

SCOPE OF SERVICES FOR TIP U-5114 US 21 / GILEAD ROAD INTERSECTION IMPROVEMENTS

Located in

HUNTERSVILLE, NC

PROJECT DESCRIPTION

The Town of Huntersville desires to provide substantial improvements to the intersection of US 21 (Statesville Road) and Gilead Road. The improvements will include two new dual U-turn bulbouts and will prohibit left-hand turns at the intersection of US 21/Gilead Road. There will be new location connections at Dallas Street for the Bayshore Plaza Shopping Center and from Commerce Center Drive to Boulder Park Drive. The project will also feature accommodations for bicyclists (wide outside lanes on US 21 and dedicated bike lanes on Gilead Road) and pedestrians. Refer to the attached Detailed Study Alternative exhibit for further details. This will be considered the design phase of the project and will include: roadway design, hydraulics design, supplemental surveying, environmental permitting, landscaping, utility coordination, signal design, geotechnical recommendations, pavement markings, signage, and structural design. It should be noted that any reference to "project team" in the following scope includes Town staff, STV, subconsultants, and anyone else the Town designates. The reference of YOU indicates the Town of Huntersville, and the reference of WE/US indicates STV or its subconsultants.

A. PROJECT MANAGEMENT

- (1) Project Manual – Develop "Project Procedures" manual containing our project management tools
- (2) Progress Report and Invoices – Prepare monthly progress reports and invoices to the Town
- (3) Coordination Meetings - Monthly progress meetings with you and other pertinent team members and a bi-weekly conference call with the consultant team
- (4) Coordination with subconsultants
- (5) QA/QC Documentation – Perform regular on-going review of QA/QC activities on the project
- (6) Project Website – Maintain the project website with current project data as directed by the Town.

Assumptions/Exclusions:

NCDOT will let the project centrally. Bid phase services will be considered an additional service. These potential services include pre-bid conference, pre-construction conference, Requests for Information (RFI's), etc.

B. ROADWAY DESIGN

- (1) We will prepare roadway plans in accordance with NCDOT standard practices; and the plans will conform to NCDOT 2012 Standard Specifications, the NCDOT 2012 Standard Drawings, and the NCDOT Roadway Design Manual.
- (2) The drawings will be prepared in Microstation V8i format.
- (3) Improvements will include the following:
 - (a) U-Turn Intersection at US 21/Gilead Road whereby left turns are prohibited and motorists will be redirected to dual lane bulbouts approximately 550' – 800' from the intersection.

- The bulbouts will accommodate a passenger car on the inside lane and a SU-30 / WB-67 on the outside.
 - Dual right turn lanes will be provided from eastbound Gilead to southbound US 21.
 - A single right turn lane will be provided from northbound US 21 to eastbound Gilead Road.
 - A single right turn lane will be provided from westbound Gilead Road to northbound US 21.
 - Dual right turn lanes will be provided from southbound US 21 to westbound Gilead Road.
 - Pedestrian refuge islands will be provided at each quadrant of the intersection between the through lanes and right turn lanes.
- (b) US 21 improvements will extend from approximately 300' north of Hunters Road to approximately 750' south of existing Dallas Street.
- Planted medians will be incorporated where practicable.
 - Left turn lanes will be incorporated at Huntersville Commons Drive/Shiv Drive and the main entrance to Huntersville Square.
 - A full access, signalized intersection will be designed at Arahova Street/Compass Street.
- (c) Gilead Road improvements will extend from the radius turnout between Statesville Road and the I-77 off ramp to approximately 475' east of Commerce Center Drive.
- Planted medians will be incorporated where practicable.
 - Left-overs will be incorporated for the Huntersville Square and Bayshore Plaza.
 - A full access, signalized intersection will be designed at Commerce Center Drive.
- (d) A new location road will connect Commerce Center Drive to Boulder Park Drive and will accommodate a WB-67 vehicle. A connection will be made from this road to the Huntersville Square Shopping Center.
- (e) A new location road will connect US 21 to the Bayshore Plaza Shopping Center. Existing Dallas Street will create a T-intersection with the new road. This connection will be made just south of the bulbout on US 21.
- (4) STV will provide wall envelopes for up to 410' linear feet of retaining walls.
- (5) STV will attend the preliminary and 65% review meetings.
- (6) STV will attend up to 3 impromptu meetings during the right-of-way phase.

Assumptions/Exclusions:

Improvements to the I-77 northbound off-ramp are excluded from this scope and will be included as part of the interchange design.

