



MEMORANDUM

TO: Chad Hanson, MnDOT

FROM: Chris Hiniker, Project Manager

DATE: September 18, 2012

RE: Red Wing Bridge Project - FINAL Approach Roadway Concept Development and Screening
SEH No. MNT06 119112 14.00

Purpose and Background

MnDOT initiated the Red Wing Bridge Project in December 2011. The project includes the US 63 (Eisenhower) Bridge over the Mississippi River and the US 63 Bridge over US 61, as well as the highway connections to US 61, Minnesota TH 58, and approach roadways in the State of Wisconsin. The Eisenhower Bridge carries US 63 across the river from Red Wing and connects to the state of Wisconsin. The bridge provides the only regional crossing of the river for approximately 30 miles upstream or downstream for several communities on both the Wisconsin and Minnesota sides of the river.

Completed in 1960, the Eisenhower Bridge is a steel truss through-deck bridge that crosses the Mississippi River main channel at Red Wing, Minnesota. The bridge is 1,631 feet long, 35 feet wide, and stands 65 feet above the river. The two lane bridge currently carries an average daily traffic count (ADT) of 13,300 vehicles per day (vpd) (2012 count).

As documented in the project's Purpose and Need Statement, the primary purposes of the project are to provide structurally sound crossings of the Mississippi River and US 61. Secondly, the project will study future capacity needs and the accommodation of pedestrian/bicycle traffic across the bridge. An additional consideration is that within the city of Red Wing US 63 intersects with US 61 and TH 58 and this area experiences circulation and congestion problems.

There are two primary project components addressed in the process of developing and assessing the range of potential improvement alternatives. The first relates to bridge options, both for Bridge 9040 (river crossing) and Bridge 9103 (US 61 overpass). The second are approach roadway improvement options on the Minnesota and Wisconsin sides of the river. Given the potentially large number of options associated with both project components, it is logical to first address each independently and reduce the number of viable options. The end result will be a more manageable number of total project alternatives advancing into the most detailed level of analysis.

This memorandum documents the process of developing, assessing, and screening the initial range of approach roadway alternatives. The memorandum concludes with documentation of the concepts to be carried forward for more detailed consideration. A separate memorandum will be prepared to document the bridge alternatives development and evaluation process. This document focuses primarily on the process undertaken to develop and assess approach roadway options on the Minnesota side of the river where there is a broader range of issues and challenges. However, alternatives on the Wisconsin side are also presented.

Alternatives Development

Minnesota Roadway Approach Options

On the Minnesota side of the river, the process of developing roadway improvement options began with defining the base improvement conditions from which concepts would be developed. Those included:

- Rehabilitate Bridge 9103 and maintain the existing road network
- Modify Bridge 9103 to enable new approach roadway options
- Remove Bridge 9103 and establish an at-grade US 61/US 63 intersection
- Remove Bridge 9103 and replace with a new bridge enabling new approach roadway options

Building from these base conditions the following improvement concepts were identified (figures of each are attached):

- Concept 1: Existing Configuration/Rehabilitate Bridge 9103 – This concept includes rehabilitation of Bridge 9103 and retaining the existing road network configuration.
- Concept 2: Three-Leg At-Grade Intersection – This concept involves removal of Bridge 9103 and establishing a three-leg Highway 61 and 63 at-grade intersection. There would be no direct link to 3rd Street into downtown Red Wing.
- Concept 3: Three-Leg At-Grade Intersection with US 63 Direct Connection – This concept is similar to Concept 2 except that it reconfigures the roadway system so that the main through-route is US 61 through downtown Red Wing to the river crossing. US 61 to the east would be the “third-leg” in the three-leg intersection.
- Concept 4: Four-Leg At-Grade Intersection – Again this concept is similar to Concept 2 except that it includes a fourth-leg of the intersection which connects directly into the downtown area via 3rd Street.
- Concept 5: Four-Leg At-Grade with Roundabout – This concept is similar to Concept 4 except that it would establish a multi-lane roundabout intersection rather than a signalized intersection.
- Concept 6: Buttonhook Intersection – This configuration includes a new US 63 overpass of US 61 and a buttonhook loop which would establish a new US 61/US 63 at-grade intersection east of the downtown area.
- Concept 7: Buttonhook Intersection with Slip Ramp – This concept is similar to Concept 6 except it includes one-way a slip ramp that would enable traffic crossing from Wisconsin to access downtown Red Wing and Highway 58 more directly via 3rd Street.
- Concept 8: Buttonhook with Rehabilitated Bridge 9103 – This concept is similar to Concepts 6 and 7 except that it assumes retaining Bridge 9103 rather than constructing a new bridge over US 61. The concept includes the option of constructing a slip ramp to connect to 3rd Street similar to Concept 7.

Wisconsin Approach Roadway Options

As noted previously, the approach roadway issues and challenges are less complex on the Wisconsin side of the river. Beyond the decision of whether to retain a two-lane river crossing or expand to a four lane crossing the primary challenge to resolve in Wisconsin, is the treatment of the 825th Street intersection at the base of the existing river bridge. 825th Street provides access to the Island Marina area as well as some residences along the Wisconsin river bank.

For purposes of developing possible improvement concepts at the 825th Street intersection it has been assumed that perpetuating the two-lane river crossing would mean the intersection would remain as it is currently configured. However with a four-lane river crossing a center median would be introduced therefore limiting access at the current intersection to right-in/right-out operations for southbound US 63 traffic only. Given this condition three concepts have been developed to accommodate different levels of access between US 63 and 825th Street. The concepts include (figures of each are attached):

- Concept 9: Right-in/Right-out Access – This concept would retain limited access to 825th Street for southbound US 63.
- Concept 10: Northbound Left Turn Lane – In addition to the right-in/right-out movement provided in Concept 9, this option includes a left turn for northbound US 63 traffic to access 825th Street.
- Concept 11: Jug-Handle Intersection – This concept retains full access at 825th Street by providing a connection to northbound US 63 via a service road under the base of the river bridge.

Alternatives Evaluation and Screening

Minnesota Approach Roadway Concepts

With the concepts defined the next step in the process was establishing the evaluating criteria against which the concepts would be assessed. The criteria include:

- Traffic Operations
- Safety
- Environmental Impacts
- Right-of-Way Impacts
- Design Standards
- Construction Complexity and Maintenance of Traffic (MOT)
- Compatibility with a Parallel River Bridge

The goal in this phase of the process was to compile sufficient information to vet out the most viable options. The initial focus of the assessment centered on traffic operations. Traffic operations is an especially important factor because any proposed improvement needs to provide for at least acceptable operations to be considered potentially viable. The importance of traffic operations is reflected in its inclusion in project's purpose and need statement. The remaining evaluating criteria were considered, along with the traffic analysis, to a level adequate to facilitate screening the eight concepts to four or less.

