

# How to Maintain Your Bridges on a Budget

2013 Michigan Bridge Conference

March 20, 2013  
Cleary University  
Howell, MI



- Inspections
- Plans of Action
- Inexpensive fixes

# Silver Bridge over the Ohio River Constructed in 1928



Photo courtesy of Herald Dispatch, Huntington, WVA



Photo courtesy of Herald Dispatch, Huntington, WVA

December 15, 1967



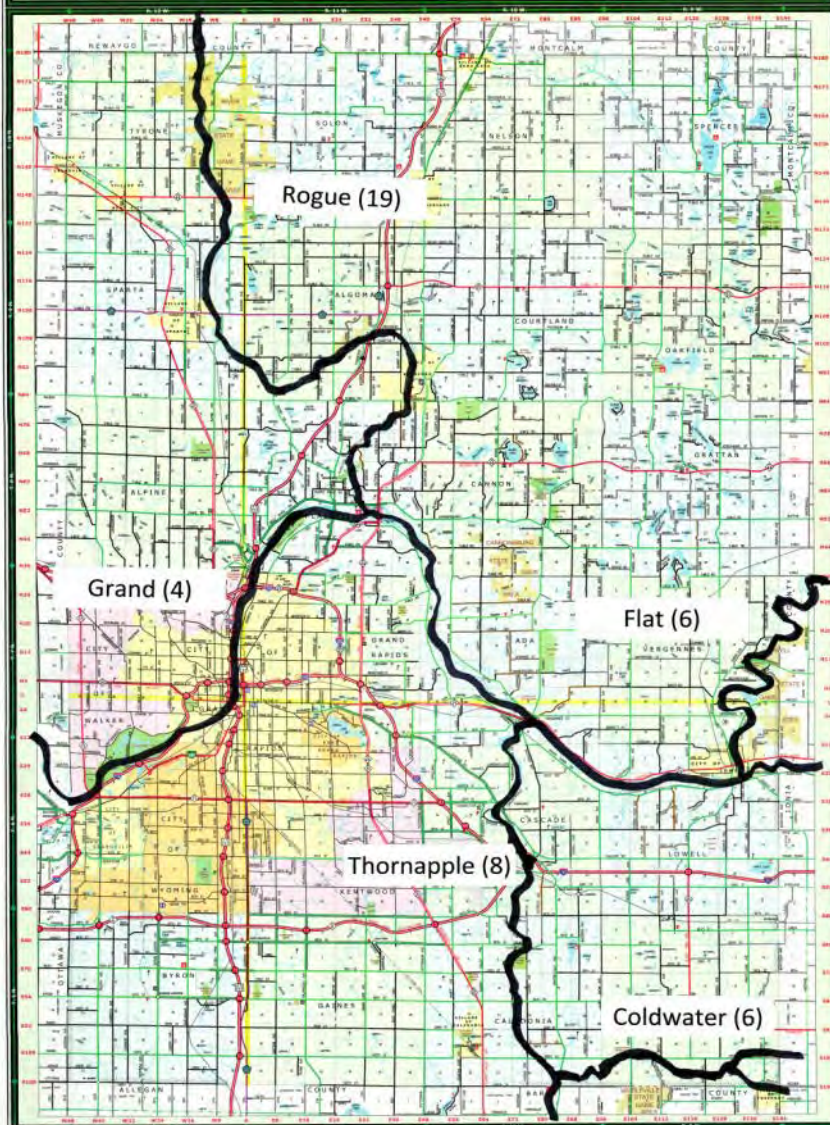
Photo courtesy of Herald Dispatch, Huntington, WVA

- Overview of Kent County
  - 176 bridges
    - 169 over water
    - 1 over roadway
  - 4 railroad over road
- 2 pedestrian over road
  - 600+ 5' to 20'



# KENT COUNTY MICHIGAN

OFFICIAL ROAD MAP



**INTERSTATE, STATE & U.S. ROADS**

- Interstate
- State
- U.S. Highway
- County Road
- Local Road

**COUNTY PRIMARY ROADS**

- County Primary Road
- County Secondary Road
- County Tertiary Road
- County Quaternary Road

**LOCAL ROADS**

- Local Road
- Local Road
- Local Road
- Local Road
- Local Road

**PUBLIC LANDS**

- Public Land
- Public Land
- Public Land
- Public Land

**OTHER FEATURES**

- City
- Township
- Water
- Forest
- Other



www.kentcountymichigan.com



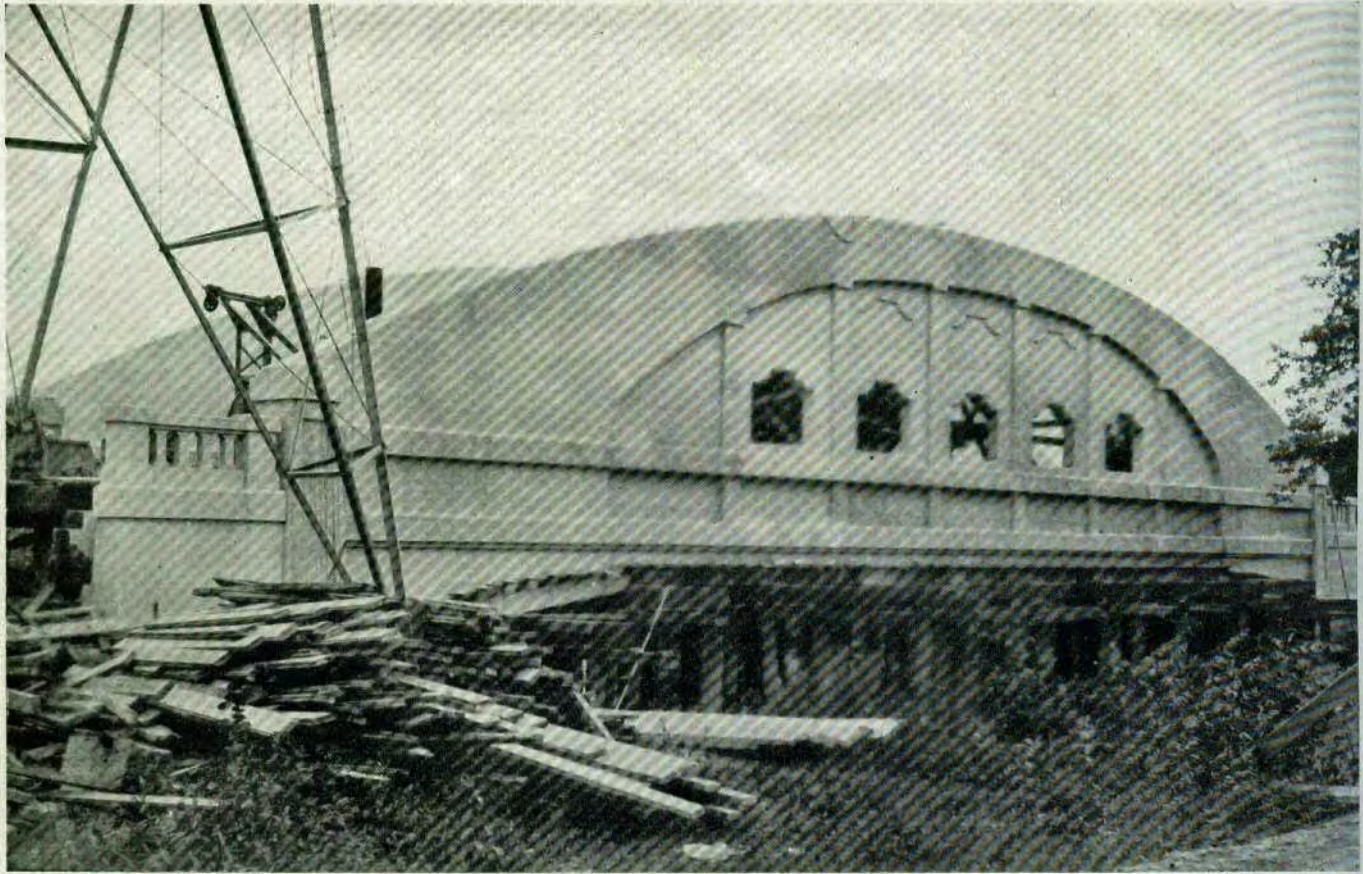
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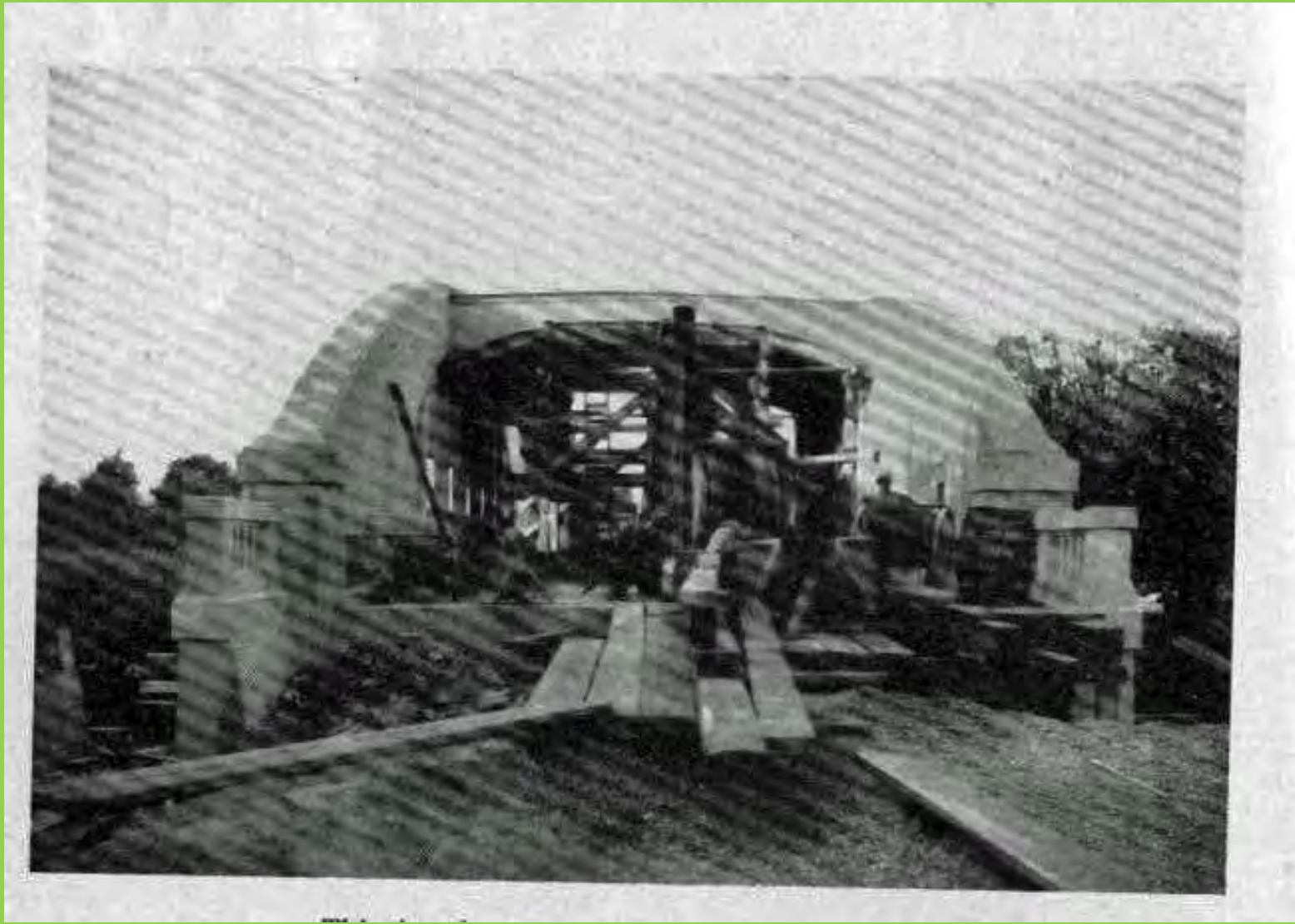