Retaining walls are assumed to be segmental block walls. STV will provide a generic detail and Special Provision. The Contractor will be required to provide design of segmental block walls 4' or greater sealed by a Professional Engineer licensed in the state of North Carolina. Design of retaining walls will be considered an additional service.

Real Estate acquisition services are not included in this scope of services.

Noise wall designs are not included in this scope of services.

Bid phase services such as CE&I and record drawings are not included in this phase of work.

Advertise and award of the PROJECT is not included in this scope of services.

C. HYDRAULICS DESIGN

- (1) STV will provide drainage design to convey storm water runoff from the proposed roadway to the existing drainage outfalls. We will provide calculations in accordance with NCDOT's "Guidelines for Drainage Studies and Hydraulic Design." We will provide a Design/Calculations Notebook which will include project description, drainage area maps, hydrologic/hydraulic calculations, and site photographs with drainage field notes.
- (2) Storm systems will be designed using MicroStation V8i and Geopak Drainage. Design will include peak discharge determination using Rational Formula, gutter spread calculations, inlet capacity, pipe system design, and outfall channel design.
- (3) Deliverables:
 - (a) Drainage Design Notebook
 - (b) Plan View Construction Plans showing pipe layout
 - (c) Drainage Summary Sheet showing pipe inverts and structure type.
- (4) Outfall Analysis
 - (a) STV will provide a pre vs. post outfall at each location that storm water runoff leaves the project site. For outfalls 10 acres or less, STV will utilize the Rational Formula. For greater than 10 acres and less than 100 acres, STV will use the NRCS Method (TR-55). We do not anticipate any watersheds greater than 100 acres.
 - (b) The outfall analysis will include:
 - Calculations and recommendations will be included in the Drainage Design Notebook
- (5) Erosion Control
 - (a) STV will prepare erosion control plans in accordance with North Carolina's "Erosion and Sediment Control Planning and Design Manual." We anticipate preparing a two-phase erosion control plan.
 - (b) Erosion Control will include:
 - Calculations will be included in the Drainage Design Notebook

Assumptions/Exclusions:

No special structure designs are included.

No pipe profiles are included.

No FEMA/County Floodplain Permits. If Conditional Letters of Map Revision (CLOMRs) or Letters of Map Revision (LOMRs) are necessary, they will be negotiated as a supplemental.

No pond design or storm water management plan.

No downstream improvement design.

We assume the Erosion Control will be reviewed and approved by NCDOT Roadside Environmental; therefore, no permitting fees have been included.

D. SUPPLEMENTAL SURVEY

- (1) Horizontal and vertical survey extending from approximately 150' north of Huntersville Commons Drive to approximately 500' north of Hunters Road. Utilities will be located horizontally (Level B and C). See attached proposal.
- (2) Supplemental survey will be provided on an as-needed basis. No supplemental survey will be provided unless written approval is provided by the client.
- (3) Vacuum excavations will be charged on a per each basis.

Assumptions/Exclusions:

Exhibits, plats, and right of way and construction staking are not included.

E. ENVIRONMENTAL PERMITTING

- (1) Prepare and submit a Pre-Construction Notification (PCN), i.e., permit application, to the USACE, pursuant to the Nationwide Permit (NWP) Program. It's anticipated that the project will be permitted pursuant to NWP #14 for Linear Transportation Projects. Authorization under NWP #14 also requires a submittal to the DWR for written authorization. Based on the conceptual design, anticipated impacts to be described in the permit application would include stream impacts of less than 150 linear feet at each potential stream crossing. The PCN will include documentation of the waters of the U.S. delineation and figures showing the extent of delineated jurisdictional areas overlain by the proposed construction limits. An essential element of the PCN will be a review of strategies to avoid and minimize project impacts to water of the U.S. Other important elements of the application would be the need to address the potential for the project to impact federally protected plants and animals and/or significant cultural resources; compensatory mitigation for project impacts to regulated waters of the U.S.; and stormwater management. Due to the minimal impacts proposed, it is understood that the avoidance and impact minimization efforts during the planning phase will satisfy the compensatory mitigation needs for the project.
- (2) Environmental deliverables:
 - (a) A letter report and associated figures depicting the findings of jurisdictional waters determination
 - (b) An overview of waters of the U.S./wetlands permitting requirements will be included.
 - (c) A letter confirming the results of the field meeting with Mecklenburg County in regards to the PCCO.

Assumptions/Exclusions:

In the event that stream or wetland mitigation is required, then it is anticipated that mitigation credits would be purchased by the Town from a USACE-approved mitigation bank.

Costs associated with mitigation payment are not included in this scope/fee estimate.

