# VALUE ENGINEERING REPORT

**SR 20 Improvements from SR 212 to Honey Creek Road**
**Newton / Rockdale Counties**
STP-869(13)  PI No. 730907
January 8, 2008

OWNER AND DESIGN TEAM:

Georgia Department of Transportation
No.2 Capitol Square
Atlanta, GA 30334

VALUE ENGINEERING CONSULTANT:

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3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144

VALUE ENGINEERING STUDY

SR 20 Improvements from SR 212 to Honey Creek Road
Newton / Rockdale Counties
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# Executive Summary

# VALUE ENGINEERING STUDY

### SR 20 Improvements from SR 212 to Honey Creek Road
### Newton / Rockdale Counties

## Introduction

This report summarizes the results of a value engineering (VE) study conducted on the SR 20 Road Improvement project in Newton and Rockdale Counties. The project consists of the widening and reconstruction of approximately 4 miles of SR 20 starting at SR 212 and extending north to Honey Creek Road. The estimated construction cost including Right of Way is $36.6 million. The design is 30% complete. The project is being designed by the GDOT Urban Design Section. The study was conducted December 10-13, 2007, at the GDOT offices in Atlanta using a three person VE team.

This report presents the VE Team's recommendations and all back-up information, for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. Lastly, the **Appendix** includes a complete record of the Team's activities and findings. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

The SR 20 corridor serves both local access and commuter traffic. Significant residential and commercial growth in the project corridor has resulted in a failing level of service and an increase in the number of traffic accidents. The proposed widening of this roadway will impact the Baptist church, the Baptist church cemetery, and a historic property at the south end of the project and also a second cemetery in the center portion of the project. The proposed project would upgrade the existing two-lane rural roadway to a four-lane urban roadway with a raised median, protected left turn lanes, and improved signalized intersections at all major cross roads. Major contract work items include roadway grading, pavement, dual bike lanes through the center section, curb and gutter, the installation of storm drains, signalization improvements, and the construction of sidewalks.

## Considerations

The project being evaluated under this VE study has an estimated construction cost (including E&C) of $22.4 million. This project will require significant amounts of new ROW and construction easements. Right of Way costs are estimated at $14.2 million. SR 20 is a State highway, therefore, the State will pay all construction and ROW acquisition costs. No firm letting dates have been established at this time, but GDOT will proceed with ROW acquisition at the end of FY 2008.

## Results Obtained

The VE team focused their efforts on the high cost items of the project. The study generated 34 ideas with 15 being identified for additional evaluation as possible recommendations or design suggestions. The VE team developed seven independent recommendations and two alternative recommendations. The implementation of all seven independent recommendations (A-2, B-1, D-2, B-4, A-5, B-6A, and F-5) has the potential to reduce the project cost by approximately $5.9 million. A detailed write-up of each recommendation is contained in the respective sections of this report. A summary of the recommendations follows.

## Recommendation Highlights

**Idea A-2: To reduce the roadway section by constructing 12-foot outside shoulders in-lieu-of 16-foot outside shoulders.**

The proposed urban roadway section includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders. The proposed section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140 to lessen its impact on a second cemetery.

It is recommended that a 12-foot wide outside shoulder be used in-lieu-of a 16-foot outside shoulder throughout the entire project length. The reduction in outside shoulder width would reduce the amount of ROW required for the project. Reducing the roadway section and ROW width would lessen the project's impact on the Baptist church, the historic property, and the two cemeteries. It would also reduce the length of storm drain cross pipes and earthwork needed to construct the project. The remaining 12-foot shoulder would still provide an adequate area for the curb and gutter and 5-foot sidewalk, especially if Type B sidewalk ramps are used at the driveways. This concept would result in significant ROW cost savings without making any changes in the current traffic lane and median widths.

**The total potential savings if accepted is $1,206,000.**

**Idea B-1: To use 11-foot travel lanes in-lieu-of 12-foot travel lanes while holding the turn lane widths at 12-feet.**

The proposed urban roadway section includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders. The proposed section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140 to lessen its impact on a second cemetery.

It is recommended that 11-foot lanes be used in-lieu-of 12-foot lanes on the 4 through travel lanes while maintaining the current 12-foot width for all turn lanes. Reducing the travel lane widths would reduce the amount of new ROW needed to construct the project. Narrowing the ROW would lessen the project's impact on the local community. Using 11-foot through lanes would reduce the amount ROW, the lengths of storm drain cross pipes, and the amount of earthwork need to construct the project. The 11-foot through lanes would accommodate the project traffic and provide adequate safety for this urban roadway with a design / posted speed of 45 MPH. This concept may require additional adjustments to the outside lane at intersections for U-Turns. This concept results in significant cost savings to the project.

**The total potential savings if accepted is $1,600,000.**

**Idea D-2: To use a 16-foot raised median in-lieu-of a 20-foot raised median and to use a 2-foot raised concrete median with 1-foot offsets in-lieu-of a curb and gutter median along the left turn lanes.**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. This proposed section requires 100 feet of ROW and adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140 to lessen its impact on a second cemetery. In left turn lane areas, which comprise 52% of the project length, the 8-foot median consists of dual 2'-6" curb and gutters and 3' of concrete median paving.

It is recommended that a 16-foot wide median be constructed in-lieu-of the proposed 20-foot raised median. It is further recommended that the resulting 4-foot wide median along the left turn lanes be constructed using a 2-foot wide concrete median with 1-foot offsets from the inside edge of the adjacent lanes. Reducing the median width 4-feet would reduce ROW, earthwork, and lessen the project's impact on the local community. Constructing a raised 2-foot concrete median with 1-foot offsets in-lieu-of dual curb and gutters with concrete median would reduce the amount of curb and gutter, the amount of median pavement, improve project constructability, and reduce construction time and cost. The raised concrete median would present a clear visual and physical barrier. This concept may require additional adjustments to the outside lanes at intersections to allow for U-Turns.

**The total potential savings if accepted is $1,083,000.**

**Idea B-4: To remove the bike lanes between Oglesby Bridge Road and Christian Circle North Road from the roadway pavement section and place them on a 10-foot multi-use trail in the 16-foot east side shoulder.**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. The current design includes 4-foot wide bike lanes on both the NB and SB roadways between Oglesby Bridge Road and Christian Circle North Road. This section is also in the area where the roadway has been shifted to the east to lessen its impact on a cemetery.

It is recommended that the dual 4-foot bike lanes be removed from the pavement section and that a 10-foot multi-use trail be constructed in the 16-foot east shoulder to accommodate both pedestrian and bike traffic. This concept would reduce the width of the roadway section, thereby, reducing the amount of ROW, full depth asphalt pavement, roadway embankment, and cross roadway storm drains required to construct the project. Constructing a multi-use trail for bike traffic in the east shoulder in-lieu-of placing bike lanes in the pavement section will also provide a safer facility for bike traffic. Reducing the amount of ROW through this area will also lessen the project's impact on the cemetery on the west side of the roadway.

**The total potential savings if accepted is $506,000.**

**Idea B-4, F-1: West Side Bike Lane Alternate to B-4 To remove the bike lanes in the pavement section and construct a 10-foot multi-use trail on the east side while reducing the west side shoulder width and eliminating the west side sidewalk.**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. The current design includes 4-foot wide bike lanes on both the NB and SB roadways between Oglesby Bridge Road and Christian Circle North Road. This section is also in the area where the roadway has been shifted to the east to lessen its impact on a cemetery.

**West Side Bike Lane Alternate to B-4**. It is recommended that the dual 4-foot bike lanes be removed from the pavement section and that a 10-foot multi-use trail be constructed in the 16-foot east shoulder. It is further recommended that the west side shoulder be reduced to 12 feet and that the west side sidewalk be eliminated. This concept would reduce the roadway section 12 feet, thereby, reducing ROW, full depth asphalt pavement, roadway embankment, and cross roadway storm drains required to construct the project. Constructing a multi-use trail in the east shoulder will also provide a safer bike facility. The multi use path on the east side of the roadway along with the west side cemetery and limited development in this area would make it possible to eliminate the west side sidewalk. Reducing the amount of ROW through this area will lessen the project's impact on the cemetery. This concept saves additional costs over Idea B-4.

**The total potential savings if accepted is $830,000.**

**Idea A-5, B-3: To realign Brown Bridge Road to line up with the relocated SR 212 T-intersection (southwest of the Kroger parking lot) instead of the relocated SR 20 intersection (south of the Baptist church).**

The current urban section requires 100 feet of ROW and adversely impacts the Baptist church, the church cemetery, and the historic property at the south end of the project. The current design relocates the Brown Bridge Road / SR 20 intersection to match-up with the realigned SR 20 segment that has been shifted east of the large Baptist church complex at the south end of the project. The long Brown Bridge Road relocation goes through a portion of the large power substation property and several other properties east of the Baptist church cemetery.

It is recommended that Brown Bridge Road be aligned into the proposed shifted T-intersection between SR 212 and SR 20 just south of the Kroger parking lot. This change would provide eastbound route continuity between SR 212 and Brown Bridge Road. This change will significantly reduce the length of the Brown Bridge Road relocation and its associated new required ROW. Connecting Brown Bridge Road to SR 20 at the proposed shifted SR 212 intersection would provide for direct eastbound connectivity between SR 212 and Brown Bridge Road. This direct connection would reduce / eliminate traffic that would cut through the Kroger parking lot using the current Brown Bridge Road cul-de-sac design that provides access to the parking lot from the east side.

This intersection relocation concept could also be combined with the recommended 5-Lane Section (Idea B-6A discussed below) at the south end of the project to further reduce the project's impact to the community and save additional costs.

**The total potential savings if accepted is $508,000.**

**Idea B-6A: To construct a 5-lane roadway section (11-foot travel lanes, 14-foot center lane, 10-foot shoulders) on the south end of the project that goes through the SR 20 / SR 212 intersection area (sta. 16+00 to 47+00).**

The proposed urban roadway section includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders throughout the entire project length. The proposed urban section requires 100 feet of ROW and adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project.

It is recommended that a 5-lane roadway section using 11-foot travel lanes, a 14-foot shared center turn lane, and 10-foot shoulders be constructed from Station 16+00 to Station 47+00 at the south end of the project. The section would end at the new intersection at Stone Creek Drive / Kroger Shopping Center. Constructing the recommended 5-lane roadway section through this area would result in a 22-foot reduction in the width of the roadway section and significantly reduce the project's impact on the previously mentioned properties. The roadway section reduction would reduce ROW, the lengths of storm drain cross pipes, curb and gutter, asphalt pavement, and the amount of earthwork. The 5-lane section would accommodate the project traffic with the minimum amount of impact to the neighborhood. This concept results in significant cost savings to the project.

**The total potential savings if accepted is $675,000.**

**Idea B-6: Alternate to Ideas A-2, B-1, & D-2 To construct a 5-lane roadway section (11-foot travel lanes, 14-foot center lane, and 12-foot shoulders) on SR 20.**

The proposed urban roadway section includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders. The proposed section requires 100 feet of ROW and adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140 to lessen its impact on a second cemetery.

