

FINAL PROJECT CONCEPT STATEMENT

Bridge over Middle Beaver Creek
on U.S. Highway 30

Boone County
Proj. #BRF-030-4(83)--38-08
PIN: 10-08-030-010
FHWA No. 15160
Maint. No. 0821.6S030

Highway Division
Office of Design

Kevin K. Patel, P.E.
515-239-1540

February 1, 2011

I. STUDY AREA

A. Project Description

This project involves the replacement of the U.S. Highway 30 bridge (Maint No. 0821.6S030) over Middle Beaver Creek, 0.4 miles west of the western junction with U.S. highway 169.

B. Need for Project

This is a 66' x 30' steel stringer/multi-beam structure which was built in 1917 and reconstructed in 1965. The bridge is classified as structurally deficient due to the condition of the deck bottom and significant superstructure section loss, including areas of 100% loss. Due to the poor condition of the girders and an overlay or re-decking not being a good option, the bridge should be replaced.



Looking east



Utility tower on the north side of U.S. 30

C. Present Facility

The existing structure is a 66' x 30' steel stringer/multi-beam structure which was built in 1917 and reconstructed in 1965.

U.S. highway 30 in the project area is 24' wide HMA pavement with 10' wide partially paved shoulders and 3:1 foreslopes, constructed in 1929. U.S. 30 was widened in 1952. HMA resurfacing was accomplished in 1967, 1983 and 2005.

D. Traffic Estimates

The 2016 and 2036 average daily traffic estimates are 4,600 ADT with 16% trucks and 6,000 ADT with 16% trucks, respectively.

E. Sufficiency Ratings

U.S. 30 is classified as a "commercial and industrial" route and is a maintenance service level "B" road with a sufficiency rating of 32. The federal bridge sufficiency rating is 38.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2005 through December 31, 2009, there was 1 crash which caused property damage only (animal in roadway).

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a triple RCB, extended to accommodate run-around

Replace the existing 66' x 30' bridge with a triple 10' x 8' x 106' reinforced concrete box culvert. The superstructure of the existing bridge will need to be removed in order to construct the new RCB. After the RCB has been constructed, 24 ft. wide PCC pavement with 10 ft. partially paved shoulders and 6:1/3.5:1 foreslopes will be placed in the area of the existing bridge. The existing horizontal and vertical alignment will be used as constructed.

Approximately 50 ft. of pavement will be also removed and replaced in each direction from the edge of the bridge to the existing EF joints. The existing guardrail will be removed and will not be replaced.

Traffic will be maintained by a two lane run-around on the north side of U.S. 30 approximately 42 ft. from the existing centerline. The runaround will consist of 24 ft. wide pavement with 3 ft. granular shoulders and 3:1 foreslopes. The RCB will be extended an additional 18 ft. on the north side to accommodate the runaround. Sheet piling will be required to prevent the runaround embankment from encroaching into the Creek. Once the runaround is no longer required it will be removed; however, the additional RCB length will remain in place thus creating an unsymmetrical final cross section.

Apply erosion control and rural seeding and fertilizing to all disturbed areas. Class E revetment will be place at the ends of the RCB.

Right of way will be required for this project.

<u>Bridge Items</u>	<u>Estimated Cost</u>
Triple 10' x 8' x 106' RCB	\$ 214,000
Removal Existing Bridge	17,000
Revetment for splash basins	10,000
Sheet piling	32,000
Staging 10%	27,300
Mobilization 10%	27,300
<u>M&C, 15%</u>	<u>49,100</u>
Bridge Total	\$376,700
10" PCC Pavement	18,300
Modified Subbase	3,900
Class 10 Roadway and Borrow	10,200
Removal of Pavement	1,100
Excavation Class 13	1,700
Two-lane Runaround	224,000
Guardrail removal	2,900
Shoulders	2,200
Temporary Concrete Barrier Rail	6,700
Temporary flood lighting	5,900
ROW	1,600
Erosion Control	5,000
Wetland Mitigation	50,000
Traffic Control@5%	16,700
Mobilization@ 5%	16,700
<u>M&C @ 20%</u>	<u>110,100</u>
Road Total	\$477,000
Total combined Bridge and Road Items	\$853,700