A significant effort was placed into conducting a comprehensive traffic operations analysis. The results of the analysis are documented in the "Red Wing Bridge Project Traffic Alternatives Operations Analysis," report, dated August 13, 2012. The key findings from the report are summarized below:

- The eight concept alternatives were analyzed for both the 2022 year of opening and 2042 design year.
- Concepts 4 through 8 have potentially acceptable traffic operations, with noticeable variations in delay and queuing. Concepts 1 and 2 have major operational issues that cannot be mitigated. Concept 3 was not analyzed given extraordinary construction impacts.
- The continued use of the 3rd Street connection in Concepts 4, 5, and 7 provides the best traffic operations as it removes a sizable amount of traffic off of U.S. 61 through downtown Red Wing.
- Concepts 4 and 5 will only operate well with a 4-lane U.S. 63 Bridge; with a 2-lane bridge both options will have operational problems through downtown Red Wing. Concepts 6, 7 and 8 will operate well with either a 2-lane or 4-lane bridge.

Table 1 presents the results of the overall evaluation and screening process. The table includes an assessment of each concept against each criteria. The primary differentiating factors are highlighted in red and green text. The red text indicates the more significant adverse impacts or concerns while the green text highlights the factors that are beneficial or favorable. The final row of the table documents the recommendations which can be summarized as follows by concept:

- Concept 1: Retain for further consideration even though it has the poorest traffic operations because it represents the "No-Build" condition which Federal law requires to be carried into the detailed environmental review phase of the process.

- Concept 2: Dismiss from consideration because of very poor traffic operations and substantial impacts to downtown resulting from raising Highway 61 to establish the at-grade US 61/US 63 intersection.
- Concept 3: Dismiss given impacts to the ADM property and operations.
- Concept 4: Dismiss from consideration given substantial impacts to downtown resulting from raising US 61 to establish the at-grade US 61/US 63 intersection.
- Concept 5: Dismiss from consideration given impacts to downtown resulting from raising US 61 to establish an at-grade US 61/US 63 intersection and truck operation concerns associated with the roundabout design.
- Concept 6: Retain for further consideration given acceptable traffic operations and reduced impacts to downtown area.
- Concept 7: Retain for further consideration given most acceptable traffic operations and reduced impacts to downtown area.
- Concept 8: Dismiss from further consideration given substantial right-of-way impacts and significant impacts to the historic eligibility of Bridge 9103.

Wisconsin Approach Roadway Concepts

Given there are only three concepts under consideration for the Wisconsin approach, it is recommended to carry all options forward into the next phase of the study process.

Conclusions/Next Steps

As noted previously, the purpose of this memorandum was to document the process of developing, assessing, and screening the initial range of approach roadway alternatives. Furthermore, the objective of the evaluation process was to provide the rationale for screening the number of approach roadway concepts to no more than four on each side of the river.

The recommendations generated as a result of the assessment and screening efforts include the following:

- Minnesota Approach Roadway
 - Retain Concepts 1, 6, and 7
 - Dismiss Concepts 2, 3, 4, 5, and 8
- Wisconsin Approach Roadway
 - Retain Concepts 9, 10, and 11

The next steps in the study process involve presenting the process recommendations to the Policy Advisory Committee (PAC) and the public, at a second project listening session, to obtain feedback. Following the feedback process, the concepts will be refined to enable more detailed cost estimating and impact assessment. A second round of screening will then be conducted, the goal of which will be to reduce the number of options to no more than two on each side of the river. Following the refined screening, the remaining concepts will be combined with the refined river crossing options to develop up to three total project alternatives. The combined project alternatives will then be assessed and screened with the objective of identifying a single preferred alternative to carry forward into the Environmental Assessment (EA) phase of the project development process.

c: Jim Koenig, WisDOT

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Attachments:

