Appendix B: Design Documentation Report

Phase A Design Documentation

US 72 at Knox Road to Coopwood Road

Marshall County

Mississippi Department of Transportation

MDOT PROJECT # SP-0007-01(102)/109563-101000

1076 Highland Colony Parkway

Suite 325

Ridgeland, MS 39157

April 8, 2024

Garver Project No.: T14-2400207

For the purposes of this project, any reference to “Project Poppy” should be construed as a reference to this project. Project Poppy was the confidential name for this project while the County and Mississippi Development Authority were in negotiations with the developers. We received 3 files from William McAbee on April 2, 2024, regarding proposed utilities layout and access road layouts for the proposed economic develop site being completed by the County. These are filed on Newforma.

Prior to beginning conceptual interchange layout, Garver confirmed MDOT’s intentions with the future planned full cloverleaf interchange (shown in dashed grey lines below) shown in the exhibit provided by MDOT below.

It was said in a meeting and verified in the 04/09/2024 email from Jessica Dilley (see below) that we are only concerned about interchange spacing from the existing interchanges, not the future planned cloverleaf. If the future planned cloverleaf is ever constructed, it will be considered a “system” interchange and include collector-distributor roads. For the purposes of this project, we only need to keep in mind that any two-way frontage roads constructed to maintain access after this stretch of US 72 is converted to Type 1 access will need to potentially be converted to one-way CD roads in the future.

RE: US 72 Interchange Placement

DJ

Dilley, Jessica <jdilley@mdot.ms.gov>
To Black, T. Wayne; Henley, Eames
Cc Holt, Derek R.

Reply | Reply All | Forward

Tue 4/9/2024 9:02 AM

This sender jdilley@mdot.ms.gov is from outside your organization.

You replied to this message on 4/9/2024 9:06 AM.

Hey Wayne,

Yes, this is correct.

Thank you,

Jessica

From: Black, T. Wayne <TWBlack@GarverUSA.com>
Sent: Tuesday, April 9, 2024 9:00 AM
To: Henley, Eames <ehenley@mdot.ms.gov>; Dilley, Jessica <jdilley@mdot.ms.gov>
Cc: Holt, Derek R. <DRHolt@GarverUSA.com>
Subject: US 72 Interchange Placement

Jessica and Eames,

I wanted to follow up with an email just to make sure I heard correctly, and we start on the right path. At the progress report meeting two weeks ago I wrote down that we are only worried about interchange spacing (1 mile minimum) from the existing interchanges and not the future planned full cloverleaf (dashed in the powerpoint provided). I also have written down that if that future cloverleaf interchange is ever built it will include collector-distributor roads and be a system interchange.

Please confirm I have this right before we move forward. Just for reference, below are one-mile radius circles placed at the intersections of each adjacent interchange overpass with US 72. The future cloverleaf sits right at one third of a mile west of the existing 302 interchange.

Section 7-2.01.4 of the 2020 MDOT Roadway Design Manual spells out the minimum interchange spacing for different segment location/types and where that is measured from.

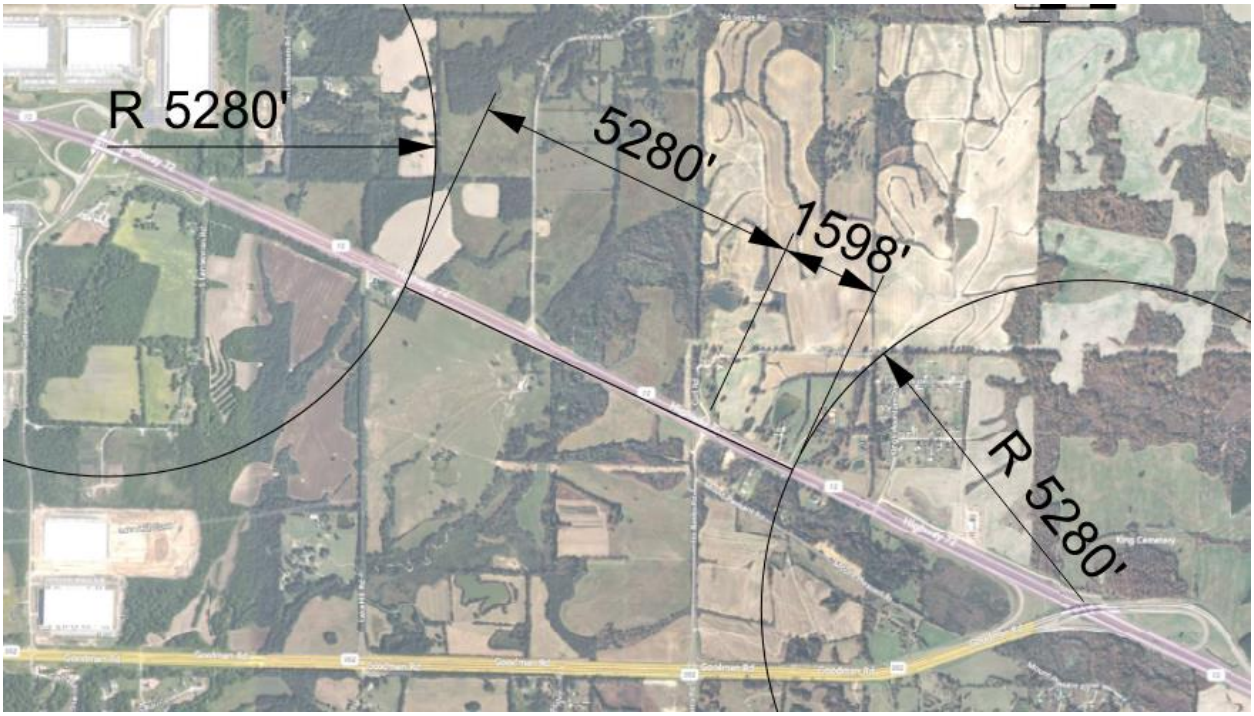
4. Interchange Spacing – Minimum interchange spacing is provided in Table 7-2-A for urban and rural roadways. These distances are measured between the centerline of each crossroad. Greater separation of interchanges in transitions between urban areas and rural areas may be desirable.

Table 7-2-A
MINIMUM INTERCHANGE SPACING

Segment Location/Type	Spacing Minimums (miles)
Urban/Interstate	1*
Urban/Non-Interstate	1*
Rural/Interstate	3
Rural/Non-Interstate	2

* *In urban areas, spacing of less than one mile may be developed with grade-separated ramps or with Collector-Distributor (C-D) roadways if a capacity analysis results in a desirable LOS. See Section 7-2.10 for information on C-D roadways.*

When looking at the existing interchange spacing, there is physical room for two interchanges to be added into this section. This could potentially allow the County to further develop this area with direct access to US 72. The interchange we are currently trying to build would need to fit somewhere in the 1598-foot stretch of US 72 detailed below to allow spacing for an additional interchange to the west. This potentially causes several impacts in this area including multiple houses, property impacts and a cemetery. Garver requested the survey files for the cemetery to evaluate further. Interchange concepts will be developed in this area for the range of concepts but could be eliminated due to environmental concerns.



The proposed interchange crossing will likely be classified as a minor arterial. Looking at the Marshall County Function Classification map on MDOT's website, N. Red Banks Road south of this area is currently classified as a minor collector.

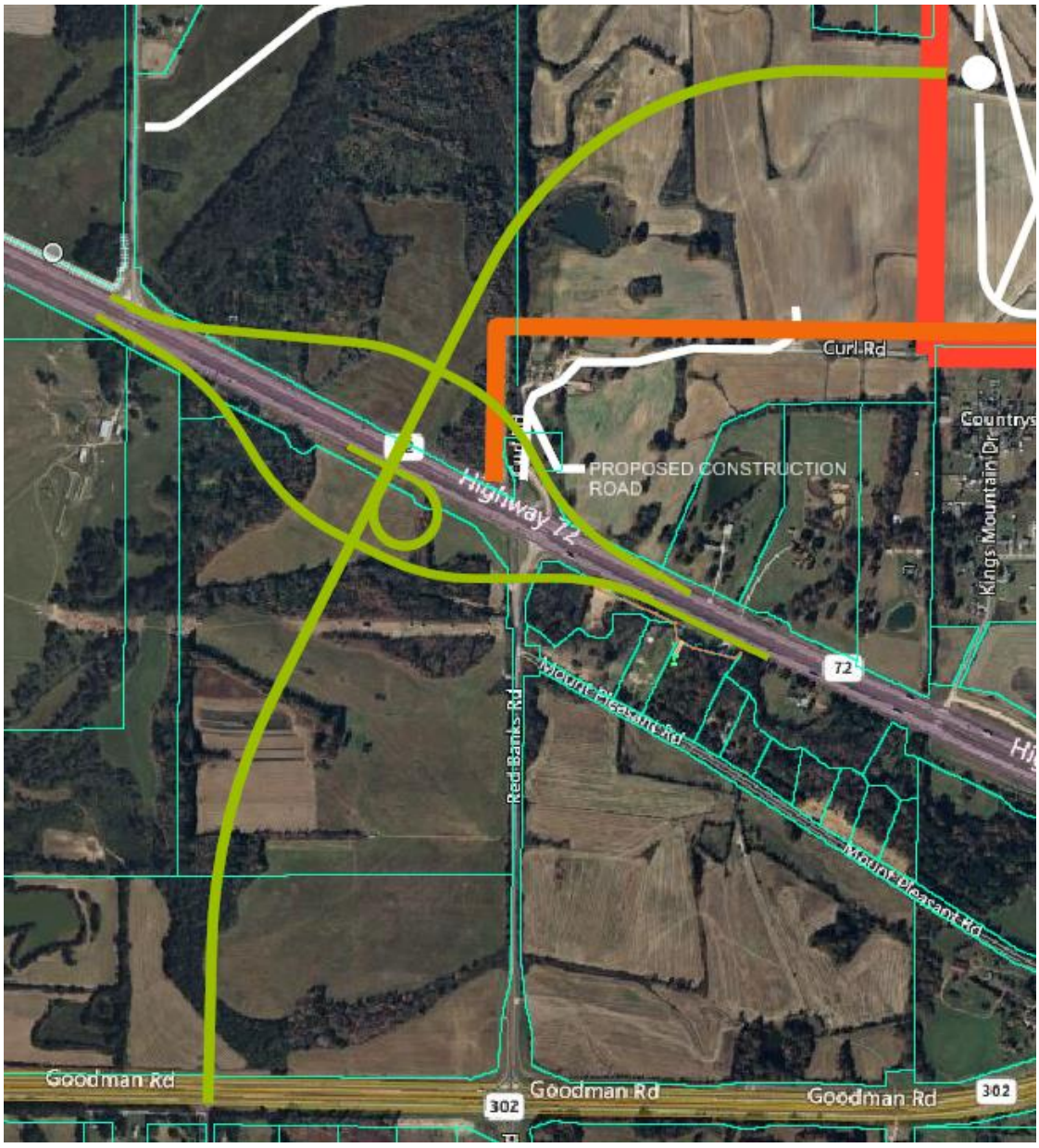
The follow alternatives were developed without data for the future traffic demand. These were conceptual in nature to help evaluate potential positive benefits and negative impacts. All of these alternatives would need to be reevaluated once the future traffic is available but for the purpose of narrowing down potential alternatives to consider further the information for each alternative is sufficient.

At the time these initial alternatives were developed it was not known that the county and MDOT wanted the southern leg of the interchange to tie in directly to N Red Banks Road.

Initial Interchange Configuration Concepts

This section describes the initial interchange configuration concepts we evaluated at a high level to determine which concepts would best fit the site while meeting the traffic and purpose and need. These concepts were brought to the initial field review with MDOT and the County to discuss. Below is a description of those initial concepts and reasons to move forward or dismiss as discussed in the field on April 22, 2024.

Alternate B

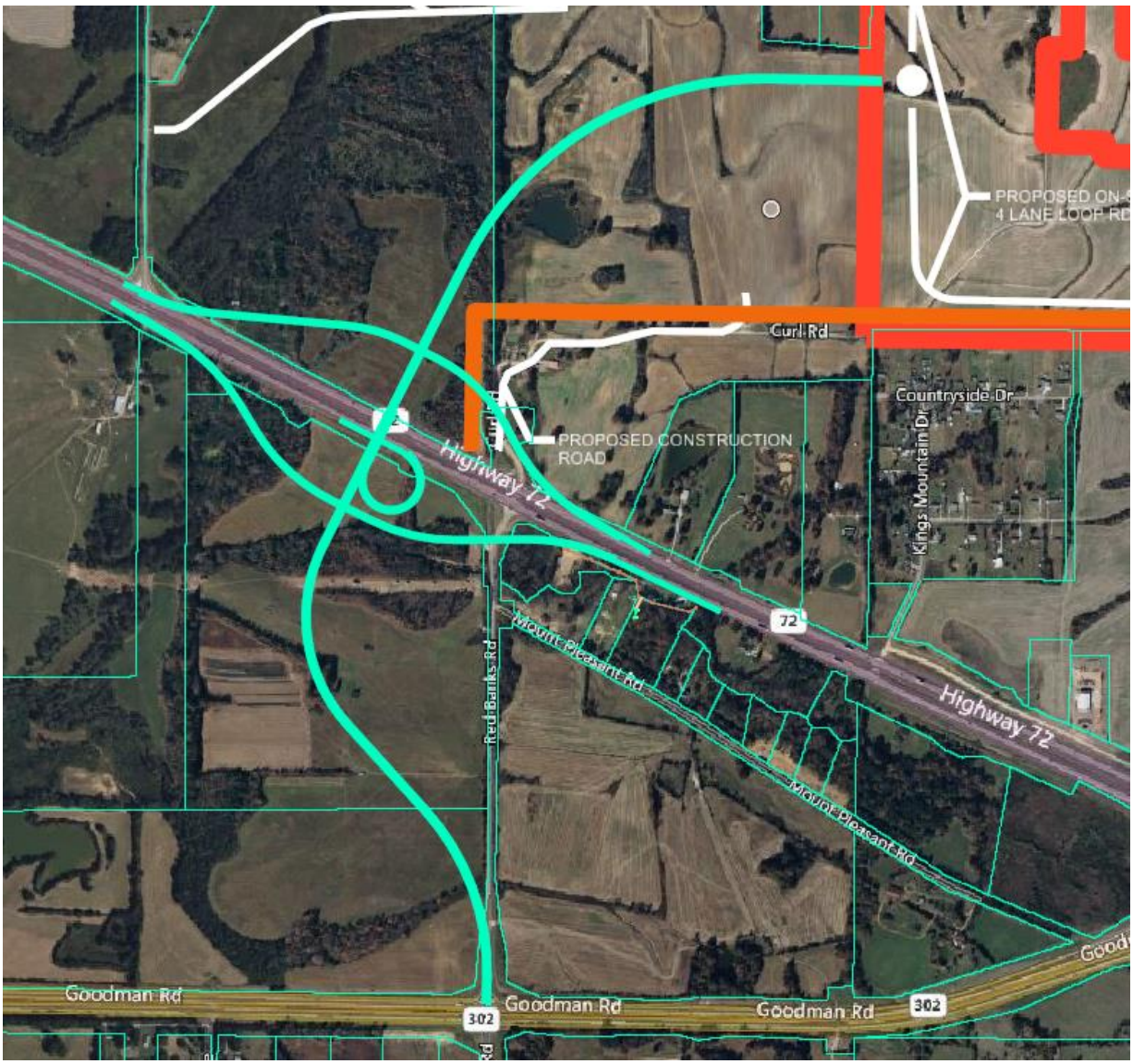


The new roadway crosses US-72 at a 90 angle and ties into a crossover on SR-302 at Lake Hill Cove. This option only crosses the transmission line once (NE Ramp) on the north side and once on the south side (SE Ramp). Access for parcels in the NE quadrant will be cutoff due to the ramp, necessitating a frontage

road to maintain access. The northern road skirts a pond, but ROW would be needed to encapsulate the entire pond.

The MDOT and County preference was to tie to Red Banks Road and the existing 302 (Goodman Rd) intersection. This is a concern because Red Banks Road is already a major intersection along Highway 302. We wouldn't want to introduce another major intersection that closely spaced. Furthermore, Red Banks Road continues south for a long way. From a safety and traffic mobility perspective, it wouldn't make sense to send traffic from the plant down to 302 and make them take a left then a right turn to continue straight. Options with direct connectivity back to Red Banks would be preferred. There is also a potential sight distance concern at existing median open west of Red Banks Road. Lastly, this alternative split the future developable land south of 72 making it less desirable to developers. This concept was not carried forward into the pre-public meeting concept phase.