Alternative #2 - Replace with a triple RCB, run-around north of the bridge

Replace the existing 66' x 30' bridge with a triple 10' x 8' x 88' reinforced concrete box culvert utilizing staged construction and a runaround. The superstructure of the existing bridge will need to be removed in order to construct the new RCB. After the RCB has been constructed, 24 ft. wide PCC pavement with 10 ft. partially paved shoulders and 6:1/3.5:1 foreslopes will be placed in the area of the existing bridge. The existing horizontal and vertical alignment will be used as constructed.

Approximately 50 ft. of the pavement will be removed and replaced in each direction from the edge of the bridge to the existing EF joints. The existing guardrail will be removed and will not be replaced.

Traffic will be maintained by a two lane run-around on the north side of the roadway, approximately 80 ft. from the existing centerline. The runaround will consist of 24 ft. wide pavement with 3 ft. granular shoulders and 3:1 foreslopes. There is a large utility tower located on the north side of U.S. 30. In order to avoid impacts to the tower, the RCB headwall and approximately 8 ft. of the RCB will be constructed after has runaround has been removed. This will enable the runaround to be built closer to U.S. 30 during stage 1 (please refer to the attached staging sheet). Three 72 in. corrugated metal pipes will be installed under the run-around to maintain drainage.

Apply erosion control and rural seeding and fertilizing to all disturbed areas. Class E revetment will be place at the ends of the RCB.

Right of way will be required for this project.

<u>Bridge Items</u>	<u>Estimated Cost</u>
Triple 10' x 8' x 88' RCB	\$ 187,000
Removal Existing Bridge	17,000
Revetment for splash basins	10,000
Three 72" CMP and aprons	25,000
Staging 10%	23,900
Mobilization 10%	23,900
<u>M&C, 15%</u>	<u>43,000</u>
Bridge Total	\$329,800
10" PCC Pavement	18,300
Modified Subbase	3,900
Class 10 Roadway and Borrow	10,200
Removal of Pavement	1,100
Excavation Class 13	1,700

Two-lane Runaround	167,000
Guardrail removal	2,900
Granular Shoulders	2,100
Temporary concrete barrier rail	6,700
Temporary flood lights	5,900
ROW	1,200
Erosion Control	5,000
Wetland Mitigation	50,000
Traffic Control@5%	13,800
Mobilization@ 5%	13,800
<u>M&C @ 20%</u>	<u>91,100</u>
Road Total	\$394,700
Total combined Bridge and Road Items	\$724,500

B. Detour Analysis

There will be no off-site detour. Traffic will be maintained via a two-lane run-around.

C. Recommendations

It is recommended that the present structure be replaced as described in Alternate 2 of this concept statement.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Office of Bridges and Structures will coordinate the plan preparation with assistance from the Office of Design.

E. Special Considerations

Right of Way will be required for this project.

A bridge option was considered; however, due to the life cycle cost, the presence of guardrail and the maintenance associated with a bridge this alternative was dismissed.

The Office of Location and Environment has determined that a Section 404 Permit will be required for this work. The work is expected to be covered by Nationwide Permit #14. Wetland mitigation will be required if wetland impacts exceed 0.09 acre. Stream mitigation in the form of rip rap pads (as per Typical 4404) should be constructed at both the inlet and outlet of the new culvert. If a borrow is identified, further review by this office may be required. A preliminary wetlands review (W00) will be completed within 30 days after the Final Concept has been completed.

Asbestos removal from the existing bridge will be accomplished by a licensed asbestos contractor prior to the bridge replacement project.

The profile grade across the existing bridge is 0.2% which is less than the minimum 0.5%. Therefore approval from the Office of Design Director was granted for maintaining the existing slope.