- Original bridges
- Owned / constructed by the townships
  - 5 covered bridges
    - 2 left
      - 1 original
      - 1 replica



- Michigan Dept. of State Highways
  - 1905
  - Charles Malek – Bridge Engineer
- Designed all the bridges in the state for MDSH, counties and cities











A typical reinforced concrete box culvert under construction on M-13 south of Grand Rapids.

- Kent County
  - Staff Engineer for Bridges
  - William Brunson PE # 1606
  - Inspection & Maintenance
    - Inspection
      - Hand written 8 X 10 cards
      - 5 year intervals starting in 1935
- Single sheet load ratings (deck) in file

# Maintenance

Both contract and dedicated county crew

Painting

Steel repairs

Redecking - trusses





Knapp Bridge—placing seal coat of tar on new floor to waterproof the surface.





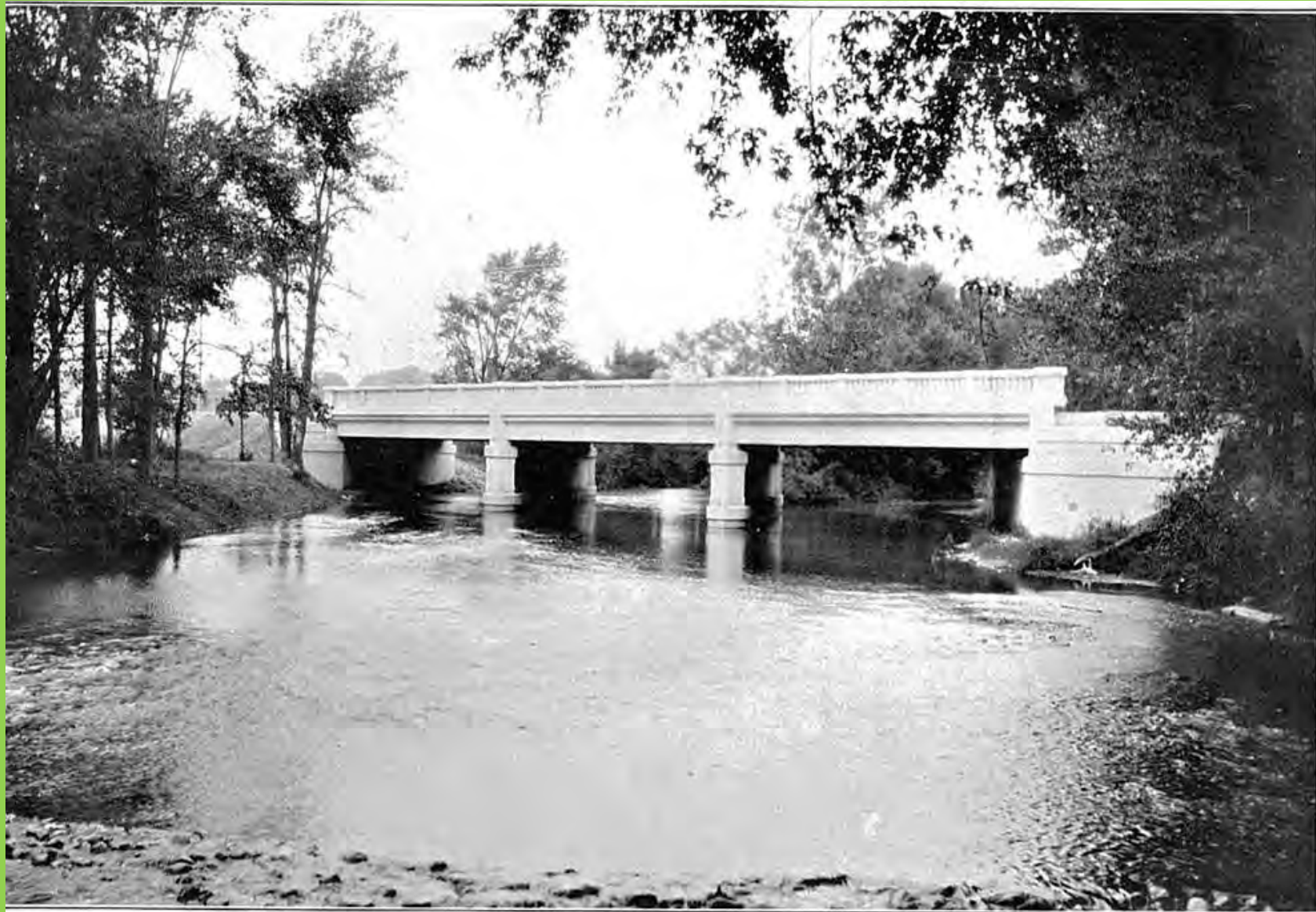
Placing new floor and guard rail on the Knapp Bridge over Grand River. Traffic was not interrupted while this work was being done.



LaBarge Bridge over the Thornapple River. Tightening, strengthening, painting and a new asphalt plank floor brought this bridge up to standard specifications. The work was done this summer, the bridge being closed to traffic only three weeks.