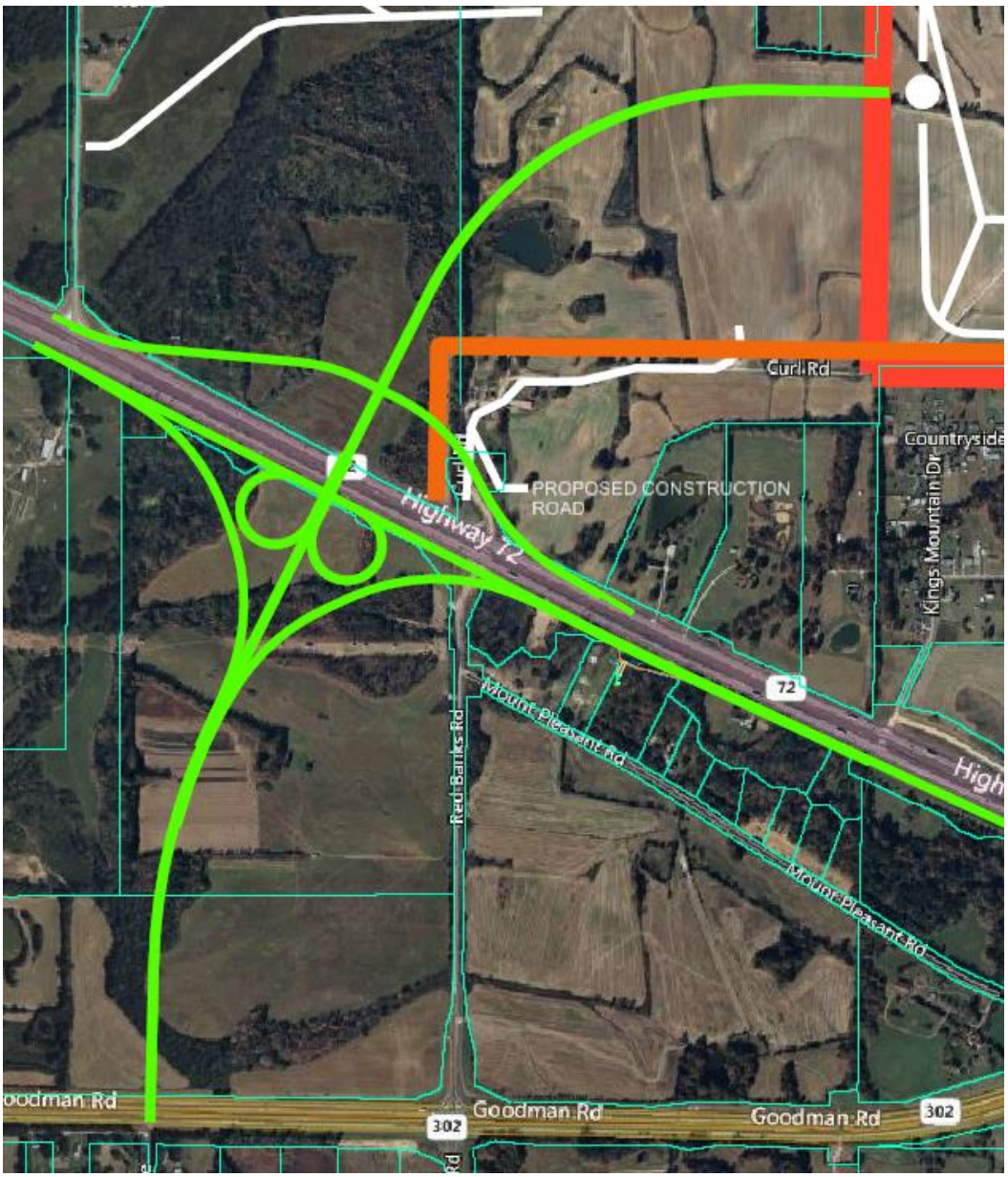
Alternate B-1



This alternate is essentially the same as Alternate B, except for the southern part of the alignment that ties into N. Red Banks Rd. North Red Banks Rd runs south all the way to I-22, which would allow for development along the corridor. The northern road skirts a pond, but ROW would be needed to encapsulate the entire pond.

This concept was not carried forward to the pre-public meeting concept phase because of significant impact to future developable land southwest of interchange by splitting property and making it less desirable to developers. Perpendicular crossing of Highway 72 will make the bridge more cost effective but causes geometric issues with tight horizontal curves to tie back to Red Banks. Lastly, this configuration pushes the interchange ramps further west which backs up the no-access limits required further west and therefore has an impact to significantly more properties including a church and an existing business.

Alternate B-2



Alternate B-2 is a modification of Alternate B that includes a C-D road for the loop ramps in the SE and SW quadrants of the interchange. This alternate is closer to the cemetery but should not impact it. The northern road skirts a pond, but ROW would be needed to encapsulate the entire pond.

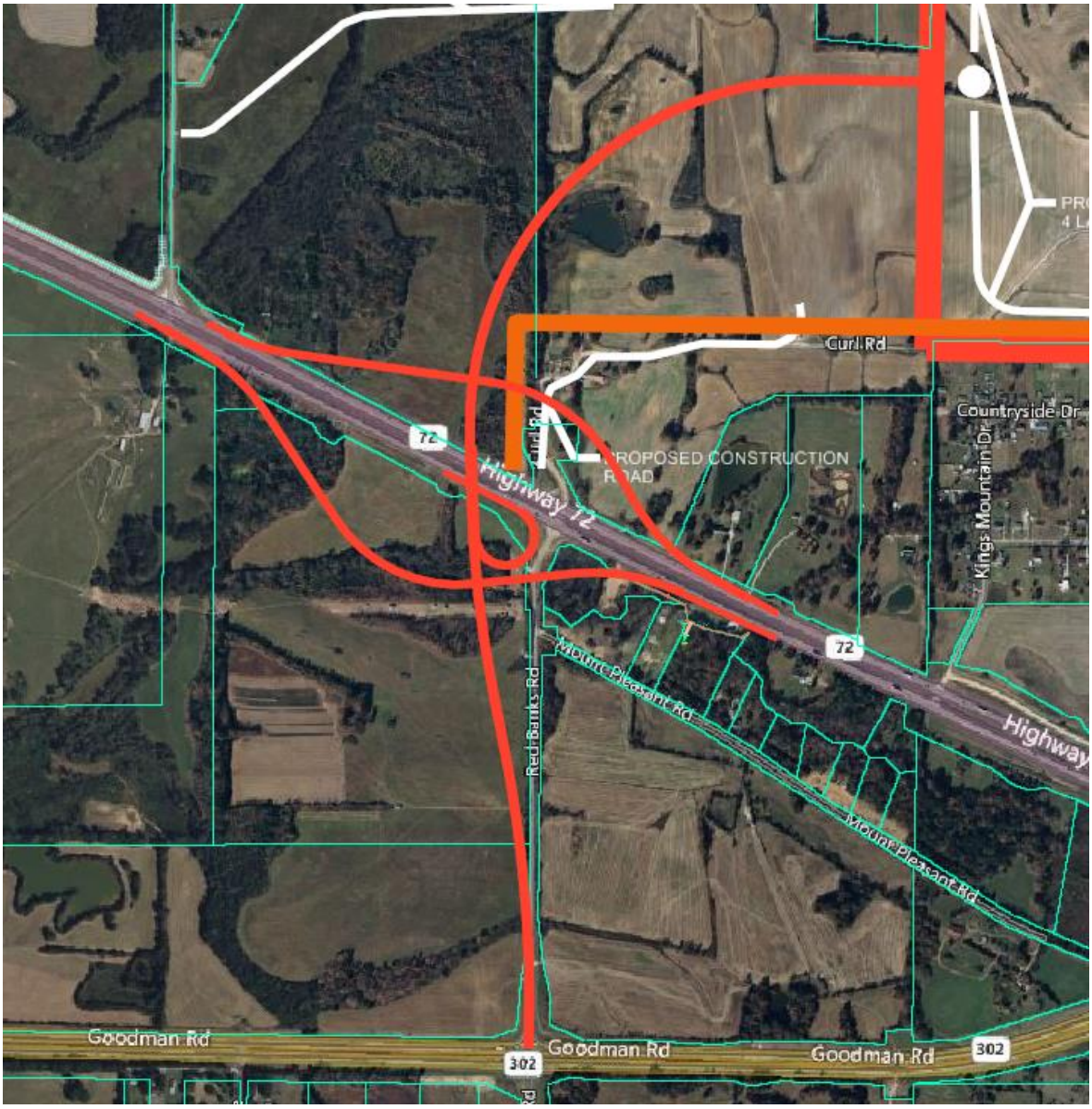
The MDOT and County preference was to tie to Red Banks Road and the existing 302 (Goodman Rd) intersection. This is a concern because Red Banks Road is already a major intersection along Highway 302. We wouldn't want to introduce another major intersection that closely spaced. Furthermore, Red Banks Road continues south for a long way. From a safety and traffic mobility perspective, it wouldn't make sense to send traffic from the plant down to 302 and make them take a left then a right turn to continue straight. Options with direct connectivity back to Red Banks would be preferred. There is also a potential sight distance concern at existing median open west of Red Banks Road. Lastly, this alternative split the future developable land south of 72 making it less desirable to developers. This concept was not carried forward into the pre-public meeting concept phase.

.Alternate B-3

Alternate B-3 is a C-D road and dual loop version of Alternate B-1, tying into Red Banks Rd. The geometry of the EB-SB and NB-EB ramps is non-standard and not desirable. One option to improve the geometry is to make these ramps come in/leave from the connector alignment perpendicular rather than making them entirely directional. The northern road skirts a pond, but ROW would be needed to encapsulate the entire pond.

This concept was not carried forward to the pre-public meeting concept phase because of significant impact to future developable land southwest of interchange by splitting property and making it less desirable to developers. Perpendicular crossing of Highway 72 will make the bridge more cost effective but causes geometric issues with tight horizontal curves to tie back to Red Banks. Lastly, this configuration pushes the interchange ramps further west which backs up the no-access limits required further west and therefore has an impact to significantly more properties including a church and an existing business.

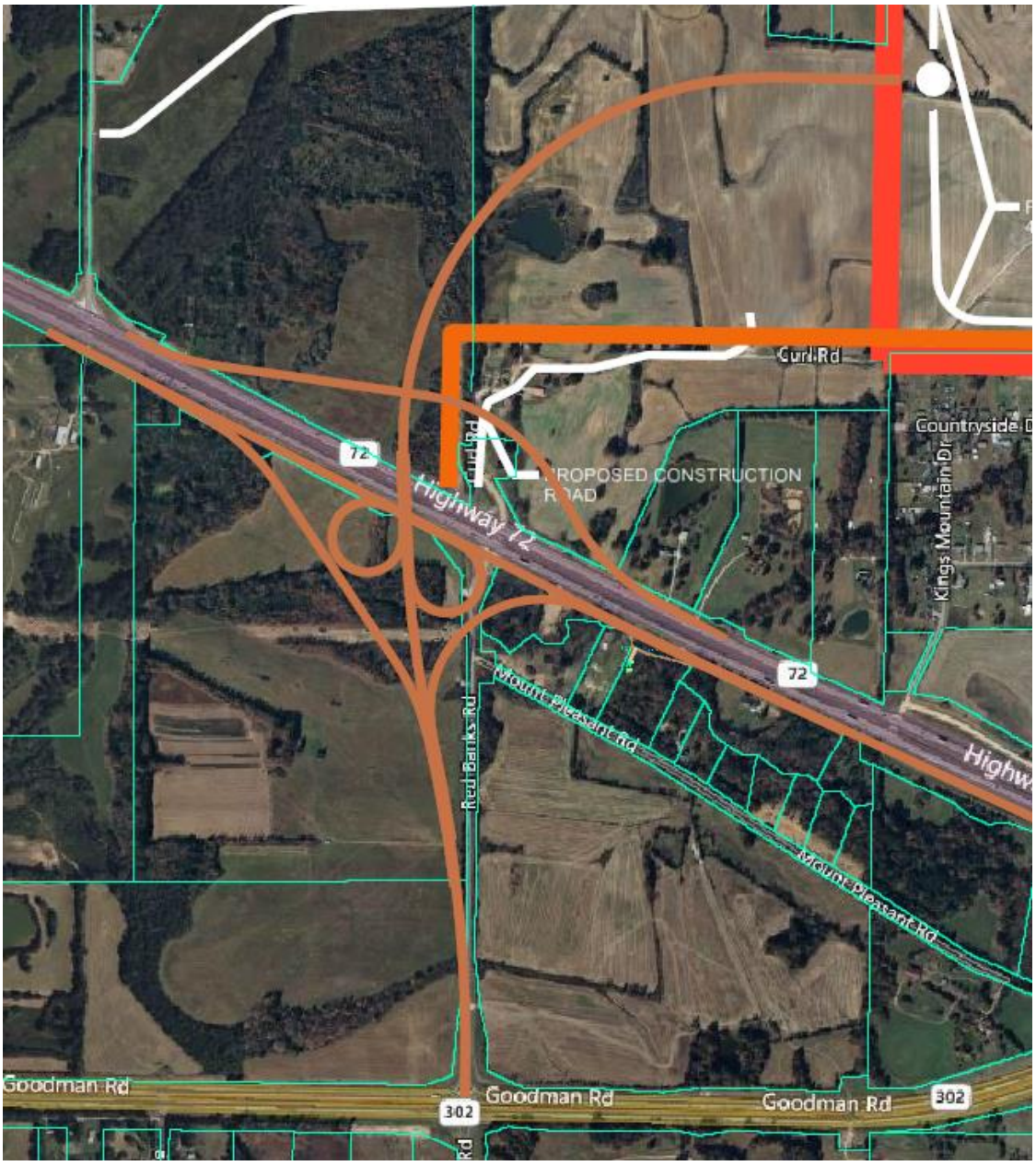
Alternate C



Alternate C is similar to Alternate B, tying into Red Banks Rd. The radius north of the interchange is the same as Alt B, extended south creating a skewed crossing of US-72. This option could have super elevation transition on the crossing bridge. Revisions to the alignment can be made, such as keeping a curve across US-72 to eliminate the super elevation issue on the bridge. This option also only crosses the transmission line once (NE Ramp) on the north side of US-72, like Alternate B. The loop ramp and SE ramp cross the transmission line on the south side of US-72, but not at the corner post. The northern road skirts a pond, but ROW would be needed to encapsulate the entire pond. Replacing the NE Ramp with a loop in the NW quadrant would improve access impacts in the NE quadrant.

This concept was carried forward into the pre-public meeting phase for further development.

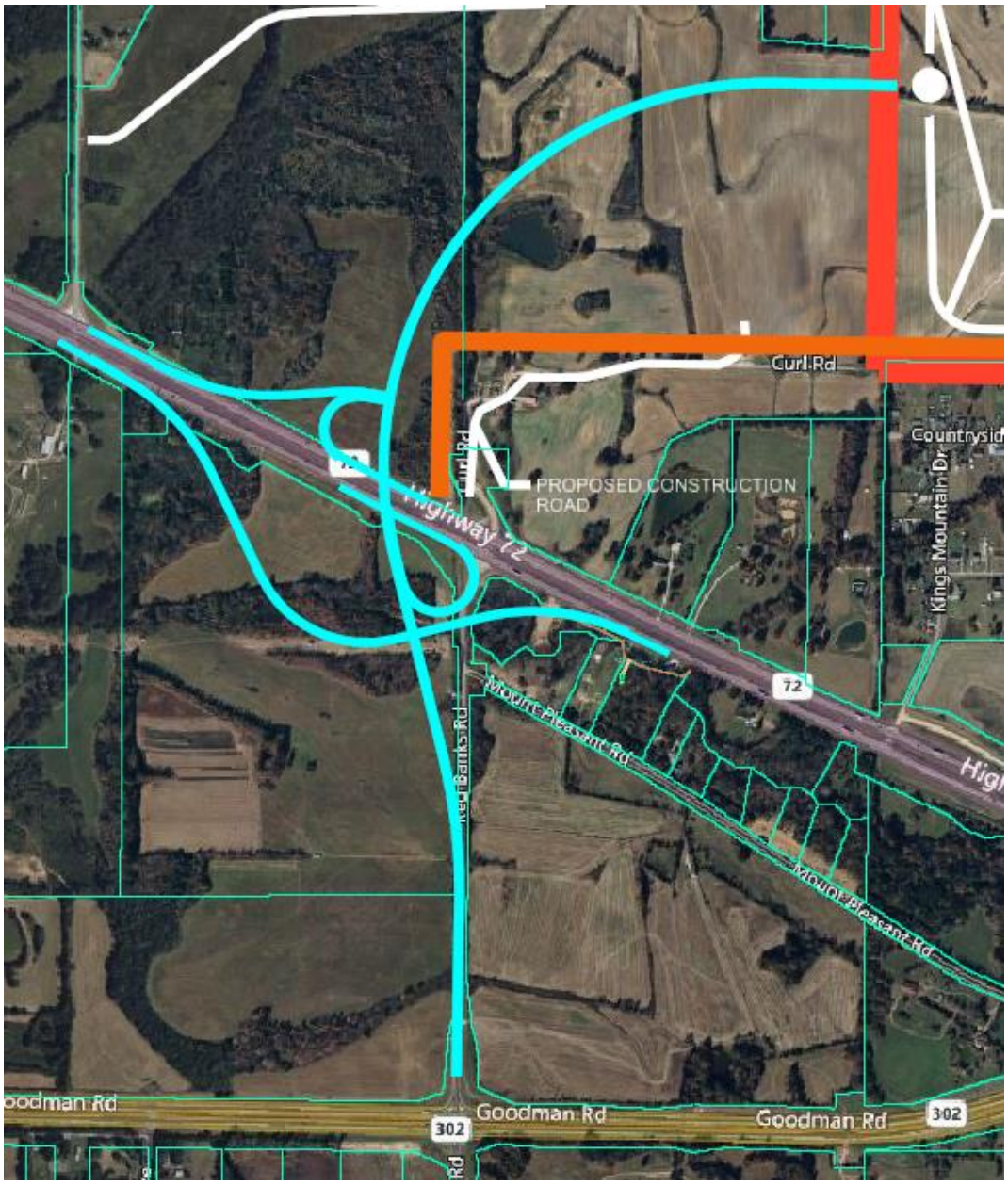
Alternate C-1



Alternate C-1 has the same base alignment as Alternate C. This option features a C-D road and loops in the SW and SE quadrants. The NB-EB ramp is non-standard and not ideal. Making the NB-EB ramp leave at a perpendicular angle is an option that would improve the geometry and make it more in line with the standard drawing.