F. Program Status

Site data has been developed by the Office of Design. This project is listed in the 2011-2015 Iowa Transportation Improvement Program, with \$466,000 programmed for replacement in FY 2015. All costs for this project will be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

KKP: als

ALTERNATIVE 1

Bridge replaced by triple 10'x8'x106' RCB.
Culvert length is extended to accommodate
two-lane run-around

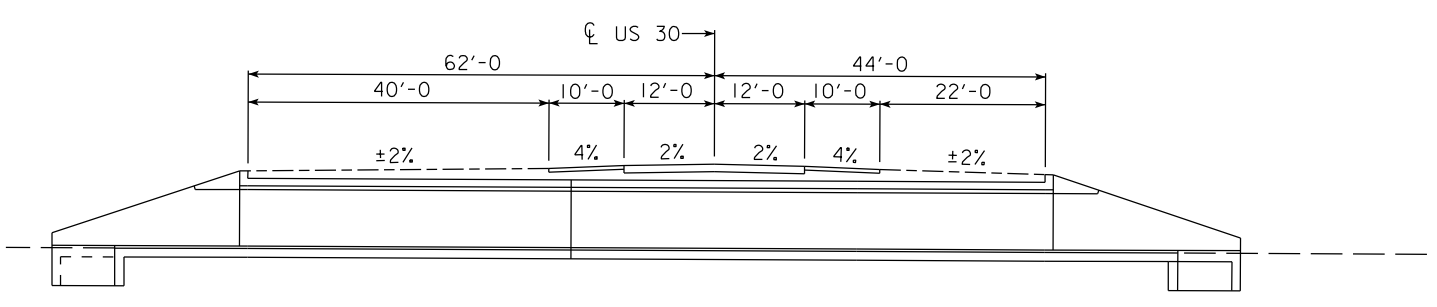
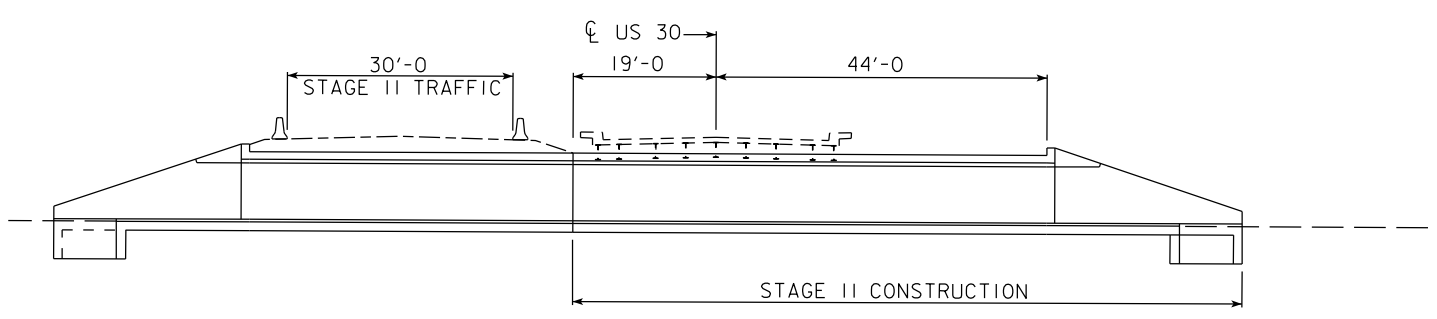
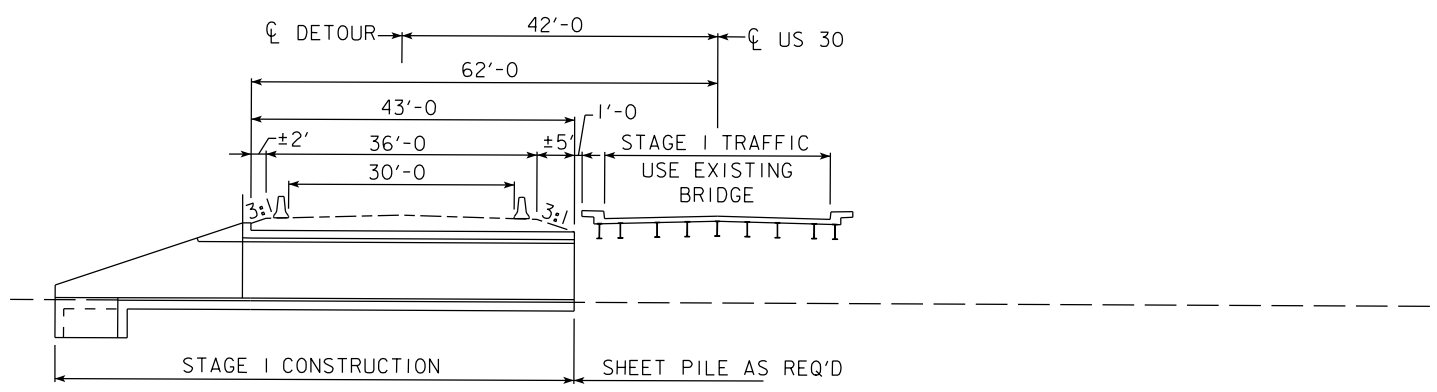
BOONE COUNTY
U.S. 30 BRIDGE OVER
MIDDLE BEAVER CREEK
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- Yellow: 2 lane run-around
- Orange: Temporary Concrete Barrier Rail
- Light blue: 3 temporary corr. metal pipes
- Red: Triple concrete box culvert
- Green: New pavement

