STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

June 20, 2013

Mr. Tom Reeder
N.C. Dept. of Environment and Natural Resources
Division of Water Quality
1650 Mail Service Center
Raleigh NC, 27699-1650

Dear Sir:

Subject: **Additional Information in Response to the N.C. Division of Water Quality's On-Hold Letter** for the proposed widening from SR 1003 (North Main Street) and SR 1820 (Skeet Club Road) to NC 68 in High Point, Guilford County; Division 7; TIP U-3615; Federal Aid Project No. STP-1820(2); WBS Element No. 34962.1.1

Reference: 1) Application for Section 404 Individual Permit, Section 401 Individual Water Quality Certification, and Randleman Lake Buffer Authorization, April 25, 2013.
2) NCDWQ On-Hold Letter, dated May 31, 2013, received June 17, 2013.

NCDOT received an on-hold letter from N.C. Division of Water Quality (NCDWQ) placing the permit application for the above-referenced project on-hold, until suitable responses are provided addressing a lack of necessary information. Original questions from your letter (in italics) as well as our responses are provided below for those questions relating to the permit application.

1. *The Indirect and Cumulative Analysis was done in 2004. Please update the analysis to include recent changes to regulations.*

   Updates have been made. See attached memorandum date June 10, 2013.

Section U-3615B Comments:

2. *Are all pipes being buried? If not please include a list and an explanation for any pipes not being buried.*

   Yes.

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3. *At site 8, it appears that there is a TDE around rip rap at the inlet and outlet. Because there is a potential need for maintenance around rip rap, a PDE needs to be provided.*

   The change has been made.

4. *The 4C minutes state that off-site water will be kept separate from on-site water. Is any of the off-site water currently being treated, and if so, will equal or greater treatment be provided with the project?*

   None of the off-site drainage is being treated.

5. *In the Randleman Rules, diffuse flow is required. Only if diffuse flow cannot be achieved, then other stormwater devices shall provide treatment prior to discharge. For sites where diffuse flow cannot be provided, please state why, and explain what treatment was provided. The stormwater management plan (SMP) needs to include a list of all devices providing treatment and level spreaders, including a station number for each device.*

   Hazardous spill basins and level spreaders have been added to SMP as requested.

   If neither diffuse flow nor treatment can be provided, then mitigation for the impact is required, as well as a description of why other BMPs were not possible. This comment applies to the entire project.

   This only occurs near site 2 at station 183+73-L Right, as noted on SMP. At site 2 plan sheet 6: 79% of the recommended treatment length was provide, which was to the Maximum Extent Practicable (MEP), because the historical property located in close proximity to our grass swale limited the options for treatment. Throughout the project we provide more treatment length than what was actually required which is exhibited in the SMP under the swales tab. The total recommended length of grass swale is 883 feet and the actual length provided is 913 feet, which actually provides 103 % treatment length of what is required for the project.

6. *At site 1, there's a pipe extension and a rip rap pad, which extends into the buffer. Is this off-site water?*

   Yes.

   Can this be shifted out of the buffer, and can a PSH be used instead?

   It cannot be shifted out of the buffer because we are extending the existing 24" cross pipe. The rip rap pad is at the outlet of this pipe. As for the PSH, the water is offsite water and the 24" cross pipe coveys too much water for a PSH.

If the pad needs to remain in the buffer, it should be counted as an impact.

The riprap pad will be located inside buffer zone 2 only and the impact has been accounted for on the impact summary sheet.

7. *At site 2, please explain the direction of flow with regard to the grassed swale and the HSB.*

   Both swales drain toward the proposed 30" RCP cross pipe and away from the HSB.

8. *At site 2B, the rip rap pad should be listed as an allowable impact, if it's receiving grassed swale treatment.*

   This impact has been changed to be allowable.

9. *At site 3A, is the pond buffered? It looks like it should be.*

   No. See attached email dated September 8, 2005 from Sue Homewood stating that the pond is not buffered.

   If so, are there buffer impacts?

   No.

   Are you adding stormwater? Is it DOT's stormwater?

   No. It is off-site stormwater.

10. *At site 4, are 2@36" RCP and 18" RCP on both sides of site 4 receiving off-site water?*

    Yes.

    Are rip rap pads discharging at non-erosive velocities?

    Yes.

    If its DOTs stormwater, why weren't Level Spreaders or PSH used?

    It is not DOT stormwater, it is off-site drainage.

11. *At site 5, impacts for the ditch should be broken out on the southeast side.*

    Based on a telephone conversation, May 23, 2013, between Shawn Harris (Hydraulics Unit) and Amy Euliss (DWQ), the impacts are not broken out on the southeast side because the impacts are due to the crosspipe extension and not the swale itself.

On the southwest side, is berm ditch carrying off-site water?

Yes, this is off-site drainage.

12. *Near site 6, at 18" pipe, is this off-site water?*

    Yes.

13. *For site 6, you need to separate out bridge and roadway buffer impacts. Also, roadway crossing impacts are only mitigable if >150' of buffer is impacted. Please review totals and calculate if necessary.*

    Based on a telephone conversation, May 23, 2013, between Shawn Harris (Hydraulics Unit) and Amy Euliss (DWQ), the impacts shown at site 6 have been changed to allowable.

14. *At site 7, is stormwater that is not being treated off-site stormwater?*

    Yes. The stormwater shown at site 7 is not being treated. It is off-site drainage. The catch basins that are shown in that system are for access only and do not server as inlets.

15. *At site 8, buffer impacts associated with the overflow channel, should be calculated separate from the crossing impacts.*

    Based on a telephone conversation, May 23, 2013, between Shawn Harris (Hydraulics Unit) and Amy Euliss (DWQ), the impacts shown at site 8 are shown correctly and are acceptable, since the buffer impacts are caused by the RCBC construction.