This concept was not carried forward to the pre-public meeting concept phase because the southwest entrance loop ramp was not warranted by the traffic volumes.

Alternate C-2

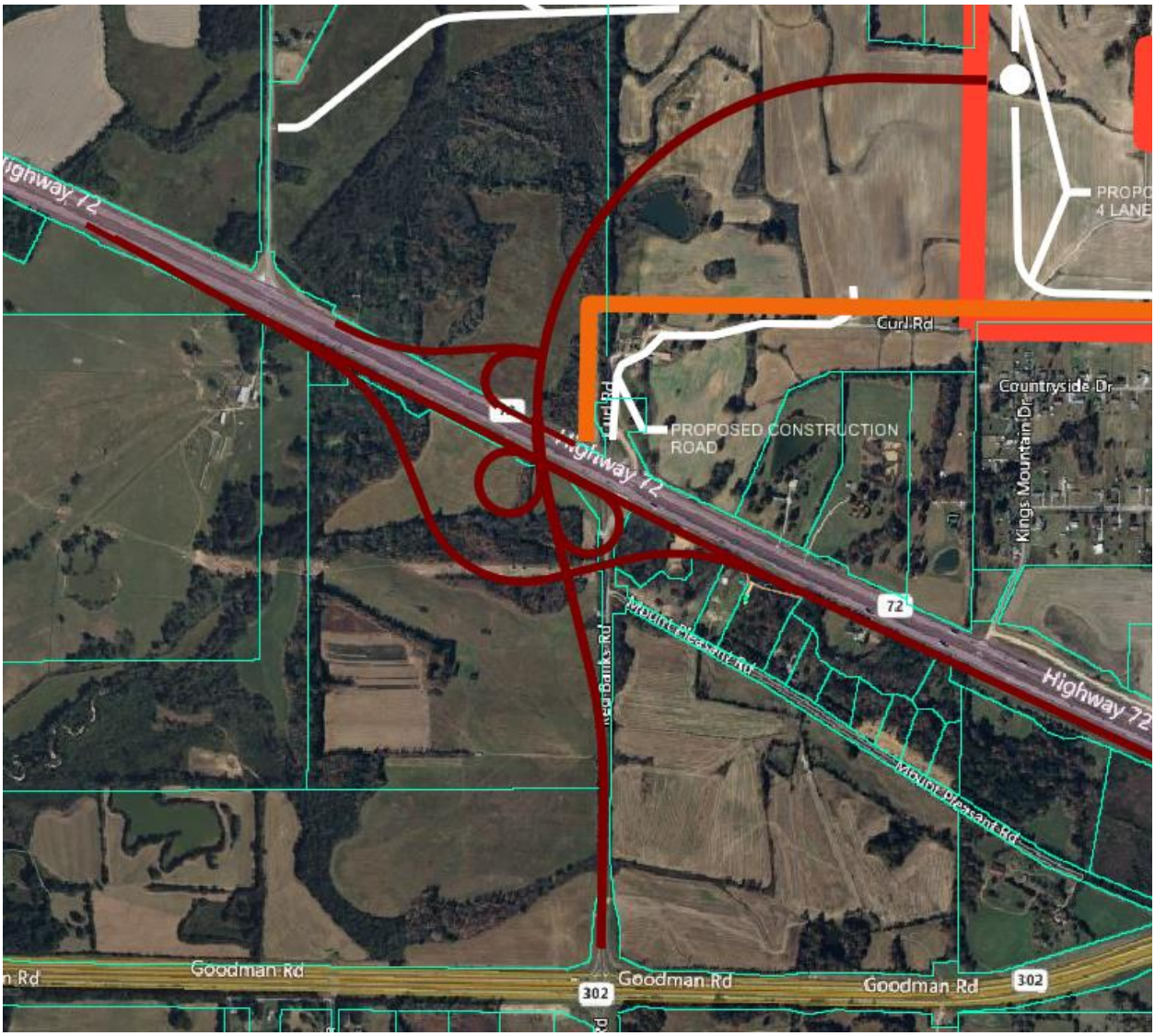


Alternate C-2 features a 2600' radius sweeping across US-72, creating a skewed crossing, but keeping the bridge in constant super. The transmission line is not impacted on the north side of US-72. Additionally, the properties in the NE quadrant of the interchange are not impacted. The SW quadrant ramp has

significant impacts to the transmission line. To minimize this impact, the ramp could be skewed coming into the connection or eliminated, making the loop tie in perpendicular with a left turn and directional right turn.

This concept was not carried forward to the pre-public meeting concept phase because the traffic study showed significant mobility issues with the northwest exit loop ramp being able to make left turns onto Red Banks Road.

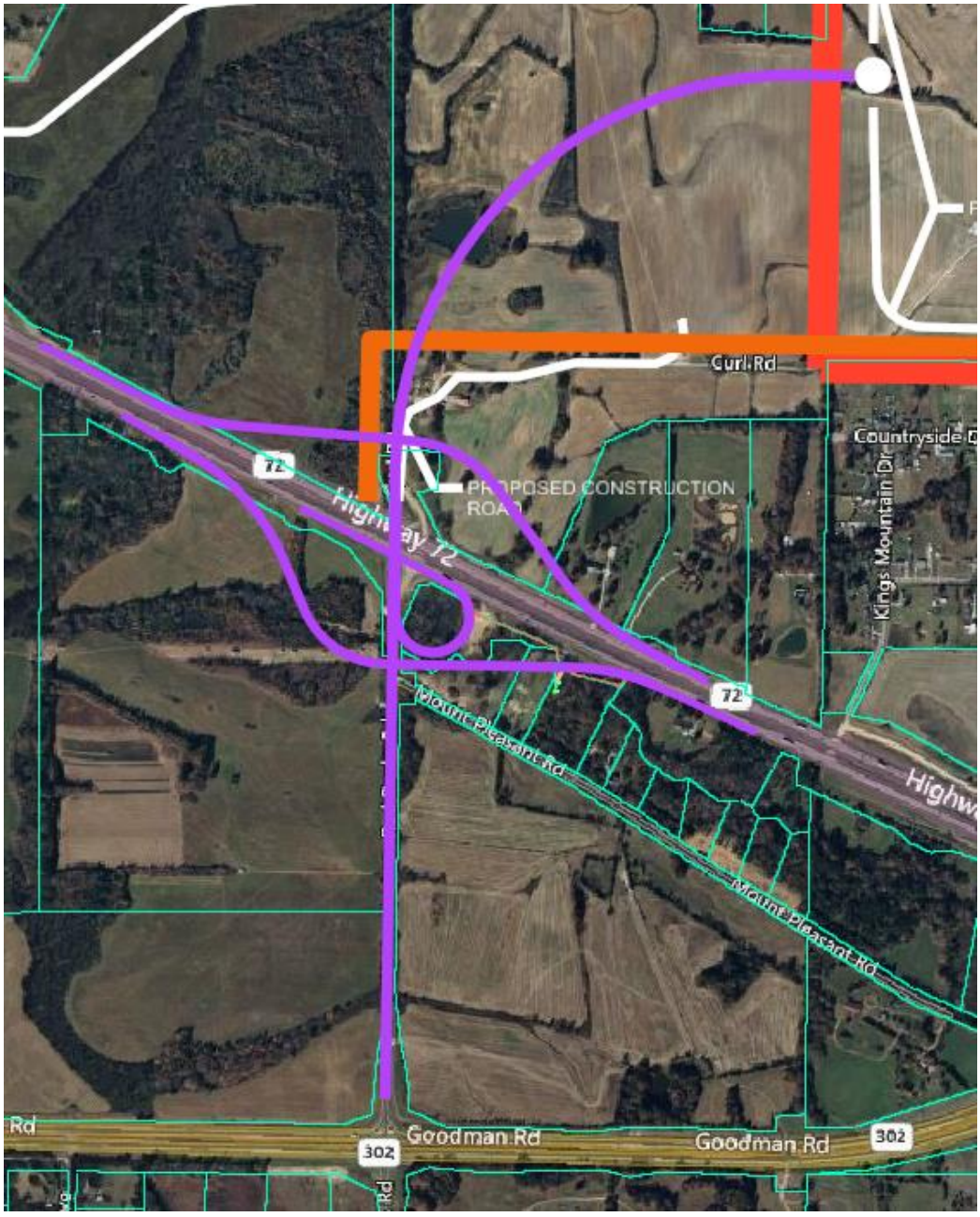
Alternate C-3



Alternate C-3 is much the same as C-2, but with a C-D road and dual loops in the southern quadrants. The on-ramp to the C-D road is closer to the cemetery but shouldn't directly impact it.

This concept was not carried forward to the pre-public meeting concept phase because the traffic study showed significant mobility issues with the northwest exit loop ramp being able to make left turns onto Red Banks Road. The traffic study also showed the southwest entrance loop ramp was not warranted by traffic volumes.

Alternate C-4

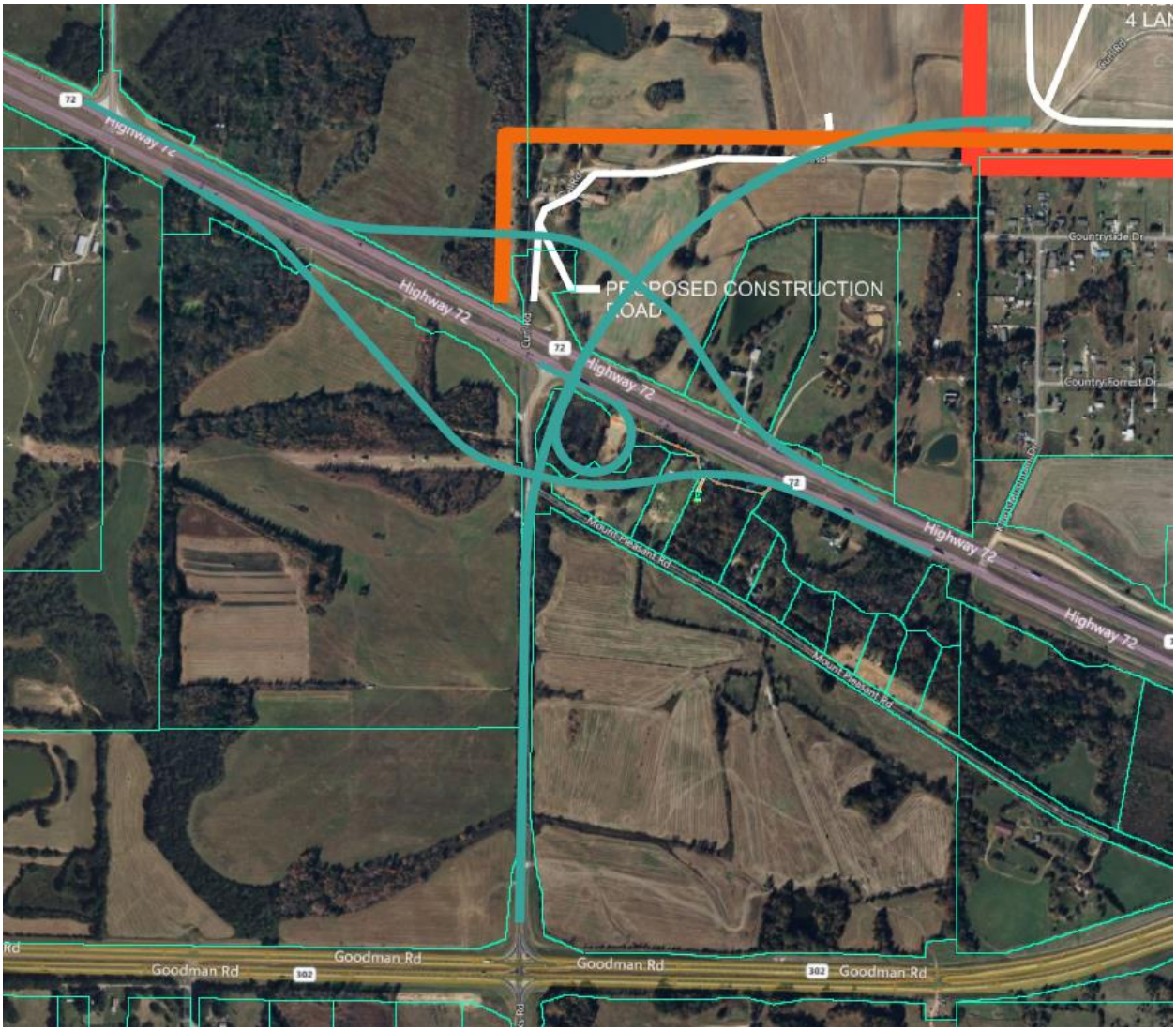


This option stays on Red Banks Rd and connects to the proposed plant roundabout with a 2600' radius. On the north side of US-72, the transmission line is crossed twice. The transmission line is crossed once on the southern side of US-72. This ramp could potentially be moved out, but only slightly, otherwise the cemetery will be impacted. This option runs through the pond to the north and impacts three large parcels/homes in the NE quadrant. MOT may be an issue for Mount Pleasant Rd.

This concept was not carried forward to the pre-public meeting concept phase due to constructability concerns and potentially impacts the Norfleet cemetery. Because this option utilizes existing Red Banks

Road horizontal alignment, the roadway would not be able to be constructed without having an onsite detour to provide connectivity to existing landowners.

Alternate D

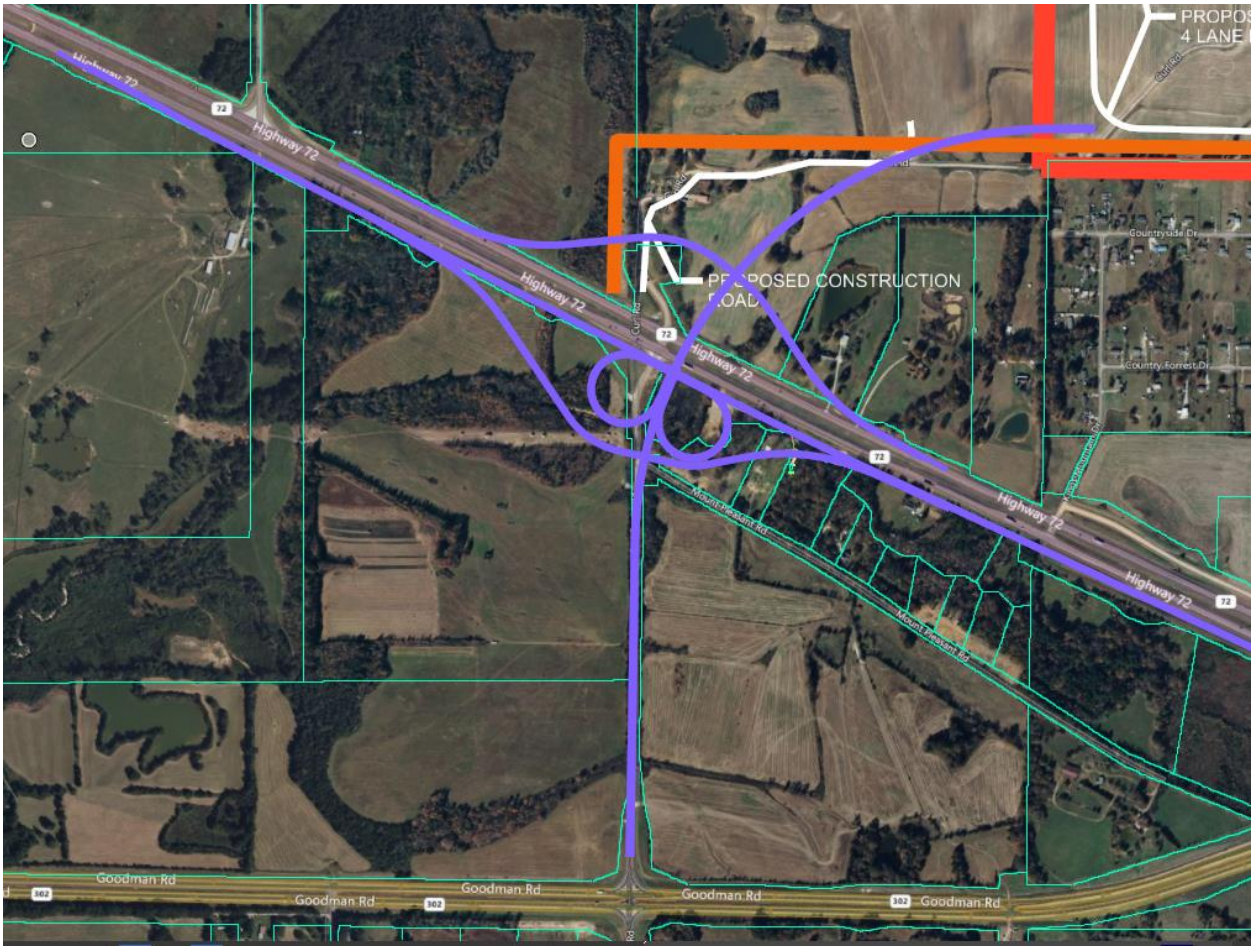


Alternate D is more eastern than other options, tying into Red Banks Rd and connecting to the site at the southern corner of the proposed alignment. This option is far enough eastward that another interchange could be added later. This option gets close to the cemetery, but the ramp cannot be pushed out very much without hitting the cemetery. This option has significant impacts to the properties in the NE quadrant. Additionally, this option crosses the transmission line twice on the north side and once on the south side, potentially hitting the corner pole.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward. Also has constructability concerns and potentially impacts the Norfleet cemetery. Because this

option utilizes existing Red Banks Road horizontal alignment, the roadway would not be able to be constructed without having an onsite detour to provide connectivity to existing landowners.