It is recommended that a 5-lane section using 11-foot travel lanes, a 14-foot shared center turn lane, and 12-foot shoulders be constructed in-lieu-of the current urban roadway section. This recommendation would maintain the 16-foot east shoulder between Oglesby Bridge Road and Christian Circle North Road to provide space to construct a 10-foot multi-purpose trail in-lieu-of dual bike lanes in the roadway. The current urban roadway section, with its 100-foot wide ROW impacts the local community. Constructing the recommended 5-lane roadway section would result in an 18-foot reduction in the overall width of the roadway section and significantly reduce the amount of ROW required for the project and its impact on the community. The section reduction would reduce the lengths of storm drain cross pipes, curb and gutter, and the amount of earthwork. The 5-lane section would accommodate the project traffic with the minimum amount of impact to the neighborhood. This concept results in significant cost savings to the project. It would also improve constructability and reduce construction time.

**The total potential savings if accepted is $3,375,000.**

**Idea F-5: To use 4” concrete sidewalk in-lieu-of 6” concrete sidewalk.**

The original design used a 6”-thick 5-foot wide concrete sidewalk throughout the proposed project.

It is recommended that a 4”-thick 5-foot wide concrete sidewalk be used in-lieu-of a 6”-thick 5-foot wide concrete sidewalk. The use of a 4”-thick 5-foot wide concrete sidewalk would reduce the cost of the project. The recommended revised concrete sidewalk meets GDOT standards.

**The total <u>potential savings</u> if accepted is $367,000.**

**SR 20 Widening / Reconstruction from SR 212 to Honey Creek Road**

## SUMMARY OF POTENTIAL COST SAVINGS

| ITEM No. | CREATIVE IDEA DESCRIPTION | ORIGINAL INITIAL COST | PROPOSED INITIAL COST | INITIAL COST SAVINGS | FUTURE SAVINGS | POTENTIAL TOTAL SAVINGS | SAVINGS POTENTIAL* (%) |
|---|---|---|---|---|---|---|---|
| | **RECOMMENDATIONS** | | | | | | |
| A-2 | To Reduce the Roadway Section - Reduce Both Outside Shoulder Widths from 16-feet to 12-feet. | $1,206,000 | $0 | $1,206,000 | N/A | $1,206,000 | 100% |
| B-1 | To use 11-Foot travel lanes in-lieu-of 12-Foot travel lanes. | $1,600,000 | $0 | $1,600,000 | N/A | $1,600,000 | 100% |
| D-2 | To reduce the median width by 4 feet and use a 2-foot raised concrete median with 1-foot offsets in-lieu-of curb and gutter median. | $1,483,000 | $400,000 | $1,083,000 | N/A | $1,083,000 | !00% |
| B-4 | To Remove the Bike Lanes Between Oglesby Bridge Road and Christian Circle North Road and Construct a 10-Foot Multi-Use Trail on the East Side. Maintain Existing West Side Sidewalk | $662,000 | $156,000 | $506,000 | N/A | $506,000 | 100% |
| B-4<br>F-1 | **West Side B-4 Bike Lane Alternative** To Remove the Bike Lanes, Construct a 10-Foot Multi-Use Trail on the East Side, and Eliminate the sidewalk on the West Side. | $986,000 | 156,000 | $830,000 | N/A | $830,000 | 100% |
| A-5<br>B-3 | To Redesign the SR 20 / SR 212 Intersection at the southern end of the project. | $1,300,000 | $792,000 | $508,000 | N/A | $508,000 | 100% |

**SR 20 Widening / Reconstruction from SR 212 to Honey Creek Road**

## SUMMARY OF POTENTIAL COST SAVINGS

| ITEM No. | CREATIVE IDEA DESCRIPTION | ORIGINAL INITIAL COST | PROPOSED INITIAL COST | INITIAL COST SAVINGS | FUTURE SAVINGS | POTENTIAL TOTAL SAVINGS | SAVINGS POTENTIAL* (%) |
|---|---|---|---|---|---|---|---|
| B-6A | To Construct a 5-Lane Section (11-foot travel lanes, 14-foot center lane, 10-foot shoulders) through the SR 20 / SR 212 intersection area (sta. 16+00 to 47+00). Stone Creek Road | $675,000 | $0 | $675,000 | N/A | $675,000 | 100% |
| B-6 | **Roadway Alternate to Ideas A-2, B-1, & D-2** To Construct a 5-Lane Roadway Section with 11-Foot Travel Lanes, 14-Foot Center Lane, and 12-Foot Shoulders. | $3,777,000 | $402,000 | $3,375,000 | N/A | $3,375,000 | 100% |
| F-5 | To Reduce Sidewalk thickness form 6” to 4” | $1,848,000 | $1,481,000 | $367,000 | N/A | $367,000 | 100% |
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* Note: Savings Potential represents how much of an individual item, exclusive of any overlapping dependent items, can be implemented.

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# STUDY IDENTIFICATION

# Study Identification

| | |
|---|---|
| **Project:** SR 20 Improvements from SR 212 to Honey Creek Road | **Date:** December 10 – 13, 2007 |
| **Location:** Newton / Rockdale Counties | |

## VE Team Members

| Name: | Title: | Organization: | Telephone: |
|---|---|---|---|
| Keith Borkenhagen | VE Team Facilitator | MACTEC | 623-556-1875 |
| Dan Cogan | Construction | Kennedy Engineering & Associates Group LLC | 678-904-8591 |
| Alex Wiley | Design Manager | MACTEC | 770-421-3481 |
| | | | |

**Project Description**

The project consists of the widening and reconstruction of approximately 4 miles of SR 20 starting at SR 212 and extending north to Honey Creek Road. The SR 20 corridor serves both local access and commuter traffic. Significant residential and commercial growth in the project corridor has resulted in a failing level of service and an increase in the number of traffic accidents. The proposed widening of this roadway will impact the Baptist church, the Baptist church cemetery, and a historic property at the south end of the project and also a second cemetery in the central portion of the project. The proposed project would upgrade the existing two-lane rural roadway to a four-lane urban roadway with a raised median, protected left turn lanes, and improved signalized intersections at all major cross roads.

Major contract work items include roadway grading, pavement, dual bike lanes through the center section, curb and gutter, the installation of storm drains, signalization improvements, and the construction of sidewalks. The estimated cost including ROW is $36.6 million. The design is 30% complete.

**Project Constraints**

The VE team was given the following constraints for this project.

- There is a historic property in the southwest quadrant of the existing SR 20 / SR 212 intersection. No changes can be made to the project that would impose additional adverse impacts on the property beyond those already imposed by the current design.
- No changes can be made to the project that would impose any adverse impacts on a second historic area located south of the Baptist church.
- Wetlands exist on the west side of SR 20 across from the Baptist church. Efforts should be made to minimize any possible impacts on these wetlands.

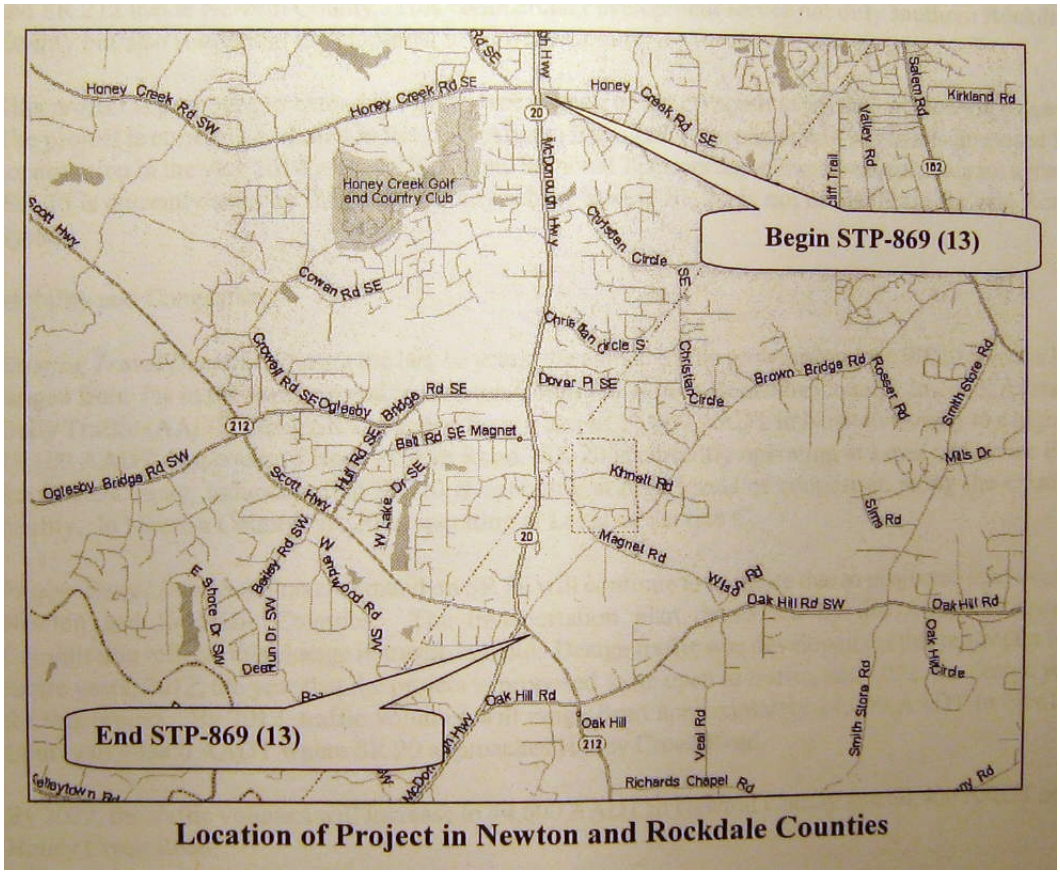
- The proposed SR 20 roadway has been shifted away from the Baptist church cemetery due to the close proximity of existing gravesites to the roadway. No changes can be made to the project that would impose any adverse impacts on the cemetery.
- The project will require significant new ROW and construction easements. Efforts should be made minimize the project's impact on the local community.

## Project Briefing

Prior to beginning work, Ms. Jill Franks, GDOT Urban Design, briefed the VE team on the design status of the project. The following items were discussed:

- This project will improve the existing SR 20 / SR 212 intersection complex by separating the two main intersections further apart. SR 20 is being relocated east of the Baptist church to tie-in further away from the current intersection.
- This project will upgrade /reconstruct the existing two-lane roadway into a four-lane roadway with a raised median and protected left turn lanes.
- There are three eligible historic properties on the project. The current design impacts one historic property (southwest quadrant of the existing SR 20/SR 212 intersection).
- There are two cemeteries located along the proposed roadway. The Baptist church cemetery has existing gravesites near the existing SR 20 roadway so the proposed new roadway has been shifted away from the cemetery and on to the church property.
- There is a dedicated bike trail that passes through the center section of the project. The current project includes dual 4-foot wide bike lanes through this section.
- The existing two-lane roadway south of this project is scheduled to be upgraded to a three-lane roadway. The existing roadway north of this project is an existing four-lane urban design with a 20-foot raised median (same section as the current design).
- A public hearing/open house has been held for this project.
- ROW is scheduled to be purchased in 2008. Construction is scheduled for September 2010.