16. *Site 8A, please differentiate which impacts are considered allowable and mitigable. Currently, only the mitigable impacts are hatched on the plans.*

    Revised the legend to include allowable impacts.

17. *Sheets 10, 12, 14, 16, the 4C minutes state that the ponds aren't jurisdictional. If so, please remove the js lines on the plans.*

    Roadway plan sheets were revised to reflect 4C minute comments.

18. *On sheet 16 there is a rip rap pad in a TDE. This should be a PDE, since it will need to be maintained.*

    The change has been made.

19. *Sheet 17, in the 4C notes, you state that you're tying into existing drainage. Where does this drainage discharge? If it's into a buffered feature, you will need to explain why diffuse flow and/or treatment isn't being provided.*

    The buffers begin further downstream of our discharge point.

Revised plan sheets 10, 11, 12, 14, and 16, permit drawing sheet 21, and stormwater plan are included with this letter. Please replace those submitted with our application with the attached versions. There is an additional revised roadway plan sheet 6 that was not part of on-hold. An easement line on parcel 15 was not included on original. The entire buffer permit plan sheet package should be replaced with the new one provided. There were some page numbering issues in the original along with the changes made for the on-hold notice.

We believe that all of DWQ's concerns have been addressed and request that the DWQ continue to process our application. If you have any further questions or need additional information, please contact Deanna Riffey at 919-707-6151 or driffey@ncdot.gov.

Sincerely,

E. L. Lusk

for Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Unit

cc:
Mr. John Thomas, USACE Raleigh Field Office
Amy Euliss, NCDWQ
Colin Mellor, NES, NCDOT
Tatia White, Roadway Unit, NCDOT
Randy Henegar, Hydraulics, NCDOT

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MEMORANDUM

To: Colin Mellor, NCODT-PDEA-NES; Deanna Riffey NCODT-PDEA-NES

From: Tristram Ford, NCDOT-PDEA-HES-Community Studies

Date: June 10, 2013

Re: U-3615 – Indirect and Cumulative Effects Screening Update

CC: Amy Euliss, NC-DWQ

Indirect and Cumulative Effects Screening Update

This memorandum serves to update the existing State Transportation Improvement Plan (STIP) Project U-3615 *Qualitative Indirect and Cumulative Effects Report (2004)* for NCDWQ permit application purposes by re-analyzing the potential for indirect and cumulative effects, in the form of change in land use, in northern portions of the City of High Point and unincorporated portions of southwest Guilford County, that surround the proposed project.

Current ICE report methodology was employed in this analysis including the ICE screening matrix, which uses data inputs to provide a numerical and therefore quantifiable output. In addition, this memorandum provides current study area population and employment trends, inventories notable natural features, outlines existing development regulations and other public policy, discusses current land use and future land use vision and outlines existing and planned infrastructure. This memorandum also includes a cumulative effects discussion to aid in project permitting.

The time horizon used for this update memorandum is 2035. This date corresponds to the design year of this project, which is 2033. This date is also generally in line with previously completed ICE studies for adjacent projects, population projections from the North Carolina Office of State Budget and Management and the High Point Urban Area Metropolitan Planning Organization's Long Range Transportation Plan, updated in 2004 with a time horizon of 2030.

The City of High Point's *Development Ordinance* was originally adopted in 1992, was most recently amended in 2011 and is currently undergoing a revision process.

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Based upon the output of the U-3615 ICE Screening Matrix, this partial control of access project has minimal likelihood to increase the development potential of and intensity in the areas adjacent to the STIP U-3615 corridor, although development is expected to continue to occur in the FLUSA in the No-Build scenario.

STIP U-3615 Project Overview

STIP Project U-3615, located within Guilford County, primarily within the City of High Point, is the proposed widening and upgrading of 6.1 miles of SR 1003 (North Main Street)/SR 1820 (Skeet Club Road) from US 311 to NC 68 (Eastchester Drive). This project also includes the reconfiguration of the existing North Main Street and Skeet Club Road intersection, involving the construction of a 0.2 mile new location section. The purpose of the project is to improve traffic carrying capacity, relieve traffic congestion, and improve safety along the Skeet Club Road corridor.

According to a memo accompanying the permit application prepared by the NCDOT Natural Environment Section, the project has a review date of August 27, 2013 and a letting date of October 15, 2013 for U-3615B and a post-year date for U-3615A, which may advance if funding becomes available.

In addition, the memo states an Environmental Assessment was approved in December 2002 and a Finding of No Significant Impact was approved in 2004, which have been provided to the regulatory review agencies.[1]

Adjacent Projects –ICE Document Conclusions Overview

Indirect and Cumulative Effects (ICE) reports have been completed for other projects in the general vicinity of STIP Project U-3615. In terms of the Greensboro Urban Loop, an ICE report was completed in 2003 for the segment of the loop that is located nearest to the proposed project, STIP U-2524AB/AC. ICE reports have also been completed for other projects in the vicinity namely: STIP U-2412, the widening of Greensboro Road/High Point Road, in 2006; STIP I-5110, the extension of Bryan Boulevard/I-73 Connector, in 2011; for the Piedmont Triad Airport Expansion project in 2003. The following text summarizes some of the ICE report conclusions:

STIP U-2524AB/AC

STIP Projects U-2524AB/AC, are new location, multi-lane freeway segments of the Greensboro Urban Loop. The project extends from just north of Interstate 85 (I-85) near Groometown to just south of the Interstate 40 (I-40) interchange with Chimney Rock Road, a distance of approximately 5.2 miles.