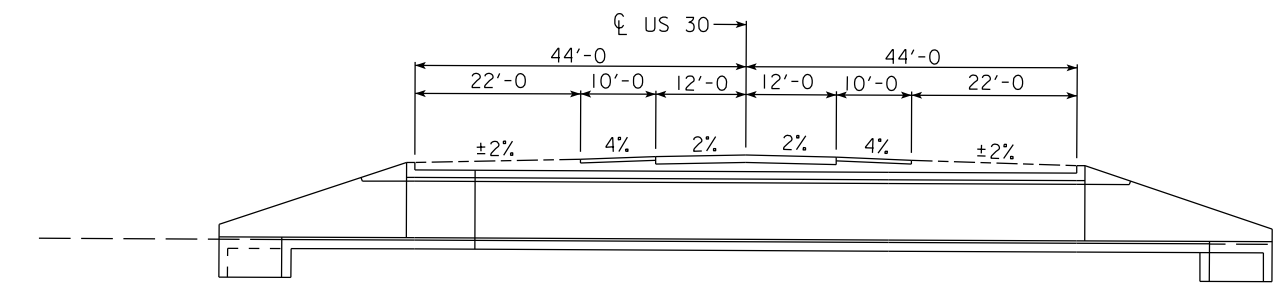
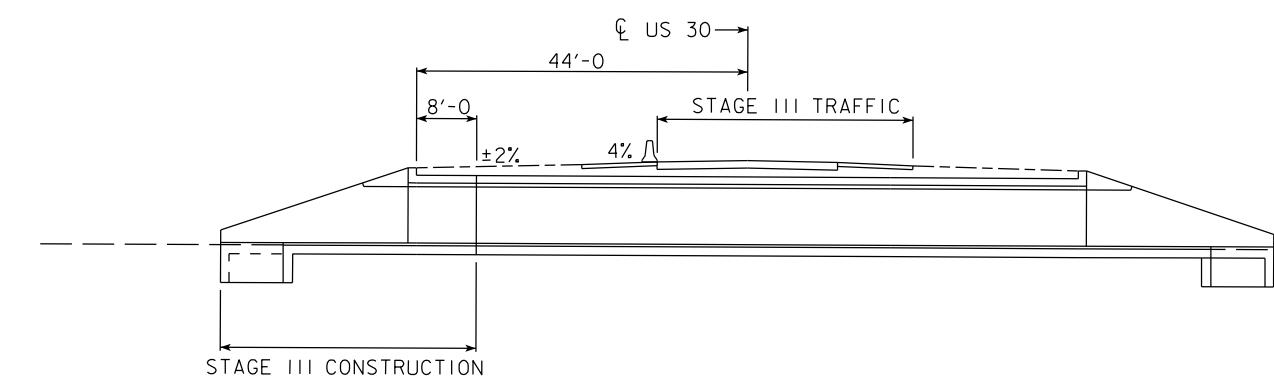