Approach Roadway Concepts Evaluation Matrix

Evaluation Criteria	Concept 1 Existing Configuration/ Rehabilitate #9103	Concept 2 Three-Leg At Grade Intersection	Concept 3 Three-Leg At Grade Intersection (US 63 Direct Connection)	Concept 4 Four-Leg At Grade	Concept 5 Four-Leg At Grade with Roundabout	Concept 6 Buttonhook Intersection	Concept 7 Buttonhook Intersection with Slip Ramp	Concept 8 Buttonhook Intersection with #9103 Rehabilitation
Traffic Operations <ul style="list-style-type: none"> TH 63 TH 61 Downtown Red Wing Access for Local Businesses 	Poorest traffic operations in year 2042	Poor operations in year 2042. Does not work with two-lane river crossing. Directs TH 63 traffic out of downtown Red Wing Shoe access reconfigured Reduces traffic congestion at 3 rd /Plum Increased traffic at US 61/Plum & US 61/Bush	Directs TH 63 traffic out of downtown Promotes primary river crossing movement Red Wing Shoe access reconfigured Reduces traffic congestion at 3 rd /Plum Increased traffic at US 61/Plum	More favorable year 2042 traffic operations assuming a four lane river crossing Greater impact to Red Wing Shoe access Reduces traffic congestion at 3 rd /Plum More direct connection to TH 58 compared to Concepts 2 and 3	Favorable year 2042 traffic operations Truck path overlap between lanes might reduce capacity Does not accommodate oversize vehicles Greater impact to Red Wing Shoe access Reduces traffic congestion at 3 rd /Plum	Acceptable 2042 traffic operations, however queuing problems at Main/Plum Directs TH 63 traffic out of downtown Red Wing Shoe access reconfigured Reduces traffic congestion at 3 rd /Plum Increased traffic at US 61/Plum & US 61/Bush	Most favorable year 2042 traffic operations Directs portion of TH 63 traffic out of downtown Red Wing Shoe access reconfigured Reduces congestion at 3 rd /Plum More direct connection to TH 58 compared to Concept 6	Favorable year 2042 traffic operations Truck path overlap between lanes might reduce capacity Directs TH 63 traffic out of downtown Greater impact to Red Wing Shoe access Reduces traffic congestion at 3 rd /Plum
Safety <ul style="list-style-type: none"> Driver Expectancy 	As currently exists	Standard intersection Reduced intersection sight distance	Standard intersection Reduced intersection sight distance Intersection on curve	Standard 4-Leg intersection	Roundabout	Controlled intersection	Controlled intersection	Controlled intersection
Environmental Impacts <ul style="list-style-type: none"> Section 106 Section 4(f) Soil Conditions (Geotech/Contamination) 	No additional	Bridge 9103 removal (Section 106 and 4f) TH 61 grade raise may require fill next to Barn Bluff	Bridge 9103 removal (Section 106 and 4f) TH 61 grade raise may require fill next to Barn Bluff	Bridge 9103 removal (Section 106 and 4f) TH 61 grade raise may require fill next to Barn Bluff Potential contaminated site impacts	Bridge 9103 removal (Section 106 and 4f) TH 61 alignment pulled away from Barn Bluff; TH 63 alignment shifted closer	Bridge 9103 removal (Section 106 and 4f) Minimal Potential contaminated site impacts	Bridge 9103 removal (Section 106 and 4f) Minimal Potential contaminated site impacts	Major impacts to historic eligibility of Bridge 9103 Potential contaminated site impacts
Right-of-Way Impacts <ul style="list-style-type: none"> Proximity to Housing Visual/Noise Access 	Minimal/As currently exists	Staging would likely require acquisition of warehouse building Visual/aesthetic impacts to downtown from raising Hwy 61	Major impacts to ADM Visual/aesthetic impacts to downtown from raising Hwy 61	Staging would likely require acquisition of warehouse building Visual/aesthetic impacts to downtown from raising Hwy 61	Visual/aesthetic impacts to downtown from raising Hwy 61	Closer to residential development with extensive R/W acquisition	Closer to residential development with extensive R/W acquisition	Significant impacts to business properties along W 4 th St and Bluff St
Design Standards	As currently met	Meets 30 mph design	Meets 30 mph design	Meets 30 mph design	Meets 30 mph design	Meets 30 mph design/Loop meets 25 mph design	Meets 30 mph design/Loop meets 25 mph design	Meets 30 mph design/Loop is 20-25 mph design
Construction Complexity and MOT	Minor impact for Bridge Rehab	Divert TH 61 via temp alignment/Construct TH 63 in halves	Construct TH 61 in halves/under traffic	Divert TH 61 via temp alignment/Construct TH 63 in halves	Complex – requires shifted roundabout; several stages	Moderate – buttonhook constructed off-line and bridge in halves	Moderate – buttonhook constructed off-line and bridge in halves	Moderate – buttonhook constructed off-line and bridge in halves
Compatibility with Parallel River Bridge	Compatible – walls required	Compatible – walls required	Non-compatible without extensive R/W impacts	Compatible – walls required	Compatible – walls required	Incompatible – would require wider bridge over TH 61	Incompatible – would require wider bridge over TH 61	Compatible – would likely require exception on bridge over TH 61
Recommendation: Retain or Dismiss	Retain – No-Build is carried through environmental process	Dismiss – very poor traffic operations and substantial downtown impacts given grade requirements	Dismiss – Major ADM impacts	Dismiss – substantial impacts to downtown given roadway grade requirements	Dismiss – substantial impacts to downtown and truck operation concerns	Retain – acceptable traffic operations	Retain – most favorable traffic operations	Dismiss – significant right of way impacts and effects Bridge 9103 historic eligibility

LEGEND	
	PROPOSED ROADWAY
	PROPOSED BRIDGE
	PROPOSED SHOULDER
	PROPOSED MEDIAN AND C&G
	PROPOSED SIDEWALK
	PROPOSED RETAINING WALL
	PARCEL BOUNDARY
	EXISTING RIGHT OF WAY



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REHABILITATE BRIDGE 9103



MAIN ST.

MAIN ST.



POTTER ST.