In terms of the potential indirect and cumulative effects of STIP U-2524AB/AC and the actions of others, it was concluded within the ICI document that:

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[1] Application for Section 404 Individual Permit, Section 401 Individual Water Quality Certification, and Randleman Lake Buffer Authorization permit application, NCDOT-NES April 25th, 2013

"Future development in the study area will be primarily influenced by the growing need for residential development to serve the Piedmont Triad area and will be largely dependent on transportation infrastructure and the availability of water and sewer services. New commercial development, constructed in response to the additional residential development, can be expected. However, much of the study area is already developed, which limits the area's future growth potential. Growth is more likely to occur in the southern and northwestern portions of the study area. More intense land uses will likely occur in the vicinity of the proposed interchanges along the Urban Loop.

Although the Urban Loop will likely accelerate residential development along the corridor and non-residential development in proximity to interchanges as permitted by local regulations, notable changes in general land use patterns are not expected. The land already developed in Greensboro and High Point limits the future growth potential of the study area. Furthermore, because the corridor is fairly close to these developed areas, it is not expected to open large areas of land for development.

The City of Greensboro implements plans, programs, and regulations to protect and improve the city's lakes and streams. The City of High Point has also adopted regulations to protect water quality. In addition to the municipal regulations, the entire study area is subject to the Randleman Rules, which further protect water quality.

Due to these existing ordinances and regulations, the construction of STIP Project No. U-2524AB/AC will not result in indirect or cumulative impacts that will adversely affect water quality."[2]

STIP I-5110

An ICE report was also completed for STIP Project I-5110, the extension of Bryan Boulevard/I-73 Connector, in 2011. Based upon the analysis of the potential indirect and cumulative effects as a result of the project, the report concluded that:

"No indirect effects are expected from the proposed I-73 Connector alone. The I-73 Connector will be designed as a short (1.5 mile), freeway to freeway connection with fully controlled access. It also will not give new exposure to properties along its alignment. Local officials expect this area to develop according to their future land use plans if the I-73 corridor is completed and PTI expands as expected. The need for this project is to provide a connection between an existing freeway (Bryan Boulevard has been constructed to interstate standards) and the proposed US 220/NC 68 Connector. Once completed, I-73 will extend to northern Guilford County. The *combination* of these transportation projects may have some effect on the rate and type of development, but this project *alone* should not result in considerable indirect effects."[3]

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[2] U-2524AB/AC Indirect and Cumulative Impact Study, Arcadis G&M of North Carolina, Inc., June 2003

[3] I-5110 Indirect and Cumulative Effects Screening Report, Florence and Hutcheson, Inc., April 2011

Piedmont Triad International Airport Cumulative Impact Study

As part of the Piedmont Triad International Airport expansion project, ICI water quality modeling was completed in order to address potential direct, indirect and cumulative impacts. The *Piedmont Triad International Airport Cumulative Impact Study*[4] was completed as a requirement of the North Carolina Division of Water Quality's Section 401 Water Quality Certification.

The larger indirect study area defined for this ICI water quality modeling study overlaps the Future Land Use Study Area (FLUSA) defined for this U-2524C update memo, as approximately the western two-thirds of the U-2524C FLUSA is within the overall indirect study area. In addition, the BMP Evaluation Study Area boundary, which corresponds to the Brush Creek sub-basin, also overlaps approximately one-quarter of the newly defined U-2524C FLUSA. This overlap area includes the land located generally southwest of Lake Higgins and Fleming Road, which is primarily developed with residential uses.

According to the executive summary within this document, "Watershed analyses were performed for an area surrounding the Piedmont Triad International Airport for each of four scenarios, two of which included the proposed expansion of the airport and two of which did not. The purpose of the study was to estimate the percentage difference in nutrient and sediment loads between the 'with project' and 'without project' scenarios." More specifically, the four scenarios included: 1. Projected growth, without the airport project; 2. Projected growth, with the airport project; 3. Year 2019 projected growth and; 4. Year 2019 projected growth, with the airport project. The executive summary goes on to state that "existing conditions were evaluated" and that "all scenarios include constraints resulting from current and possible land use ordinances and controls, including water supply watershed protection regulations, Randleman Riparian Buffer Rules, and Phase I and Phase II storm water controls expressed as changes in land use."

The study concluded that, "actual pollutant loads are expected to be less than reported in this study with current measures in place. It is believed that full inclusion of BMP efficiencies may result in a reduction of pollutant yields beyond what has been demonstrated through use of land use density restrictions and overland BMP's."

Future Land Use Study Area

The Future Land Use Study Area (FLUSA) is the area surrounding a construction project that could possibly be indirectly affected by the actions of others as a result of the completion of the project and combined projects. This study area encompasses all of the areas examined for potential increases in development pressure as a result of project construction.

For the purposes of this analysis, the FLUSA is generally defined as an area of northern High Point, in the vicinity of Oak Hollow Lake, both within municipal boundary and within the city's Extra Territorial Jurisdiction. More specifically, the FLUSA is bounded on the west by the Guilford

[4] Piedmont Triad International Airport, Cumulative Impact Study Calculation of Comparative Sediment and Nutrient Loads Under Alternative Growth Scenarios Without Full Consideration of Best Management Practice Efficiencies, Eco-Science Corporation, June 2003

County line; to the north by Sandy Ridge Road and Clinard Farms Road; to the east by NC 68/Eastchester Drive (expanded at the eastern terminus in the Deep River area along Penny Road and Samet Drive); and to the south by I-74/US 311 (expanded at the western terminus along Shady Brook Road , Old Winston Road and W. Bellevue Drive).

The FLUSA has been re-defined for this update to take into account the fact that interchanges between area collectors (NC 66, NC 68 and Sandy Ridge Road) and area arterials (I-40 and I-74/US 311) provide access and influence travel patterns to a greater extent than Skeet Club Road, which does not provide the same level of accessibility. Therefore the FLUSA does not extend outside of this travelshed.