- Construction
- 20's 30's 50's60's
- Kept up with primary system using federal funds





New Bridge over Rouge River on the West River Road, looking upstream.



18 Mile over the Rogue River

- Early 60's lots of growth in the townships
- Lots weight restricted trusses or 18 foot wide concrete slab decks
- Identified 45 - 20 feet and longer on the local system needing replacement
- Loading concern was school buses









- 1968-1977 local bridge program
  - 3-party agreement

|                    |                 |
|--------------------|-----------------|
| 25% township       | \$35,000 / year |
| 25% County of Kent | \$35,000 / year |
| 50% KCRC           | \$70,000 / year |

Bridges by contract

Culverts by county forces (“the bridge crew”)

8



3







- 2<sup>nd</sup> 10 year program 1979-1988
  - 64 bridges / culverts
    - 25% County of Kent \$61,000 / year
    - 10% Townships \$18,000 / year
    - 65% KCRC \$167,000 / year

Very successful in getting bridge and culvert needs addressed

Manager ended the bridge crew

- 1968

National Bridge Inspection Standards

Only on Federal aid routes

- 1978

Applied to all public roads

- New inspection / filing system
  - Still in use today

KCRC did entire system not just the Federal Aid routes





# PRE STRESSED CONCRETE BRIDGE

MEGER BUSINESS SYSTEMS

DATE JUNE 5, 1970

NO. OF SPANS THREE SPAN

DATE BUILT SEPT. 1970 --

|   |  |  |                            |                      |                         |                         |                           |
|---|--|--|----------------------------|----------------------|-------------------------|-------------------------|---------------------------|
| APPROX. SAFE LOAD CAPACITY                  |  | OF STRUCTURE H-20                                      |                            | OF FLOOR SYSTEM H-20 |                         |                         |                           |
| CLEAR SPAN<br>149'-11"                      | LENGTH O. TO O. OF FLOOR<br>33'-5"                   | WIDTH  | BETWEEN CURBS<br>-         | FELLOE GUARDS<br>-   | CLEAR ROADWAY<br>31'-7" | OUT TO OUT TRUSSES<br>- | SUPER STRUCTURE<br>33'-5" |
| HEIGHT OF FLOOR ABOVE                       |  | CLEARANCE DIMENSIONS                                   |                            |                      | PROVISION FOR EXPANSION |                         |                           |
| BRIDGE SEAT<br>2'-0 1/2"                    | BOTTOM CHORD<br>-                                    | MAX. HEIGHT<br>-                                       | WIDTH<br>31'-7"            | MIN. HEIGHT<br>-     | ROLLER REST<br>-        | ROCKERS<br>-            | SLIDING<br>✓              |
| WIDTH SIDEWALK<br>-                         | TYPE OF RAILING<br>STEEL BEAM GUARD RAIL, WOOD POSTS |  | TYPE AND SIZE OF CURB<br>- |                      |                         |                         |                           |
| DESCRIPTION OF FLOOR DRAINAGE<br>-          |  | TYPE AND THICKNESS OF WEARING SURFACE<br>3" BIT. CONC. |                            |                      |                         |                         |                           |
| ALIGNMENT AND SKEW OF STRUCTURE<br>O.K. 65° |  |  |                            |                      |                         |                         |                           |

|                            |   |                        |   |      |                                 |      |                                 |
|----------------------------|---|------------------------|---|------|---------------------------------|------|---------------------------------|
| STREAM ROGUE RIVER         |   | 14.0'                  | HEIGHT FROM GRADE TO STREAM BED                       | 7.0' | HEIGHT FROM GRADE TO HIGH WATER | 9.0' | HEIGHT FROM UNCL. TO STREAM BED |
| CHANNEL CHARACTERISTICS    | APPROX. WIDTH BETWEEN BANKS<br>135' @ 30°             | CHANNEL DEPTH<br>2'-3" | NATURE OF BOTTOM<br>SANDY & GRAVELLY                  |      |                                 |      |                                 |
| CONDITION OF BANKS<br>O.K. | ALIGNMENT OF STREAM ABOVE AND BELOW STRUCTURE<br>O.K. |                        | TYPE OF SLOPE PROTECTION<br>SLOPE PROTECTION, CLASS A |      |                                 |      |                                 |
| SKEW OF NORMAL FLOW<br>65° |   |                        |   |      |                                 |      |                                 |

### PRESTRESSED CONCRETE BOX BEAMS

| NO. OF BEAMS | WIDTH OF BEAMS | BEAM DEPTH | BEAM LENGTH | WIDTH O. TO O. | TYPE OF JOINT SEAL                          |
|--------------|----------------|------------|-------------|----------------|---|
| 11           | 3'-0"          | 21"        | 49'-11"     | 33'-5"         | 1" Neoprene Seal (Jeene) Transverse<br>1996 |

### PRESTRESSED CONCRETE 1-BEAMS

| NO. OF BEAMS | WIDTH OF BEAMS | BEAM DEPTH | BEAM LENGTH | BEAM SPAC'G | WIDTH O. TO O. | TYPE OF JOINT SEAL | SLAB THICKNESS |
|--------------|----------------|------------|-------------|-------------|----------------|--------------------|----------------|
|              |                |            |             |             |                |                    |                |

### SUB-STRUCTURE

| ABUTMENTS AND PIERS | MATERIAL | TYPE                     | HT. FTG. TO BR. SEAT | WIDTH BR. SEAT | LENGTH OF BR. SEAT | FOUNDATIONS (PILINGS)  | WINGS (LENGTHS, ANGLES, ETC.) |
|---------------------|----------|--------------------------|----------------------|----------------|--------------------|------------------------|-------------------------------|
| REAR "A"            | CONCRETE | CURTAIN WALL             | 9'-5 1/2"            | 2'-0"          | 33'-5"             | 12" C.I.P. CONC. PILES | NO WINGS                      |
| FORWARD "B"         | "        | "                        | "                    | "              | "                  | "                      | "                             |
| PIER #1             | "        | C.I.P. CONC. PILE w/ CAP | (PILES ARE ENCASED)  | 3'-0"          | 33'-5"             | 60TON PILES            |                               |
| PIER #2             | "        | "                        | "                    | "              | "                  | "                      |                               |
| PIER                |          |                          |                      |                |                    |                        |                               |

|                       |      |  |  |                   |
|-----------------------|------|--|--|-------------------|
| POSTED FOR: GROSS WT. | TONS | <input type="checkbox"/> ONE LANE BRIDGE | <input type="checkbox"/> NARROW BRIDGE | OVERALL CONDITION |
|-----------------------|------|--|--|-------------------|

|                |          |              |   |               |     |               |         |             |       |          |      |
|----------------|----------|--------------|---|---------------|-----|---------------|---------|-------------|-------|----------|------|
| WORK ORDER NO. | PLA. 353 | CORRES. FILE | YES   | NOTE FILE NO. | 417 | PLAN FILE NO. | Yes     |             |       |          |      |
| BRIDGE NO.     | PLA.-16  | LOCATION     | ROGUE RIVER ROAD - 0.30 MILE WEST OF PACKER DRIVE | ROAD CL.      | 10. | SECTION       | 15 # 22 | CL. ROADWAY | 31.6' | STRENGTH | H-20 |