# Project Sketch Map




Location of Project in Newton and Rockdale Counties

# RECOMMENDATIONS

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** |
|---|---|---|
| A-2 | 1 of 3 | To Reduce the Roadway Section by Constructing 12-Foot Outside Shoulders in-lieu-of 16-Foot Outside Shoulders. |

Comp By: D.P.C. Date: 12-11-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders throughout the entire project length. The proposed urban roadway section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140+00 to lessen its impact on a second cemetery. During the development and design of this project, ROW costs have escalated significantly and are expected to continue to rise.

**Proposed Change:**

It is recommended that a 12-foot wide outside shoulder be used in-lieu-of a 16-foot outside shoulder throughout the entire SR 20 project length.

**Justification:**

The recommended 8-foot reduction in outside shoulder width would narrow the roadway section and reduce the amount of ROW required for the project. Reducing the roadway section and ROW width would lessen the project's impact on the Baptist church, the historic property, and the two cemeteries. It would also reduce the length of storm drain cross pipes and earthwork needed to construct the project. The remaining 12-foot shoulder would still provide an adequate area for the curb and gutter and 5-foot sidewalk, especially if Type B sidewalk ramps are used at the driveways. This concept would result in significant ROW cost savings without making any changes in the current traffic lane and median widths.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $1,206,000 | | |
| **- Proposed** | $0 | | |
| **- Savings** | $1,206,000 | | $1,206,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$1,206,000** |

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: A-2<br>CLIENT: GDOT<br>Sheet 2 of 3 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| | | | | | | | |
| **Reduction in ROW:** | | | | | | | |
| 20,900 ft x 8 ft = 167,200 | SF | 167,200 | $6.00 | $1,003,200 | 0 | $0 | $0 |
| | | | | | | | |
| **Embankment: (4' Reduction):** | | | | | | | |
| Per 4' Foot Reduction | EA | 2 | $40,000 | $80,000 | 0 | $0 | $0 |
| | | | | | | | |
| **Storm Drain System:** | | | | | | | |
| NB 4-FootsShoulder Reduction | | | | | | | |
| 30 drain lines x 4' of 18" pipe | LF | 120 | $55.00 | $6,600 | 0 | $0 | $0 |
| | | | | | | | |
| SB 4-Foot Shoulder Reduction | | | | | | | |
| 30 drain lines x 4' of 18" pipe | LF | 120 | $55,00 | $6,600 | 0 | $0 | $0 |
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| **SUBTOTAL** | | | | $1,096,400 | | | $0 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $109,640 | | | $0 |
| **TOTAL** | | | | $1,206,040 | | | $0 |
| **TOTAL ROUNDED** | | | | **$1,206,000** | | | **$0** |

| CALCULATIONS | |
|---|---|
| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : A-2<br>CLIENT: GDOT<br>Sheet 3 of 3 |

ROW Calculations:

The SR 20 Mainline roadway length is 20,900 feet

Average Price for Commercial Land = $9.00 / SF
Average Price for Residential Land = $1.50 / SF
Net Average Price = Say $6.00 / SF

Embankment Estimates:

For recommendation estimating purposes the VE team will assume a 3% reduction in embankment for each 4-foot reduction in roadway section.

For a 4-foot reduction assume $40,000

Storm Drains:

Assume 30, 18” crossroad drain pipes for NB and SB Roadways

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** To Use 11-Foot Travel Lanes in-lieu-of 12-Foot Travel Lanes While Holding the Turn Lane Widths at 12-Feet. |
|---|---|---|
| **B-1**, A-3, C-2, F-2 | 1 of 3 | |

Comp By: D.P.C. Date: 12-11-07 Checked By: K.B. Date: 12-12-17

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders throughout the entire project length. The proposed urban roadway section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140+00 to lessen its impact on a second cemetery. During the development and design of this project, ROW costs have escalated significantly and are expected to continue to rise.

**Proposed Change:**

It is recommended that 11-foot lanes be used in-lieu-of 12-foot lanes on the four through travel lanes while maintaining the current 12-foot width for all turn lanes.

**Justification:**

Reducing the through travel lanes 4-feet would reduce the amount of new ROW needed to construct the project. Narrowing the ROW would lessen the project's impact on the local community. Using 11-foot through lanes would reduce the amount of new ROW, the lengths of storm drain cross pipes, and the amount of earthwork need to construct the project. The 11-foot through lanes would accommodate the project traffic and provide adequate safety for this urban roadway with a design / posted speed of 45 MPH. This concept may require additional adjustments to the outside lane at intersections for U-Turns. This concept results in significant cost savings to the project.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $1,600,000 | | |
| **- Proposed** | $0 | | |
| **- Savings** | $1,600,000 | | $1,600,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$1,600,000** |

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: B-1<br>CLIENT: GDOT<br>Sheet 2 of 3 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| **Pavement Section:** | | | | | | | |
| Full depth pavement section including 12" GAB, 25mm base, 19mm intermediate level, and 12.5mm top-coarse. | SF | 114,400 | $6.00 | $686,400 | 0 | $0 | $0 |
| | | | | | | | |
| **Reduction in ROW:** | | | | | | | |
| 20,900 ft x 4 ft = 83,600 | SF | 83,600 | $6.00 | $501,600 | 0 | $0 | $0 |
| 1,400 ft x 7 ft = 9,800 | SF | 9,800 | $6.00 | $58,800 | | | |
| 2,000 ft x 4 ft = 8,000 | SF | 8,000 | $6.00 | $48,000 | | | |
| 3,000 ft x 3 ft = 9,000 | SF | 9,000 | $6.00 | $54,000 | | | |
| 1,000 ft x 4 ft = 4,000 | SF | 4,000 | $6.00 | $24,000 | | | |
| | | | | | | | |
| **Embankment (4' Reduction):** | | | | | | | |
| Per 4 Foot Reduction | EA | 1.0 | $40,000 | $40,000 | 0 | $0 | $0 |
| | | | | | | | |
| **Drainage system:** | | | | | | | |
| NB 4-foot lane reduction | | | | | | | |
| 30 drain. lines x 4' of 18" pipe | LF | 120 | $55.00 | $6,600 | 0 | $0 | $0 |
| | | | | | | | |
| SB 4-foot lane reduction | | | | | | | |
| 30 drain. lines x 4' of 18" pipe | LF | 120 | $55.00 | $6,600 | 0 | $0 | $0 |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| **SUBTOTAL** | | | | $1,426,000 | | | $0 |
| Includes E & C | | | | | | | |
| **MARK-UP (10 %)** | | | | $142,600 | | | |
| **TOTAL** | | | | $1,568,600 | | | $0 |
| **TOTAL ROUNDED** | | | | **$1,600,000** | | | **$0** |

# CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-1<br>CLIENT: GDOT<br>Sheet 3 of 3 |
|---|---|

Roadway lane length reduction calculations:

a.) Mainline lane length's calculated from sta. 16+00 to 225+00; (4) lanes = 20,900 LF
b.) Honey Creek Rd. lane length from sta. 493+00 to 507+00; (7) lanes = 1,400 LF
c.) Relocated SR 20 lane length from sta. 480+00 to 500+00; (4) lanes = 2,000 LF
d.) Relocated Browns Bridge Rd. lane length from sta. 500+00 to 530+00; (3) lanes =3,000 LF
e.) SR 212 lane length from sta. 590+00 to 600+00; (4) lanes = 1,000 LF

16+00 – 225+00 = 20,900' x 4' = 83,600 SF
493+00 – 507+00 = 1,400' x 7' = 9,800 SF
480+00 – 500+00 = 2,000' x 4' = 8,000 SF
500+00 – 530+00 = 3,000 x 3' = 9,000 SF
590+00 – 600+00 = 1,000 x 4' = 4,000 SF

Total 114,400 SF x $6.00 SF = $686,400

ROW reduction calculations:

Total ROW Cost = $14,189,250
Estimated ROW Cost / SF = $6.00

Project reduced area is calculated from above at:
(20,900 x 4) + (1,400 x 7) + (2,000 x 4) + (3,000 x 3) + (1,000 x 4) = 114,400 SF
114,400 SF x $6.00 = $686,400

Embankment Estimates:

Current estimate provides only a LS Grading Complete item at $4.9 million.
Current roadway section has a 100-foot minimum width (to edge of shoulders) plus variable widths (easements) on both sides for cuts and / or fills.

For recommendation estimating purposes the VE team will assume a 3% reduction in embankment for each 4-foot reduction in roadway section width, therefore a 4-foot reduction would produce an approximate $40,000 savings cost.

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** To reduce the median width by 4 feet and use a 2-foot raised concrete median with 1-foot offsets in-lieu-of curb and gutter median. |
|---|---|---|
| D-2 | 1 of 4 | |

Comp By: D.P.C. Date: 12-11-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. This proposed section requires 100 feet of ROW and adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140+00 to lessen its impact on a second cemetery. In areas where there are left turn lanes (52.3% of the SR 20 length), the median width is reduced to 8 feet. The baseline design for this 8-foot median consists of dual 2'-6" curb and gutters with the 3' area between the curbs filled with concrete median paving. During the development and design of this project, ROW costs have escalated significantly and are expected to continue to rise.

**Proposed Change:** It is recommended that a 16-foot wide median be constructed in-lieu-of the proposed 20-foot raised median. It is further recommended that the resulting 4-foot wide median along the left turn lanes be constructed using a 2-foot wide concrete median with 1-foot offsets from the inside edge of the adjacent lanes.

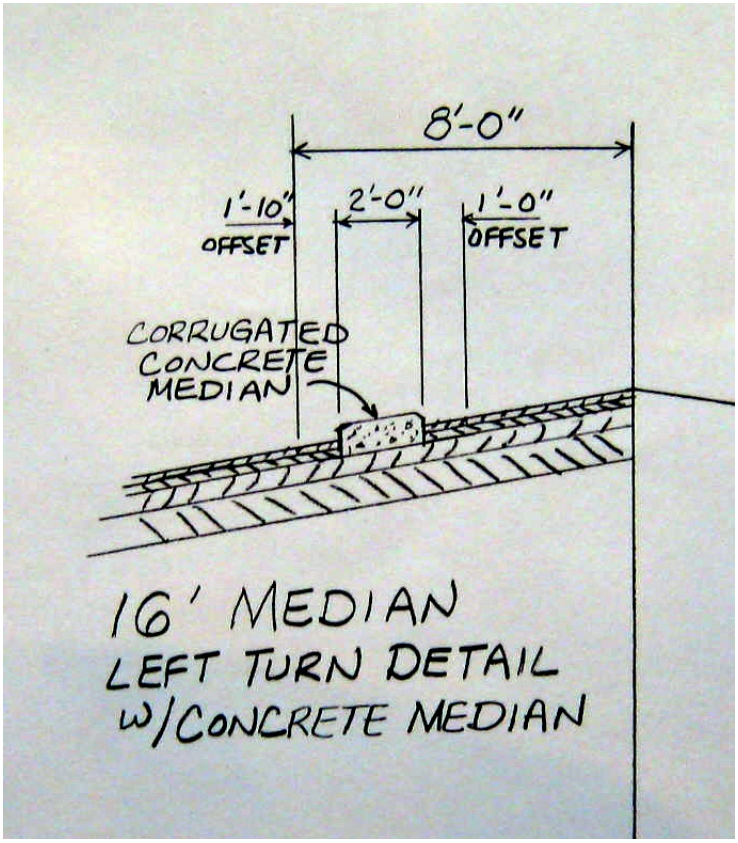
**Justification:**

Reducing the median width 4-feet would reduce the amount of new ROW and earthwork needed to construct the project. Narrowing the ROW would lessen the project's impact on the local community. Constructing the median with a raised 2-foot wide concrete median with 1-foot offsets in-lieu-of dual curb and gutters with concrete median would reduce the amount of curb and gutter, the amount of median pavement, improve project constructibility, and reduce construction time and cost. The raised concrete median would present a clear visual and physical barrier. This concept may require additional adjustments to the outside lanes at intersections to allow for U-Turns.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST – Original** | $1,483,000 | | |
| **- Proposed** | $400,000 | | |
| **- Savings** | $1,083,000 | | $1,083,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$1,083,000** |