Current Land Use

Existing land use varies within the FLUSA and includes: agricultural land, forested land, park land, land owned by the City of High Point for water impoundment and the associated buffer (Oak Hollow Lake reservoir), single family residential (both in recently developed and established high and low density subdivisions as well as individual rural homesteads and clusters), multi-family residential, commercial/retail clusters at both project termini, and institutional.

Water and Sewer Infrastructure

Water and sewer service exists in the majority of the FLUSA and is provided by the City of High Point, however according to the City of High Point Director of Public Services, there are parcels within the northern portion of the FLUSA that are served by private wells and septic systems. In addition, this area is within the city's annexation area and services are planned to be provided in the future.

Sewer Service

According to the City of High Point's *Annual Wastewater Report*[5], "the City's wastewater collection and wastewater treatment facilities provide service to homes, commercial establishments and industries. For this report period, there were approximately 38,000 connections through which an average of 17 million gallons of wastewater traveled each day."

There are two wastewater treatment plants operated by the City of High Point, the Westside Wastewater Treatment Plant and the Eastside Wastewater Treatment Plant.

According to the *Annual Wastewater Report*, "a new NPDES permit was issued to the Westside WWTP on July 10, 2009 by the DWQ. This permit became effective August 1, 2009 and will be in effect until midnight April 30, 2014. An average of 3.56 MGD (million gallons per day) was treated during the fiscal (reporting) year 2011-2012. The WWTP is designed to treat 6.2 MGD and serves approximately 10,000 customers.

Plant upgrade and renovation of the Westside WWTP is currently underway in part to meet increasingly strict NPDES discharge limits.

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[5] City of High Point Annual Wastewater Report
http://www.highpointnc.gov/pubsrv/2011_2012_Annual_WW_Report_final.pdf

The Eastside Wastewater Treatment Plant is designed and operated as a biological nutrient removal 5-stage (BNR) facility. The reduction of phosphorous and nitrogen in the plant's effluent will help in reducing the potential for algae growth in Randleman Lake, to which the treated effluent is discharged.

The Eastside WWTP treated an average of 12.27 MGD during the fiscal year 2011-2012. The Eastside WWTP is currently designed to treat 26.0 MGD and serves approximately 28,000 customers."

Water Service

The City of High Point's water is stored in two reservoirs, City Lake and Oak Hollow Lake (which is within the FLUSA). Water stored in these lakes is then pumped to the Ward Water Filtration Plant. This plant is permitted to provide 24 MGD per day. Currently, the average plant production is 13.5 MGD.

In addition, the Randleman Lake Project has been recently completed and provides another source of water for the Triad region under the control of the Piedmont Triad Regional Water Authority. According to the *Piedmont Triad Regional Water Authority 2012 Annual Drinking Water Quality Report*[6] the Randleman Reservoir holds approximately 18.3 billion gallons of water is capable of providing up to 48 million gallons per day which will fulfill projected water demand for 30 to 50 years.

Forecasted Population Growth

In order to analyze population characteristics within the FLUSA, data from the US Census Bureau and the North Carolina Office of State Budget and Management (NCOSBM) were used. According to data from the 2000-2010 Decennial US Census, the population of the Demographic Study Area in 2000 was 24,822. In 2010, the population was 28,554. This represented a 15% change or a 1.4% annualized rate during that decade time period. In comparison, Guilford County as a whole grew by a 1.5% annualized rate.

According to population estimates and projections from the State Demographer provided by the North Carolina Office of State Budget and Management[7], Guilford County's total population was estimated to be 489,671 in July 2010 and was expected to be 613,198 in July of 2032. This represents a projected 1.03% annualized growth rate during that time period.

Forecasted Employment Growth

According to employment projections provided by the North Carolina Department of Commerce-Division of Employment Security, the Greensboro/High Point/Guilford County Workforce

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[6] Piedmont Triad Regional Water Authority 2012 Annual Drinking Water Quality Report webpage, http://ptrwa.org/images/2012%20PTRWA%20CCR.pdf

[7] North Carolina Office of State Budget and Management webpage, http://www.osbm.nc.gov/ncosbm/facts_and_figures/socioeconomic_data/population_estimates/municipal_estimates.shtm

Development Board (WDB) will experience a 0.65% annualized employment growth rate between 2008-2018.[8]

Available Land

The FLUSA as a whole contains approximately 12,337 acres. The total area of the parcels within the FLUSA is 11,388 acres; the remaining acreage of the FLUSA is in roadway rights-of-way. The City of Greensboro owns parcels around the lakes and in parks. These were assumed to be protected from development and were subtracted out, leaving 8,681 acres of non-city-owned parcels. Among the non-city-owned parcels, there are 2,886 acres of undeveloped parcels, where a parcel is defined as being undeveloped if the value of any buildings on it is less than $20,000. The Clip tool was used in ArcGIS to calculate the acreage within each of the following:

- 50-foot stream and lake buffers (250 acres)
- 300-foot project right-of-way (*i.e.*, 150-foot buffer to either side of the project centerline) (48 acres)

To avoid double-counting the acreage that is in both the stream/lake buffer and the right-of-way, the Union tool was used in ArcGIS to calculate the "unique" acreage, resulting in 291 acres. This acreage was subtracted out, leaving 2,595 acres of undeveloped parcels in the FLUSA which are considered to be available for development.

Market for Development

Annualized population growth of the Demographic Study Area and that of Guilford County between 2000 and 2010, was 1.4% and 1.5%, respectively. Population projections predict that Guilford County will experience a 1.03% annualized growth rate until 2032. Based upon the historical data and projections, future land use plans, the presence of some available land and availability of water and sewer service, it can be assumed that the market for development within the FLUSA will remain strong.