| BRIDGE NO.        | LOCATION   | ROAD CL. | SECTION    | CL. ROADWAY | STRENGTH |
|-------------------|--|----------|------------|-------------|----------|
| PLA.-16           | ROGUE RIVER RD. - 0.30 MILE W. OF PACKER DR.   | 10.      | 15 & 22    | 31.6        | H-20     |
| INSPECTION DATE   | REMARKS  |          |            |             |          |
| 5-16-77           | SOME WOOD BLOCKS, BOLTS & NUTS ARE MISSING IN BRIDGE RAILING.<br>"POP-OUTS" IN ALL 3 SPANS - (5 TOTAL ON BOTTOM OF BMS.)<br>NEED GROUTED RIPRAP IN SE CORNER.<br>SOME BLOCKS & BOLTS MISSING IN APPRO. GD. RAIL, (NEVER BOLTED IN SW COR.) |          |            |             |          |
| 4-17-79           | Same plus riprap N.E & S.W. N.W. shoulder needs gravel   |          |            |             |          |
| 12-8-80           | L & T joints leaking S.E. Corner   |          |            |             |          |
| 12-17-86          | " " " " SE NE corner/as remove large rocks   |          |            |             |          |
| 6-24-89           | Clean & Seal Exp. Jnts. ; NE corner need rock @ header; SW cut tree  |          |            |             |          |
| 4-19-91           | see Report   | 10-26-07 | see Report |             |          |
| 7-17-93           | see Report   | 10-29-09 | see Report |             |          |
| 6-7-95            | see Report   |          |            |             |          |
| 8-13-97           | see Report   |          |            |             |          |
| 10-28-99          | see Report   |          |            |             |          |
| 12-10-01          | see Report   |          |            |             |          |
| 11-21-03          | see Report   |          |            |             |          |
| 10-26-05          | see Report   |          |            |             |          |
| MAINTENANCE DATES |  |          |            |             |          |
| 6-13-85           | Cut brush  |          |            |             |          |
| Fall 89           | Cleaned & sealed long. & transverse jnts.; cut tree SW slope; placed rock NE Header-   |          |            |             |          |
| 6-96              | Resurfaced Bit. Wearing Surface with 3/4" Polyester Hot Mix and 3" Bit. Mix 36A. Install neoprene joint seals (1" Jeene) and upgrade guardrail bridge anchorage<br>Contract 96-16 Contractor: J. Slaughter & Son                           |          |            |             |          |
| 9-16-11           | Mill & Fill  |          |            |             |          |
| 5-7-12            | Debris Removal   |          |            |             |          |

# KENT COUNTY ROAD COMMISSION BRIDGE INSPECTION REPORT

WBKR BUSINESS SYSTEMS

| BRIDGE NO.   | LOCATION  | ROAD CLASS | SECTION | STRENGTH | YEAR BUILT |
|--|---|------------|---------|----------|------------|
| BYR-2  | 64 <sup>TH</sup> ST., 0.3 MI. E. OF KENOWA AVE. | P          | 6       | H-20     | 1957       |
| DESCRIPTION: 72" X 48" REINF CONC. PIPE 48' LONG. GR. ROCKFILL HW'S. R.W.-26'  |   |            |         |          |            |
| CONDITION CODE: GOOD = 1, FAIR = 2, POOR = 3, CRITICAL = 4   |   |            |         |          |            |
| SUPERSTRUCTURE: <span style="float: right;">REMARKS: <span style="border: 1px solid black; padding: 2px;"> </span> TYPE COND.</span>   |   |            |         |          |            |
| 1. DECK SLAB:<br>REINF. CONC. = 1, TIMBER PLANK = 2, CORR. STL. PLANK = 3, JACK ARCH = 4, OTHER = 5  |   |            |         |          |            |
| WEARING SURFACE:<br>2. CONC. = C, BIT CONC. = B, GRAVEL = G, BLACKTOP = BT TYPE COND.  |   |            |         |          |            |
| 3. CURBS:<br>CONC. = C, STL = S, TIMBER = T, OTHER = 0   |   |            |         |          |            |
| 4. WALKWAYS<br>SEE DECK SLAB FOR CODE  |   |            |         |          |            |
| 5. RAILINGS:<br>CONC. = C, STL = S, TIMBER = T, PARAPET-TYPE = P, OTHER = 0  |   |            |         |          |            |
| 6. JOISTS:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 7. FLOOR BEAMS:<br>STL = S, CONC. = C, TIMBER = T  |   |            |         |          |            |
| 8. FLOORBEAM CONNECTIONS:<br>ROD = R, PLATE = P, ANGLE = A   |   |            |         |          |            |
| 9. LONGITUDINAL BEAMS OR ORDERS:<br>STL = S, CONC. = C, PRESTRESSED CONC. = P, TIMBER = T  |   |            |         |          |            |
| 10. TRUSS ALIGNMENT:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 11. HIP VERTICALS:   |   |            |         |          |            |
| 12. END POSTS:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 13. TOP CHORDS:<br>STL = S, TIMBER = T   |   |            |         |          |            |
| 14. BOTTOM CHORDS:<br>STL = S, TIMBER = T TYPE COND.   |   |            |         |          |            |
| 15. WEB MEMBERS - VERTICAL:<br>STL = S, TIMBER = T   |   |            |         |          |            |
| 16. DIAGONAL:  |   |            |         |          |            |
| 17. PORTALS:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 18. SWAYBRACING:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 19. LATERAL BRACING:<br>STL = S, TIMBER = T  |   |            |         |          |            |
| 20. CROSS FRAMES OR DIAPHRAGMS:<br>STL = S, TIMBER = T, CONC. = C  |   |            |         |          |            |
| 21. DECK EXPANSION DEVICES:<br>STL = S, PREMOULDED FIBER = F, OTHER = 0  |   |            |         |          |            |
| 22. BEARINGS: ROCKERS = R, ROLLERS = B, MOLLENS = M, PLATES = P, ELASTOMERIC = E, OTHER = 0  |   |            |         |          |            |
| 23. DRAINAGE SYSTEM: DRAIN CASTINGS = C<br>SCUPPERS = S, OTHER = 0   |   |            |         |          |            |
| 24. ARCHES:<br>CONC. = C, MASONRY = M, TIMBER = T  |   |            |         |          |            |
| 25. PAINTS:<br>SHOW YEAR LAST PAINTED IN LEFT & CENTER BLOCKS  |   |            |         |          |            |
| 26. LEAKAGE:<br>LONG JOINTS = L, TRANSVERSE JOINTS = T, OTHER = 0  |   |            |         |          |            |
| 27. RESPONSE TO LIVE LOAD:<br>EXCESSIVE DEFL. & VIB. = E, SATISFACTORY = 0   |   |            |         |          |            |
| SUB-STRUCTURE  |   |            |         |          |            |
| 28. ABUTMENTS:<br>CURTAIN-WALL = C, STL W-PILE = S, CANTILEVER = L TYPE COND.  |   |            |         |          |            |
| 29. BACKWALLS:<br>CONC. = C, MASONRY = M, STL = S, OTHER = 0   |   |            |         |          |            |
| 30. WING WALLS:<br>CONC. = C, MASONRY = M, STL = S, OTHER = 0  |   |            |         |          |            |
| 31. BRIDGE STAYS-ABUTMENT:<br>CONC. = C, MASONRY = M, TYPICAL = T, STL = S   |   |            |         |          |            |
| 32. PIERS:   |   |            |         |          |            |
| 33. PIERS:<br>COLUMN = C, WALL = W, T-TYPE = T, CAPPED PILE = P, OTHER = 0   |   |            |         |          |            |
| 34. PILING: STL = S, TIMBER = T,<br>CAST-IN-PLACE = C, PRECAST CONC. = P   |   |            |         |          |            |
| GENERAL: <span style="float: right;">TYPE COND.</span>   |   |            |         |          |            |
| 25. STREAM CHANNEL - <span style="float: right;">R N Z</span><br>WATERWAY<br>SHOW IN LEFT BLOCK UNRESTRICTED = U, RESTRICTED = R<br>SCOUR<br>SHOW IN LEFT BLOCK SCURED = Y, NOT SCURED = N<br>ALIGNMENT<br>SHOW IN CONDITION BLOCK |   |            |         |          |            |
| 26. BANK PROTECTION:<br>SHOW IN TYPE BLOCK: ADDITIONAL PROTECTION NEEDED = Y, NO = N   |   |            |         |          |            |
| 27. SLOPE PROTECTION:<br>CONC. = C, BROUDED RIPRAP = S, PLAIN RIPRAP = P <span style="float: right;">E 1</span>  |   |            |         |          |            |
| 28. CULVERTS:<br>BOX = B, ARCH = A, SLAB TOP = S, PIPE = P, WOOD = W <span style="float: right;">P 1</span>  |   |            |         |          |            |
| 29. APPROACH GUARDRAIL:<br>STL BEAM = SB, PLATE = P, CABLE = C, OTHER = 0  |   |            |         |          |            |
| 30. APPROACH GUARD ROSTS:<br>SHOW IN TYPE BLOCK: ADDITIONAL NEEDED = Y, NO = N <span style="float: right;">None N 1</span>   |   |            |         |          |            |
| 31. APPROACH EMBANKMENT:<br>SHOW IN TYPE BLOCK: SETTLED = Y, NOT SETTLED = N <span style="float: right;">N 1</span>  |   |            |         |          |            |
| 32. APPROACH PAVEMENT:<br>CONC. = C, BIT. CONC. = B, OTHER = 0 <span style="float: right;">BT 1</span>   |   |            |         |          |            |
| 33. APPROACH ALIGNMENT & GRADE: <span style="float: right;">2</span>   |   |            |         |          |            |
| 34. SUMMARY: SATISFACTORY = 1, NEEDS HOUSEKEEPING MAINT. = 2,<br>MINOR REPAIR = 3, MAJOR REPAIR = 4 <span style="float: right;">Remove Lattice 1</span>  |   |            |         |          |            |
| 35. INSPECTED BY: <span style="float: right;">USE REVERSE SIDE FOR ADDITIONAL DETAILS<br/>REVIEWED BY:</span>  |   |            |         |          |            |