W. 3RD ST.

E. 3RD ST.

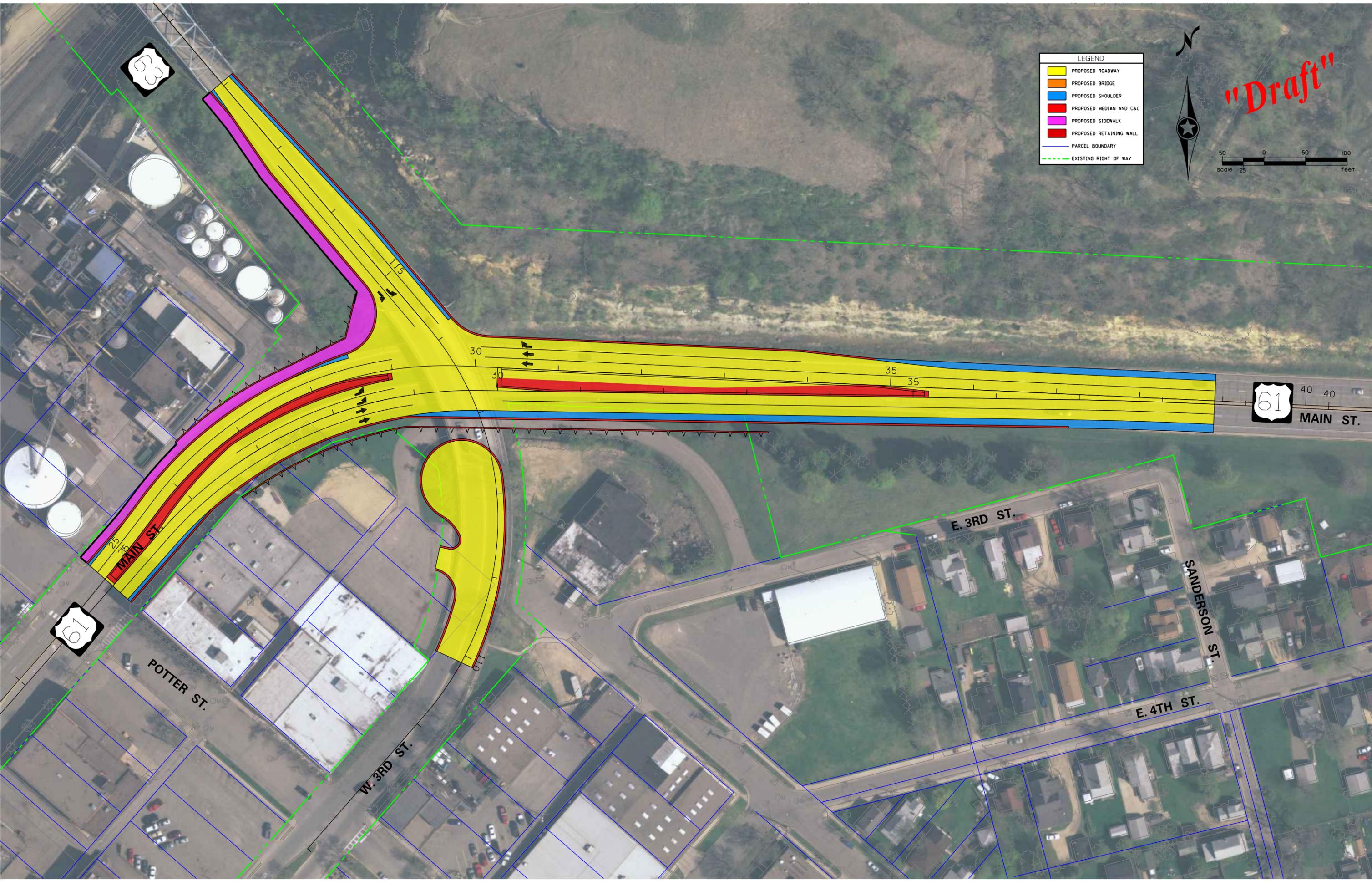
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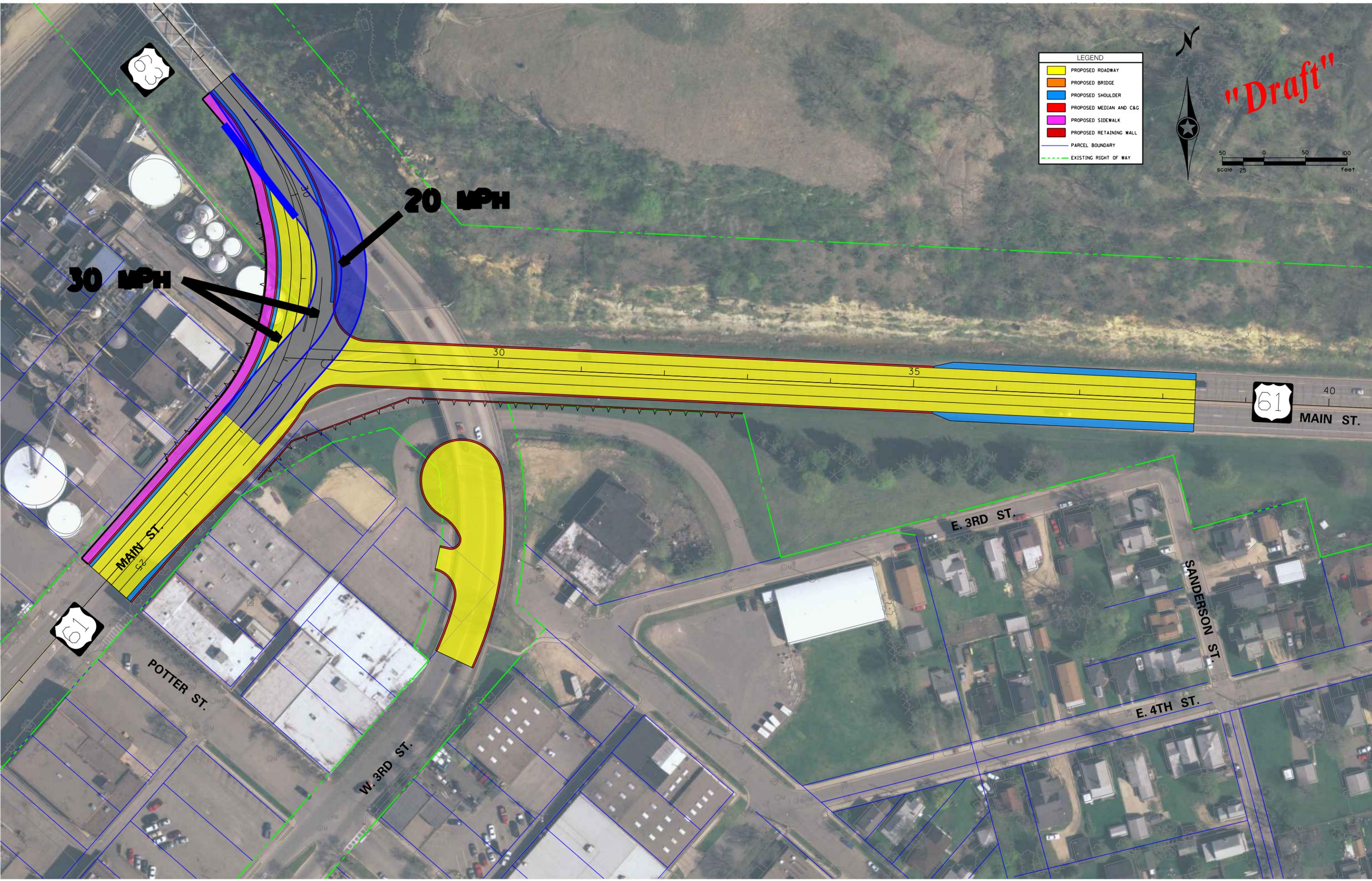
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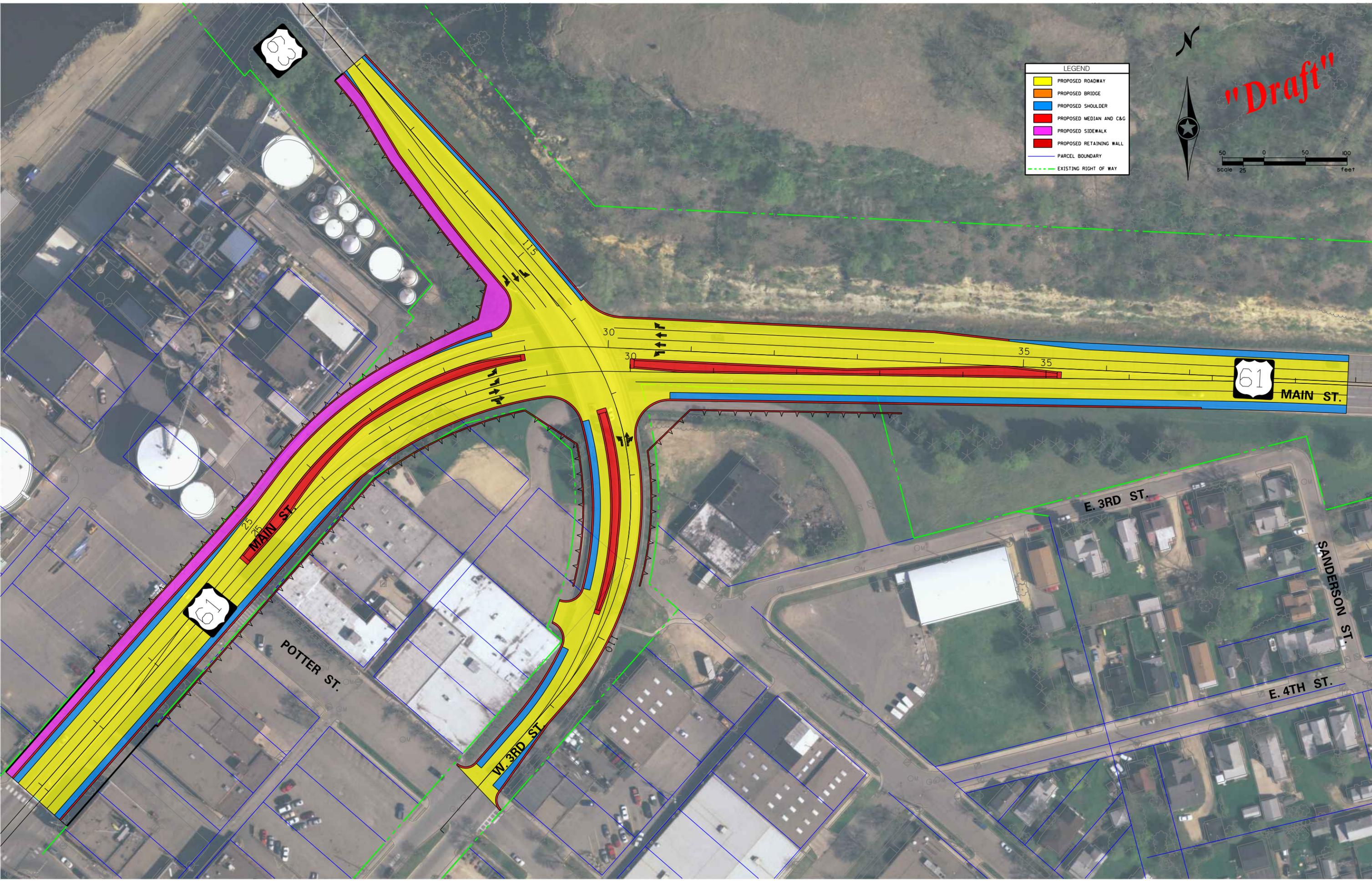