Public Policy

Future Land Use

According to the City of High Point's *Land Use Plan* (refer to Appendix A-3) the majority of the planned future land use is low density residential, which is concentrated in the northern and southwestern portions. In addition, the FLUSA also contains: land designated for open space, namely surrounding Oak Hollow Lake; Mixed-Use and Local Convenience south of Clinard Farms Road; Restricted Industrial south of Clinard Farms Road and Sandy Ridge Road; a designated Activity Center at the NC 68 and Clinard Farms Road intersection; a designated Activity Center located south of Sandy Ridge Road which includes High Density Residential and Mixed-Use, Community/Regional Commercial, Office, Mixed-Use, High Density Residential, Medium Density Residential and Institutional at the NC 68/Skeet Club Road intersection; and Moderate Density

[8] North Carolina Department of Commerce-Division of Employment Security WDB webpage, http://eslmi23.esc.state.nc.us/projections/EmpByMajIndGrp

Residential, Community/Regional Commercial, High Density Residential, Low-Density Residential, and Institutional in the vicinity of the western project terminus (N. Main Street and US 311).

The City of Greensboro *Comprehensive Plan – Connections 2025*, adopted in May 2005 and last updated in June 2007, identifies the some northern portions the FLUSA as an Anticipated Growth Pressure Area, as shown on Page A-3 in the Appendix.

Zoning

City of High Point Development Ordinance (2002)

The City of High Point's *Development Ordinance*[9] which contains the city's zoning, subdivision, and environmental regulations was originally adopted in 1992 was most recently amended in 2011 and is currently undergoing a revision process (UPDATE High Point project). The need for the Development Ordinance rewrite was originally identified by the Core City Plan adopted by the city in 2007.

Zoning classifications within the FLUSA include various residential densities and planned unit developments. Portions of the FLUSA north of Skeet Club Road are zoned for agricultural uses, while residential zoning is predominantly concentrated around Oak Hollow Lake. Industrial zoning is concentrated along the NC 68 corridor in the northeast corner of the FLUSA. Commercial zoning designations are located along North Main Street south of Skeet Club Road and at the intersection of Skeet Club Road, NC 68/Eastchester Drive, and Wendover Avenue.

NPDES Phase I and II Regulations

In 1972, the National Pollutant Discharge Elimination System (NPDES) was established under the authority of the Clean Water Act. Phase I of the NPDES stormwater program was established in 1990. It focused on site and operations planning to reduce pollutant sources. Phase I covered industrial activities in 10 categories, construction activities that disturbed five or more acres, and municipalities with populations of 100,000 or more that owned or operated a municipal separate storm sewer system (MS4). The Phase II program extends permit coverage to smaller (< 100,000 population) communities and public entities that own or operate a municipal separate storm sewer system (MS4) by requiring them to apply for and obtain a NPDES permit for stormwater discharge. Federal law requires communities and public entities that own or operate a MS4, and that meet either of the following two conditions, to obtain a NPDES Phase II stormwater permit:

1) The MS4 is located in an urbanized area as determined by the latest Decennial Census of the Bureau of the Census. If the MS4 is not located entirely within an urbanized area, only the portion that is within the urbanized area is regulated.

[9] City of High Point Development Ordinance, http://www.highpointnc.gov/cityofhighpoint/plan/docs/c1.pdf

2) The community or public entity is designated by the NPDES permitting authority. In the state of North Carolina, the NPDES permitting authority is the Environmental Management Commission (EMC).[10]

The entirety of the FLUSA is subject to Phase II regulations. The City of High Point is a designated Phase II municipality. In addition, the portions of the FLUSA that are not within High Point are within the designated Phase II MSI area. This includes the portion of Davidson County and the Phase II tipped Guilford County and Forsyth County.

Randleman Rules

The majority of the FLUSA is subject to the Randleman Rules (North Carolina Administrative Code 15A NCAC 02B .0250, Randleman Lake Water Supply Watershed: Protection and Maintenance of Riparian Areas). This represents the management strategy for maintaining and protecting riparian areas in the Randleman Lake watershed. More specifically, associated buffer regulations include: a 50-foot riparian buffer along the water body and streams contributing to it, a 100-foot vegetative buffer for new developments along streams utilizing the high density option, and a 200-foot protective buffer encompassing the normal pool level of the lake.

High Point Urban Area MPO Long Range Transportation Plan 2004-2030

The *High Point Urbanized Area MPO Long Range Transportation Plan*[11], originally adopted in 2001 and updated in 2004, coordinates all transportation planning activities in the High Point urbanized area. Skeet Club Road is listed as No. 11 on the top-twenty list of priority projects identified as in need of improvement. Potential strategies listed to improve the Skeet Club Road corridor include: improved traffic signal coordination, intersection improvements, access management, and additional capacity.

Notable Natural Features

Water Supply Watersheds

The majority of the FLUSA is within West Fork Deep River WS-IV Protected Water Supply Watershed (WSWS), the West Fork Deep River WS-IV Critical WSWS (surrounding the Oak Hollow Lake reservoir) or the East Fork Deep River (High Point Lake) WS-IV Protected WSWS, which are all within the Cape Fear River basin.

- Development within the protected area is restricted to two dwelling units per acre or 24% built-upon area for the low density option and two dwelling units per acre or 24-70% built-upon area for the high density option.