### KENT COUNTY ROAD COMMISSION - BRIDGE INSPECTION REPORT

| BRIDGE #              | STRUCTURE TYPE  | SPANS       | ROAD CLASS | STRENGTH | YEAR BUILT |
|-----------------------|---|-------------|------------|----------|------------|
| PLA-16                | PRESTRESSED CONC. BOX BEAM  | 3           | LOCAL      | H-20     | 1970       |
| LOCATION              | ROGUE RIVER RD. - 0.3 MI WEST OF PACKER DR.                                   | LENGTH      | 150 FEET   | SECTION  | 16/22      |
| DESCRIPTION           | PRESTRESSED CONC. BOX BEAMS ON CONCRETE CURTAINWALL ABUTS. & CONC. COL. PIERS |             |            |          |            |
| CLEAR ROADWAY - 31.5' | CROSSING  | ROGUE RIVER |            |          |            |

CONDITION CODE :    9-7 Good    6-5 Fair    4-3 Poor    2-0 Critical

| ITEM | SUPERSTRUCTURE        | TYPE | COND | REMARKS   |
|------|-----------------------|------|------|---|
| 1.   | DECK                  | C    | 7    |   |
| 2.   | WEARING SURFACE       | BIT  | 6    | MILLED & FILLED WITH MEMBRANE OVER THE JOINTS   |
| 3.   | CURB & GUTTER WALK    | -    | -    |   |
| 4.   | RAILINGS              | SB   | 7    | DUAL STEEL BEAM RAILING - 1 PIECE ON BACK - S SIDE; N SPAN W SIDE 4 BROKEN POSTS                            |
| 5.   | LONGITUDINAL BEAMS    | PC   | 6    | SEE EMBET NO. 2   |
| 6.   | FLOOR BEAMS           | -    | -    |   |
| 7.   | LATERAL BRACING       | -    | -    | NOTE: MICHCON SOUTH FASCIA - SE CORNER @ WINGWALL, SMALL UNDERPINE @ CASING                                 |
| 8.   | X-FRAMES OR DIAPHRAGM | -    | -    |   |
| 9.   | TRUSS MEMBERS         | -    | -    |   |
| 10.  | DECK JOINTS           | N    | 6    | NEOPRENE (JEBME) JOINT SEAL W/ POLYMER CONC. HEADER - MILLED OUT & PAVED OVER                               |
| 11.  | BEARINGS              | O    | 7    |   |
| 12.  | PAINT/ YEAR 10        | -    | -    |   |
|      | SUBSTRUCTURE          |      |      |   |
| 13.  | ABUTMENTS             | C    | 6    | CURTAINWALL ABUTMENTS: S ABUT LEAKAGE 1", 2", 3" FROM EAST, N ABUT 2" FROM WEST                             |
| 14.  | BACKWALLS             | -    | -    |   |
| 15.  | WINGWALLS             | C    | 6    |   |
| 16.  | PIERS                 | C    | 7    | N PIER (#1) - SPALL ON CAP FACE NE CORNER    S PIER SPALL ON UPSTREAM FACE                                  |
| 17.  | PILES                 | CP   | 6    | 12" CP PILES PIER #1 PILE #4 ENCASEMENT SPALL @ WATERLINE; PIER #2 COL. #1, #4 & #6 VERT CRK. ON ENCASEMENT |
|      | GENERAL               |      |      |   |
| 18.  | WATERWAY OPENING      | U    | 6    |   |
| 19.  | STREAM ALIGNMENT      |      | 6    | 70 TO CENTERLINE ROAD   |
| 20.  | SCOUR                 | #    | 7    |   |
| 21.  | SLOPE PROTECTION      | C    | 6    | EAST SLOPE PAVING    SOUTH HEADER SETTLED 4" ON END   |
| 22.  | APPROACH GUARDRAIL    | SB   | 6    | TYPE 5 RAIL W/ CABLE ENDINGS; SW QUAD END HIT   |
| 23.  | APPROACH PAVEMENT     | BIT  | 6    | MILLED & FILLED 2011  |
| 24.  | APPROACH ALIGNMENT    |      | 6    | HORIZONTAL CURVE WEST APPROACH  |
| 25.  | OVERALL CONDITION     |      | 7    | CUT TREES ACROSS EAST SPAN  |

INSPECTED BY :           TJB                DATE INSPECTED :           10/31/11          

### KENT COUNTY ROAD COMMISSION - BRIDGE INSPECTION REPORT

SHEET 2    BRIDGE #: PLA-16

GENERAL REMARKS :

|   |
|---|
| ITEM #5 (BEAMS):  |
| SPAN #1 - NORTH FASCIA BOTTOM LONG. POP 8" X 8" X 3", SOUTH FASCIA MAP CRACKING @ BEARING "CURB" POPOUT 6" X 9" X N END 6"                                      |
| BEAM #5 AND #7 HAVE 12" SEMI-CIRCLE POPOUT @ SOUTH SIDE   |
| BEAM #6 HAS 12" SEMI-CIRCLE POPOUT NORTH SIDE NEAR ABUT.  |
| 3 STRANDS GONE AT BROKEN POSTS  |
| SPAN #2 - SOUTH FASCIA MAP CRACKING @ BEARING BOTH ENDS; SOME DETERIORATION S END - ASR?  |
| BEAM #5 AND #6 - 12" SEMI-CIRCLE POPOUT ON BOTTOM EDGE (MIDSPAN); #7 SMALL POPOUT S. SIDE 10' FROM PIER #2  |
| BEAM #8 HAS 12" SEMI-CIRCLE POPOUT ON BOTTOM EDGE EAST  |
| BM #4 & #6 BTM CRKS @ PIER #2; BM #1 RUST STAINING ON BTM @ POST-TENSIONING   |
| SPAN #3 - SOUTH FASCIA MAP CRACKING @ BEARING BOTH ENDS   |
| S NORTH FASCIA VERT. FACE CRACK @ GR POST #5 (TOP & BTM BOLT ) ALSO BTM CRACK 3" AND 6" FROM FACE POST #6, LONG. BOTTOM CRACK 6" FROM N. FACE BTW. POST #3 & #4 |
| BEAM #9 HAS 3" X 18" X 3/4" SPALL ON SOUTH END  |

SKETCH :

- Inspections

What do you find?

Culverts

Headwall cave-ins, washouts, brush

Occasionally a “surprise”

Bridges

Cracks, shallow holes in the concrete deck, rusty steel, box beam damage, joint failures



























