F3
- Manufacturer code (as specified by KDOT Bureau of Constr. & Maint.)
- Date (month and year)
INSTALLATION: Noise into the pavement to anchor the concrete safety barrier may be drilled after positioning barrier. Install barrier with through anchoring bolts where possible, use grouted anchor bolts where through bolt can't be used. Do not drill into or otherwise damage support beams, girders, or expansion joints. All work and materials required for the installation of the anchors are subsidiary to the bid item "Concrete Safety Barrier".

GENERAL NOTES:

1. Alternately Drilled and Grouted Anchor Installation avoids damage to the support beams, girders, or expansion joint. The State Bridge Office shall approve the use of the Alternate Drilled and Grouted Anchor Installation for Opt. 1B applications.

2. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

3. For sign spacing, traffic control device details and reference notes, see Reference Notes on this drawing.

4. Utilize the Alternate Drilled and Grouted Anchor Installation for Opt. 1B applications. For sign spacing, traffic control device details and reference notes, see Reference Notes on this drawing.

5. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

6. Following the manufacturer's procedures for hole preparation and curing, install the anchor bolts per the manufacturer's recommended specifications. The hole used must be completely filled with the hole using bitumen bituminous material. For removed or relocated barriers on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

7. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

8. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

9. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

10. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

11. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

12. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

13. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

14. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

15. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

16. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

17. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

18. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

19. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

20. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

21. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

22. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

23. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

24. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

25. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

26. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

27. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

28. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

29. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.

30. For removed or relocated barrier on flexible pavement, fill stake holes with material that meets KDOT Pre-Cast Concrete - Non-shrink Grouts for grouting anchor bolts and reinforcing bars (Material 28071 or 28072). Work and materials required to remove and patch anchor holes is a temporary measure to prevent concrete pullout strength or approved equivalent.
**GENERAL NOTES**

ABSORB 350 (TL2 or TL3) details shown are for "Information Only" and may not be an exact detail of ABSORB 350. See Engineer's copy of ABSORB 350 (TL2 or TL3) Installation Manual for component details, installation procedures and maintenance.

ABSORB 350 (TL2 or TL3) installation in Kansas requires an antifreeze solution regardless of the time of year. Use an antifreeze solution of Calcium Chloride (CaCl2) 25%, by weight, Calcium Magnesium Acetate (CMA) 32% by weight or Potassium Acetate (KAc) 32% by weight. Fill elements within 2' of the top with antifreeze solution, reject elements regularly to ensure adequate fill levels.

Do not fill FIRST ELEMENT behind the NOSE PIECE with solution but leave empty.

Transport, reuse or dispose of antifreeze solution properly when emptying Absorb 350 elements.

The ABSORB 350 can connect to permanent or temporary T-Shape Barrier. Units shown in sheets abut T-Shape Barriers or within 3'-9" of the adjacent T-Shape Barrier.

Install ABSORB 350 Impact Attenuator on a paved surface with a crown slope of 9% or less. Maintain a clear area free of obstructions behind ABSORB 350 Terminal Assembly. Keep an additional Clear Area 20' parallel from the back of barrier for a distance of 75' behind ABSORB 350 Terminal Assembly.

Maintain a clear area free of obstructions behind ABSORB 350 Terminal Assembly. Keep an additional Clear Area 20' parallel from the back of barrier for a distance of 75' behind ABSORB 350 Terminal Assembly.

Do not install Absorb 350 Impact Attenuator in Narrow Medians, on Elevated Structures or where Clear Area can be achieved.

All work and material required for installation of this Impact Attenuator to be paid under the bid item "Impact Attenuator (Temporary)".

Install Cap and drill additional 3" diameter hole in "B" Position Element. Drilling holes as needed on some higher speed configurations. See ABSORB 350 System Configuration Chart for location of additional vent holes.

Do not fill FIRST ELEMENT behind the NOSE PIECE with solution but leave empty.

Transport, reuse or dispose of antifreeze solution properly when emptying Absorb 350 elements.

Check components for antifreeze solution. Replace elements as needed.

Do not install Absorb 350 Impact Attenuator in Narrow Medians, on Elevated Structures or where Clear Area can be achieved.

Transport, reuse or dispose of antifreeze solution properly when emptying Absorb 350 elements.

Drill additional 3" diameter hole in "A" Position Element. Drill Cap and drill 7/8" hole for Cap Tether.

Do not fill FIRST ELEMENT behind the NOSE PIECE with solution but leave empty.

Transport, reuse or dispose of antifreeze solution properly when emptying Absorb 350 elements.

Drill additional 3" diameter hole in "A" Position Element. Drill Cap and drill 7/8" hole for Cap Tether.

Additional holes required on some higher speed configurations. See ABSORB 350 System Configuration Chart for location of additional vent holes.

Drill additional 3" diameter hole in "B" Position Element.

Install Cap and drill 7/8" hole for Cap Tether.

**KANSAS**

**STATE**

**KANSAS DEPARTMENT OF TRANSPORTATION**

**IMPACT ATTENUATOR**

**ABSORB 350 (TL2 OR TL3)**

For Temporary Installation

**TABLE 1**

<table>
<thead>
<tr>
<th>Flare Rate</th>
<th>Quantity</th>
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**DATE**

10-05-10

**DESIGN CK.**

S.W.K.

**TRACED**

Bowser

**TRACED**

King

**DESIGNED**

KDOT Graphics Certified

**KDOT Graphics Certified**
# INERTIAL BARRIER SYSTEM

**Station** | **Side** | **Design Speed** | **Comments**
--- | --- | --- | ---
170 EB | R1 | 65 mph |  

## TYPICAL PLAN of INERTIAL BARRIER

When two-way traffic is adjacent to only one side of Concrete Barrier or Obstacle, these additional modules will be placed on the Traffic Side of Concrete Barrier or Obstacle. Traffic adjacent to both sides of the Concrete Barrier or Obstacle requires an additional set of modules on each side if approach traffic is exposed to the back portion of the Inertial Barrier. These additional modules are not required along the sides of Concrete Barrier or Obstacle when the location is outside the Clear Zone or one-way directional traffic.

**PLAN - CLEAR AREA**

- Concrete Barrier
- Inertial Barrier
- Variable Module

**PLAN Module Replacement**

- LFR module to correct weight for its position in array.

**STATIC NOTE**

- This drawing details general configurations for Inertial Barrier Systems. Some project specific conditions may require variations which are designed to meet prevailing criteria.
- Use Inertial Barrier System consisting of the units as shown for the specified design speed, all hardware and attachments.
- Install Inertial Barrier System on a flat, stable base with cross-slope no steeper than 10:1. See Manufacturer's recommendations for module materials and method of installation.
- Provide a 6" spacing between modules and one foot between the end of concrete barrier or other rigid object.
- Keep available replacement modules to replace any size module used on site. Inertial Barrier System damaged by the Contractor during relocation of Inertial Barrier System are replaced at the Contractor's expense.
- Module weights shown are in pounds.
- Install 270 square inches of Type II High Performance (vertical, rectangular or diamond shape) reflective sheeting on first module of Inertial Barrier System facing traffic.
- Where sufficient space is available the Inertial Barrier System may be aligned at an angle, not to exceed 10°, in the direction of approach traffic.
- No portion of the system shall encroach into the approach traffic lane.
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