F. LANDSCAPING

- (1) Project Management
 - (a) Attend four design team meetings.
 - (b) Attend two meetings with Town staff.
 - (c) Team coordination for file sharing, drawing protocol, and revisions.
- (2) We will develop landscape plans for approximately 2000 linear feet of center median planting.
 - (a) Prepare an assumptions and design criteria memo to guide the streetscape design. This includes the site triangles, clear zones, and planting criteria.
 - (b) Landscape layout, including materials and quantities.
 - (c) Planting details and plant schedule.
 - (d) Prepare a cost estimate for the landscape improvements with a 10% contingency.
 - (e) Coordination with irrigation sub-consultant
- (3) We will provide construction documents for an automatic irrigation system for approximately 2000 linear feet of center median planting.
 - (a) Documents to be provided are plans, details, and specifications and will be issued at the construction document level.
 - (b) Our design assumes a new potable water connection for the water supply and a new dedicated electrical connection for the controls.

Assumptions/Exclusions:

Lighting, monument, and decorative signage design is not included in this scope of services.

Water line and electrical connection designs for the irrigation to be provided as a supplemental.

G. UTILITY COORDINATION

- (1) Utility Analysis
 - (a) Furnish each owner representative with a copy of project plans for their use in preparing relocation plans and agreements.
 - (b) Determine the relocation lengths and location for public water and sewer lines, if any.
 - (c) Determine if additional right of way and/or a PUE are required.
 - (d) Determine if SUE is required.
- (2) Utility Owner Concurrence
 - (a) Develop a schedule for utility design and relocation.
 - (b) Determine who is financially responsible for the relocation of utilities that are in conflict.
 - (c) Verify that PUE's and impacts have been determined.
- (3) Utilities By Others

- (a) Prepare UBO plans by transcribing markups provided by the utility owners.
- (4) Utility Authorizations
 - (a) Submit Utility Relocation Agreements executed by the utility company.
 - (b) Provide appropriate encroachment agreement executed by the utility company.

Assumptions/Exclusions:

Water and sewer line designs are not included and will be negotiated as a supplemental if necessary.

H. WATER AND SEWER PRELIMINARY EVALUATION AND DESIGN

The US 21 / Gilead Road intersection area has significant existing water and sewer utilities, including 24" and 10" water main on Gilead Road east of the intersection, 24" and 10" water main on US 21 north of the intersection, 16" and 8" water main on Gilead Road south of the intersection, 12" water main on Gilead Road west of the intersection; and there are also a significant amount of 8" and 12" sewer mains in the project area. Depending on the existing pipe material and configuration, some of the large size pipe (16" and 24") will be costly to relocate. STV will coordinate among disciplines to evaluate the utility impacts and determine whether to implement a design modification to avoid major water and sewer utility impacts or relocation of existing water and sewer utilities, based on constructability, cost, schedule, etc.

- (1) Evaluation of existing water and sewer utilities
 - (d) Acquire as-builts info from Charlotte Water
 - (e) Compare as-builts info with SUE/Survey
 - (f) Site visit to verify as-builts
 - (g) Order soft digs to verify pipe material, depth, condition, etc. at critical areas
- (2) Project meetings and coordination during design
 - (c) Meetings with different disciplines to evaluate potential impacts
 - (d) Alternative analysis to determine either design modification to avoid major water and sewer utility impact or conceptual design of water and sewer relocation
- (3) Project meetings and coordination with Charlotte Water
 - (a) Meetings with Charlotte Water to discuss standards and specifications to be used in the project; future expansion and demand to determine pipe sizes; discuss potential major impacts and retain preliminary approval on conceptual layout

Assumptions/Exclusions:

The actual cost for the soft digs is considered an additional service and will be billed on a per each basis.

Water and sewer line designs are not included and will be negotiated as a supplement if it is determined impact on existing water and sewer utilities cannot be avoided.

It is assumed that the water and sewer relocation plan will be reviewed and approved by Charlotte Water.