[10] NCDENR NPDES Stormwater Program webpage, http://portal.ncdenr.org/web/wq/ws/su/npdessw
[11] High Point Urban Area MPO Long Range Transportation Plan 2004-2030, http://www.hpdot.net/HPMPO/plans/LRTP04/2030_Long_Range_Transportation_Plan.pdf

- Development within the critical area of these watersheds is restricted to two dwelling units per acre or 24% built-upon area for the low density option and two dwelling units per acre or 24-50% built-upon area for the high density option.[12]

303(d) Listed Impaired Waters and Other Waterways

There are no streams within the FLUSA that are listed on the 2012 303(d) list of impaired waterways.

There are no High Quality Waters or Outstanding Resource Waters within one mile of the project area. There are no streams within the project area that are designated as, trout streams, North Carolina Natural or Scenic Rivers or as National Wild and Scenic Rivers.

Lands Managed for Conservation, Open Space, Clean Water Management Trust Properties

According to GIS data, there are several parcels located within the FLUSA that are listed as lands managed for conservation or open space including Oak Hollow Park, Festival Park and North Ramp, which are all located on the shore of Oak Hollow Lake and aid in watershed protection.

In addition, Deep River Community Park is located on the north side of Skeet Club Road.

Indirect Screening Matrix Methodology

An Indirect and Cumulative Land Use Effects Screening Matrix was developed for STIP U-3615. This matrix assesses factors that influence land development decisions and presents an assessment in a quantitative matrix based upon existing conditions and trends. It rates the impact of each category from higher potential for indirect effects to lower potential for indirect effects. The measures used are supported by documentation. Each category is assessed individually and the results of the table are looked at comprehensively to determine the indirect and cumulative effects potential of the proposed project. The Scope of Project, Change in Accessibility, Public Policy, and Notable Environmental Features categories are given extra weight to determine if future growth in the area is related to project modifications.

[12] U-3615 Final Qualitative Indirect and Cumulative Effects Report, HNTB, November 2004

ICE Screening Matrix

Indirect Land Use Effects Screening Tool - STIP Project U-3615 - Proposed Skeet Club Road Widening										
Rating	Scope of Project	Change in Mobility	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/ Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
More Concern	Major New Location	> 10 minute travel time savings	> 3% annual population growth	Substantial # of New Jobs Expected	5000+ Acres of Land	All services existing / available	Development activity abundant	Less stringent; no growth management	Targeted or Threatened Resource	
⬆										
						X				
	X		X				X			
		X		X	X			X		Indirect Scenario Assessment Not Likely
⬇									X	
Less Concern	Very Limited Scope	No travel time savings	No population growth or decline	No new Jobs or Job Losses	Limited Land Avaialble	No service available now or in future	Development activity lacking	More stringent; growth management	Features incorporated in local protection	

ICE Screening Matrix Summary

Based upon the information analyzed and the corresponding values assigned for each category within the ICE screening matrix, the output recommendation is 'Indirect Scenario Assessment Not Likely'.

Scope of Project

The proposed project is an approximately 6.1 mile widening and upgrading of SR 1003 (North Main Street)/SR 1820 (Skeet Club Road). This project also includes the reconfiguration of the existing North Main Street and Skeet Club Road intersection, involving the construction of a 0.2 mile new location section. This category was rated as 'moderate' due to the project's relatively moderate length and the majority being on existing location.

Change in Travel Time

Potential travel time savings as a result of the project was estimated by utilizing the Google Maps trip estimating application. The project's termini were inputted and the trip was estimated by Google Maps. It was estimated that the trip currently takes 11 minutes. The majority of the project corridor is currently signed at 45 mph, which translates into 1.5 minutes per mile assuming a steady speed without signals. If capacity is increased due to widening the facility it can be assumed that travel time savings would be between 0-3 minutes. Therefore, this category was rated as 'moderately-low'.

Forecasted Population Growth

According to population estimates and projections from the State Demographer provided by the North Carolina Office of State Budget and Management, Guilford County's total population was estimated to be 489,671 in July 2010 and is expected to be 613,198 in July of 2032. This represents a projected 1.03% annualized growth rate during that time period. As a result, this category was rated a 'moderate' or between 1-2%.

Forecasted Employment Growth

According to employment projections provided by the North Carolina Department of Commerce-Division of Employment Security, the Greensboro/High Point/Guilford County Workforce Development Board (WDB) will experience a 0.65% annualized employment growth rate between 2008-2018. Consequently, this category was rated as 'moderately-low' or between 0-1%.

Available Land

The FLUSA is 9,799 acres in size and as a whole contains approximately 2,000 acres of undeveloped land which is considered to be available for development. As a result, this category was rated as 'moderately-low' or between 1,250-2,500 acres.

Water and Sewer Availability

Water and sewer service exists in the majority of the FLUSA and is provided by the City of High Point, however according to the City of High Point Director of Public Services, there are parcels within the northern portion of the FLUSA that are served by private wells and septic systems. In addition, this area is within the city's annexation area and services are planned to be provided in the future. Therefore, this category was rated 'moderately-high'.

Market for Development

Development has been prevalent, primarily in the southern portion of the FLUSA which is largely built-out and will continue to occur in the northern portions of the FLUSA, but will be tempered by the short term availability of services and long term by Water Supply Watershed density requirements. Based upon the historical data and projections, future land use plans, available land and available water and sewer service, it can be assumed that the market for development within the FLUSA will remain relatively strong. This category was rated 'moderate'.

Public Policy

There are stringent public policies in place including Phase II regulations, Randleman Lake Nutrient Management Strategy Rules, an adopted Water Supply Watershed ordinance, an adopted Development Ordinance and the High Point Urbanized Area MPO Long Range Transportation Plan that include planned provisions for this project. As a result, this category was rated as 'low', signifying a comprehensive set of growth management policies.

Notable Environmental Features

Because of the above average presence of growth management policies, the notable natural features that are present within and in close proximity to the FLUSA (Oak Hollow Lake, and lands managed for conservation and open space) will be incorporated into local protection. Therefore, this category was conservatively rated as 'moderately-low'.