## SKETCH

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | ITEM Nº : D-2<br>CLIENT: GDOT<br>Sheet 2 of 4 |
|---|---|



# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | | | | | IDEA No.: D-2<br>CLIENT: GDOT<br>Sheet 3 of 4 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| **Current Design:** | | | | | | | |
| **8' Median at turn lane locations** | | | | | | | |
| Curb & Gutter | LF | 23,780 | $16.00 | $380,480 | 0 | $0 | $0 |
| 4' Concrete Median | SY | 3,963 | $31.28 | $123,963 | 0 | $0 | $0 |
| 8" GAB | SF | 95,120 | $2.76 | $262,531 | 0 | $0 | $0 |
| | | | | | | | |
| **VE Recommended Design:** | | | | | | | |
| **4' Median at turn lane locations** | | | | | | | |
| 6" Concrete Median | SY | 0 | $0 | $0 | 2,642 | $45.52 | $120,264 |
| Asp (top 2 courses | SF | 0 | $0 | $0 | 23,780 | $1.44 | $34,243 |
| Asp (AC 25mm) | SF | 0 | $0 | $0 | 47,560 | $1.64 | $77,998 |
| 8" GAB | SF | 0 | $0 | $0 | 47,560 | $2.76 | $131,266 |
| | | | | | | | |
| **Embankment: (4' Reduction)** | | | | | | | |
| Per 4' Foot Reduction | EA | 2 | $40,000 | $80,000 | 0 | $0 | $0 |
| | | | | | | | |
| **Reduction to ROW:** | | | | | | | |
| 4 x 20,990 = 83,600 | SF | 83,600 | $6.00 | $501,600 | 0 | $0 | $0 |
| | | | | | | | |
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| **SUBTOTAL** | | | | $1,348,574 | | | $363,771 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $134,857 | | | $36,377 |
| **TOTAL** | | | | $1,483,431 | | | $400,148 |
| **TOTAL ROUNDED** | | | | **$1,483,000** | | | **$400,000** |

# CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | ITEM Nº : D-2<br>CLIENT: GDOT<br>Sheet 4 of 4 |
|---|---|

SR 20

Station 17+70 – 22+50 = 480
Station 23+50 – 27+00 = 350
Station 32+00 – 36+10 = 410
Station 36+90 – 41+00 = 410
Station 59+00 – 62+00 = 300
Station 63+00 – 66+00 = 300
Station 71+50 – 75+50 = 400
Station 76+50 – 84+10 = 760
Station 85+10 – 89+00 = 390
Station 91+50 – 95+60 = 410
Station 96+50 – 100+50 = 400
Station 104+50 – 110+50 = 600
Station 111+20 – 121+10 = 990
Station 122+00 – 126+00 400
Station 132+00 – 136+00 400
Station 137+00 – 141+00 400
Station 146+00 – 150+00 400
Station 151+30 – 155+50 420
Station 167+00 – 170+80 380
Station 171+90 – 176+00 410
Station 183+30 – 187+30 390
Station 188+30 – 192+30 400
Station 199+00 – 202+00 300
Station 203+00 – 208+00 500
Station 212+30 – 215+70 340

Honey Creek Rd

Station 495+00 – 498+00 300
Station 499+50 - -506+00 650

Total Length 10,940 ft (SR 20) + 950 ft (Honey Creek Rd) = 11,890 ft
Total length of median at turn lanes = 11,890 feet.

Current Plans
Calculate cost of road in the currently proposed 8-foot median section.

Curb and gutter: (11,890)(2) =23,780 ft x $16 / ft = $380,480
4" Concrete median: (11,890)(3)(1/9) =3,963 SY x $31.28 / SY = $123,963
GAB: (11,890)(8) = 95,120 SF x $2.76 / SF = $262,531
TOTAL = $766,974

Plans with VE recommendation
Calculate cost of road in the proposed VE revision to a 4-foot median section.

6" Concrete median: (11,890)(2)(1/9) = 2,642 SY x $45.52 / SY = $120,264
Asphaltic concrete pavement (top 2 courses): (11,890)(2) = 23,780 SF x $1.44 / SF = $34,243
Asphaltic concrete pavement (AC 25mm): (11,890)(4) =47,560 SF x $1.64 / SF = $77,998
GAB: (11,890)(4) = 47,560 SF x $2.76 / SF = $131,266
TOTAL = $363,771

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** To remove the bike lanes (between Oglesby Bridge Rd and Christian Circle North Rd) from the pavement section and place them on a 10-foot multi-use trail in the 16-foot east side shoulder. |
|---|---|---|
| B-4 | 1 of 4 | |

Comp By: A.W. Date: 12-11-07 Checked By: K.B. Date: 12/17/-07

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. The current design includes 4-foot bike lanes on both the NB and SB roadways between Oglesby Bridge Road and Christian Circle North Road. This section is in the area where the roadway has been shifted to the east to lessen its impact on a cemetery.

**Proposed Change:**

It is recommended that the dual 4-foot bike lanes be eliminated from the roadway pavement section. It is further recommended that a 10-foot multi-use trail be constructed in the 16-foot shoulder on the east side of SR 20 to accommodate both pedestrian and bike traffic.

**Justification:**

This concept would reduce the width of the roadway section through the area by eight feet, thereby, reducing the amount of ROW, full depth asphalt pavement, roadway embankment, and cross roadway storm drains required to construct the project.

Constructing a multi-use trail for bike traffic in the east shoulder in-lieu-of placing bike lanes in the pavement section will provide a safer facility for bike traffic. Reducing the amount of ROW through this area will lessen the project's impact on the cemetery on the west side of the roadway.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST – Original** | $662,000 | | |
| **- Proposed** | $156,000 | | |
| **- Savings** | $506,000 | | $506,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$506,000** |

## SKETCH

| | |
|---|---|
| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | ITEM Nº : B-4<br>CLIENT: GDOT<br>Sheet 2 of 4 |

**GENERAL AREA PLAN**

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: B-4<br>CLIENT: GDOT<br>Sheet 3 of 4 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| | | | | | | | |
| **Reduction in ROW:** | | | | | | | |
| (5,955 ft x 4 ft) x 2 = 47,640 | SF | 47,640 | $6.00 | $285,840 | 0 | $0 | $0 |
| | | | | | | | |
| **Asphalt Pavement Reduction:** | | | | | | | |
| (6,055 ft x 4 ft) x 2 = 48,440 | SF | 48,440 | $6.00 | $290,640 | 0 | $0 | $0 |
| | | | | | | | |
| **Additional 6" Sidewalk:** | | | | | | | |
| 6,055 ft x 5 ft = 30,275 / 9 = 3,364 SY | SY | 0 | $0 | $0 | 3,364 | $42.00 | $141,288 |
| | | | | | | | |
| **Embankment: (4' Reduction):** | | | | | | | |
| Earthwork for 6,055' Section | LS | 1 | $21,600 | $21,000 | 0 | $0 | $0 |
| | | | | | | | |
| **Storm Drain System:** | | | | | | | |
| 18" Cross Pipe Reduction | LF | 60 | $55.00 | $3,300 | 0 | $0 | $0 |
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| **SUBTOTAL** | | | | $601,380 | | | $141,288 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $60,138 | | | $14,129 |
| **TOTAL** | | | | $661,518 | | | $155,417 |
| **TOTAL ROUNDED** | | | | **$662,000** | | | **$156,000** |

## CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-4<br>CLIENT: GDOT<br>Sheet 4 of 4 |
|---|---|

Oglesby Bridge Road Intersection @ Station 110+75.46
Cowan Road / Christian Circle North Intersection @ Station 171+30.54
171+30.54 – 110+75.46 = 6,055.08 ft Use 6,055 ft

Asphalt Pavement: Bike Lanes
(6,055 ft x 4 ft) x 2 = 48,440 SF

Additional 5’ concrete sidewalk to make 10’ multi-use path
6,055 ft x 5 ft = 30,275 SF / 9 = 3,363.9 SY Use 3,364 SY

ROW Area:
6,055 ft – 100 ft (intersection areas) = 5,955 ft
(5,955 ft x 4 ft) x 2 = 47,640 SF

Storm Drain Reduction:
Assume 10, 18” cross drains in section (5 will cross entire roadway & 5 will cross one roadway)
(5 x (4 ft x 2 )) + (5 x 4 ft) = 60 LF

Earthwork Reduction:
Use VE concept of $40,000 per 4-foot reduction in total project length.
Project Length: 4.19 mile x 5,280 ft / mile = 22,123.2 ft
Bike Trail Section = 6,055 ft
6,055 / 22,123 = 27% of project length
$40,000 x 2 = $80,000 x 27% = $21,600

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA: <u>West Side B-4 Alternate</u>** To |
|---|---|---|
| B-4, F-1 Alternate | 1 of 4 | Remove the Bike Lanes and construct a 10-Foot Multi-Use Trail on the east side while reducing the west side shoulder width and eliminating the west side sidewalk. |

Comp By: A.W. Date: 12-11-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes and a 20-foot wide raised median. The current design includes 4-foot bike lanes on both the NB and SB roadways between Oglesby Bridge Road and Christian Circle North Road. This section is in the area where the roadway has been shifted to the east to lessen its impact on a cemetery.

**Proposed Change:** <u>This recommendation is an alternate to Idea B-4</u>. It is recommended that the dual 4-foot bike lanes be removed from the roadway pavement section. It is further recommended that a 10-foot multi-use trail be constructed in the 16-foot shoulder on the east side of SR 20 while the west side shoulder is reduced to 12 feet and the west side sidewalk is eliminated.

**Justification:**

This concept would reduce the width of the roadway section through the area by 12 feet, thereby, reducing the amount of ROW, full depth asphalt pavement, roadway embankment, and cross roadway storm drains required to construct the project. Constructing a multi-use trail for bike traffic in the east shoulder in-lieu-of placing bike lanes in the pavement section will provide a safer facility for bike traffic.