I. SIGNAL DESIGN

- (1) STV will prepare traffic signal plans utilizing metal strain poles per the Detailed Study Alternative to include the following intersections:
 - (a) Gilead Road and US 21 (Statesville Road)
 - (b) Gilead Road and Commerce Centre Drive
 - (c) US 21 (Statesville Road) and South U-Turn
 - (d) US 21 (Statesville Road) and North U-Turn
 - (e) US 21 (Statesville Road) and Compass Drive/Arahova Drive
- (2) The traffic signal plans for the above intersections will include at a minimum, equipment placement, general and intersection specific notes, phasing diagrams, color sequence chart, signal timings, signal face identification, stop bar and pole locations and wiring diagrams.
- (3) The traffic signal plans will be designed in compliance with the NCDOT Traffic Management and Signal Systems Unit Design Manual, the National Electric Safety Code, the 2009 Manual on Uniform Traffic Control Devices, the 2012 NCDOT Specifications and Standard Drawings and any Town of Huntersville or NCDOT supplemental specifications. The latest edition of each design manual or guide will be used if these are not the most current.
- (4) STV will coordinate and attend one (1) scoping meeting with the Town of Huntersville and NCDOT staff to discuss each of the signals, including but not limited to configurations, timing and phasing plans, interconnectivity and coordination, pedestrian and bicycle accommodations, etc.
- (5) STV will coordinate the signal design and review with the Town of Huntersville and NCDOT and obtain approvals. Signal plans, signed and sealed by a North Carolina Registered Professional Engineer, will be submitted with updated quantities.

Assumptions/Exclusions:

Mast arms will be considered an additional service.

Foundation design shall be provided by the Contractor.

J. GEOTECHNICAL

Geotechnical services will be based on the "Guidelines and Procedures Manual for Subsurface Investigations" as established by NCDOT and revised August 2004.

- (1) Coordination with team, Town of Huntersville, and property owners to gain access to test locations.
- (2) Coordinate and perform clearing of small trees and brush to provide drill rig access in areas where borings are to be performed in undeveloped areas (new roadway alignments).
- (3) Perform site visits to observe site surface conditions, mark proposed boring locations, coordinate field activities and traffic control, measure stabilized groundwater levels and measure boring surface elevations.
- (4) Contact North Carolina 811 to mark the locations of existing underground utilities in the proposed exploration areas.
- (5) Mobilize a power drilling rig mounted on a truck or an all-terrain vehicle and crew to the site.

- (6) Traffic control including signs, cones and flagmen will be provided by a subcontractor (Traffic Control Safety Services) while working within the roadway and along the shoulders of existing roadways.
- (7) Drill soil test borings to depths of up to 20 feet below existing grades at a frequency of approximately 200 feet along new roadway areas. Soil test borings will be performed in accordance with ASTM D 1586. The following number of soil test borings is proposed for the project alignments:

Roadway Alignment	Number of Soil Test Borings
New Roadway (2 locations)	10
Statesville Road (Hwy 21)	0
Gilead Road	0
I-77 Ramp	0

- (8) Asphalt cores will be advanced at a minimum of twenty (20) locations along the existing alignment to determine existing pavement thicknesses. The existing Aggregate Base Course (ABC) and subgrade soils at the core locations will be tested using the Kessler Dynamic Cone Penetrometer (DCP) to estimate in-situ California Bearing Ratio (CBR) values for pavement overlay design.
- (9) Backfill the boreholes with soil cuttings, install a hole closure device near the ground surface in each borehole, backfill with soil cuttings to the ground surface, and patch the existing pavement with asphalt cold patch.
- (10) Perform laboratory testing on samples collected from representative strata consisting of Atterberg limits, gradation and moisture content. Representative bulk samples will be obtained of subgrade soils to perform testing to evaluate their suitability for pavement subgrade support. Laboratory testing of the bulk samples will include natural moisture contents, Atterberg limits, grain size distribution, standard Proctor and soaked CBR tests on recompacted samples.
- (11) Perform pavement designs for full depth widening and overlays.
- (12) Prepare a NCDOT Roadway Report including boring logs, profiles, site photographs, laboratory testing results, recommendations and notes, pavement thickness design and applicable supportive documentation. The report will be signed and sealed by a professional engineer specializing in geotechnical engineering.

Assumptions/Exclusions:

*Asphalt coring must be performed using lane closures at night under traffic control.
Soil test borings may be performed during normal business hours.*

Underground utilities such as water, sewer and fiber optic lines are anticipated as well as overhead power and telephone lines along the existing roadways. S&ME safety protocols do not allow the mast of the drill rig to be raised within 20 feet of an overhead power line. Borings will be offset accordingly.

Boring locations will be marked in the field using Global Positioning System (GPS) equipment.

Direct measurement of shear wave velocities of the subsurface materials at the site via geophysical methods, such as surface wave methods (e.g., Multi-Channel Analysis of Surface Waves, Microtremor Measurements, etc.) is excluded.

The scope of services does not include the design of retaining walls.

Construction-phase services are excluded. The monitoring of construction or testing of construction materials is beyond the proposed scope of geotechnical services.