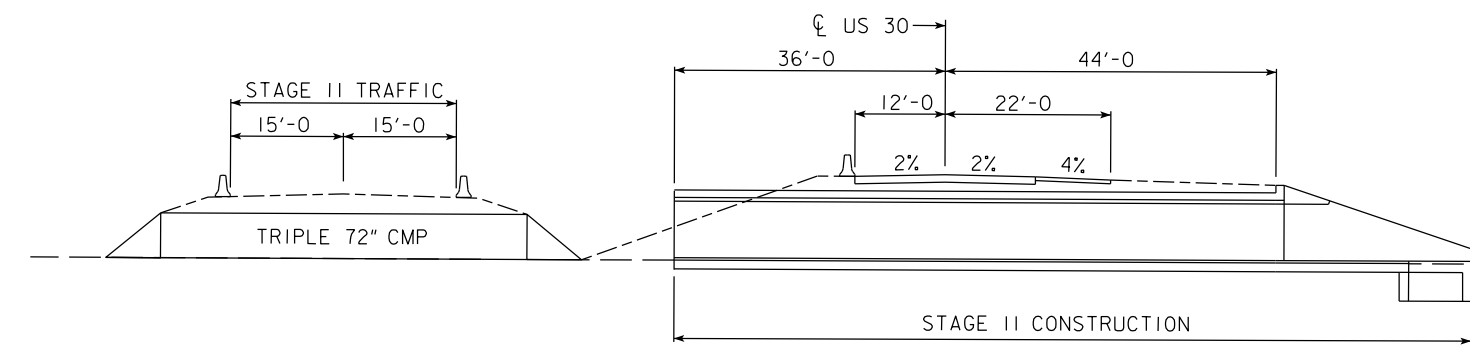
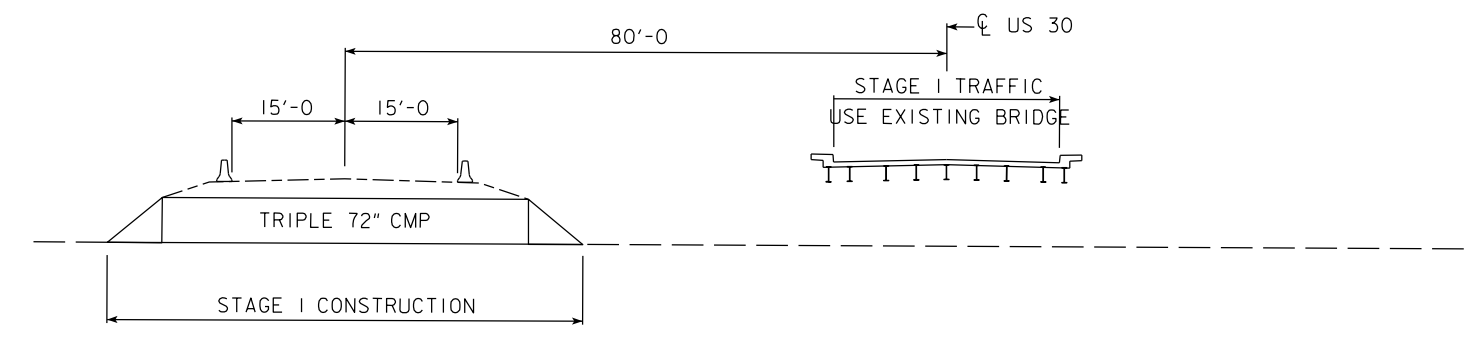
ALTERNATIVE 2