2005/01/01

















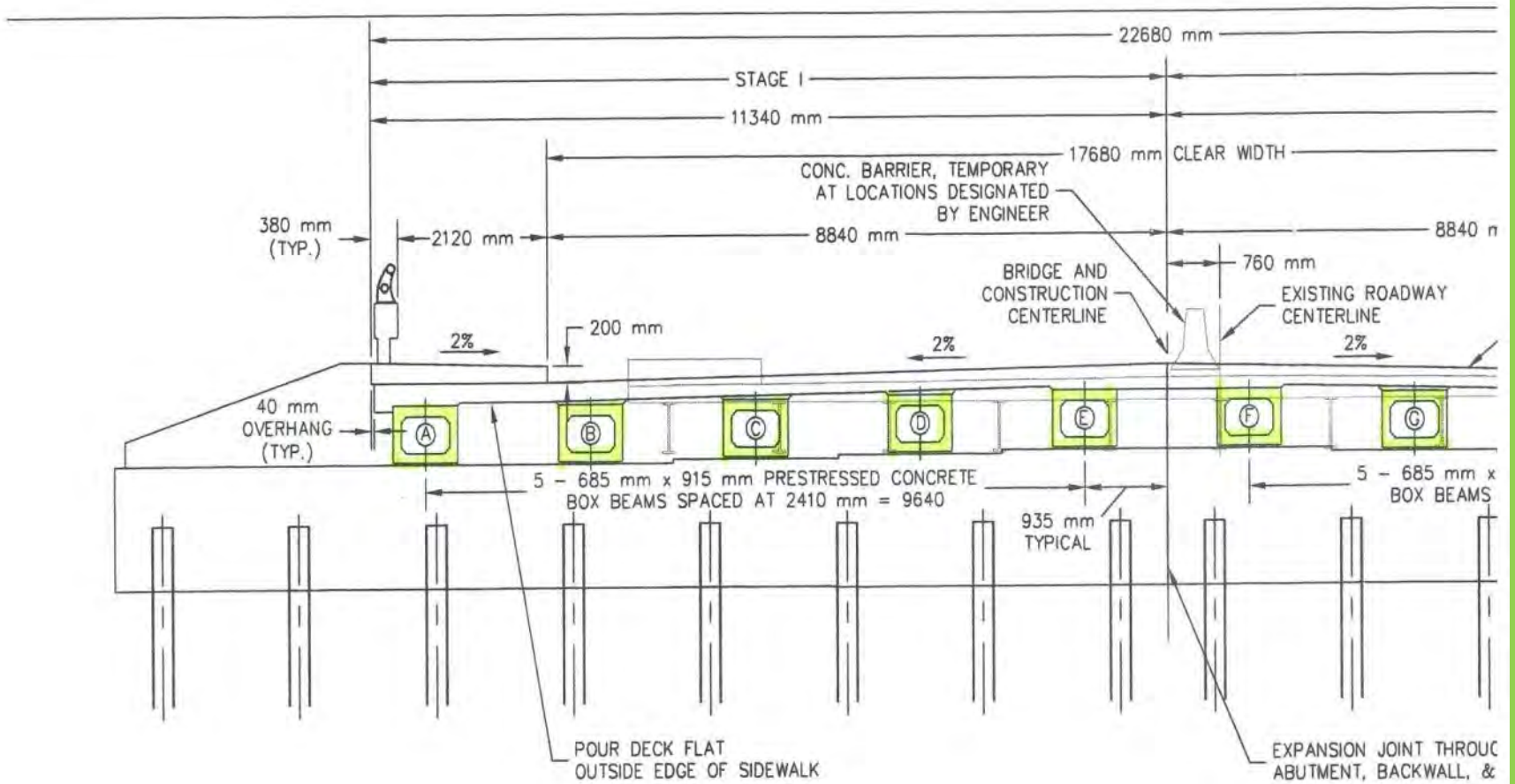


- Bridge Work items
- Beam repair, deck repair, epoxy seal, joint repair









## DECK SECTION AT MIDSPAN

SCALE 1:50

CONCRETE DECK ALONG PROPOSED CENTERLINE.  
 POSITION OF DECK AND BEAMS.  
 STEEL SHEET ALONG PROPOSED  
 MAIN ROAD FILL.  
 POSITION OF PROPOSED CENTERLINE.  
 STEEL BACKWALL NORTH OF PROPOSED CENTERLINE.  
 THE SCALE OF BRIDGE

NOTE: STAY-IN-PLACE FORMS NOT ALLOWED



RAP, HEAVY, MODIFIED  
ICAL EACH QUADRANT

3000 mm  
(TYP.)

GAURDRAIL, ANCHORAGE,  
DGE, DET T3 - MODIFIED

8000 mm  
(TYP.)

NEW 2120 mm  
SIDEWALK SHOWN  
HATCHED

SIDEWALK

2120 mm

ING #2

6100 mm  
APPROACH SLAB

SOIL  
6100  
APPROA

PROPOSED  $\phi$

10+880

90°

REF. PT. A  
STA. 10+876.450  
ELEV. 205.623

REF.  
STA.  
ELEV.

EXISTING REF. LINE

EXISTING

150  
PAVEM  
(1

2000 mm  
SIDEWALK  
(TYP.)