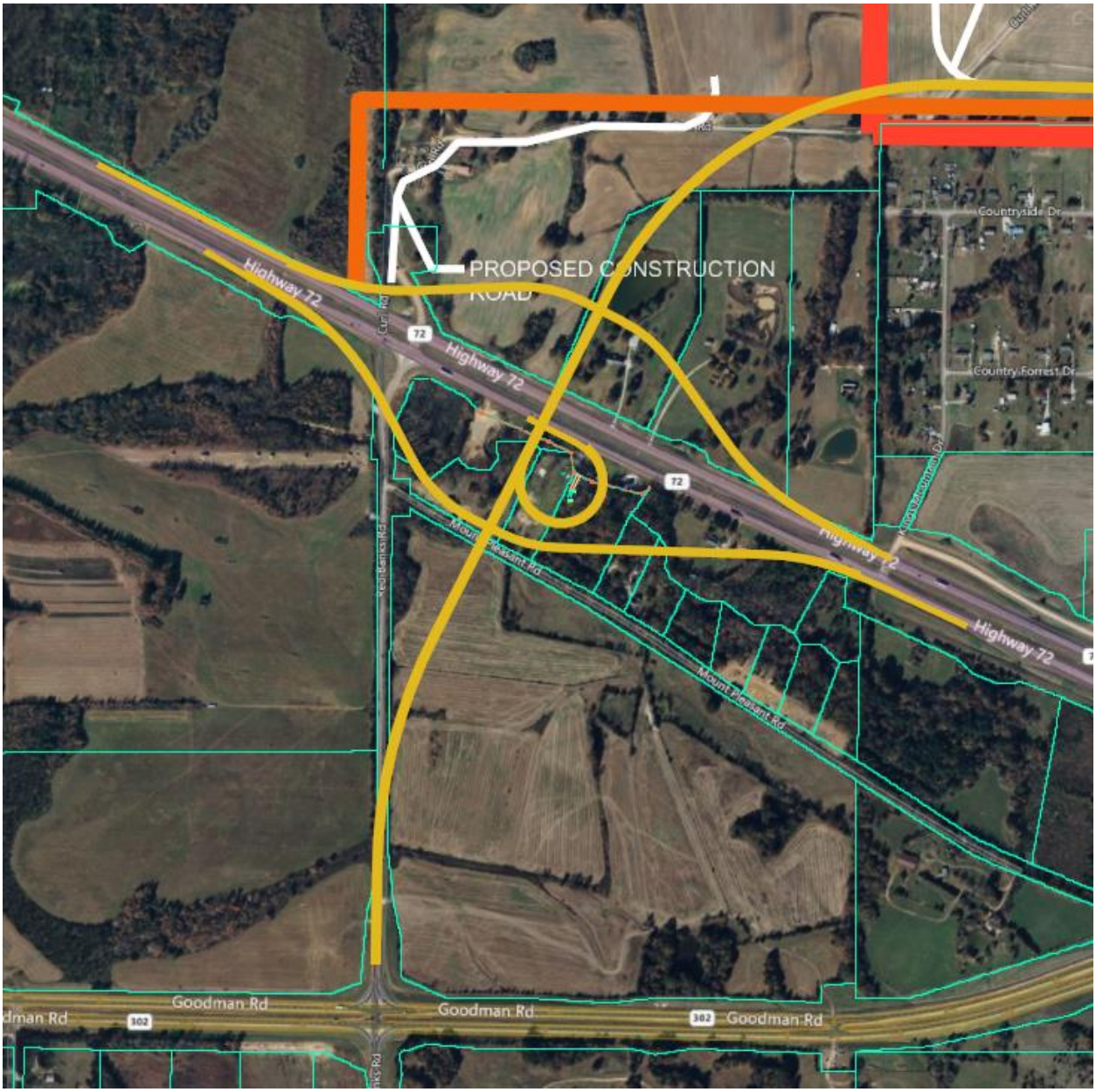
Alternate D-1



This option is very similar to Alternate D, but with a C-D road and dual loops in the southern quadrants. The on-ramp to the C-D road is about 30' closer to the cemetery than Alt D. This option may work better with the transmission line on the south side of US-72.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward. Also has constructability concerns and potentially impacts the Norfleet cemetery. Because this option utilizes existing Red Banks Road horizontal alignment, the roadway would not be able to be constructed without having an onsite detour to provide connectivity to existing landowners. The southwest loop ramp was also determined to not be warranted by the traffic volumes.

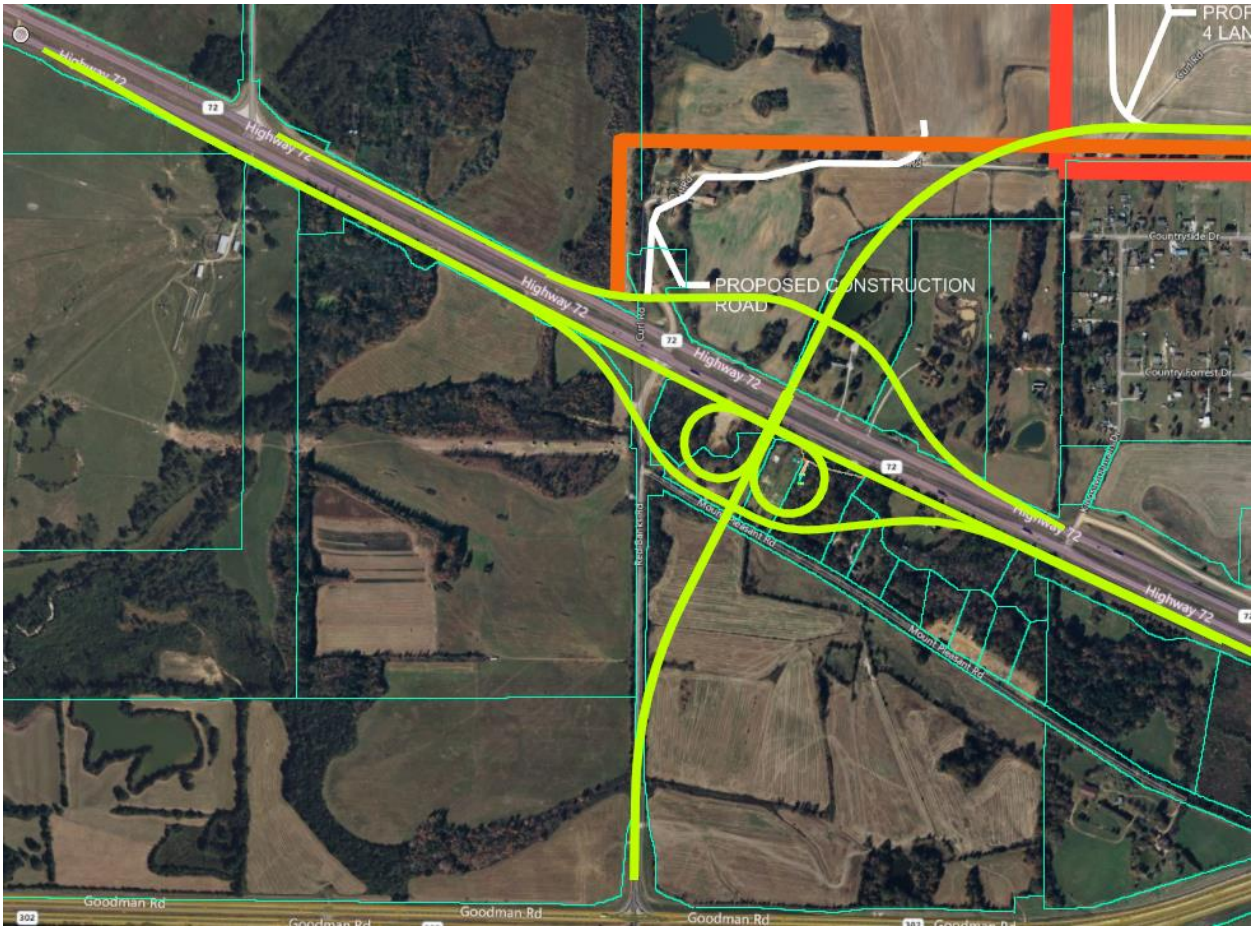
Alternate E



This option is the easternmost alternative. This option's biggest drawback is the impact to the cemetery, which is enclosed within the loop ramp. Though certainly not ideal, a box large enough for vehicular access could be placed within the loop to allow access to the cemetery. An instance of a cemetery within the confines of an interchange is the US-49/Natchez Trace interchange. This option has significant property impacts, likely taking two houses in the NE quadrant as well as changing access for a significant number of parcels. This option has the least impact on the transmission line and could be constructed with a lot of the work off alignment. This option would also allow for another future interchange, since it is so far east.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward. Also has potential impacts to the Norfleet cemetery.

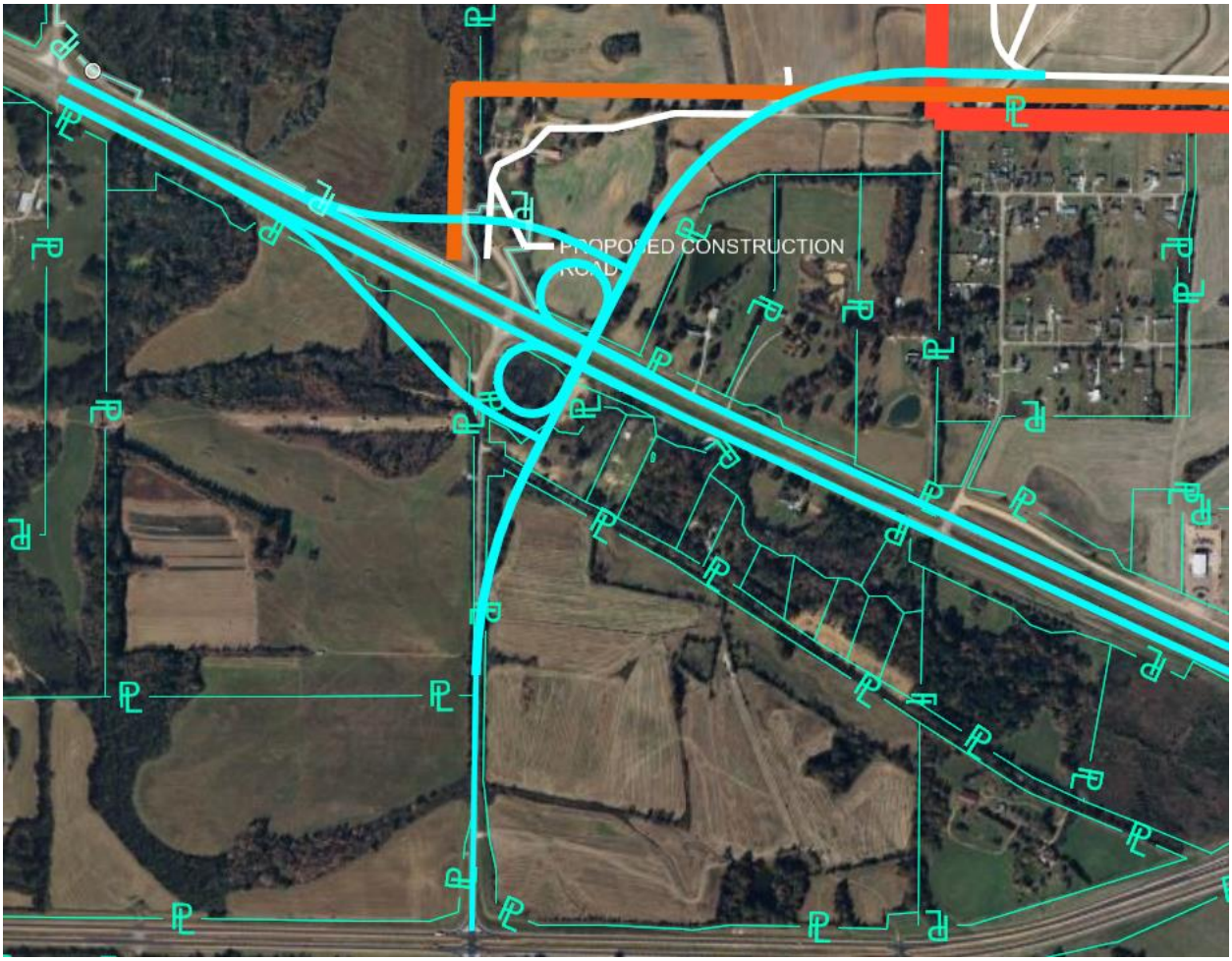
Alternate E-1



This alternate is the C-D road and dual loop version of Alternate E, facing the same issues and benefits.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward. Also has potential impacts to the Norfleet cemetery.

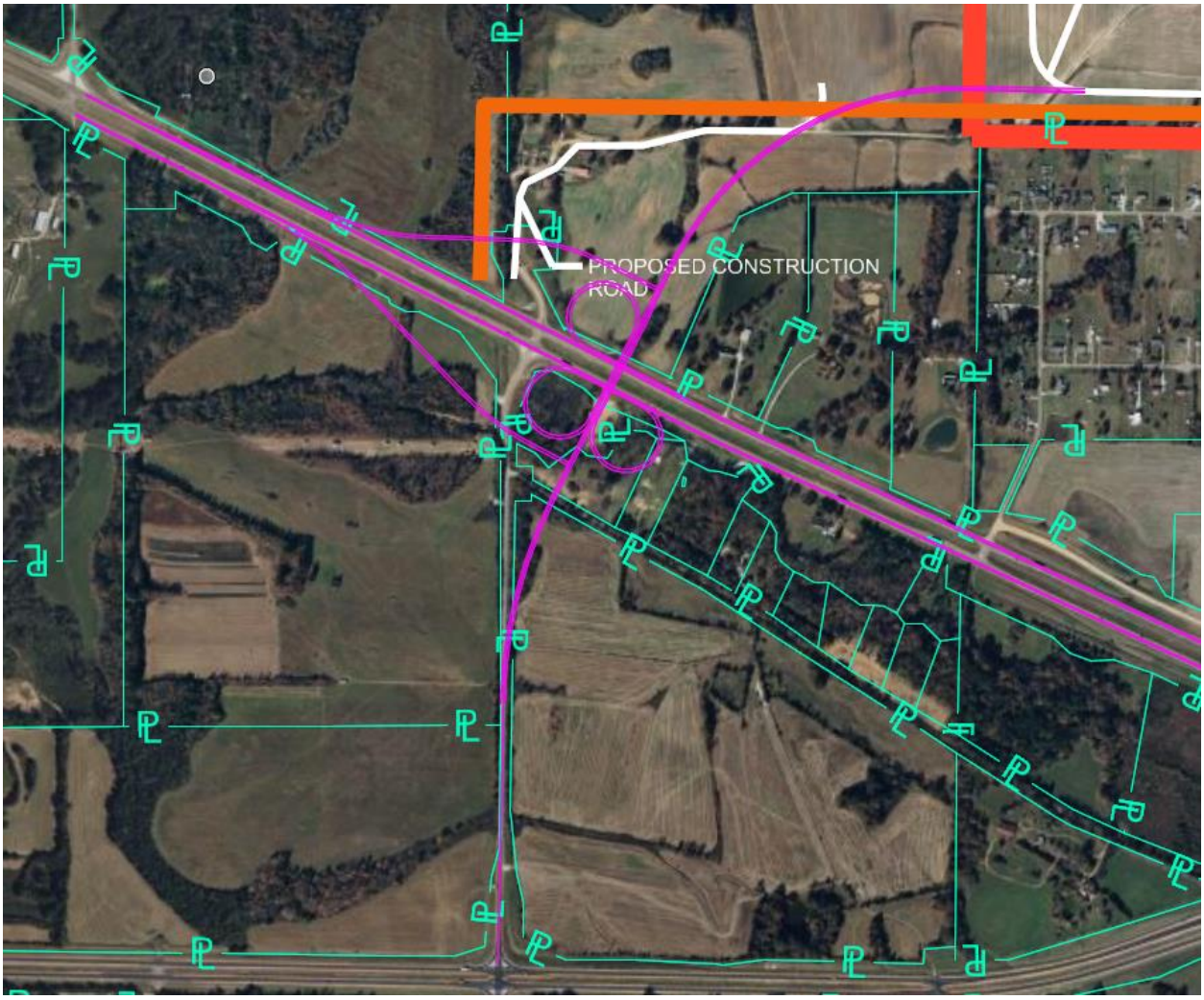
Alternate F



Alternate F ties to Red Banks Rd and the lower SW corner of the plant roadway. This partial cloverleaf alternate avoids the cemetery and minimizes impacts to the transmission line and ditches. This alternate also is eastward enough that an additional interchange could be added to the west. This option does significantly impact several businesses, which would result in their acquisition.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward.