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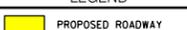
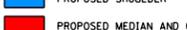
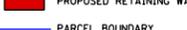
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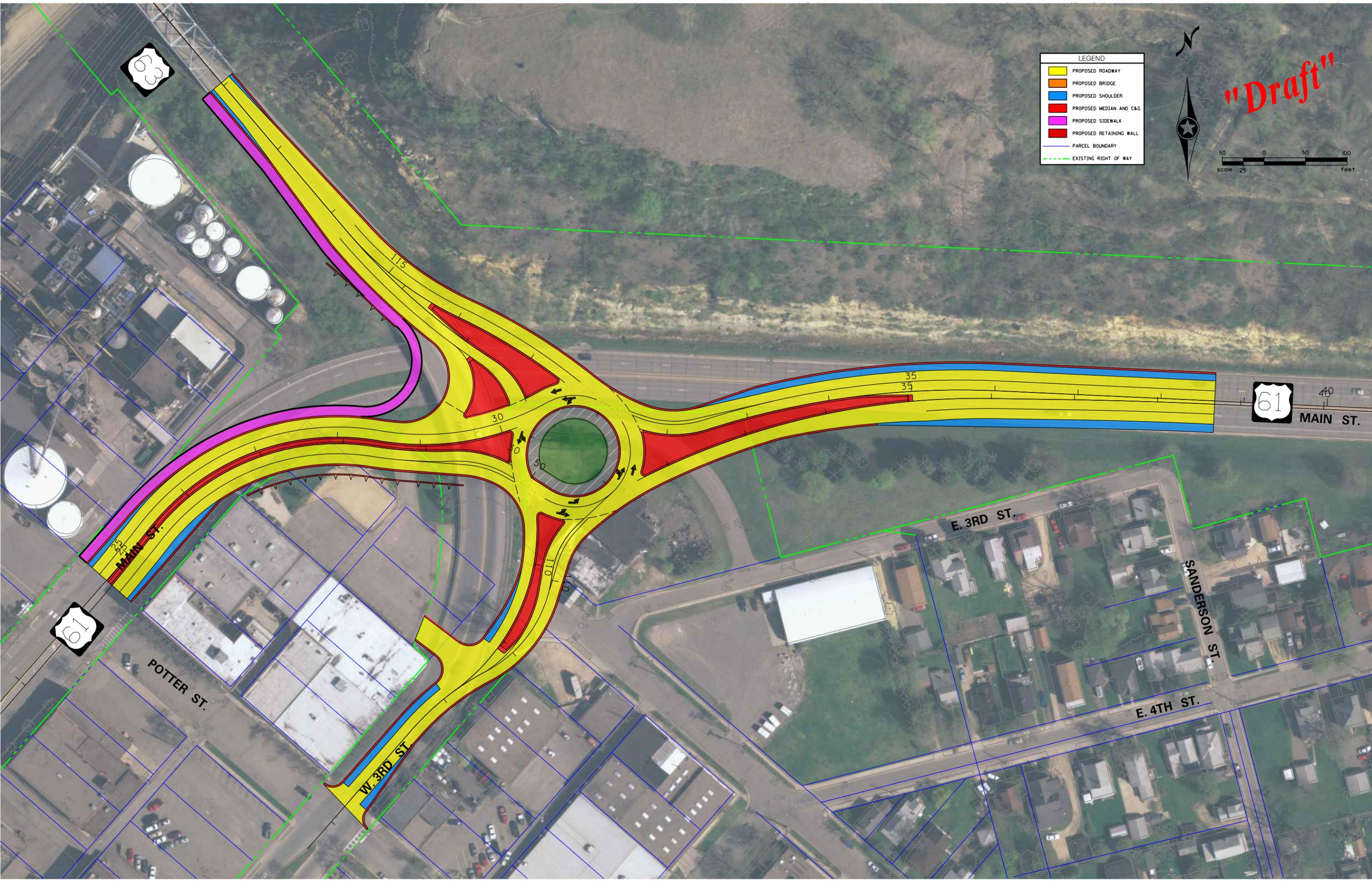
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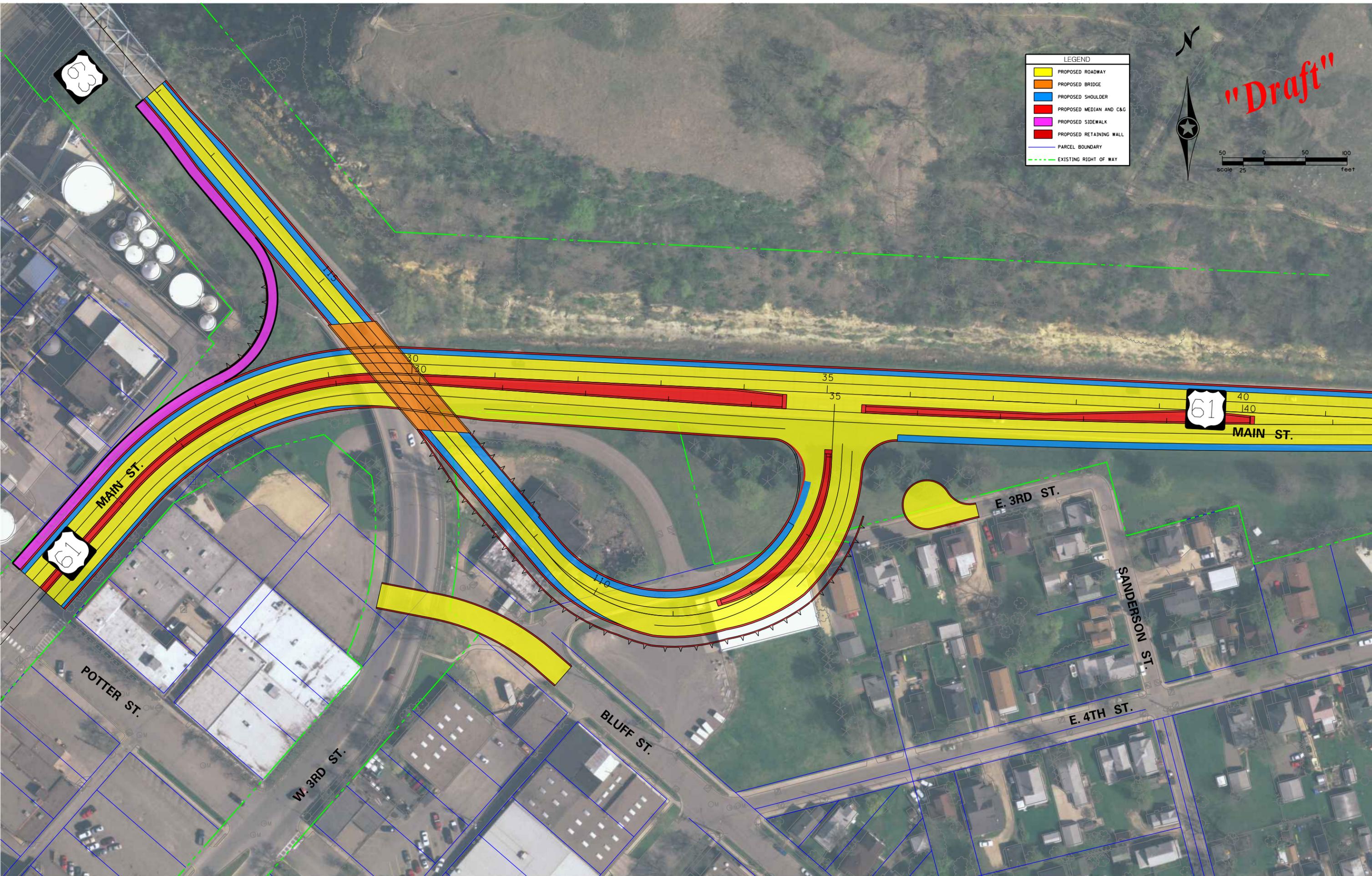
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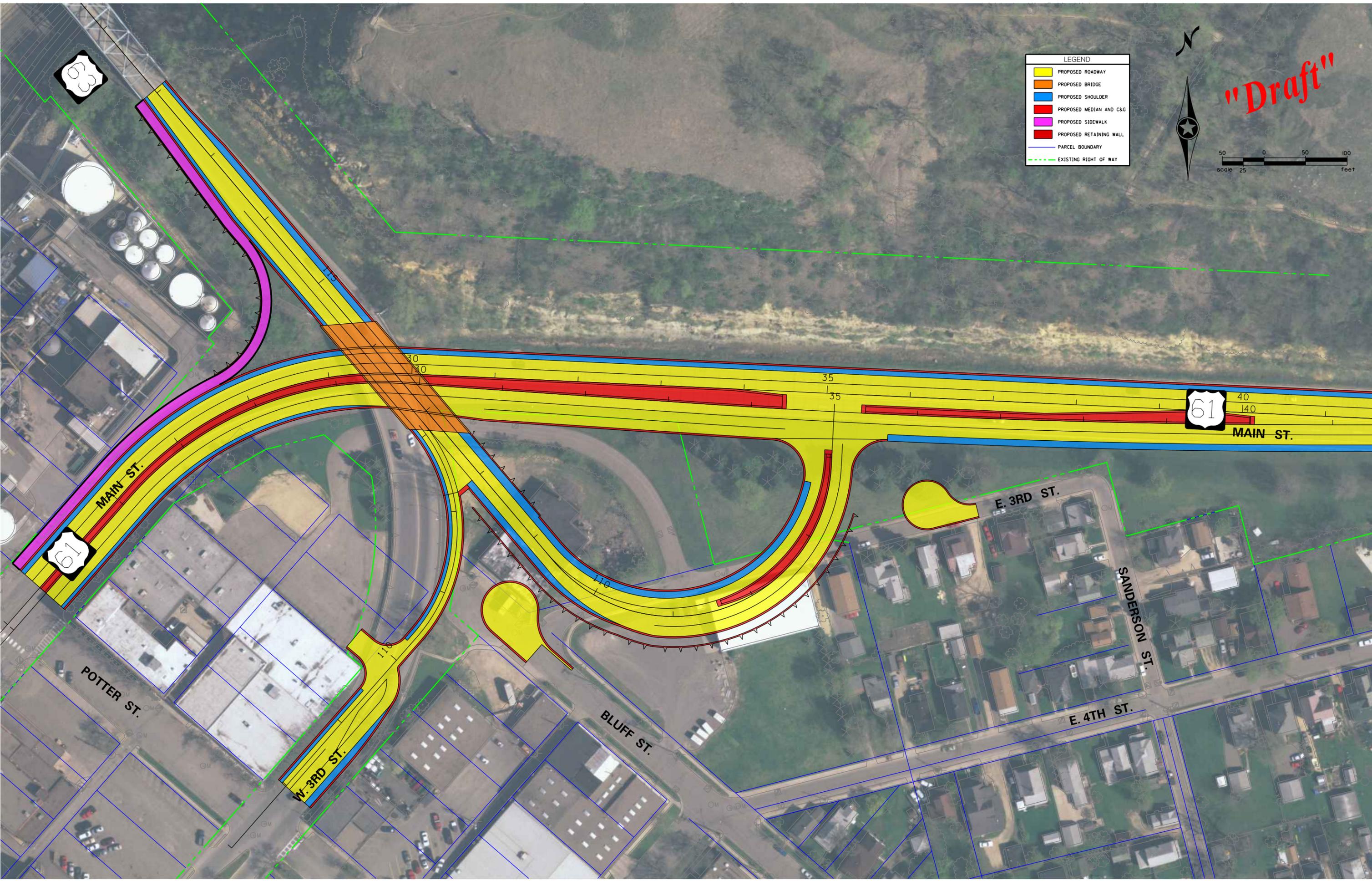