The recommended multi use path on the east side of the roadway, along with the west side cemetery and limited development in this area would make it possible to eliminate the west side sidewalk. Reducing the amount of ROW through this area will lessen the project's impact on the cemetery. This concept save additional costs over Idea B-4.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST – Original** | $986,000 | | |
| **- Proposed** | $156,000 | | |
| **- Savings** | $830,000 | | $830,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$830,000** |

| SKETCH | |
|---|---|
| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | ITEM N$^{o}$ : B-4, F-1<br>CLIENT: GDOT<br>Sheet 2 of 4 |

**GENERAL AREA PLAN**

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road – Newton / Rockdale Counties** | | | | | IDEA No.: B-4, F-1<br>CLIENT: GDOT<br>Sheet 3 of 4 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| | | | | | | | |
| **Reduction in ROW:** | | | | | | | |
| BL (5,955 x 4) x 2 = 47,640 | SF | 47,640 | $6.00 | $285,840 | 0 | $0 | $0 |
| Shoulder 5,955 x 4 = 23,820 | SF | 23,820 | $6.00 | $142,920 | 0 | $0 | $0 |
| | | | | | | | |
| **Asphalt Pavement Reduction:** | | | | | | | |
| (6,055 ft 4 ft) x 2 = 48,440 | SF | 48,440 | $6.00 | $290,640 | 0 | $0 | $0 |
| | | | | | | | |
| **Concrete Sidewalk:** | | | | | | | |
| Eliminate West Side Sidewalk | SY | 3,364 | $42.00 | $141,288 | 0 | $0 | $0 |
| Additional Trail Sidewalk | SY | 0 | $0 | $0 | 3,364 | $42.00 | $141,288 |
| | | | | | | | |
| **Embankment: (4' Reduction)** | | | | | | | |
| BL Earthwork | LS | 1 | $21,600 | $21,600 | 0 | $0 | $0 |
| Shoulder Earthwork | LS | 1 | $10,800 | $10,800 | 0 | $0 | $0 |
| | | | | | | | |
| **Storm Drain Pipes** | | | | | | | |
| 18" Pipe Reduction | LF | 60 | $55.00 | $3,300 | 0 | $0 | $0 |
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| **SUBTOTAL** | | | | $896,388 | | | $141,288 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $89,639 | | | $14,129 |
| **TOTAL** | | | | $986,027 | | | $155,417 |
| **TOTAL ROUNDED** | | | | **$986,000** | | | **$156,000** |

# CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-4, F-1<br>CLIENT: GDOT<br>Sheet 4 of 4 |
|---|---|

Oglesby Bridge Road Intersection @ Station 110+75.46
Cowan Road / Christian Circle North Intersection @ Station 171+30.54
171+30.54 – 110+75.46 = 6,055.08 ft Use 6,055 ft

Asphalt Pavement: Bike Lanes
(6,055 ft x 4 ft) x 2 = 48,440 SF

Concrete Sidewalk:
Additional 5' concrete sidewalk to make 10' multi-use path
6,055 ft x 5 ft = 30,275 SF / 9 = 3,363.9 SY Use 3,364 SY
Elimination of 5' concrete sidewalk on west side
6,066 ft x f ft = 30,275 SF / 9 = 3,363.9 SY Use 3,364 SY

ROW Area:
6,055 ft – 100 ft (intersection areas) = 5,955 ft
(5,955 ft x 4 ft) x 2 = 47,640 SF
Reduce west side shoulder from 16 ft to 12 ft
5,955 ft x 4 ft = 23,820 SF

Storm Drain Reduction:
Assume 10, 18" cross drains in section (5 will cross entire roadway & 5 will cross one roadway)
(5 x (4 ft x 2 ) + (5 x 4 ft) = 60 LF

Earthwork Reduction:
Use VE concept of $40,000 per 4-foot reduction in total project length.
Project Length: 4.19 mile x 5,280 ft / mile = 22,123.2 ft
Bike Trail Section = 6,055 ft
6,055 / 22,123 = 27% of project length
$40,000 x 2 = $80,000 x 27% = $21,600
$40,000 x 1 = $40,000 x 27% = $10,800

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** To realign Brown Bridge Road to line up with SR 212 relocation instead of SR 20 relocation |
|---|---|---|
| A-5 | 1 of 4 | |

Comp By: A.W. Date: 12-12-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The current design relocates the Brown Bridge Road intersection with SR 20 to match-up with the realigned SR 20 segment that has been shifted west of the large Baptist church complex at the south end of the project. This long Brown Bridge Road relocation goes through a portion of the large power substation property and several other properties east of the Baptist church cemetery.

**Proposed Change:**

It is recommended that Brown Bridge Road be aligned into the proposed shifted T-intersection between SR 212 and SR 20 just south of the Kroger parking lot. This change would provide route eastbound continuity between SR 212 and Brown Bridge Road.

**Justification:**

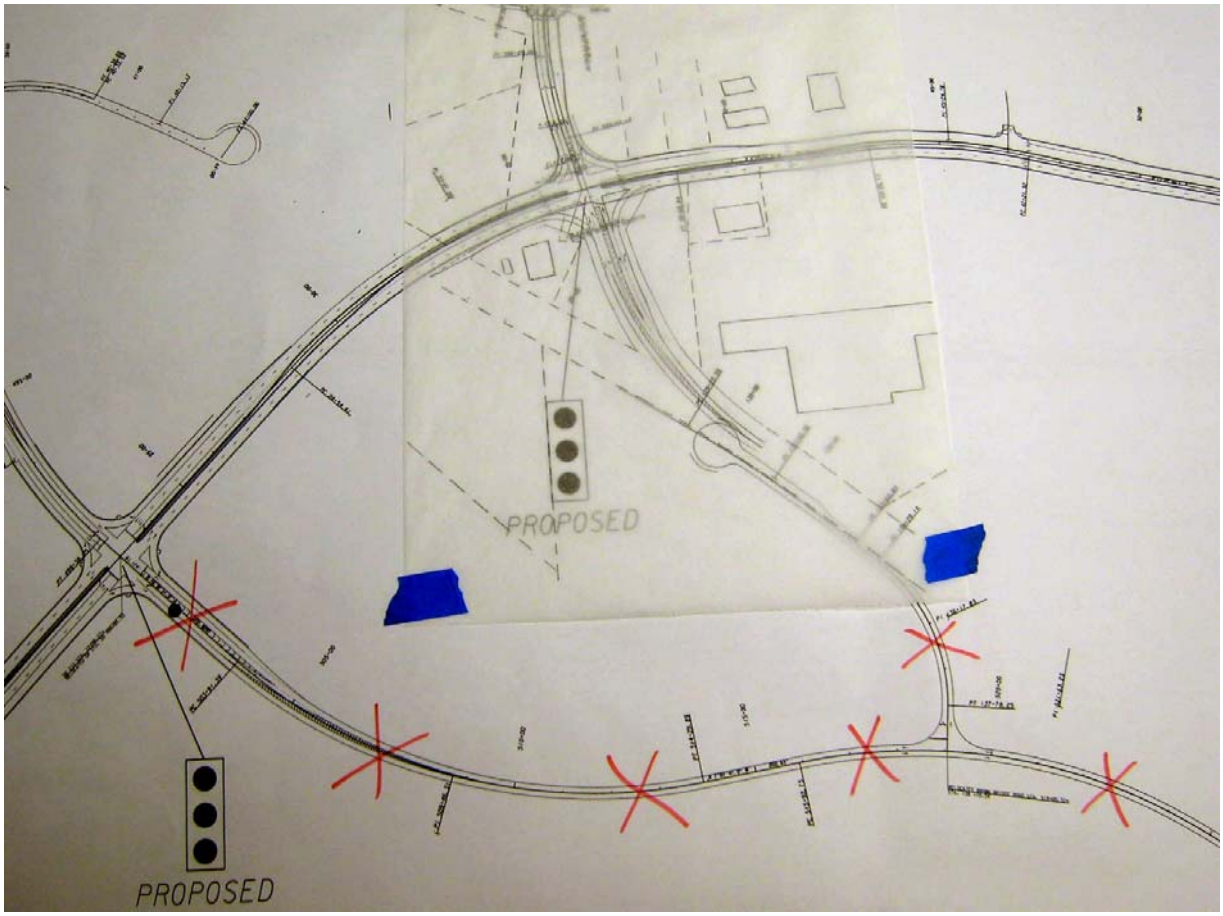
This change will significantly reduce the length of the Brown Bridge Road relocation and its associated new required ROW. Connecting Brown Bridge Road to SR 20 at the proposed shifted SR 212 intersection would provide for direct eastbound connectivity between SR 212 and Brown Bridge Road. This direct connection would reduce / eliminate traffic that would obviously cut through the Kroger parking lot using the current Brown Bridge Road cul-de-sac design that provides access to the parking lot from the east side.

This realignment concept would also work if the south end of SR 20 is converted to a 5-lane section as discussed in recommendation B-6A.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $1,300,000 | | |
| **- Proposed** | $792,000 | | |
| **- Savings** | $508,000 | | $508,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$508,000** |

## SKETCH

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM N$^{o}$ : A-5, B-3<br>CLIENT: GDOT<br>Sheet 2 of 4 |
|---|---|



# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: A-5, B-3<br>CLIENT: GDOT<br>Sheet 3 of 4 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| **ROW Current Design:** | | | | | | | |
| Commercial | SF | 47,500 | $9.00 | $427,500 | 0 | $0 | $0 |
| Small Residential | SF | 26,650 | $1.50 | $39,975 | 0 | $0 | $0 |
| Large Residential | SF | 64,875 | $0.40 | $25,950 | 0 | $0 | $0 |
| | | | | | | | |
| **ROW VE Concept:** | | | | | | | |
| Commercial | SF | 0 | $0 | $0 | 58,375 | $9.00 | $525,375 |
| | | | | | | | |
| **Asphalt Pavement:** | | | | | | | |
| Current Design | SF | 102,354 | $6.00 | $614,124 | | $0 | $0 |
| VE Design | SF | 0 | $0 | $0 | 32,400 | $6.00 | $194,400 |
| | | | | | | | |
| **Earthwork:** | | | | | | | |
| Current Design | CY | 8,900 | $6.50 | $57,850 | 0 | $0 | $0 |
| | | | | | | | |
| **Drainage:** | | | | | | | |
| 18” Storm Drain Pipe | LF | 200 | $55.00 | $11,000 | 0 | $0 | $0 |
| 18” Flared End Sections | EA | 10 | $550.00 | $5,500 | 0 | $0 | $0 |
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| **SUBTOTAL** | | | | $1,181,899 | | | $719,775 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $118,190 | | | $71,978 |
| **TOTAL** | | | | $1,300,089 | | | $791,753 |
| **TOTAL ROUNDED** | | | | **$1,300,000** | | | **$792,000** |

# CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM N$^{o}$ : A-5, B-3<br>CLIENT: GDOT<br>Sheet 4 of 4 |
|---|---|

**ROW:**

Current Brown Bridge Road

Commercial (Power Substation)

50’ 750’ = 37,500 SF + 50’ x 150’ = 7,500 SF + ((50’/2 x 20’) x 2 = 2,500 SF **= 47,500 SF**

Small Residential

95’ x 250’ = 23,750 SF + 20’/2 x 50’ = 500 SF + 12’ x 200’ = 2,400 SF = **26,650 SF**

Large Residential

50’ x 500’ = 25,000 SF + (95’ + 50’)/2 x 550’ = 39,875 SF = **64,875 SF**

VE Proposed Brown Bridge Road

Commercial

95’ x 380’ = 36,100 SF + (95’ + 0’)/2 x 300’ = 14,250 SF + (75’/2 x 75’) x 2 = 5,625 SF = **58,375 SF**

**Asphalt Pavement:**

Current Brown Bridge Road

24’ x 1,800’ = 43,200 SF + 48’ x 250’ = 12,000 SF + (48’ + 36)/2 x 200’ = 8,400 SF
(36’ + 24’)/2 x 350’ = 10,500 SF + 24’ x 750’ = 18,000 SF + 3.141 x 50’ x 50’ = 7,854 SF
12’ x 200’ = 2,400 SF
Total Area = **102,354 SF**

VE Proposed Brown Bridge Road

48’ x 200’ = 9,600 SF + (48’ + 36’)/2 x 250’ = 10,500 SF + (36’ + 24’)/2 x 250’ = 7,500 SF
12’ x 400’ = 4,800 SF
Total Area = **32,400 SF**

**Drainage:**

Assume cross drains at 500’. Current Brown Bridge Road is approximately 2,000 feet longer than the VE proposed alignment. This is approximately 4 crossings plus 1 on the cul-de-sac road for 5 crossings. Assume 40’ length per crossing and two flared end sections.