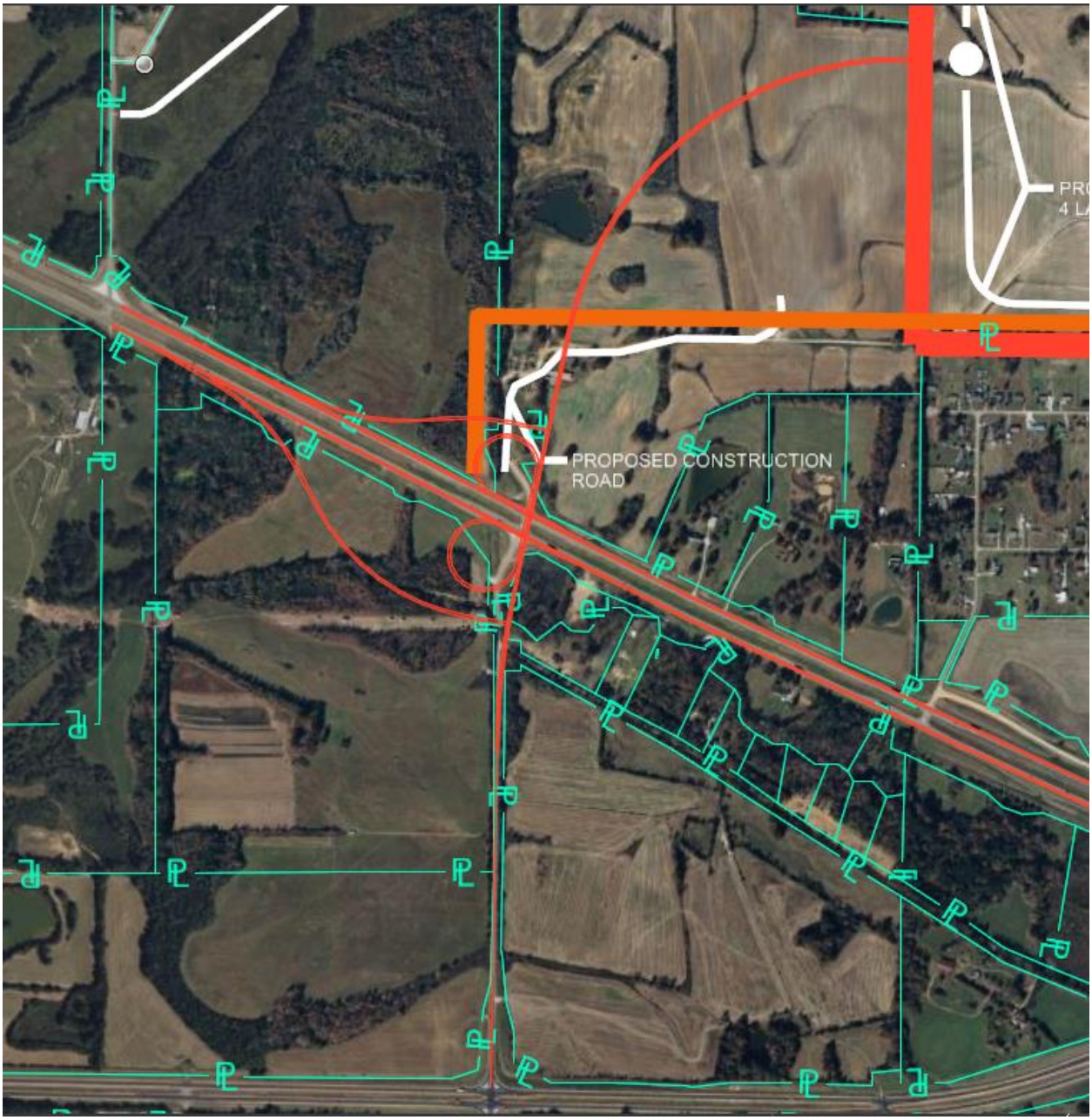
Alternate F-1



This alternate is much the same as Alternate F but with an EB to NB loop ramp. This alternate shares the same pros and cons as Alternate F but with additional direct parcel impacts due to the additional loop.

This concept was not carried forward to the pre-public meeting concept phase because the County strongly stated that the main entrance to the battery plant would be via the roundabout they were building further to the north of where this option tied to their site. This option was tying into their site at another location on their site plan. Since this wasn't acceptable to the site developers and County, it was not carried forward.

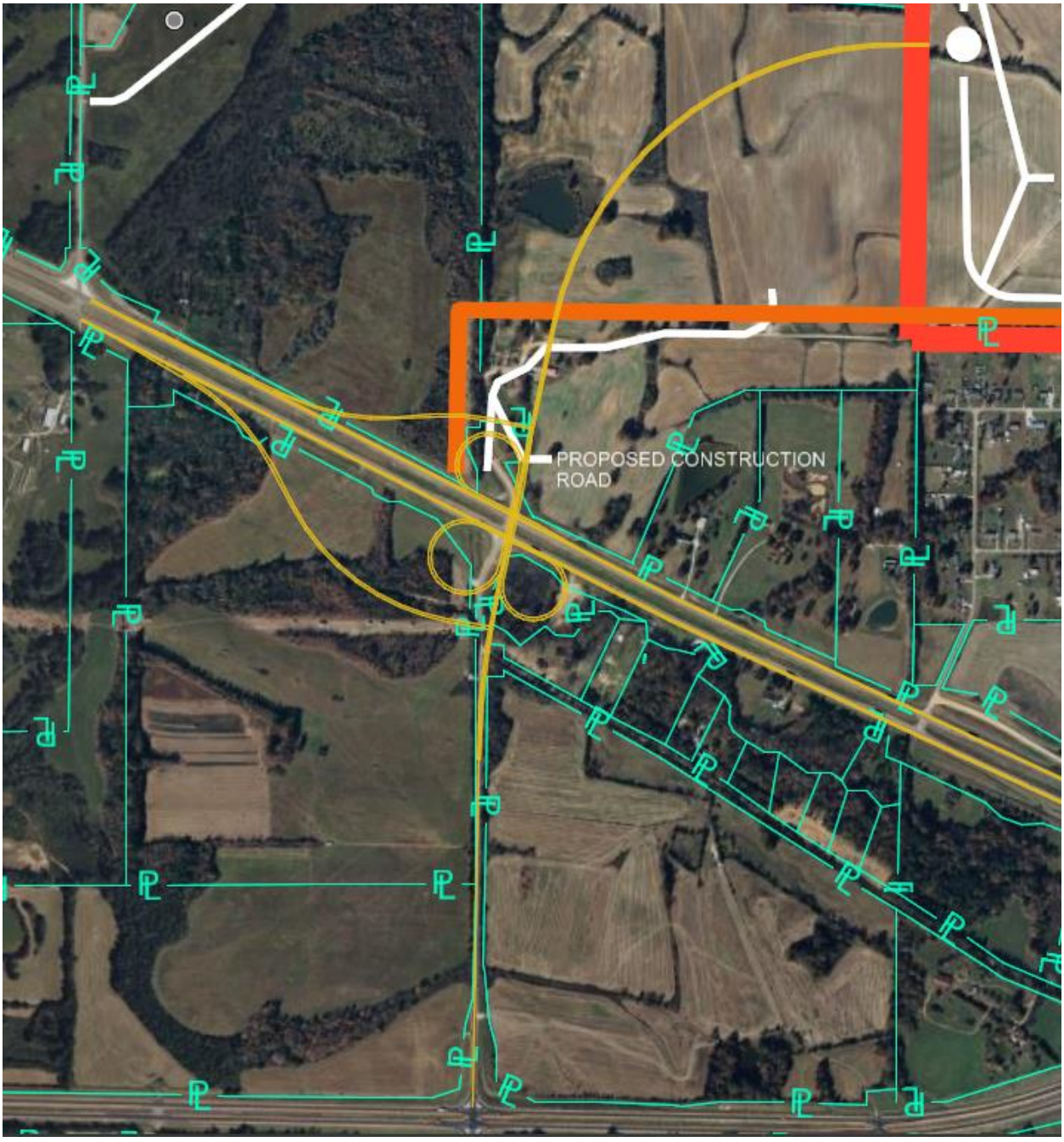
Alternate G



Alternate G is another partial cloverleaf alternate and is similar to Alternate F with the major difference being that it ties at the proposed roundabout at the plant roadway. This option stays on existing Red Banks Rd longer than Alternate F and has fewer direct parcel impacts. However this alternate also is much closer to the transmission line on the south side of US-72.

This concept was not carried forward to the pre-public meeting concept phase because of constructability issues. Because this option utilizes existing Red Banks Road horizontal alignment, the roadway would not be able to be constructed without having an onsite detour to provide connectivity to existing landowners.

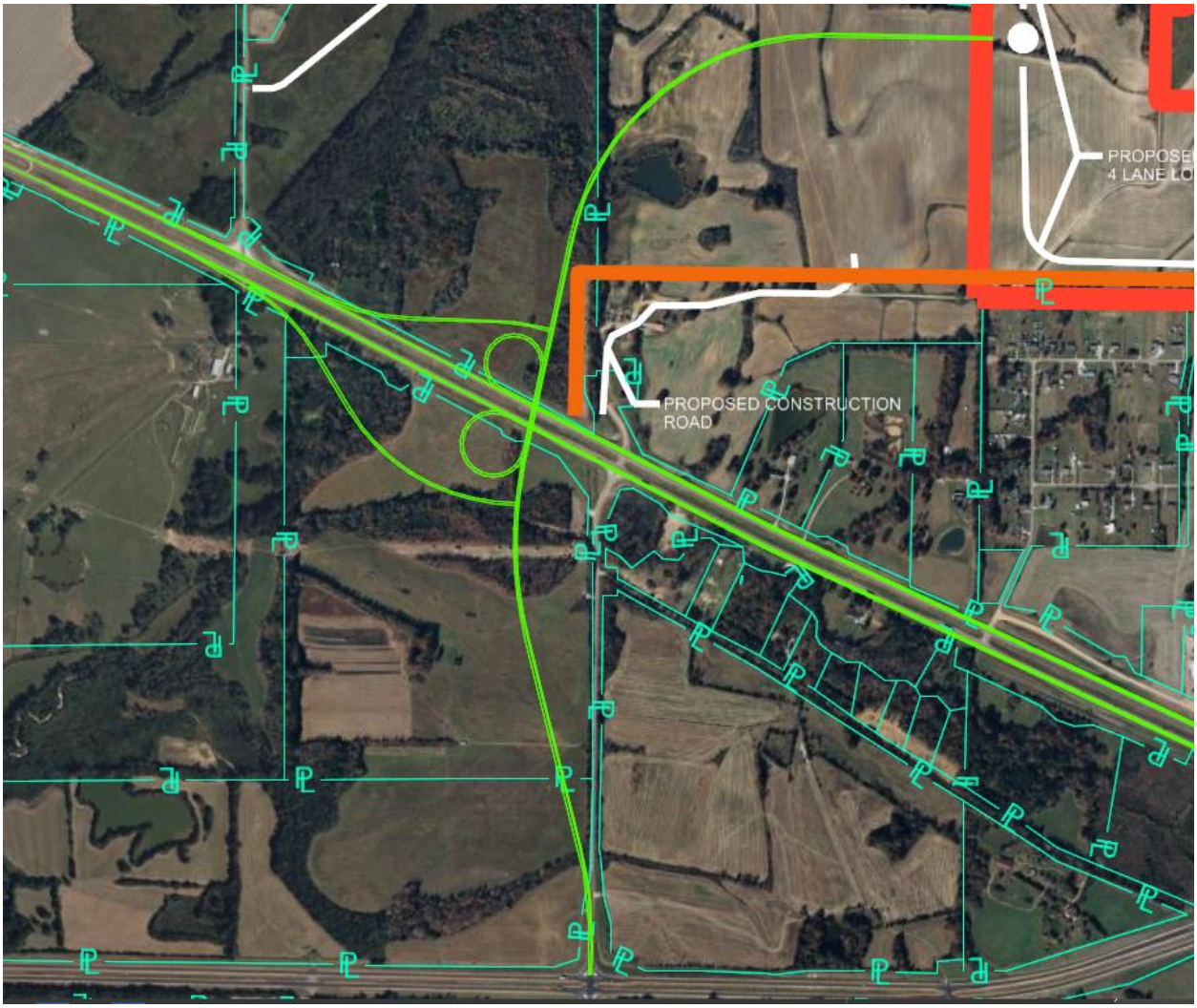
Alternate G-1



Alternate G-1 is a variant of Alternate G that features an additional loop ramp. The pros and cons are much the same with the main difference being that the additional loop has more direct parcel impacts.

This concept was not carried forward to the pre-public meeting concept phase because of constructability issues. Because this option utilizes existing Red Banks Road horizontal alignment, the roadway would not be able to be constructed without having an onsite detour to provide connectivity to existing landowners.

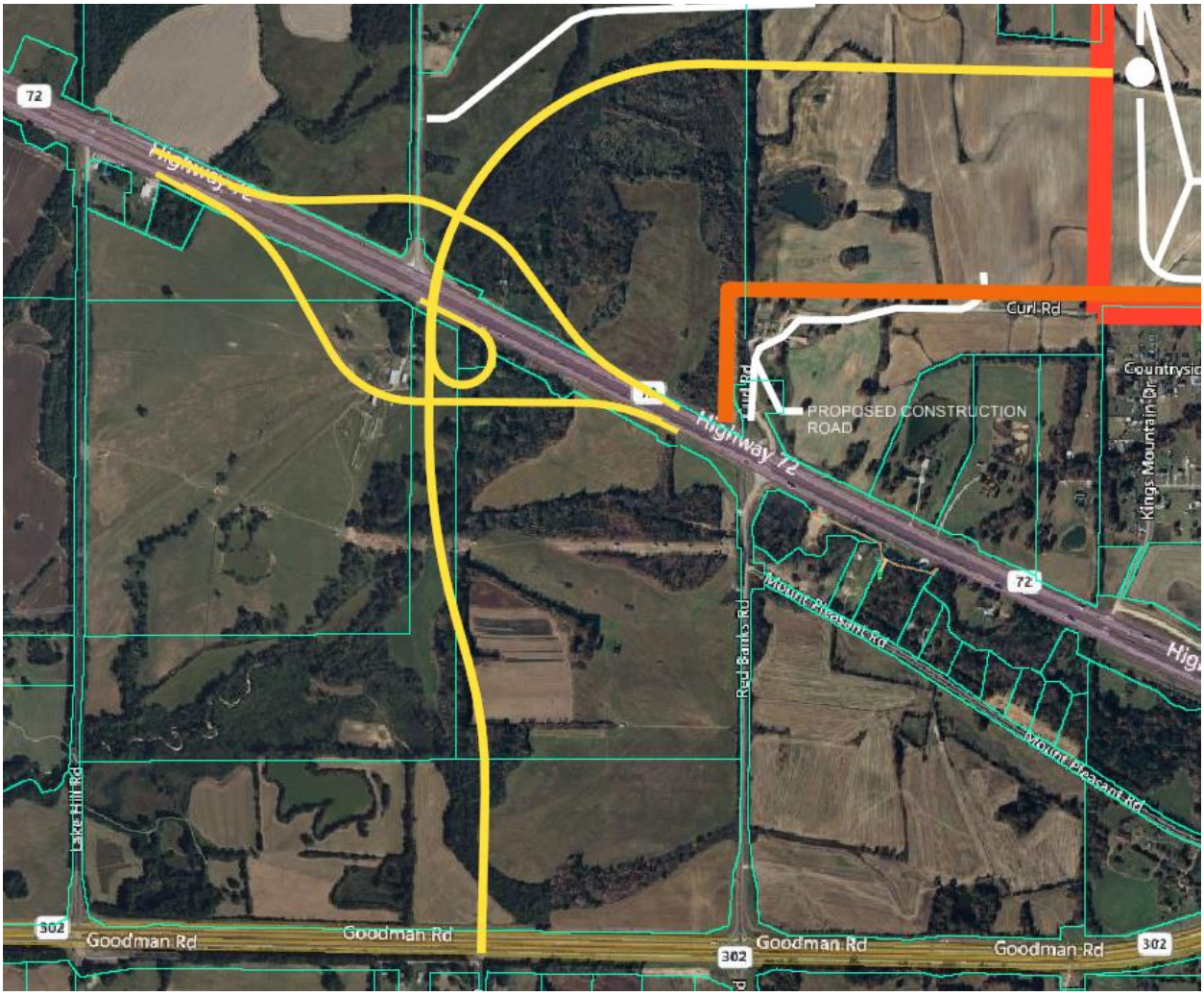
Alternate H



Alternate H is a partial cloverleaf that crosses US-72 on the western side of the transmission line, tying at Red Banks Rd on the south side and at the proposed roundabout on the northern side. This alternate avoids impacting the transmission line, minimizes impacts on drainage channels within the study area, and minimizes the number of parcels that are impacted.