CONC. OPEN PARAPET  
BRIDGE RAIL

PROPOSED BRIDGE

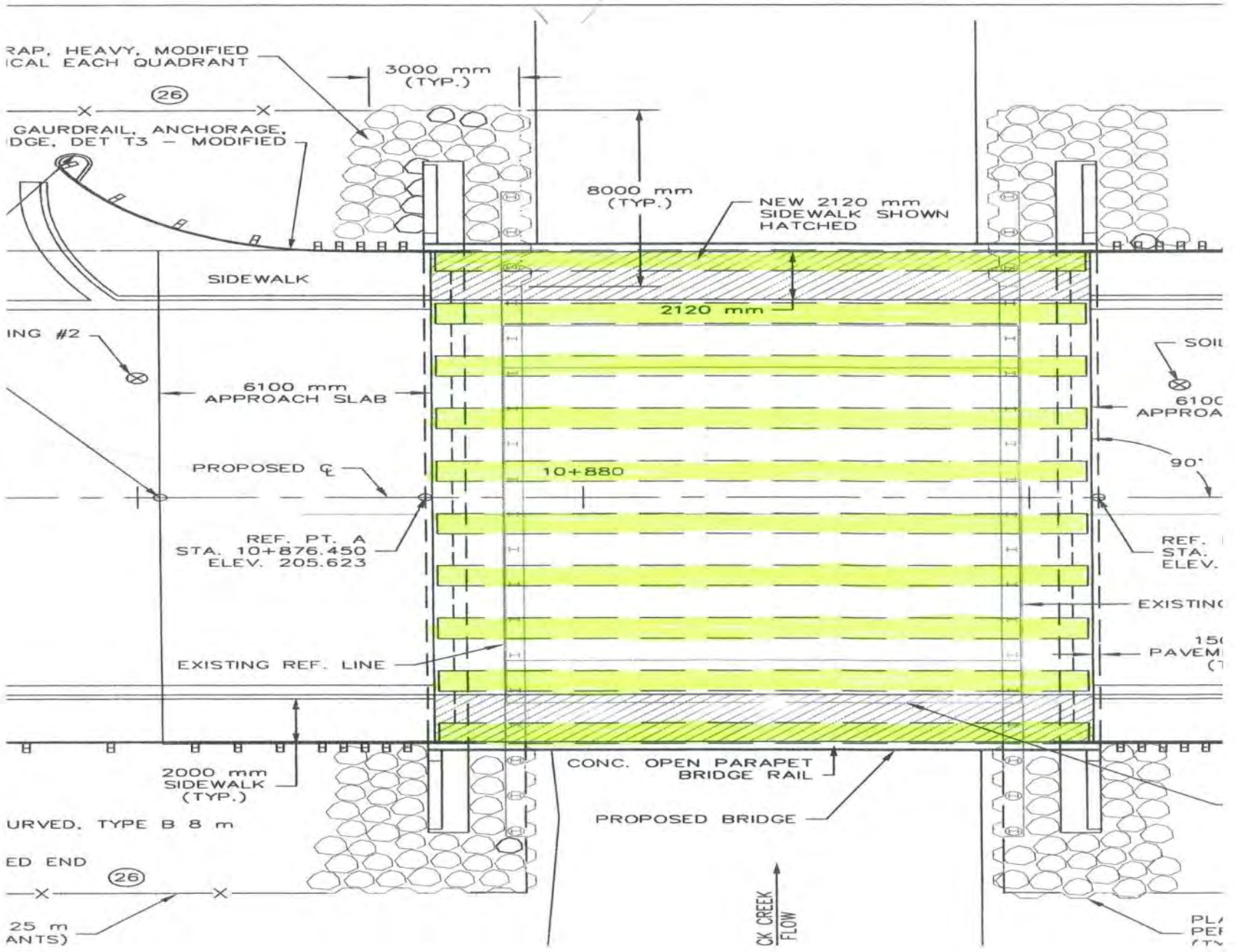
URVED, TYPE B 8 m

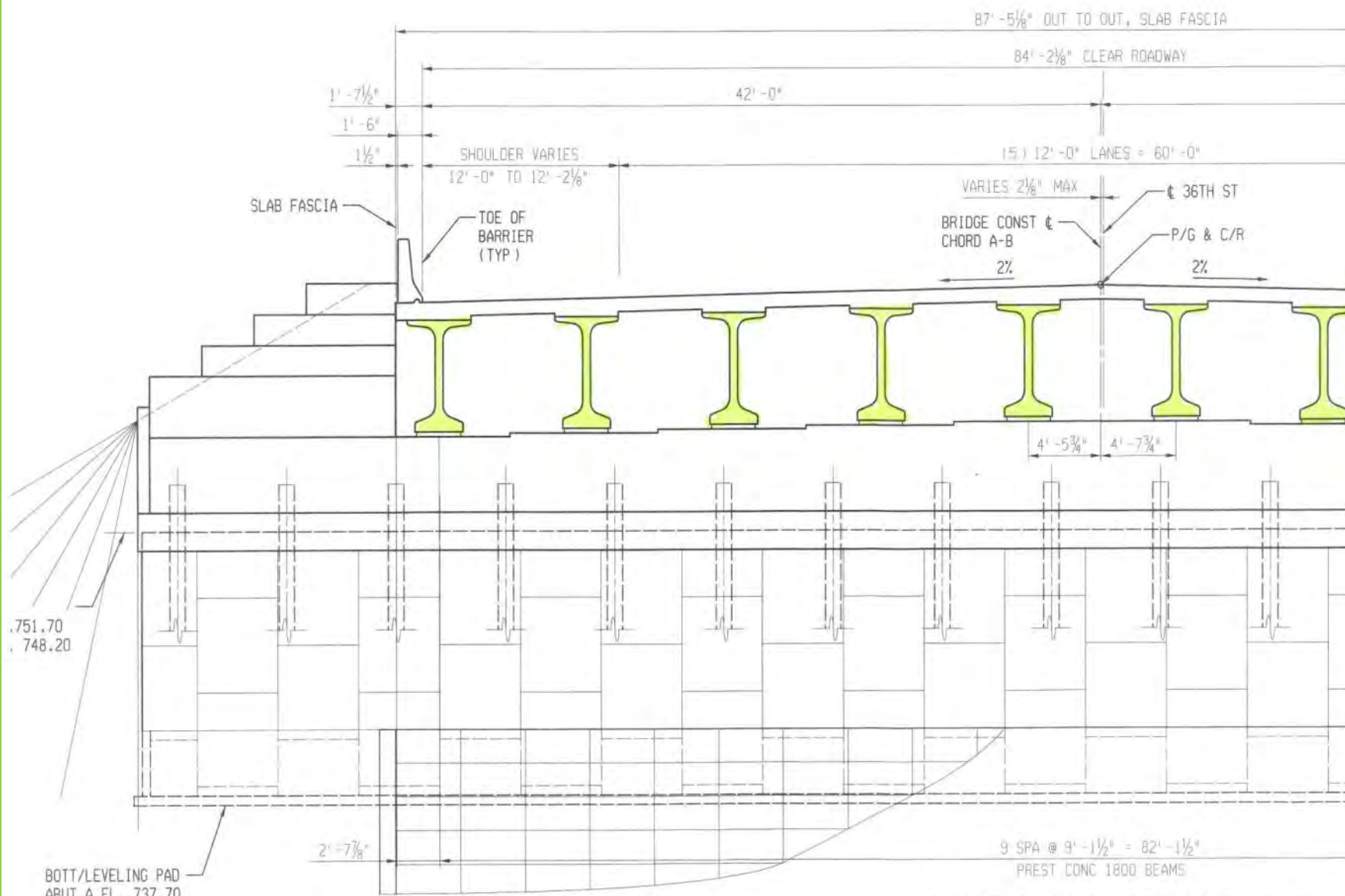
ED END

25 m  
ANTS)

CK CREEK  
FLOW

PL  
DEF  
77





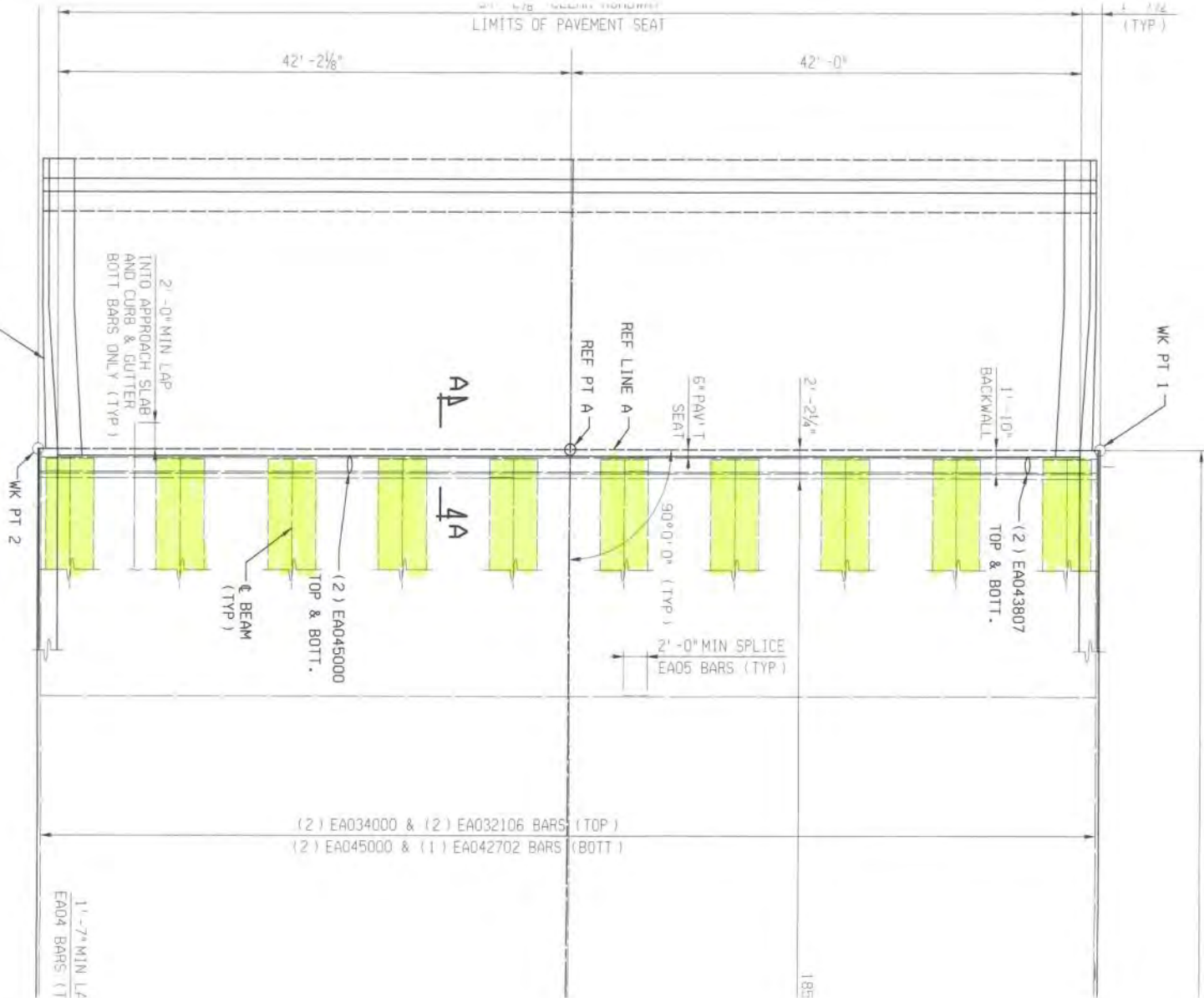
BOTT/LEVELING PAD  
 ABUT A EL. 737.70  
 ABUT B EL. 733.90

TYPICAL DECK SECTION A-A

Expansion

1' - 10"

c and Gutter, Bridge Approach  
( TYP X SEE ROAD PLANS )



185



- By the end of the first decade of the new century became evident we were losing ground on our bridge maintenance
- Maintenance Division could not keep up as part of the “daily work”
  - Reestablished the “bridge crew”
- 2 full time employees, part timers and full time as necessary mid April to mid Oct.