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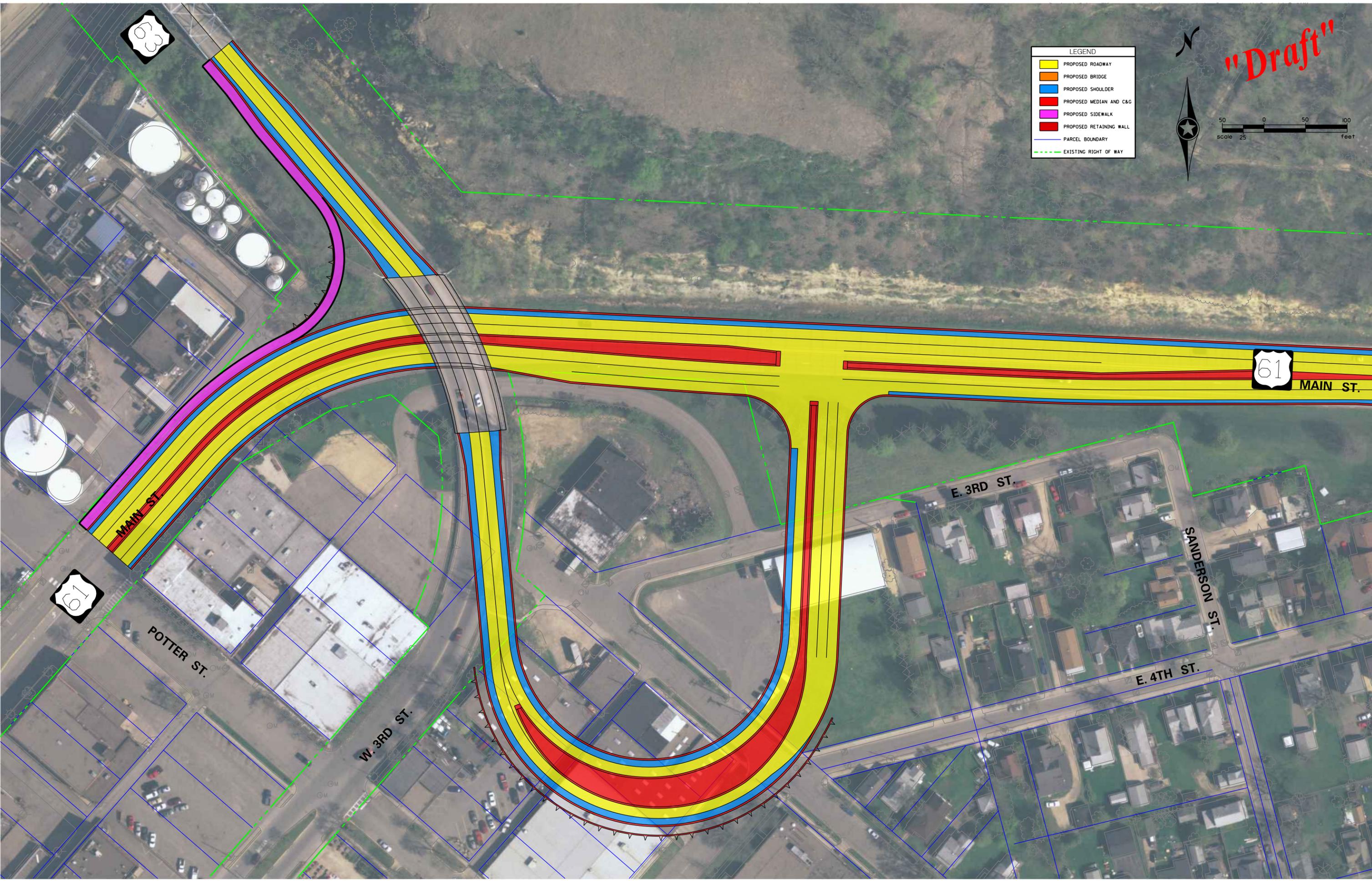
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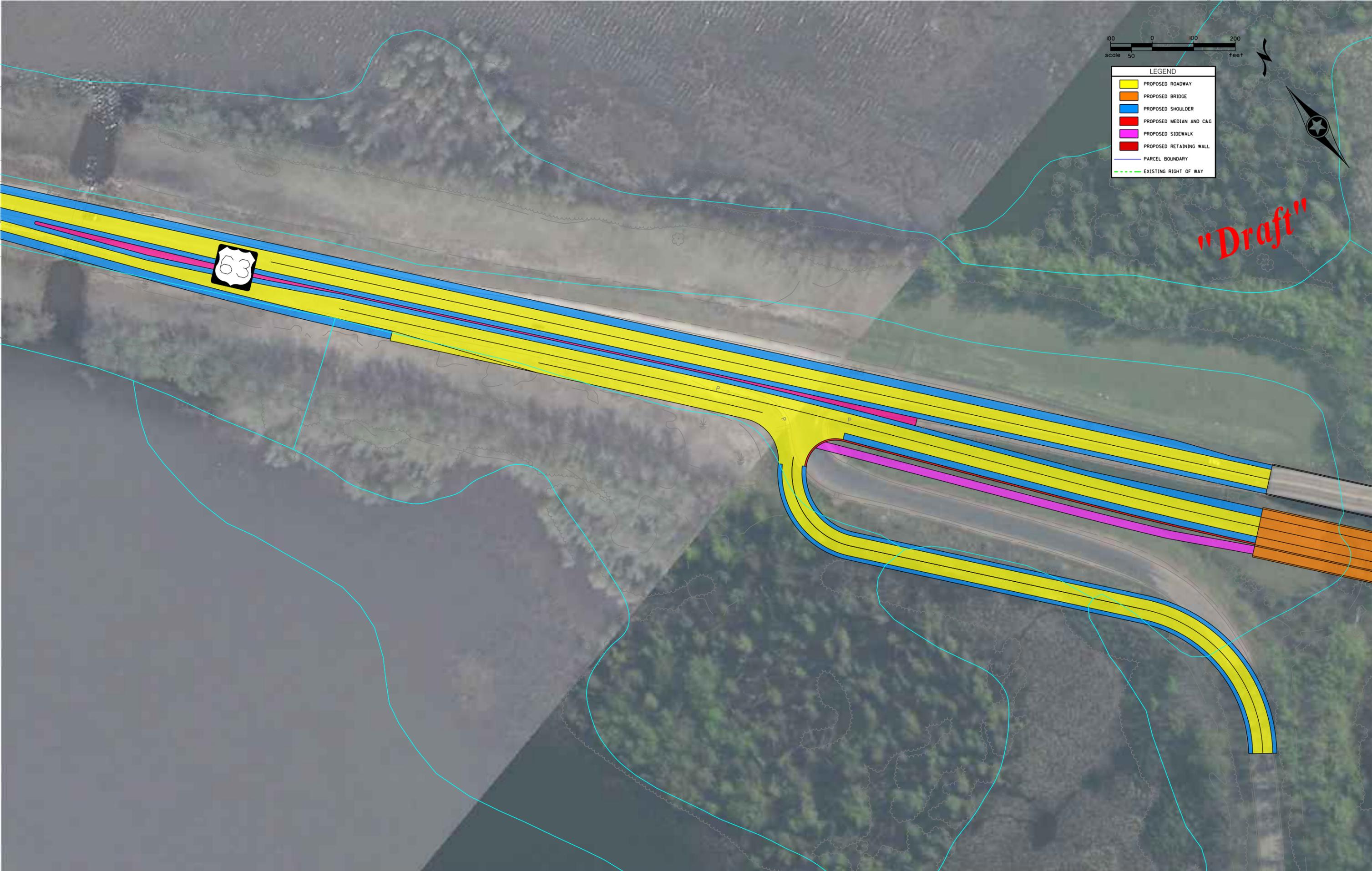