5 x 40’ = 200 LF (18” Pipe) + 10, 18” end sections

**Earthwork:**

Assume a 40’ width (24’ pavement + 8’ shoulders) and 3’ depth. Length along Brown Bridge Road Relocation = 1,500 ft + Length of cul-de-sac road = 500 ft = 2,000 LF

2,000’ x 40’ x 3’ = 240,000 CF / 27 = 8,889 CY **Use 8,900 CY**

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** Construct a 5-Lane Section (11-foot travel lanes, 14-foot center lane, 10-foot shoulders) through the SR 20 / SR 212 intersection area (sta. 16+00 to 47+00). |
|---|---|---|
| B-6A | 1 of 4 | |

Comp By: D.P.C. Date: 12-12-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The proposed urban roadway section for the project includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders throughout the entire project length. The proposed urban roadway section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project. During the development and design of this project, ROW costs have escalated significantly and are expected to continue to rise.

**Proposed Change:**

It is recommended that a 5-lane roadway section using 11-foot travel lanes, a 14-foot shared center turn lane, and 10-foot shoulders be constructed from Station 16+00 to Station 47+00 at the south end of the project. The section would end at the new intersection at Stone Creek Drive / Kroger Shopping Center.

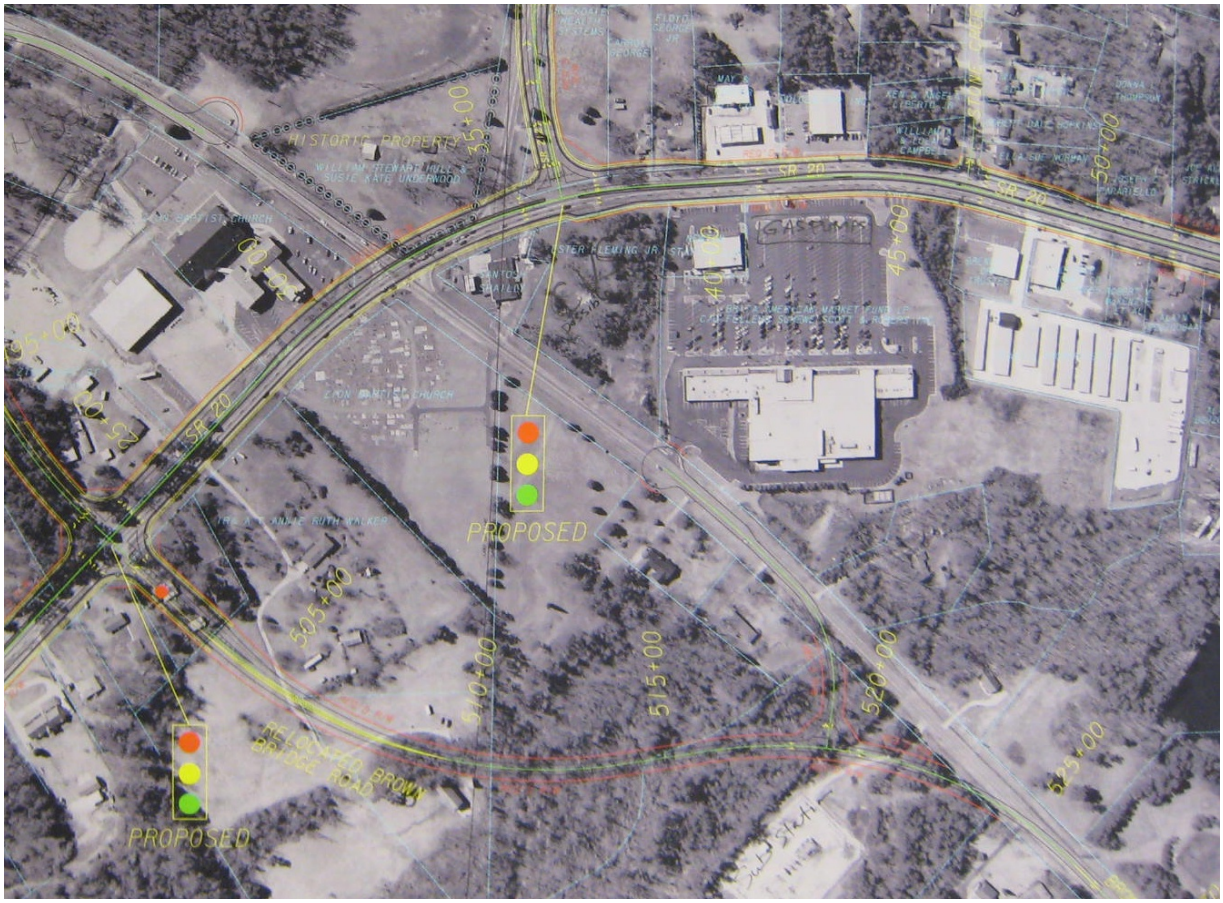
**Justification:** The current urban roadway section, with its 100-foot wide ROW requirement adversely impacts the Baptist church, the Baptist church cemetery, and the historic property. Constructing the recommended 5-lane roadway section through this area would result in a 22-foot reduction in the overall width of the roadway section. This reduction would significantly reduce the amount of ROW required for the project and also its impact on these properties.

The 22-foot reduction in roadway section would reduce the lengths of storm drain cross pipes, curb and gutter, asphalt pavement, and the amount of earthwork. The 5-lane section would accommodate the project traffic with the minimum amount of impact to the neighborhood. This concept results in significant cost savings to the project.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $675,000 | | |
| **- Proposed** | $0 | | |
| **- Savings** | $675,000 | | $675,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$675,000** |

## SKETCH

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-6A<br>CLIENT: GDOT<br>Sheet 2 of 4 |
|---|---|



# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: B-6A<br>CLIENT: GDOT<br>Sheet 3 of 4 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| **Additional Asphalt Pavement:** | | | | | | | |
| **Current Urban Section:** | | | | | | | |
| Full depth pavement section including 12" GAB, 25mm base, 19mm intermediate level, and 12.5mm top-coarse. | SF | 4,760 | $6.00 | $28,560 | 0 | $0 | $0 |
| | | | | | | | |
| **Reduction in ROW:** | | | | | | | |
| Median, Pavement, Shoulders | SF | 68,200 | $6.00 | $409,200 | 0 | $0 | $0 |
| | | | | | | | |
| **Embankment: (4' Reduction):** | | | | | | | |
| 22-foot reduction | EA | 1.0 | $33,000 | $33,000 | 0 | $0 | $0 |
| | | | | | | | |
| **Storm Drainage System:** | | | | | | | |
| NB 5-lane section reduction | | | | | | | |
| 8 drain. line x 24' of 18" pipe | LF | 192 | $55.00 | $10,560 | 0 | $0 | $0 |
| SB 5-lane section reduction | | | | | | | |
| 8 drain. line x 24' of 18" pipe | LF | 192 | $55.00 | $10,560 | 0 | $0 | $0 |
| | | | | | | | |
| **Eliminate Curb & Gutter:** | | | | | | | |
| 2,850 ft x 2 = 5,700 | LF | 5,700 | $16.00 | $91,200 | 0 | $0 | $0 |
| | | | | | | | |
| **Concrete Median:** | | | | | | | |
| (1,500 ft x 4 ft) / 9 = 667 | SY | 667 | $45.52 | $30,362 | 0 | $0 | $0 |
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| **SUBTOTAL** | | | | $613,442 | | | $0 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $61,344 | | | $0 |
| **TOTAL** | | | | $674,786 | | | $0 |
| **TOTAL ROUNDED** | | | | **$675,000** | | | **$0** |

# CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-6A<br>CLIENT: GDOT<br>Sheet 4 of 4 |
|---|---|

Typical Section width reduction calculations: Station 16+00 to 47+00

a.) SB and NB Main line lane length = 3,100' x 4' = 12,400 SF
b.) SB Shoulder reduced from 16' to 10' = 6' x 3,100' = 18,600 SF
c.) NB Shoulder reduced from 16' to 10' = 6' x 3,100' = 18,600 SF
d.) 20' median reduced to 14' in width = 6' x 3,100' = 18,600 SF
**Total 68,200 SF in reduced roadway section.**

Roadway Section width reduction calculations:

5-Lane Section: Travel Lanes + Center Lane
(3,100 ft x 11 ft) x 4 + (3,100 ft x 14 ft) = 179,800 SF
Current Urban Section: Travel Lanes + Left Turn Bays + LT Tapers
(3,100 ft x 12 ft) x 4 + (3,100 ft x 80% x 12) + 4 x (12 x 250) x ½ = 184,560 SF
**Net Roadway Difference:**
Current Section – 5-Lane Section = 184,560 – 179,800 = **4,760 SF x $6.00 = $28,560**

ROW reduction calculations:

Estimated ROW Cost / SF = $6.00
Total reduced area is calculated from above at 68,200 SF x $6.00 = $409,200

Embankment Estimates:
For recommendation estimating purposes the VE team will assume a 3% reduction in total project embankment for each 4-foot reduction in roadway section width, therefore a single 4-foot reduction would produce an approximate $40,000 savings cost.
We propose to reduce section by 22-feet, therefore, 22' / 4' = 5.5 multiplier, 5.5 x $40,000 = $220,000 x a reduction multiplier of 15% since our corridor is only 3,100 LF in length, therefore, 15% x $220,000 = $33,000.

Curb & Gutter:
SB and NB Main line lane length's calculated from sta. 16+00 to 47+00 = 3,100' minus the 250' of proposed median breaks = 2,850' of one side curb and gutter x 2 sides = 5,700 LF of curb and gutter removed.