This concept was carried forward into the pre-public meeting phase for further development.

Alternate I



This alternate skirts the ditch on the north side of US-72, crosses US-72 in a curve at near 90 degrees and then heads south through a single parcel. The alignment crosses Lee Creek and the other ditch at a single point with a near perpendicular crossing and then ties into SR-302 at Lake Hill Cove. The transmission line is only crossed once, just south of the Lee Creek crossing. There is also a ditch that runs through the southern part of the alignment that has to be crossed before tying in at SR-302. There is a church and small engine repair business at the western end of the EB off ramp that would be within the no access limits of the ramps.

The MDOT and County preference was to tie to Red Banks Road and the existing 302 (Goodman Rd) intersection. This is a concern because Red Banks Road is already a major intersection along Highway 302. We wouldn't want to introduce another major intersection that closely spaced. Furthermore, Red Banks Road continues south for a long way. From a safety and traffic mobility perspective, it wouldn't make sense to send traffic from the plant down to 302 and make them take a left then a right turn to continue straight. Options with direct connectivity back to Red Banks would be preferred. There is also a potential sight

distance concern at existing median open west of Red Banks Road. Lastly, this alternative split the future developable land south of 72 making it less desirable to developers. Shifting the interchange footprint to the west also caused potential conflicts with an additional business and a church along Highway 72. This concept was not carried forward into the pre-public meeting concept phase.

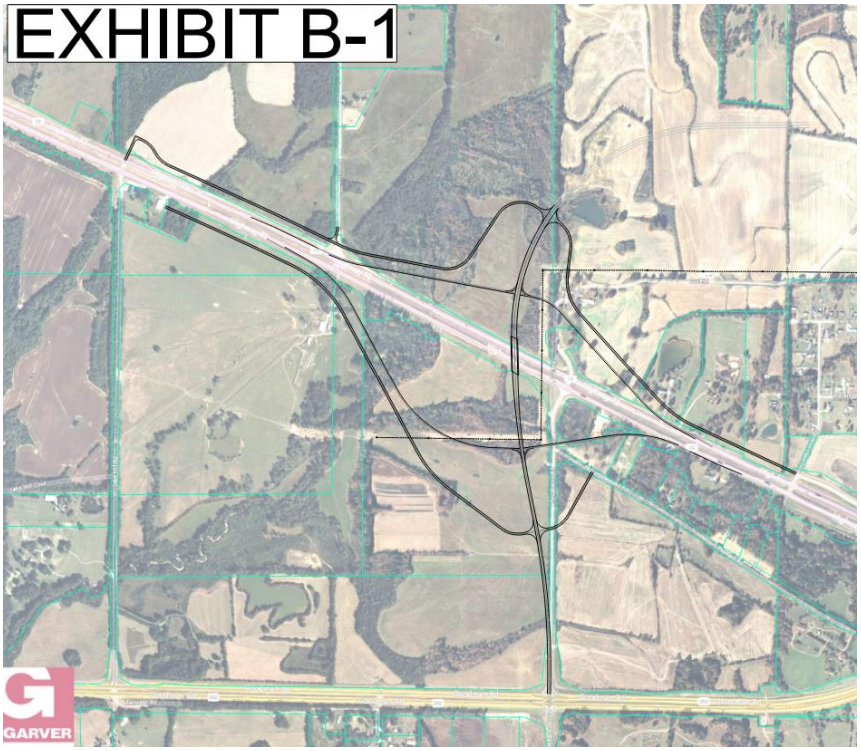
Alternate Analysis and Refinement

A field visit was held on Monday April 22nd. Minutes from that meeting can be found L:\2024\T14-2400207 - US 72 Road Improvements\Correspondence\Meetings\MDOT\Site Visit 4.22.2024. Prior to the public meeting, Garver eliminated some and refined others from the above documented alternatives to show at the meeting. Decisions on whether to eliminate or carry forward an alternate is described under each alternate in **RED.**

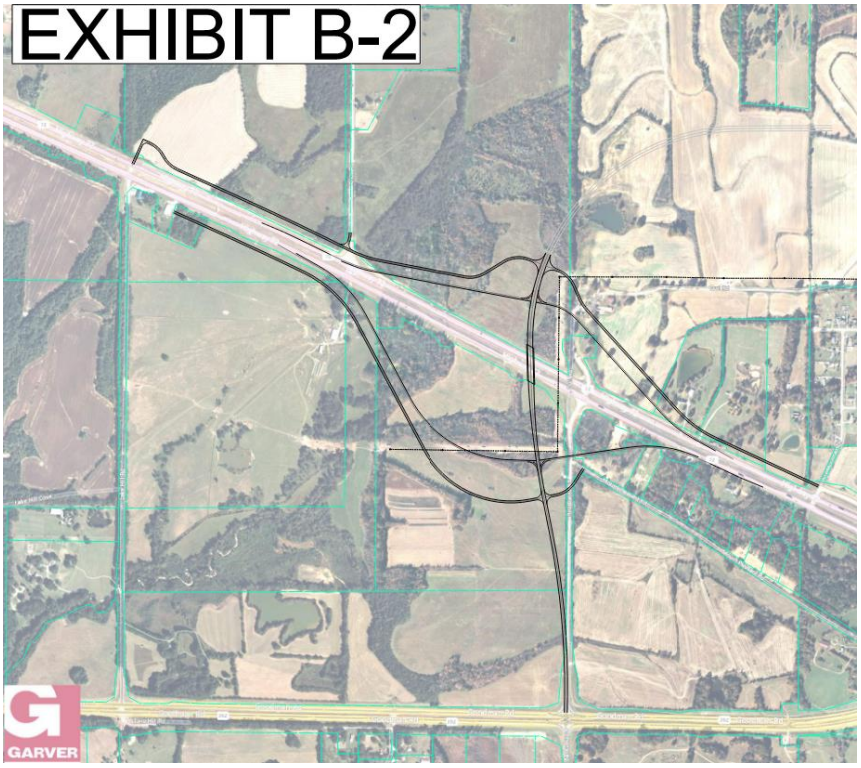
Alternates Carried Forward for Refinement Into Pre-Public Meeting Phase

Alternate C from the initial package of alternates was carried forward in two versions: a diamond interchange and a diamond interchange with an EB to NB loop ramp. Alternate H was also carried forward, but the horizontal alignment of the crossing route was modified so that it paralleled the transmission line, ensuring that a buffer was maintained throughout the transmission line limits. During refinement, the MDOT Access Management Guide was reviewed to determine the spacing between the interchange ramps and the frontage roads. There does not appear to be an exact scenario match in the Access Management Guide to the current design (5-lane roadway), based on Tables 3 and 4 in the Access Management Guide. After several iterations of design and discussion, it was decided that achieving the 1,760' spacing was infeasible. Therefore, it was decided to proceed with two variations of each carried forward alternate: one variation with 880' of space between ramp end of radius and frontage road CL and another variation with 300' of space between ramp end of radius and frontage road CL (loosely based on Figure 2 in the Access Management Guide). For clarity's sake, the alternates were renamed from the original package as follows:

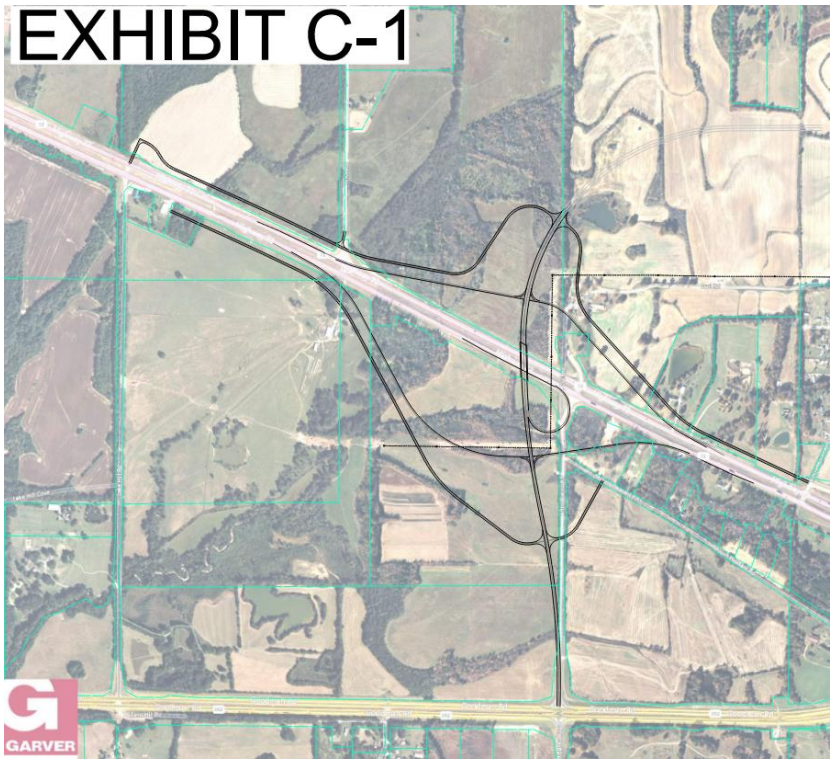
- Alternate B-1 – Diamond Interchange with 880’ frontage road spacing. Originally named Alternate C in the initial package.



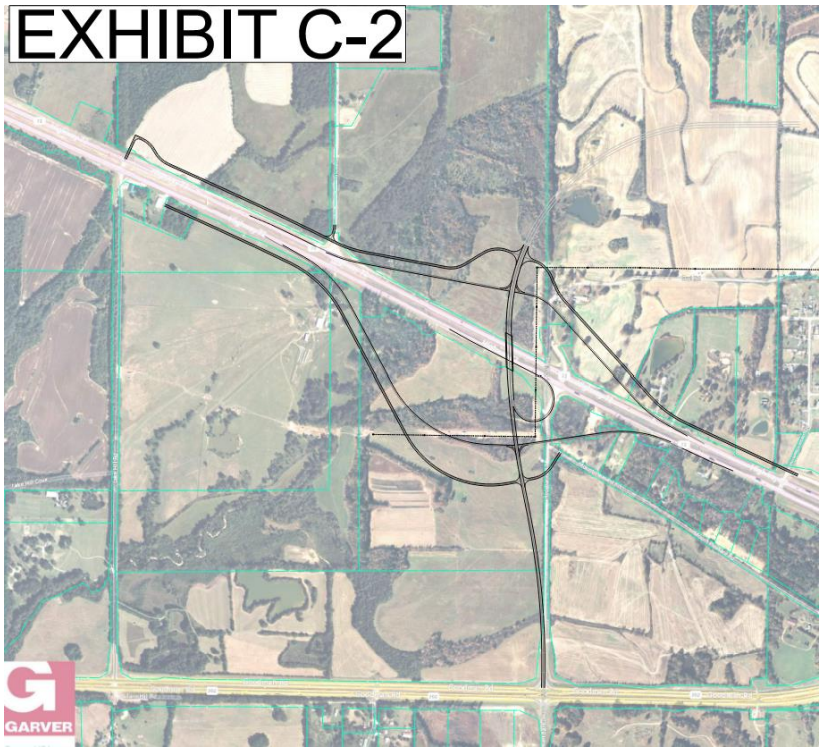
- Alternate B-2 – Diamond Interchange with 300’ frontage road spacing. Originally named Alternate C in the initial package.



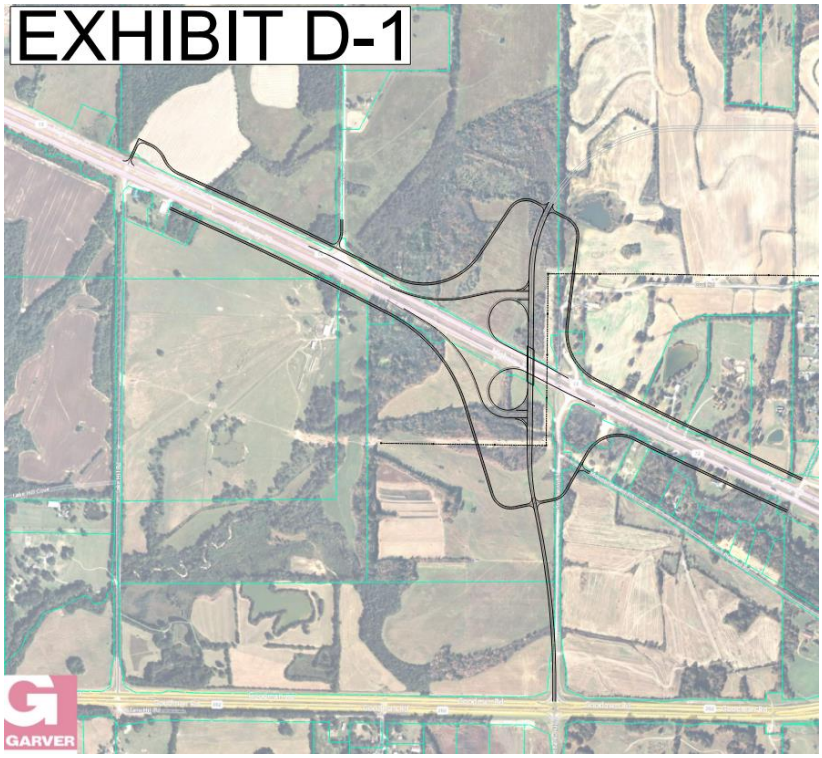
- Alternate C-1 – Diamond Interchange with loop ramp in SE quadrant and 880’ frontage road spacing. Originally named Alternate C in the initial package.



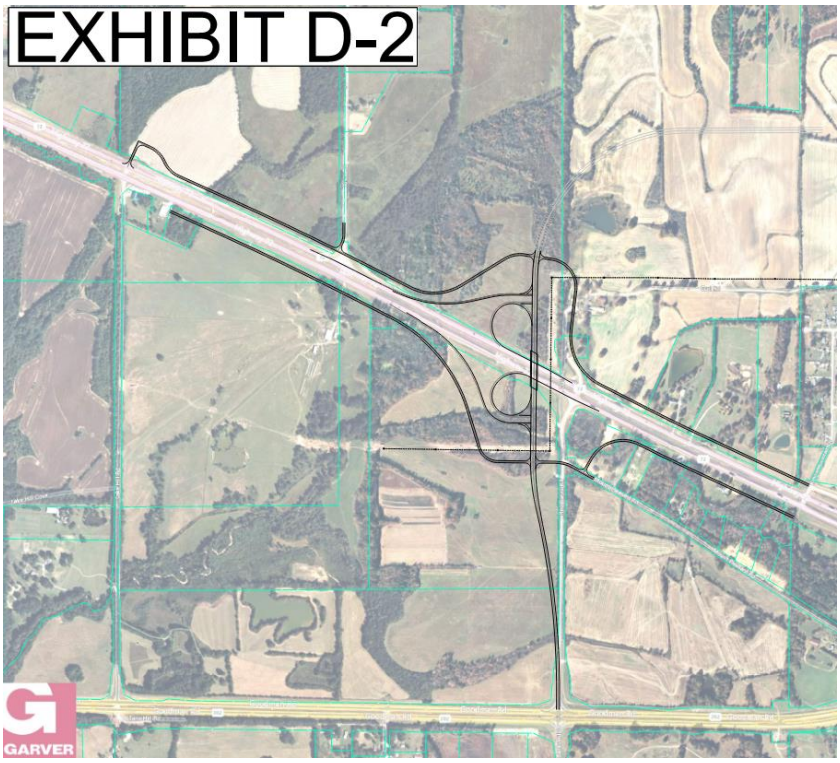
- Alternate C-2 – Diamond Interchange with loop ramp in the SE quadrant and 300’ frontage road spacing. Originally named Alternate C in the initial package.