Indirect Effects Summary

Based upon the output of the ICE Screening Matrix, this partial control of access project has minimal likelihood to increase the development potential of and intensity in the areas adjacent to the STIP U-3615 corridor, although development is expected to continue to occur in the FLUSA in the No-Build scenario.

Transportation impact causing activities include an increase in exposure and minimal travel time savings. The project is proposed as a partial control of access facility and the vast majority of project will be on existing location, which will not increase access to parcels along the project corridor currently without access or create land use nodes not already planned. There is a 0.2 mile new location segment proposed to address a skewed angle at the North Main Street and Skeet Club Road intersection, which will slightly alter access.

The southern portion of the FLUSA is largely built-out and any development in the northern FLUSA will be planned low-density residential or will be clustered in planned mixed-use developments as shown on the Future Land Use Map (FLUM) in designated activity centers. This is important to note, because planned compact mixed-use development helps to steer development away from environmentally sensitive areas and serves to reduce impervious surface.

Any development, with or without the project, that potentially impacts jurisdictional resources, will be subject to regulatory permitting requirements. Furthermore, any development within the Protected or Critical Water Supply Watershed areas will be subject to the requirements of the adopted ordinance such as specific density requirements, the prohibition of certain activities, and riparian buffers and will adhere to adopted land use plans and zoning regulations. Lastly, the presence of Phase II stormwater regulations and the Randleman Lake Nutrient Management Strategy Rules, which stipulate post construction stormwater treatment, maintenance of Best Management Practices and 50-foot wide riparian buffers, will further mitigate potential water quality effects.

Therefore, analysis indicates indirect effects in the form of change in land use, as a result of the project, are likely to be minimal and this project will likely not result in a significant change in impervious surface and subsequently will not notably affect water quality within the FLUSA.

Cumulative Effects Summary

The construction of STIP Project U-3615, in conjunction with other planned transportation projects in the general vicinity within the Triad region, will improve mobility and have the potential to change travel patterns. Any resultant induced development and complementary land development, coupled with the completion of recent transportation and development projects along with the construction of planned transportation projects and private development projects, could constitute a cumulative effect on the study area.

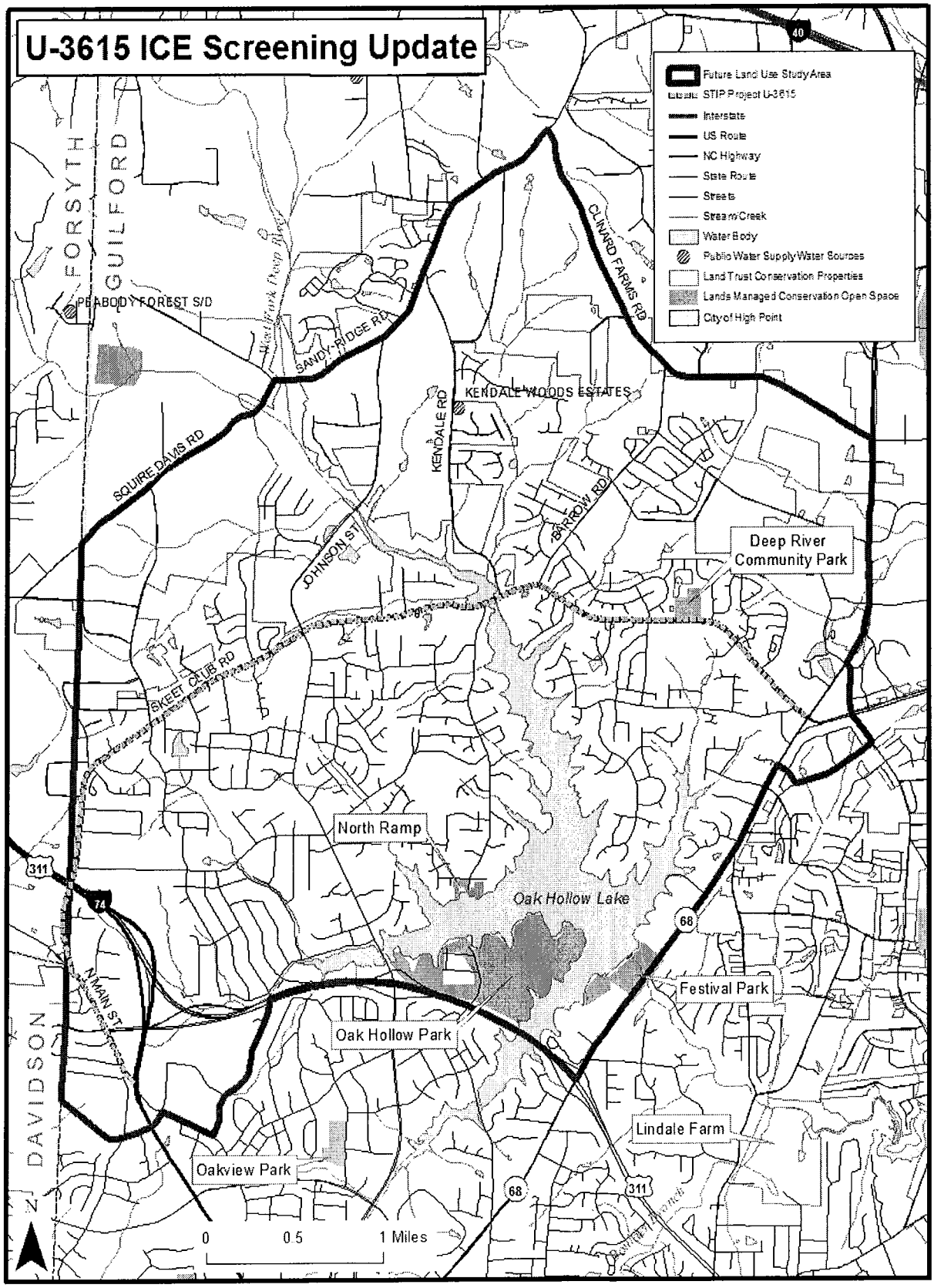
With respect to past and present projects within the FLUSA, development has occurred in the form of various types of land use including the PTI airport expansion, and transportation projects such as the completion of existing segments of the Greensboro Urban Loop and the widening of I-40. Presently, some residential and commercial development is under construction and a few development applications are under consideration. The past, present and future projects within the FLUSA are consistent with local land use and long range transportation plans.