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** **B-6** | **Sheet No.:** 1 of 3 | **CREATIVE IDEA:** **Alternate to Ideas A-2, B-1, & D-2** Construct a 5-Lane Section (11-foot travel lanes, 14-foot center lane, and 12-foot shoulders) on SR 20. |
|---|---|---|

Comp By: D.P.C. Date: 12-12-07 Checked By: K.B. Date: 12-12-07

**Original Concept:** The proposed urban roadway section for the project includes four 12-foot lanes, a 20-foot wide raised median, and 16-foot outside shoulders throughout the entire project length. The proposed urban roadway section (requiring 100 feet of ROW) adversely impacts the Baptist church, the Baptist church cemetery, and the historic property at the south end of the project and requires the roadway to be shifted to the east at Station 140+00 to lessen its impact on a second cemetery. During the development and design of this project, ROW costs have escalated significantly and are expected to continue to rise.

**Proposed Change:** It is recommended that a 5-lane roadway section using 11-foot travel lanes, a 14-foot shared center turn lane, and 12-foot shoulders be constructed in-lieu-of the current proposed urban roadway section. This recommendation would maintain the 16-foot shoulder on the east side of the roadway between Oglesby Bridge Road and Christian Circle North Road to provide space to construct a 10-foot multi-purpose trail in-lieu-of dual bike lanes in the roadway.

**Justification:** The current urban roadway section, with its 100-foot wide ROW impacts the local community. Constructing the recommended 5-lane roadway section would result in an 18-foot reduction in the overall width of the roadway section. This reduction would significantly reduce the amount of ROW required for the project and also its impact on the community. The 18-foot reduction in roadway section would reduce the lengths of storm drain cross pipes, curb and gutter, asphalt pavement, and the amount of earthwork. The 5-lane section would accommodate the project traffic with the minimum amount of impact to the neighborhood. This concept results in significant cost savings to the project. It would also improve constructability and reduce construction time.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $3,777,000 | | |
| **- Proposed** | $402,000 | | |
| **- Savings** | $3,375,000 | | $3,375,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$3,375,000** |

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: B-6<br>CLIENT: GDOT<br>Sheet 2 of 3 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| **Additional Asphalt Pavement:** | | | | | | | |
| **VE 5-Lane Section:** | | | | | | | |
| Full depth pavement section including 12" GAB, 25mm base, 19mm intermediate level, and 12.5mm top-coarse. 5,400 LF | SF | 0 | $0 | $0 | 37,332 | $6.00 | $223,992 |
| **Eliminate Dual Bike Lanes:** | | | | | | | |
| (6,055 ft x 4 ft) x 2 = 48,440 | SF | 48,440 | $6.00 | $290,640 | 0 | $0 | $0 |
| **Reduction in ROW:** | | | | | | | |
| Median, Pavement, Shoulders | SF | 351,400 | $6.00 | $2,108,400 | 0 | $0 | $0 |
| **Embankment: (4' Reduction);** | | | | | | | |
| 18 Foot Reduction | EA | 4.5 | $40,000 | $180,000 | 0 | $0 | $0 |
| **Storm Drain System:** | | | | | | | |
| NB 5-lane section reduction | | | | | | | |
| 30 drain. line x 24' of 18" pipe | LF | 720 | $55.00 | $39,600 | 0 | $0 | $0 |
| SB 5-lane section reduction | | | | | | | |
| 30 drain. line x 24' of 18" pipe | LF | 720 | $55.00 | $39,600 | 0 | $0 | $0 |
| **Eliminate Curb & Gutter:** | | | | | | | |
| Curb and Gutter Section | LF | 39,000 | $16.00 | $624,000 | 0 | $0 | $0 |
| **Concrete Median:** | | | | | | | |
| (10,000 ft x 3 ft) / 9 = 3,334 | SY | 3,334 | $45.52 | $151,764 | 0 | $0 | $0 |
| **Add 6" Sidewalk for Trail** | | | | | | | |
| 6,055' x 5' = 30,275/9 = 3,364 | SY | | | | 3,364 | $42.00 | $141,288 |
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| **SUBTOTAL** | | | | $3,434,004 | | | $365,280 |
| Includes E & C | | | | | | | |
| **MARK-UP (10%)** | | | | $343,340 | | | $36,528 |
| **TOTAL** | | | | $3,777,344 | | | $401,808 |
| **TOTAL ROUNDED** | | | | **$3,777,000** | | | **$402,000** |

## CALCULATIONS

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | ITEM Nº : B-6<br>CLIENT: GDOT<br>Sheet 3 of 3 |
|---|---|

Typical Section width reduction calculations: Station 16+00 to Station 225+00 (20,900 ft)
a.) SB and NB Main line lane length 20,900' x 4' = 83,600 SF
b.) SB Shoulder reduced from 16' to 12' = 4' x 20,900' = 83,600 SF
c.) NB Shoulder reduced from 16' to 12' = (4' x (20,900' – 6,200 for trail)) = 58,800 SF
d.) 20' median reduced to 14' in width for full length of project = 6' x 20,900' = 125,400 SF
**Total 351,400 SF in reduced roadway section.**

Roadway Section width reduction calculations:

5-Lane Section: Travel Lanes + Center Lane
(20,900 ft x 11 ft) x 4 + (20,900 ft x 14 ft) = 1,212,200 SF
Current Urban Section: Travel Lanes + Left Turn Lanes + LT Tapers
(20,900 ft x 12) x 4 + (20,900 ft x 52.3% x 12 ft) + 12 x (12 x 250) x ½ = 1,174,868 SF
**Net Roadway Difference:**
5-Lane Section - Urban Section = 1,212,200 – 1,174,868 = **37,332 SF x $6.00 = $223,992**

ROW reduction calculations:

Estimated ROW Cost / SF = $6.00
Project reduced area is calculated from above at 351,400 SF x $6.00 = $2,108,400

Embankment Estimates:
For recommendation estimating purposes the VE team will assume a 3% reduction in embankment for each 4-foot reduction in roadway section width, therefore a 4-foot reduction would produce an approximate $40,000 savings cost.
We propose to reduce section by 18-feet except for the 6,200' multi-purpose trail area. 18' / 4' = 4.5 multiplier, 4.5.0 x $40,000 = $180,000

Curb & Gutter:
SB and NB Main line lane length's calculated from sta. 16+00 to 225+00 = 20,900' minus the 1,400' of proposed median breaks = 19,500' of one side curb and gutter x 2 = 39,000 LF of curb and gutter removed.

## DEVELOPMENT AND RECOMMENDATION PHASE

**SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties**

| **IDEA No.:** | **Sheet No.:** | **CREATIVE IDEA:** |
|---|---|---|
| F-5 | 1 of 2 | To use 4” concrete sidewalk in-lieu-of 6” concrete sidewalk. |

Comp By: A.W. Date: 12-12-07 Checked By: K.B. Date: 12/17/07

**Original Concept:**

The original design used a 6”-thick 5-foot concrete sidewalk throughout the proposed project.

**Proposed Change:**

It is recommended that a 4”-thick 5-foot concrete sidewalk be used in-lieu-of a 6”-thick 5-foot concrete sidewalk.

**Justification:**

The use of a 4”-thick 5-foot concrete sidewalk would reduce the cost of the project. The recommended revised concrete sidewalk meets State standards.

| **LIFE CYCLE COST SUMMARY** | **CAPITAL COST** | **FUTURE COST** | **TOTAL COST** |
|---|---|---|---|
| **INITIAL COST - Original** | $1,848,000 | | |
| **- Proposed** | $1,481,000 | | |
| **- Savings** | $367,000 | | $367,000 |
| **FUTURE COST – Savings** | | | |
| **TOTAL PRESENT WORTH SAVINGS** | | | **$367,000** |

# COST WORKSHEET

| **Project: SR 20 Improvements from SR 212 to Honey Creek Road - Newton / Rockdale Counties** | | | | | IDEA No.: F-5<br>CLIENT: GDOTR<br>Sheet 2 of 2 | | |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ELEMENT** | | **ORIGINAL ESTIMATE** | | | **NEW ESTIMATE** | | |
| **Item** | **Unit** | **No. Units** | **Cost/Unit** | **Total Cost** | **No. Units** | **Cost/Unit** | **Total Cost** |
| | | | | | | | |
| 6” Concrete Sidewalk | SY | 40,000 | $42.00 | $1,680,000 | | | |
| | | | | | | | |
| 4” Concrete Sidewalk | SY | | | | 40,000 | $33.67 | $1,346,800 |
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| **SUBTOTAL** | | | | $1,680,000 | | | $1,346,800 |
| Includes E & C<br>**MARK-UP (10%)** | | | | $168,000 | | | $134,680 |
| **TOTAL** | | | | $1,848,000 | | | $1,481,480 |
| **TOTAL ROUNDED** | | | | **$1,848,000** | | | **$1,481,000** |

# APPENDIX

# Sources

## Approving/Authorizing Persons

| Name: | Position: | Telephone: |
|---|---|---|
| Ron Wishon, P.E. | GDOT – Office of Engineering Services - Assistant Project Review Engineer | 404-651-7470 |
| Brian Summers, P.E. | GDOT – Office of Engineering Services - Project Review Engineer | 404-656-6846 |
| | | |

## Personal Contacts

| Name: | Telephone: | Notes: |
|---|---|---|
| Neal O'Brien | 404-656-5442 | Intersection Layout Alternatives |
| James Magnus | 404-656-5442 | Intersection Print Outs |
| | | |
| | | |

## Documents/Abstracts

| Reference: | Reference: |
|---|---|
| Construction Cost Estimate | 1998 Master Trails Plan |
| ROW Cost Estimate | Preliminary Layout of Eligible Resources |
| 100 Scale Plan Layout | GDOT Design Policy Manual |
| Project Concept Report | GDOT Standards & Construction Details |
| 30% Plans | AASHTO Green Book |
| 100 Scale Layouts of Various Intersection Designs for SR 20 / SR 212 | GDOT Average Unit Bid Prices |
| | |
| | |