- Alternate D-1 – Partial Cloverleaf with 880’ frontage road spacing. Originally named Alternate H in the initial package.



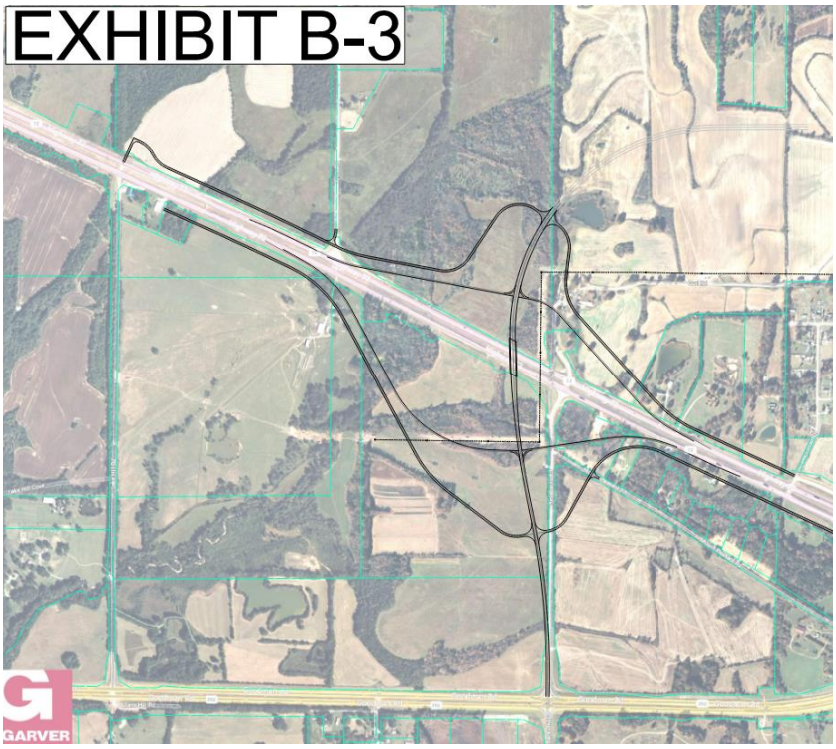
- Alternate D-2 – Partial Cloverleaf with 300’ frontage road spacing. Originally named Alternate H in the initial package.



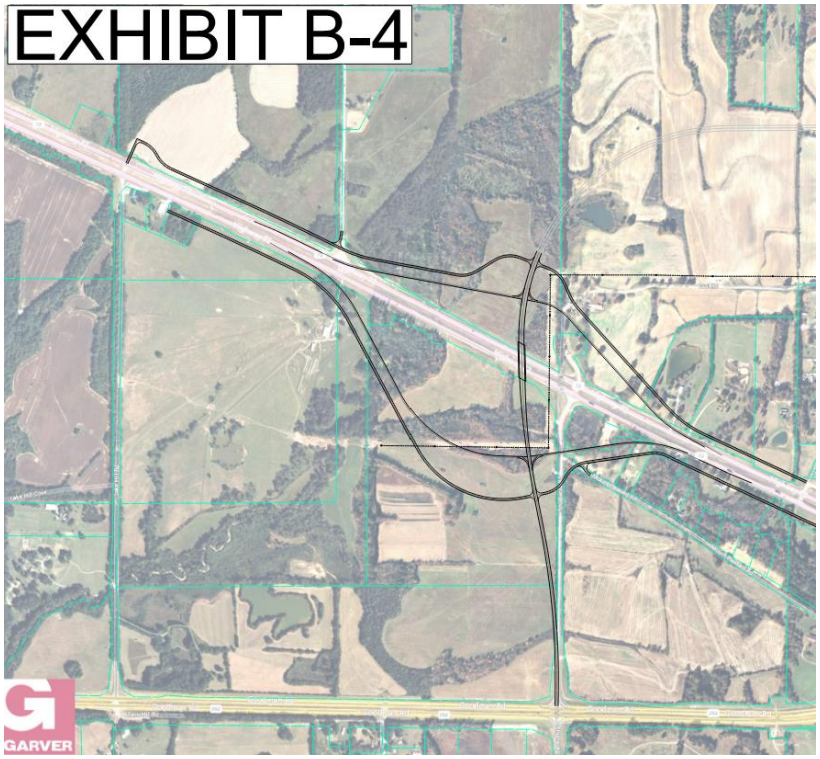
The minimum clear to clear distance along CL was measured to determine the probable span length, span arrangement, and section depth of a bridge crossing US-72. This drawing can be found here: L:\2024\T14-2400207 - US 72 Road Improvements\Drawings\PDF\Prelim TS 5 Lane.pdf. A preliminary check of the profile using MARIS terrain data was performed assuming a clearance of 25’ to be conservative in design.

Because several of the alternates used existing Mount Pleasant Rd as the proposed frontage road, we then decided to add five more alternates to include a frontage road in the SE quadrant that ran parallel to US-72 at a 150’ offset and had Mount Pleasant Rd tying into it. The new alternates followed the same naming convention as shown above and are named: Alternate B-3, Alternate B-4, Alternate C-3, Alternate C-4, and Alternate D-3. Alternate D-3 uses 300’ spacing from ramp to frontage road; Alternate D-1 already had the frontage road in the SE quadrant.

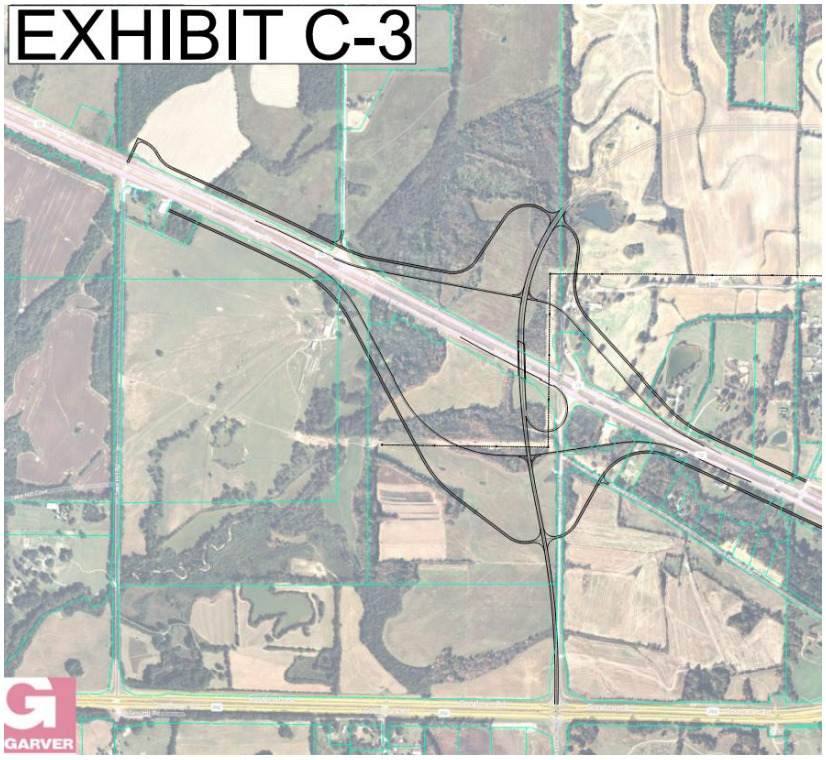
- Alternate B-3 – Diamond Interchange with 880’ frontage road spacing. Includes southeast frontage road. Originally named Alternate C in the initial package.



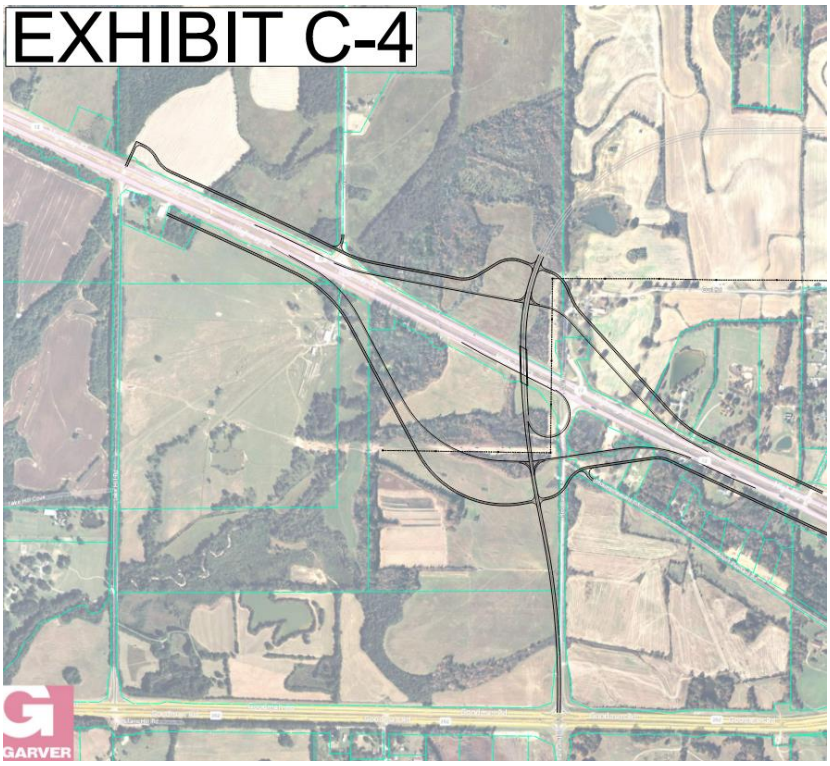
- Alternate B-4 – Diamond Interchange with 300’ frontage road spacing. Includes southeast frontage road. Originally named Alternate C in the initial package.



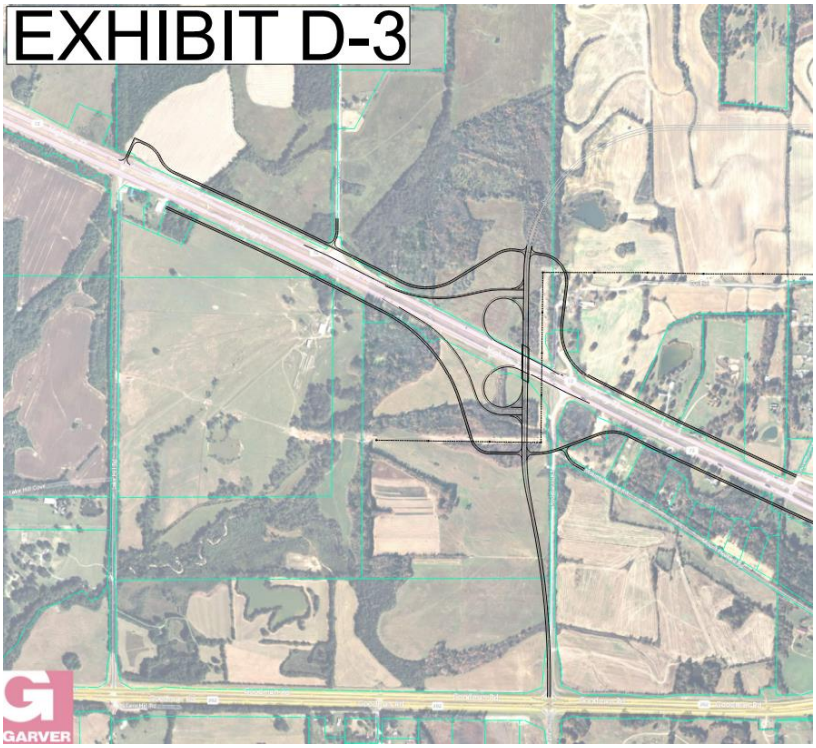
- Alternate C-3 – Diamond Interchange with loop ramp in SE quadrant and 880’ frontage road spacing. Includes southeast frontage road. Originally named Alternate C in the initial package.



- Alternate C-4 – Diamond Interchange with loop ramp in SE quadrant and 300’ frontage road spacing. Includes southeast frontage road. Originally named Alternate C in the initial package.



- Alternate D-3 – Partial Cloverleaf with 300’ frontage road spacing. Includes southeast frontage road. Originally named Alternate H in the initial package.



All loop ramps were designed so that they can accommodate a future C-D road at a 90’ offset from US-72 CL. This offset was approximated from examining several other interchanges featuring a C-D road in the

surrounding area. The loops were designed using construction level C-D road alignment and then had a 300' radius fit in between the loop ramp and the US-72 loop deceleration lane EP to ensure proper function in the current configuration as well as future compatibility with a C-D road.

Frontage road spacing was based on the Access Management Guide (Figure 2) as well as case examples, ensuring that a future C-D road could be accommodated. Radii for frontage road offset transitions were based on similar situations found on Simpson 49 (107248/301000).

Alternates Carried Forward to the Public Meeting

These 11 concepts were evaluated to determine which to show the public. Factors evaluated were property access, frontage road spacing and project footprint. Instead of showing the public multiple variations of potential frontage road designs on the three base concepts, it was determined to carry the three concepts with the largest footprint to the public meeting. This was to show them worst case and if we could narrow this footprint up as the concepts were further refined that would be a positive. For this reason, concepts B-3, C-3 and D-1 were taken to the public meeting.

Chosen Alternative

After the public meeting, the traffic study was completed. The study analyzed all the concepts versus the no-build and build traffic volumes with the below findings:

- Concept B (Includes B-1, B-2, B-3, and B-4): The eastbound to northbound build traffic volumes can not be supported within the interchange without adding an exit loop ramp in the southeast quadrant or widening the eastbound exit ramp to three lanes and signalizing the intersection. For this reason, the concept was eliminated as being viable.
- Concept C (Includes C-1, C-2, C-3, and C-4): This concept could handle the eastbound exit traffic volumes, but need further refinement to accommodate the southbound to westbound traffic onto Highway 72. The C concepts were viable to accommodate the traffic and were carried forward for further development.
- Concept D (Includes D-1, D-2, and D-3): The eastbound to northbound build traffic volumes can not be supported within the interchange without adding an exit loop ramp in the southeast quadrant or widening the eastbound exit ramp to three lanes and signalizing the intersection. Due to this same northbound traffic volume at the westbound ramp intersections, the volumes will be too high for the northwest loop exit ramp traffic to make a left turn onto northbound Red Banks Road. Likewise, the large volume of southbound to westbound traffic would severely impact the northbound Red Banks traffic from being able to take a left onto the westbound entrance ramp. For these reasons, the concept was eliminated as being viable.

The carried forward C Concepts were further refined for property access and to accommodate the traffic volumes.