- Work Plan
- Get copy of each inspection report with work items highlighted
- Work item matrix by individual townships  
so they can gear up to do a work item say deck patching or guardrail repairs on multiple structures





### KENT COUNTY ROAD COMMISSION - BRIDGE INSPECTION REPORT

| BRIDGE #              | STRUCTURE TYPE  | SPANS       | ROAD CLASS | STRENGTH | YEAR BUILT |
|-----------------------|---|-------------|------------|----------|------------|
| PLA-16                | PRESTRESSED CONC. BOX BEAM  | 3           | LOCAL      | H-20     | 1970       |
| LOCATION              | ROGUE RIVER RD. - 0.3 MI WEST OF PACKER DR.                                   | LENGTH      | 150 FEET   | SECTION  | 16/22      |
| DESCRIPTION           | PRESTRESSED CONC. BOX BEAMS ON CONCRETE CURTAINWALL ABUTS. & CONC. COL. PIERS |             |            |          |            |
| CLEAR ROADWAY - 31.5' | CROSSING  | ROGUE RIVER |            |          |            |

CONDITION CODE :    9-7 Good    6-5 Fair    4-3 Poor    2-0 Critical

| ITEM | SUPERSTRUCTURE        | TYPE | COND | REMARKS   |
|------|-----------------------|------|------|---|
| 1.   | DECK                  | C    | 7    |   |
| 2.   | WEARING SURFACE       | BIT  | 6    | MILLED & FILLED WITH MEMBRANE OVER THE JOINTS   |
| 3.   | CURB & GUTTER WALK    | -    | -    |   |
| 4.   | RAILINGS              | SB   | 7    | DUAL STEEL BEAM RAILING - 1 PIECE ON BACK - S SIDE; N SPAN W SIDE 4 BROKEN POSTS                          |
| 5.   | LONGITUDINAL BEAMS    | PC   | 6    | SEE EMBET NO. 2   |
| 6.   | FLOOR BEAMS           | -    | -    |   |
| 7.   | LATERAL BRACING       | -    | -    | NOTE: MICHCON SOUTH FASCIA - SE CORNER @ WINGWALL, SMALL UNDERPINE @ CASING                               |
| 8.   | X-FRAMES OR DIAPHRAGM | -    | -    |   |
| 9.   | TRUSS MEMBERS         | -    | -    |   |
| 10.  | DECK JOINTS           | N    | 6    | NEOPRENE (JEEBE) JOINT SEAL W/ POLYMER CONC. HEADER - MILLED OUT & PAVED OVER                             |
| 11.  | BEARINGS              | O    | 7    |   |
| 12.  | PAINT/ YEAR 10        | -    | -    |   |
|      | SUBSTRUCTURE          |      |      |   |
| 13.  | ABUTMENTS             | C    | 6    | CURTAINWALL ABUTMENTS: S ABUT LEAKAGE 1", 2", 3" FROM EAST, N ABUT 2" FROM WEST                           |
| 14.  | BACKWALLS             | -    | -    |   |
| 15.  | WINGWALLS             | C    | 6    |   |
| 16.  | PIERS                 | C    | 7    | N PIER (#1) - SPALL ON CAP FACE NE CORNER    S PIER SPALL ON UPSTREAM FACE                                |
| 17.  | PILES                 | CP   | 6    | 12" CP PILES PIER #1 PILE #4 ENCASEMENT SPALL @ WATERLINE; PIER #2 COL #1, #4 & #6 VERT CRK ON ENCASEMENT |
|      | GENERAL               |      |      |   |
| 18.  | WATERWAY OPENING      | U    | 6    |   |
| 19.  | STREAM ALIGNMENT      |      | 6    | 70 TO CENTERLINE ROAD   |
| 20.  | SCOUR                 | #    | 7    |   |
| 21.  | SLOPE PROTECTION      | C    | 6    | EAST SLOPE PAVING    SOUTH HEADER SETTLED 4" ON END   |
| 22.  | APPROACH GUARDRAIL    | SB   | 6    | TYPE 5 RAIL W/ CABLE ENDINGS; SW QUAD END HIT   |
| 23.  | APPROACH PAVEMENT     | BIT  | 6    | MILLED & FILLED 2011  |
| 24.  | APPROACH ALIGNMENT    |      | 6    | HORIZONTAL CURVE WEST APPROACH  |
| 25.  | OVERALL CONDITION     |      | 7    | CUT TREES ACROSS EAST SPAN  |

INSPECTED BY :    TJB    DATE INSPECTED :    10/31/11

### KENT COUNTY ROAD COMMISSION - BRIDGE INSPECTION REPORT

SHEET 2    BRIDGE #: PLA-16

GENERAL REMARKS :

|  |  |
|--|--|
| ITEM #5 (BEAMS):   |  |
| SPAN #1 - NORTH FASCIA BOTTOM LONG. POP 8" X 8" X 3", SOUTH FASCIA MAP CRACKING @ BEARING "CURB" POPOUT 6" X 9" X N END 6"                                       |  |
| BEAM #5 AND #7 HAVE 12" SEMI-CIRCLE POPOUT @ SOUTH SIDE  |  |
| BEAM #6 HAS 12" SEMI-CIRCLE POPOUT NORTH SIDE NEAR ABUT.   |  |
| 3 STRANDS GONE AT BROKEN POSTS   |  |
| SPAN #2 - SOUTH FASCIA MAP CRACKING @ BEARING BOTH ENDS; SOME DETERIORATION S END - ASR?   |  |
| BEAM #5 AND #6 - 12" SEMI-CIRCLE POPOUT ON BOTTOM EDGE (MIDSPAN); #7 SMALL POPOUT S. SIDE 10' FROM PIER #2   |  |
| BEAM #8 HAS 12" SEMI-CIRCLE POPOUT ON BOTTOM EDGE EAST   |  |
| BM #4 & #6 BTM CRKS @ PIER #2; BM #1 RUST STAINING ON BTM @ POST-TENSIONING  |  |
| SPAN #3 - SOUTH FASCIA MAP CRACKING @ BEARING BOTH ENDS  |  |
| S NORTH FASCIA VERT. FACE CRACK @ GR POST #5 (TOP & BTM BOLT ) ALSO BTM CRACK 3" AND 6" FROM FACE POST #6, LONG. BOTTOM CRACK 6" FROM N. FACE BTW. POST # 3 & #4 |  |
| BEAM #9 HAS 3" X 18" X 3/4" SPALL ON SOUTH END   |  |

SKETCH :





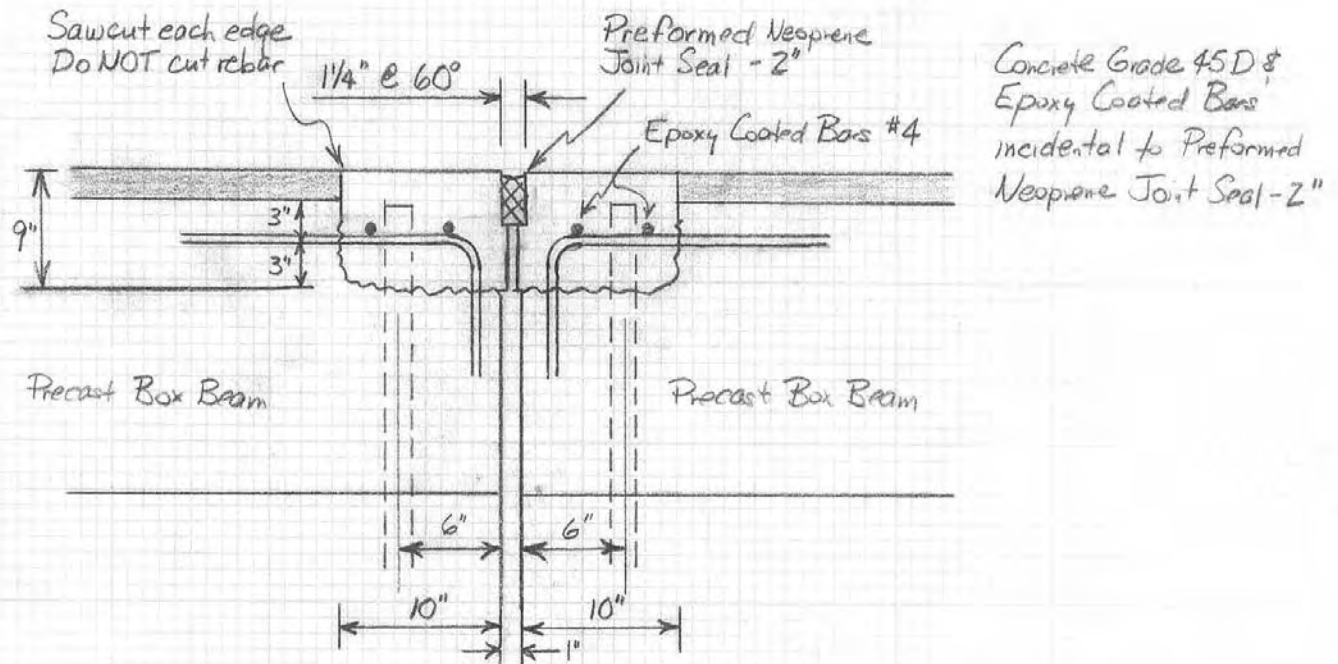












Expansion Joint at Pier















Plainfield Bridge No 6  
Childsdale Ave over the Rogue River  
New box beam deck and rail

By KCRC crew

Cost was about the same as our share of a Local  
Bridge fund project

Did not have to widen to meet MDOT standards

















































- Questions?