Bridge replaced by triple 10'x8'x88' RCB.
Two-lane run-around north of roadway
and culvert.

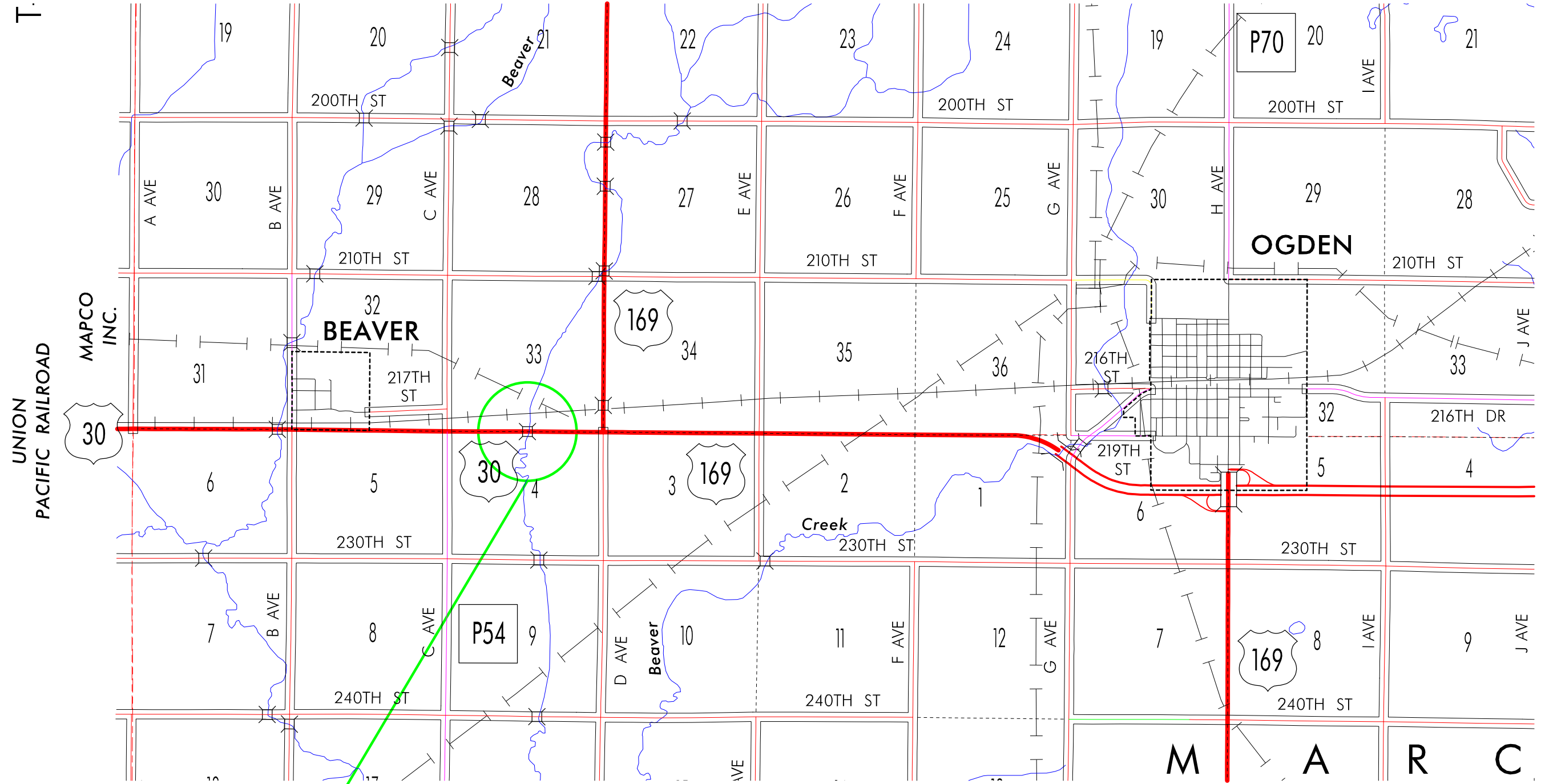


ALTERNATE 1 STAGING

BOONE CO. US 30 OVER
 MIDDLE BEAVER CREEK
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ALTERNATE 2 STAGING



BOONE COUNTY

U.S. 30 Bridge over Middle Beaver Creek
 0.4 miles west of west junction with U.S. 169

T-83N/84N R-28W
 Amaqua Township, Section 33
 Beaver Township, Section 4



BOONE COUNTY

U.S. 30 Bridge over Middle Beaver Creek

0.4 miles west of west junction with U.S. 169

FHWA #15160 Maint. # 08121.6S030 Design #264