Property Access

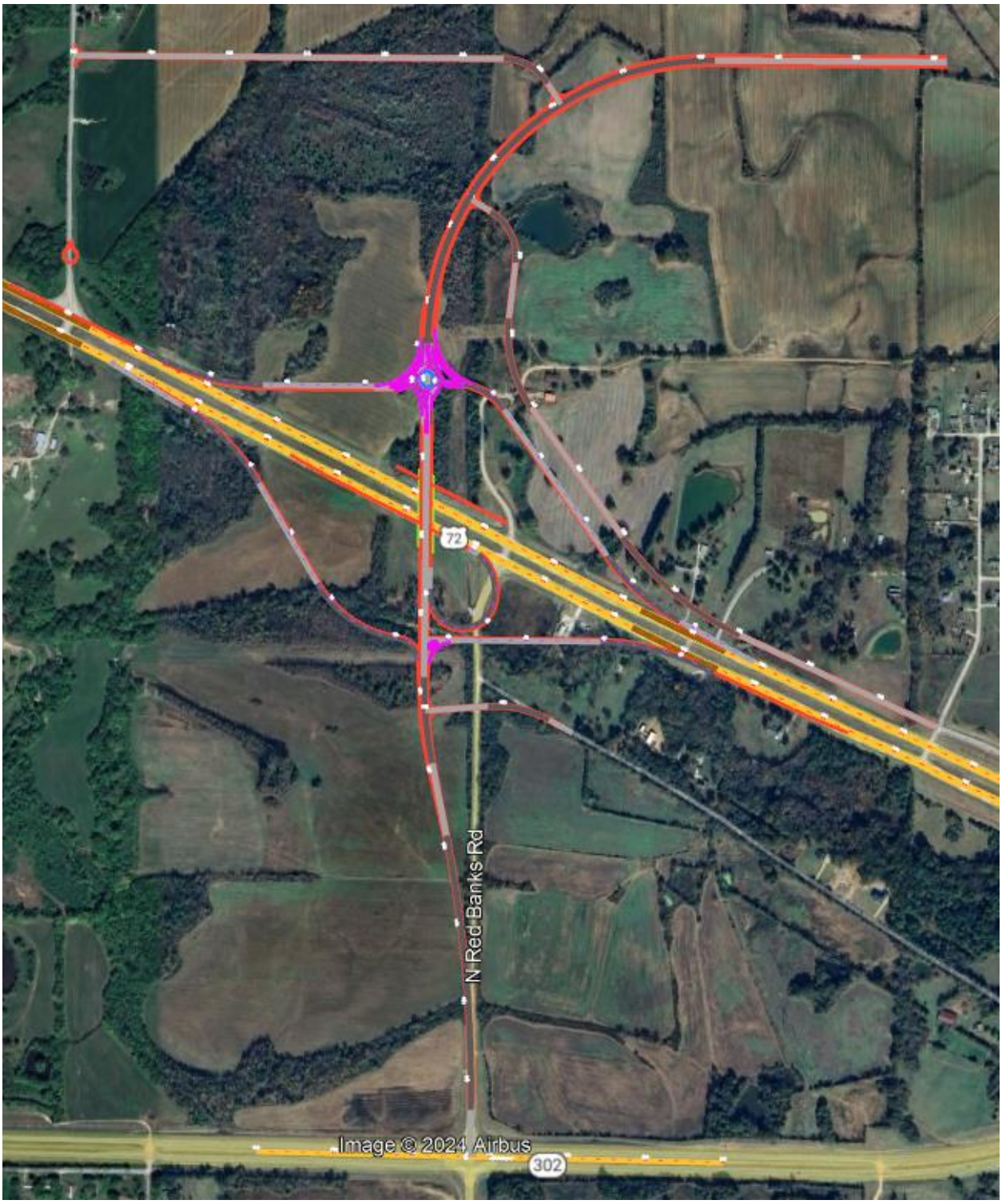
The frontage roads shown to the public in all four quadrants of the interchanges were evaluated based on functionality, impacts, and need. In the southwest quadrant, it was determined this entire frontage road could be eliminated as it was there to serve one property owner. The property owner still had access off of Lake Hill Road and could be paid for his damages rather than build a one-mile frontage road that isn't needed. This also allows the opportunity for future site developers to layout and design their own road system that fits their site instead of having to design their site around existing roads. In the southeast quadrant of the interchange, the frontage road paralleling Highway 72 would ultimately end up impacting the properties and one residence it was intended to serve likely causing full buys of each parcel. For this reason that frontage road was eliminated and the State will buy out these parcels without also building the frontage road. The Concept C-2 Mt. Pleasant Road frontage road was modified to be a realignment of the local road tying at 300-foot spacing from the ramp. In the northeast quadrant of the interchange, the frontage road must remain to provide property access to multiple residences, Kings Mountain Drive and Twin Hills Drive. Due to the large volumes of traffic expected north of the interchange, the spacing of the frontage road intersection was kept at 800-feet spacing from the ramps like shown on Concepts C-1 and C-3. In the northwest quadrant, it was determined that to provide access to all the property owners, we only needed to either tie Knox Road to the Lake Hill Road median opening or tie Knox Road to the proposed Red Banks Road, but not both. While evaluating which half of the previously shown northwest frontage road would have the least impacts, the discussion of utilizing the construction road further north the County would already have built to serve the site came up. After discussions with the County and MDOT, it was determined that utilizing this route would have the least amount of impacts to the site and developable acres. Elimination of frontage roads also lessons the footprint and overall impacts of the project while reducing the maintenance burden on the County after the project is complete.

Traffic Volume Accommodations

In order to accommodate the build traffic volumes, Concept C had to be modified as follows to get an acceptable Level of Service (LOS):

- The intersection of Red Banks and the westbound ramps was converted to a dual lane roundabout
- The westbound entrance ramp was modified to included a second lane between the roundabout and the ramp gore.
- A raised median was added between the roundabout and the northeast frontage road intersection since this would all be no-access right-of-way and no need for a two-way left turn lane in this section.

Final Concept (Modified Concept C-1/2)



Survey/Existing Alignments

As-built CADD files for US-72 were provided by MDOT. This 4-lane project was a metric job, but all parts of the interchange project will be standard MDOT East with English units. The US-72 centerline is increasing in station from West to East. Centerline and edges of pavement from the as-built dgns were imported into "US-72 Exist Ali.dgn" and stored on the appropriate existing levels.

Design Speed

A design speed of 45 was used for the realigned Red Banks Connector.

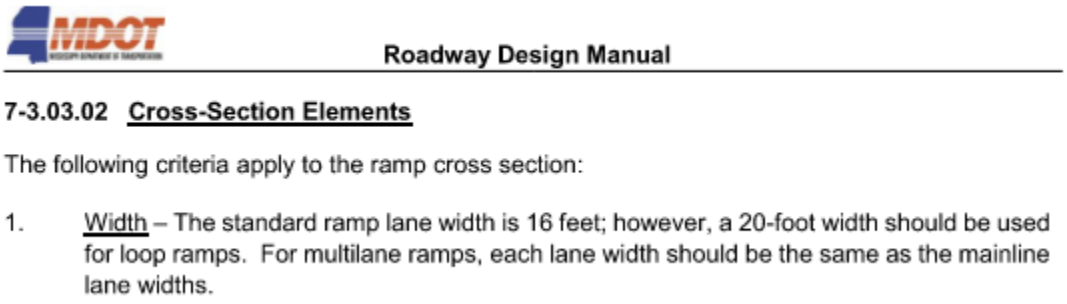
Traffic Discussion 7/9/2024

TWB, NLG, and DRH met with JAP and APS to get clarification regarding some Traffic recommendations. The following came out of that meeting:

- Per APS, the New Connector Road at the Access Road needs to be signalized for full build conditions, however recommended the Access Road having stop conditions at first and monitoring for future signalization. Channelized right turns were recommended to be removed and replaced with a standard simple intersection to reduce the footprint. It was discussed that a roundabout would not work in this situation.
- The SB to WB on ramp could be a single ramp per HCM, however utilizing Sim Traffic APS recommended a two lane entrance ramp that merged prior to entering US-72. If a true dual lane entrance ramp was utilized it would require 2,500' minimum plus the 1,760' of no access beyond the ramp which would result in buying access to the western interchange potentially. The NB left turn would yield to the SB to WB movement.
- The SB to WB on ramp per Sim Traffic needs to have a dedicated right lane that extends approximately 100'-150' beyond the northern Access Road from the ramp to allow cars to begin getting over prior to the future signalized intersection. This will extend the limits further east along the New Connector Road.
- The WB to NB ramp does not need 1,450' of storage from US-72 per APS. Recommended approximately 350' of storage. Discussed adding a right turn auxiliary lane with a taper to make the WB to NB movement. Also, per APS the NB lane from the ramp doesn't need to extend all the way to the Access Road intersection and can be reduced to taper after a reasonable acceleration lane (used 350').
- APS said the NE loop can be removed and the 5th lane on the bridge picked up from the EB to NB loop rather than a 6th lane. DRH and NLG developed a concept to push the gore of the NE ramp nearly to the intersection. Asked APS to evaluate both scenarios (e.g. modified loop with no NB to WB left turn movement and no loop with a NB to WB left turn movement) to see if there was any difference in serviceability at the intersection. DRH and NLG to provide updated layouts.
- Garver doesn't have current traffic volumes to verify a signal warrant analysis at the intersection of the New Connector Road and Hwy. 302. APS currently recommends to maintain the intersection at it's current configuration and monitor. Transitioned the lanes out both NB and SB to the south of the Mt. Pleasant tie-in.

- DRH and NLG discussed the Mt. Pleasant tie-in which is currently 300’ from the centerline of Mt. Pleasant and the centerline of the New Connector Road to where the curves start for the right turn on and off the New Connector Road. The tapers were not taken into consideration when determining this length. It does not meet MDOT Access Management and a design variance would be needed. The current layout services very few properties and minimizes the impact to the remaining properties along Mt. Pleasant as well as to the farmland property to the south.
- Sent a follow up e-mail to APS and JAP with updated concepts and confirmation of recommendations on 7/9/2024.

Per the design manual, the lane width of the multi-lane ramp should match the mainline, i.e. two twelve foot lanes (14’ of pavement per lane).



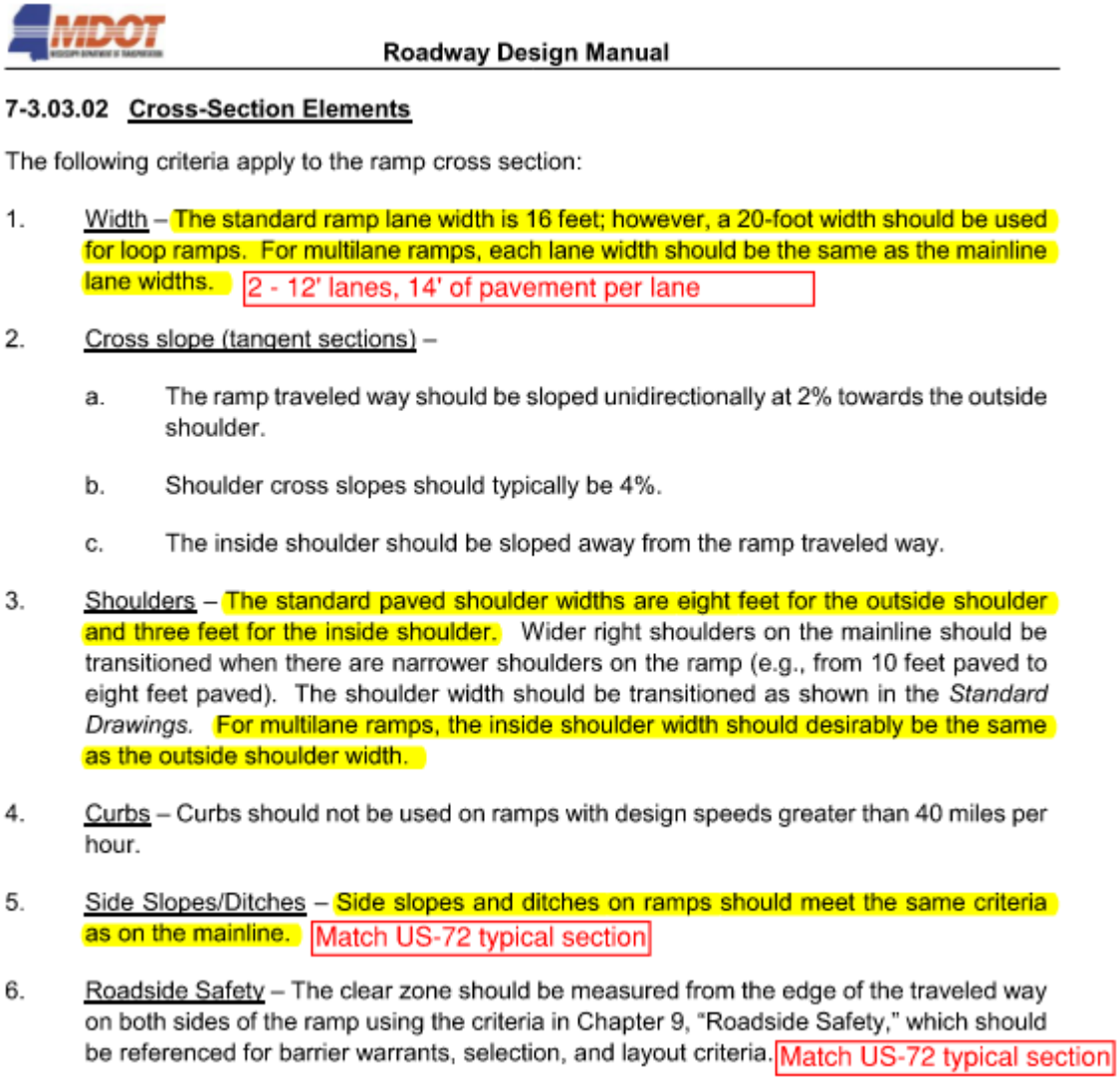
MDOT Roadway Design Manual

7-3.03.02 Cross-Section Elements

The following criteria apply to the ramp cross section:

1. Width – The standard ramp lane width is 16 feet; however, a 20-foot width should be used for loop ramps. For multilane ramps, each lane width should be the same as the mainline lane widths.

Also on the multi-lane ramp, the inside shoulder should match the outside shoulder width through the multi-lane limits of the ramp.



MDOT Roadway Design Manual

7-3.03.02 Cross-Section Elements

The following criteria apply to the ramp cross section:

1. Width – The standard ramp lane width is 16 feet; however, a 20-foot width should be used for loop ramps. For multilane ramps, each lane width should be the same as the mainline lane widths. 2 - 12' lanes, 14' of pavement per lane

2. Cross slope (tangent sections) –

   a. The ramp traveled way should be sloped unidirectionally at 2% towards the outside shoulder.

   b. Shoulder cross slopes should typically be 4%.

   c. The inside shoulder should be sloped away from the ramp traveled way.

3. Shoulders – The standard paved shoulder widths are eight feet for the outside shoulder and three feet for the inside shoulder. Wider right shoulders on the mainline should be transitioned when there are narrower shoulders on the ramp (e.g., from 10 feet paved to eight feet paved). The shoulder width should be transitioned as shown in the *Standard Drawings*. For multilane ramps, the inside shoulder width should desirably be the same as the outside shoulder width.

4. Curbs – Curbs should not be used on ramps with design speeds greater than 40 miles per hour.

5. Side Slopes/Ditches – Side slopes and ditches on ramps should meet the same criteria as on the mainline. Match US-72 typical section

6. Roadside Safety – The clear zone should be measured from the edge of the traveled way on both sides of the ramp using the criteria in Chapter 9, "Roadside Safety," which should be referenced for barrier warrants, selection, and layout criteria. Match US-72 typical section

Progress Meeting 7/15/2024

It was discussed regarding the northern Knox Road access road to provide a t-intersection rather than the original curve that was shown. This would reduce impacts to the northern property owner and allow for Knox Road to the south of the intersection to be utilized for property access with a cul-de-sac at the end north of US 72. TWB and DRH later discussed utilizing a minimal 65' radius without any tapers similar to what traffic recommended at the Knox Road connection on the New Connector Road.

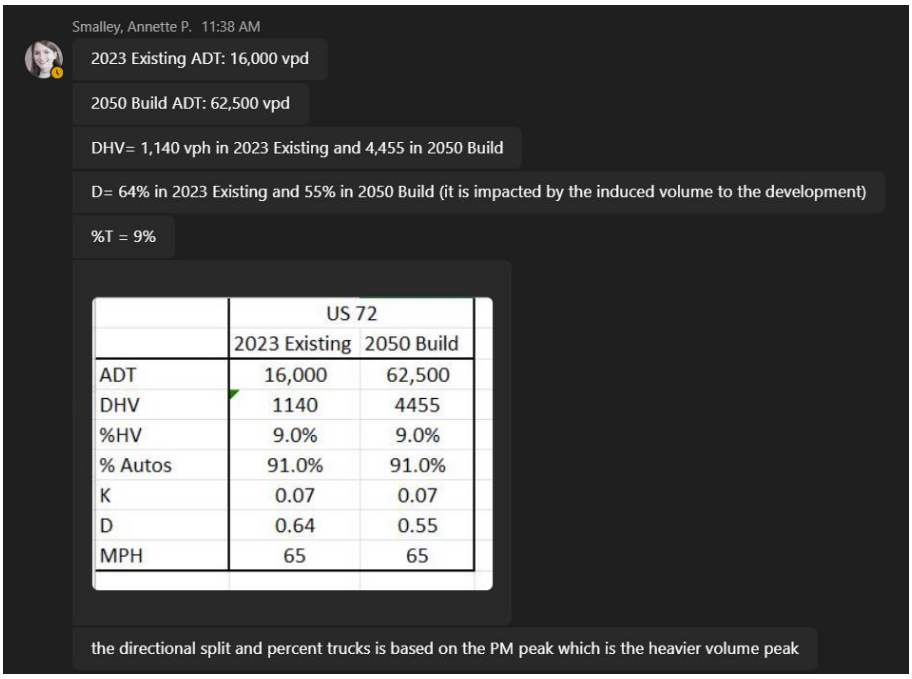
DRH provided an updated KMZ file after the first progress meeting with the updated alternative frontage roads to remove the portion between Knox Road and the New Connector Road since access would be provided to the west at the cross-over.

Survey Request for South of US 72

DRH provided WLC and TWB a KMZ file with an approximate survey limits for the south of US 72. TWB later discussed with DRH that he was good with the limits shown. TWB mentioned if the ramps were extended south and Lee Creek kept where it was at rather the channel change shown that he agreed the survey limits shown should cover the necessary changes.

Title Sheet Traffic Data

APS provided traffic data for the title sheet for concept plan submittal. Information screenshot below.



Smalley, Annette P. 11:38 AM

2023 Existing ADT: 16,000 vpd

2050 Build ADT: 62,500 vpd

DHV= 1,140 vph in 2023 Existing and 4,455 in 2050 Build

D= 64% in 2023 Existing and 55% in 2050 Build (it is impacted by the induced volume to the development)

%T = 9%

	US 72	
	2023 Existing	2050 Build
ADT	16,000	62,500
DHV	1140	4455
%HV	9.0%	9.0%
% Autos	91.0%	91.0%
K	0.07	0.07
D	0.64	0.55
MPH	65	65

the directional split and percent trucks is based on the PM peak which is the heavier volume peak