# SR 20 Widening / Reconstruction
# Newton / Rockdale Counties

## Cost Model / Distribution

| Item | Description | $ Amount | % of Total Project |
|---|---|---|---|
| | | | |
| **A** | ROW | $14,200,000 | 41.0% |
| **B** | Asphalt Concrete | $5,625,000 | 16.2% |
| **C** | Grading | $4,900,000 | 14.2% |
| **D** | Curb & Gutter | $2,250,000 | 6.5% |
| **E** | Storm Drains | $2,000,000 | 5.8% |
| **F** | Sidewalks | $1,680,000 | 4.9% |
| **G** | Miscellaneous | $1,593,000 | 4.6% |
| **H** | Traffic Control | $1,500,000 | 4.3% |
| **I** | Traffic Signals | $480,000 | 1.4% |
| **J** | Erosion Control | $400,000 | 1.1% |
| | | | |
| | **Sub-Total** | $34,628,000 | 100% |
| | | | |
| | E&C @ 10% | $2,043,000 | |
| | | | |
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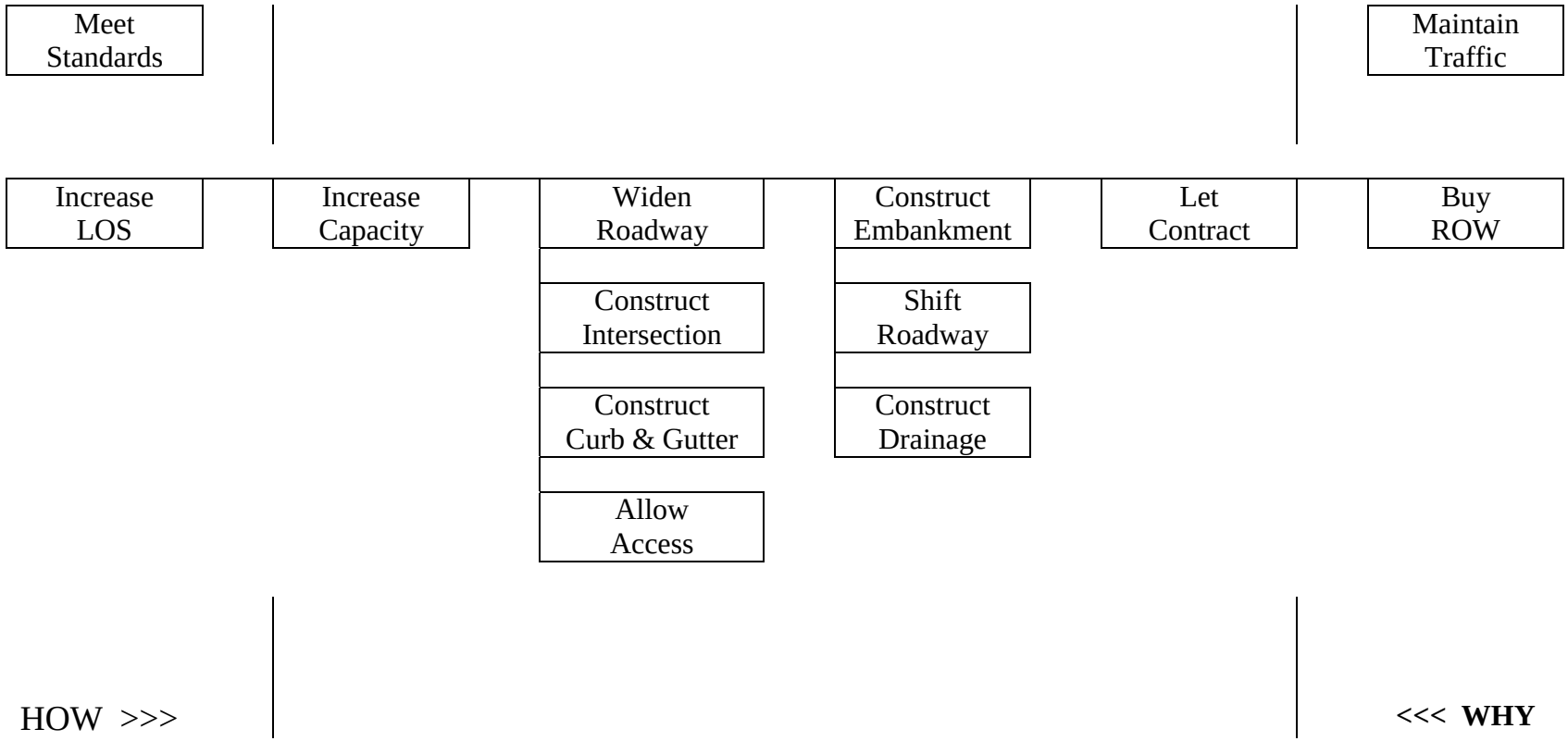
| **Note:** The 10% E & C Rate will be used as the Mark-up on the Recommendation Cost Sheet | | | |

# FAST DIAGRAM

**Study** **Project Name**: **SR 20 Widening & Reconstruction Newton / Rockdale Counties**

**Basic Function** **Increase Capacity**



# INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** **SR 20 Widening & Reconstruction**
**Function:** **Increase Capacity**

| ITEM No. | DESCRIPTION | FUNCTION | | INITIAL DOLLARS | | |
|---|---|---|---|---|---|---|
| | | Verb | Noun | Cost | % of Total | Worth/Save |
| A | ROW | Store | Project | $14,200,000 | 41.0% | Yes |
| | | Allow | Construction | | | |
| | | | | | | |
| B | Asphalt Pavement | Provide | Surface | $5,625,000 | 16.2% | Yes |
| | | Provide | Access | | | |
| | | Increase | Capacity | | | |
| | | Improve | Safety | | | |
| | | | | | | |
| C | Grading | Achieve | Grade | $4,900,000 | 14.2% | Yes |
| | | Widen | Roadway | | | |
| | | Construct | Intersection | | | |
| | | Construct | Sidewalks | | | |
| | | Improve | Safety | | | |
| | | | | | | |
| D | Curb & Gutter | Control | Access | $2,250,000 | 6.5% | Yes |
| | | Improve | Safety | | | |
| | | Separate | Traffic | | | |
| | | Collect | Water | | | |

# INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** **SR 20 Widening & Reconstruction**
**Function:** **Increase Capacity**

| ITEM No. | DESCRIPTION | FUNCTION | | INITIAL DOLLARS | | |
|---|---|---|---|---|---|---|
| | | Verb | Noun | Cost | % of Total | Worth/Save |
| | Curb & Gutter (Continued) | Define | Lanes | | | |
| | | Buffer | Sidewalk | | | |
| | | | | | | |
| E | Storm Drain Pipes | Drain | Pavement | $2,000,000 | 5.8% | Yes |
| | | Improve | Safety | | | |
| | | Control | Runoff | | | |
| | | Reduce | ROW | | | |
| | | | | | | |
| F | Sidewalk | Meet | Standards | $1,680,000 | 4.9% | Yes |
| | | Provide | Access | | | |
| | | Improve | Safety | | | |
| | | Continue | Sidewalk | | | |
| | | Satisfy | Public | | | |
| | | | | | | |
| G | Miscellaneous | Construct | Project | $1,593,000 | 4.6% | No |
| | | | | | | |
| H | Traffic Control | Maintain | Traffic | $1,500,000 | 4.3% | No |
| | | Maintain | Safety | | | |

# INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** **SR 20 Widening & Reconstruction**
**Function:** **Increase Capacity**

| ITEM No. | DESCRIPTION | FUNCTION | | INITIAL DOLLARS | | |
|---|---|---|---|---|---|---|
| | | Verb | Noun | Cost | % of Total | Worth/Save |
| | Traffic Control (Continued) | Construct | Project | | | |
| | | Allow | Construction | | | |
| | | | | | | |
| I | Traffic Signals | Control | Traffic | $480,000 | 1.4% | Yes |
| | | Improve | LOS | | | |
| | | Allow | Access | | | |
| | | Improve | Safety | | | |
| | | | | | | |
| J | Erosion Control | Control | Erosion | $400,000 | 1.1% | No |
| | | | | | | |
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| CREATIVE PHASE<br>Creative Idea Listing | | JUDGMENT PHASE<br>Idea Evaluation | |
|---|---|---|---|
| **No.** | **CREATIVE IDEA** | **COMMENTS** | **IDEA RATING** |
| **A** | **ROW** | | |
| A-1 | Reduce Roadway Section | See A-2, A-3, and A-4 | X |
| A-2 | Reduce 16-Foot Outside Shoulder | Reduce ROW, Embankment, Storm Pipes | ✓ |
| A-3 | Reduce 12-Foot Lanes | See B-1 | X |
| A-4 | Reduce Median Width | Reduce ROW, Embankment, Storm Pipes | ✓ |
| A-5 | Redesign SR 20 / SR 212 Intersection | Reduce ROW, Embankment, and Pavement | ✓ |
| **B** | **Asphalt Pavement** | | |
| B-1 | Reduce 12-Foot Through Lanes | Reduce ROW, Embankment, Storm Pipes | ✓ |
| B-2 | Reduce Left Turn Lanes to 11 Feet | Impacts Left Turns & U-Turns | X |
| B-3 | Redesign SR 20 / SR 212 Intersection | Reduce ROW, Embankment, and Pavement | ✓ |
| B-4 | Remove Bike Lanes – Add Multi-Use Path | Reduce Pavement, Save Cost | ✓ |
| B-5 | Construct 5-Lane Section – 12-Foot Lanes | See B-1 Option | X |
| B-6 | Construct 5-Lane Section – 11-Foot Lanes, 14-Foot Median, 12-Foot Shoulders, No Bike Lanes | Minimum Cost Section | ✓ |
| B-7 | Construct 5-lane Section – Full ROW for Median Sect. | Not Practical, Added Future Work & Cost | X |
| B-8 | Check # of Lanes at Honey Creek Road | Check at School on East Side | DS |
| ✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team | | | |

| CREATIVE PHASE<br>Creative Idea Listing | | JUDGMENT PHASE<br>Idea Evaluation | |
|---|---|---|---|
| **No.** | **CREATIVE IDEA** | **COMMENTS** | **IDEA RATING** |
| **C** | **Grading** | | |
| C-1 | Reduce Outside Shoulder Width | See A-2 | X |
| C-2 | Reduce 12-Foot Lane to 11 Feet | See B-1 | X |
| C-3 | Reduce Median Width | See A-4 | X |
| C-4 | Redesign SR 20 / SR 212 Intersection | See A-5 | X |
| C-5 | Reduce / Eliminate Sidewalk | See F-1, F-2, F-3 | X |
| C-6 | Provide for Multi-Use Trail | See F-1, F-2 | X |
| | | | |
| **D** | **Curb & Gutter** | | |
| D-1 | Use Concrete Median In-Lieu-of Curb & Gutter with 8-Foot Width | Reduce Cost, Simplify Construction | ✓ |
| D-2 | Use Concrete Median with 4-Food Width | Reduce Cost, Simplify Construction | ✓ |
| D-3 | Eliminate Curb & Gutter and Use 5-Lane Section @ Left Turn Lanes | See B-6 | X |
| | | | |
| | | | |
| ✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team | | | |

| CREATIVE PHASE<br>Creative Idea Listing | | JUDGMENT PHASE<br>Idea Evaluation | |
|---|---|---|---|
| **No.** | **CREATIVE IDEA** | **COMMENTS** | **IDEA RATING** |
| **E** | **Storm Drain Pipes** | | |
| F-1 | Reduce Outside Shoulder Width | See A-2 | X |
| F-2 | Reduce 12-Foot Lane Width | See B-1 | X |
| F-3 | Reduce Median Width | See A-4 | X |
| F-4 | Eliminate Bike Lanes | See B-4 | X |
| **F** | **Sidewalk** | | |
| F-1 | Construct Multi-Use Path in Area of Bike Trail | Reduce Pavement Costs | ✓ |
| F-2 | Construct Multi-Use Path on One Side Only | Reduce ROW, Sidewalk | ✓ |
| F-3 | Construct only at Existing Commercial / Residential Buildings | Not Practical Due to Active Development | X |
| F-4 | Reduce Grass Area Between Sidewalk & C&G | See A-2 | X |
| F-5 | Use 4” Sidewalk in-lieu-of 6” Sidewalk | Reduce Cost | ✓ |
| **I** | **Traffic Signals** | | |
| I-1 | Check Warrants at Intersections | Meets Criteria | X |
| I-2 | Check Cost Data for Signals | Low Cost for 8 Signalized Intersections | DS |
| I-3 | Check if Signal is needed at School | Check Access | DS |
| ✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team | | | |