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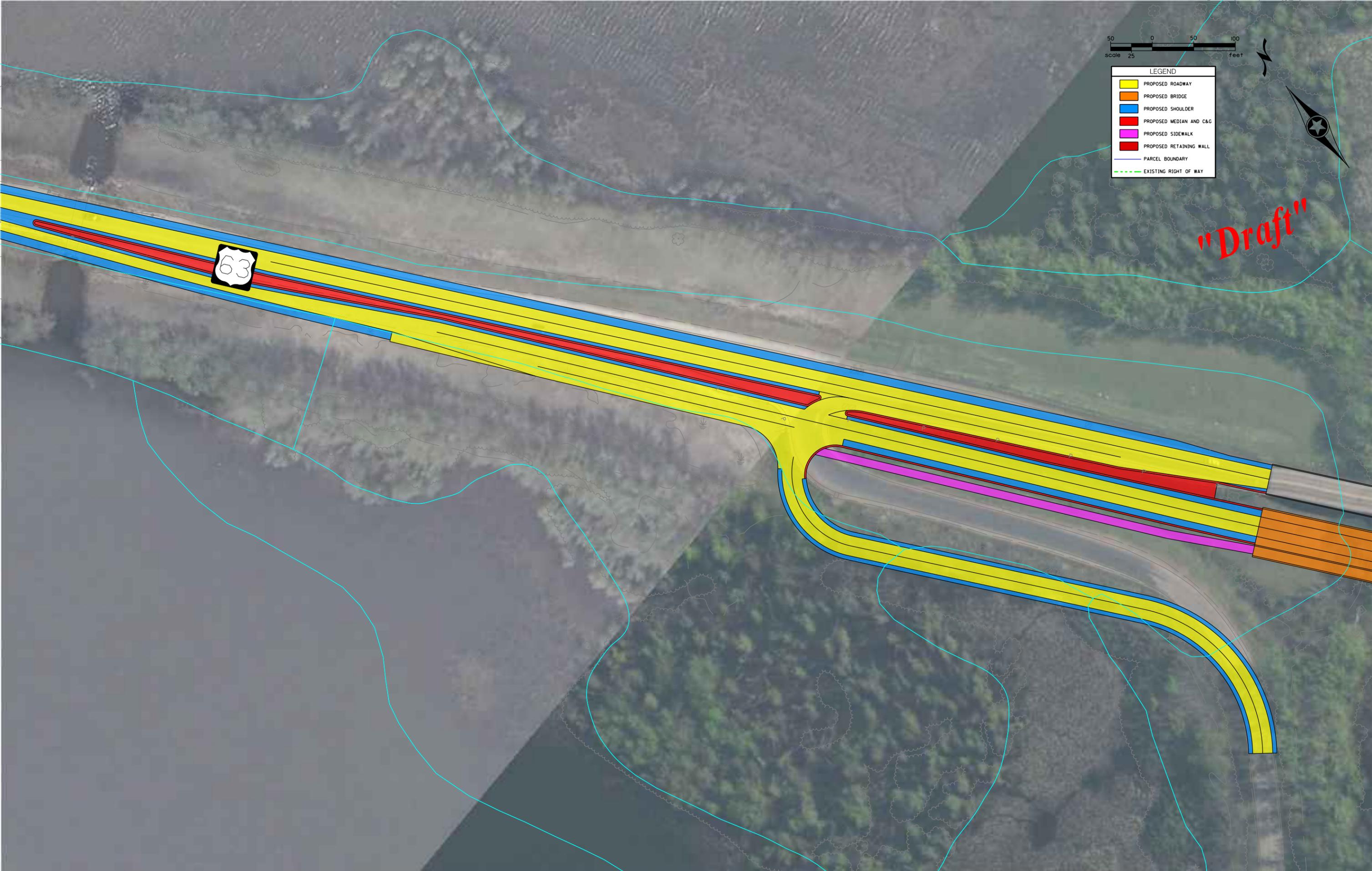




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