K. PAVEMENT MARKINGS/SIGNING

- (1) Pavement markings and signing will be designed in accordance with the 2008 Manual on Uniform Traffic Control Devices (MUTCD).
- (2) STV will provide pavement marking plans for approximately 1.5 miles of roadway based on NCDOT standards.
- (3) STV will provide quantity take-offs to be compiled in an Engineer's estimate.
- (4) STV will provide ground mounted signing plans for approximately 1.5 miles of roadway based on NCDOT standards.

Assumptions/Exclusions:

We anticipate all overhead signs, interchange signage, and pavement markings for the I-77 / Gilead Road interchange will be handled by the interchange design team.

L. STRUCTURAL DESIGN

- (1) Design the extension to one side of a double 5'x7' reinforced concrete box culvert to NCDOT Structure Standards and AASHTO Standard Specifications.
- (2) Plans will be in Microstation V8i format.

Assumptions/Exclusions:

It is assumed the structural condition of the existing box culvert is acceptable. Design of a replacement box culvert, if needed, would be considered an additional service. Staged construction is not anticipated and is not included in this scope of work. It is assumed that the culvert extension will not include any kinks.

M. TRAFFIC CONTROL

Item excluded.

Assumptions/Exclusions:

It is anticipated that the I-77 interchange project will complete the traffic control plans for both the intersection and interchange improvements as both projects will be let together.

N. TECHNICAL SPECIFICATIONS, QUANTITIES, COST ESTIMATE

- (1) Design will conform to the following:
 - (a) Town of Huntersville's Standards
 - (b) NCDOT 2012 Standard Specifications
 - (c) NCDOT 2012 Roadway Standard Drawings
 - (d) NCDOT Roadway Design Manual
 - (e) 2011 AASHTO's A Policy on Geometric Design of Highways and Streets (Green Book)
 - (f) 2008 Manual on Uniform Traffic Control Devices (MUTCD)

(g) NCDOT's "Guidelines for Drainage Studies and Hydraulic Design"

(2) Engineer's Cost Estimate will be submitted at each of the following submittals:

- (a) Right of Way Plans
- (b) Final Plans
- (c) Sealed Plans

O. REGULATORY REVIEWS AND PERMITS

<u>Agency</u>	<u>Type of Review/Permit</u>
US Army Corps of Engineers	JD & Nationwide 401/404 Permit
NCDOT – Central (Raleigh), Division 10, & District 2	Discipline Reviews – Roadway, Hydraulics, Geotechnical, Signals, WZTC
Roadside Environmental Unit	Erosion Control

K. ITEMS TO BE PROVIDED BY THE CLIENT:

The Town will provide, or arrange for others to provide, the following items for the PROJECT. We will use and rely upon the accuracy of this information as we perform the SERVICES described herein.

- (1) Complete information concerning your objectives, requirements, and constraints relative to the PROJECT.
- (2) All available information pertinent to the SERVICES to be provided including site drawings locating proposed roadways, previous studies, reports, maps, rezoning documents, drawings, correspondence with regulatory agencies, traffic studies, and previous surveys.
- (3) Designation of the individual who has: (1) the authority to act on your behalf with respect to the SERVICES we are providing, and; (2) the responsibility of coordinating the activities of any other entities involved with the PROJECT.

P. DELIVERABLES:

- (1) A design schedule in Microsoft project
- (2) Design criteria
- (3) Plans – We will prepare plans in accordance with NCDOT's "Guidelines for Roadway Design Activities" for 5 submittals:
 - (a) Preliminary (25%)
 - (b) Pre Right-of-Way (65%)
 - (c) Right of Way
 - (d) Final (90%)
 - (e) Sealed (100%)
- (4) Special Provisions (*We assume NCDOT will prepare the up-front documents for the Bid Package.*)

(5) Quantities

(6) Engineer's Estimate

Submittals will be sent to NCDOT Central Roadway Design Unit for distribution to the different disciplines within Central, to the Division, and to the District. RDU will collect all comments onto one plan set and will mitigate any contradictory comments. Huntersville will concurrently review the plans.

All deliverables will also be provided electronically via the project website or as directed by the Town.

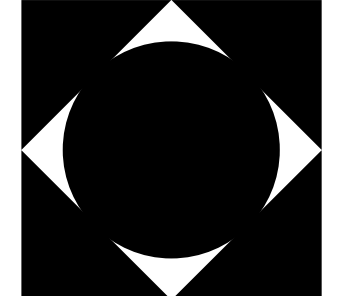
STIP# U-5114
US 21 / GILEAD RD
SCALE 1" = 100'
DATE: 05-22-2015

PRELIMINARY
SUBJECT TO CHANGE

U-TURN INTERSECTION



Town of
Huntersville
NORTH CAROLINA



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