Conclusion

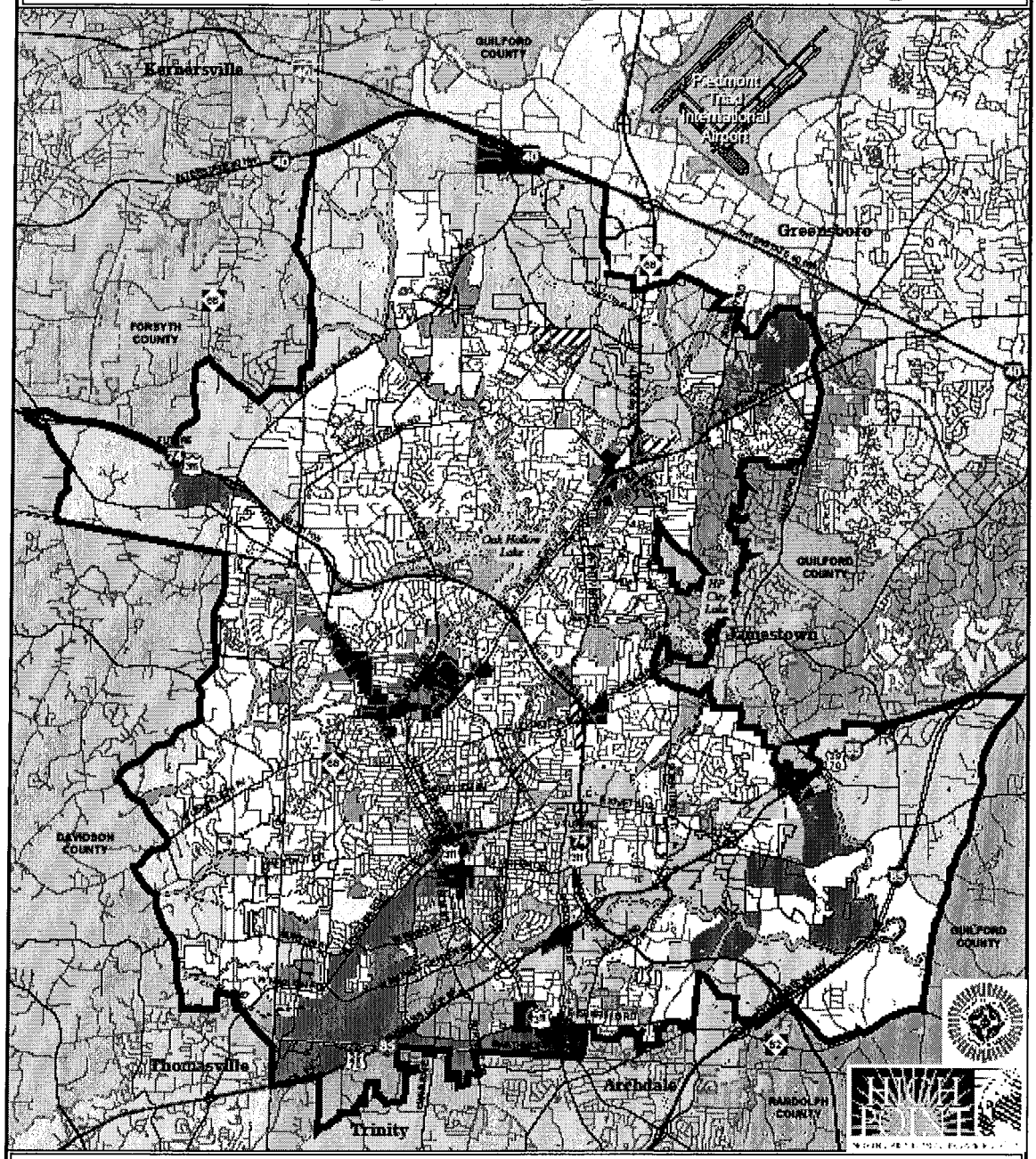
The potential does exist for water resources within the FLUSA to be minimally impacted given the level of past, present, and planned projects. The FLUSA contains both Protected and Critical Watershed Areas. However, comprehensive planning, watershed protection zones and rules, stormwater ordinances, and local sediment and erosion control measures will minimize these effects.

Direct natural environmental impacts by NCDOT projects will be addressed by programmatic agreements with resource agencies, and will be further evaluated by the NCDOT Natural Environment Unit during project permitting. Natural environmental impacts that may result from any induced development may be avoided or minimized through the implementation of local, state and federal regulations. Because few indirect impacts are anticipated, the cumulative effect of this project when considered in the context of other past present and future actions, and the resulting impact on the notable human and natural features, should be minimal. Therefore, potential indirect and cumulative effects to downstream water quality should be minimal.

APPENDIX


U-3615 ICE Screening Update
Future Land Use Study Area
STIP Project U-3615
Interstate
US Route
NC Highway
State Route
Streets
Stream/Creek
Water Body
Public Water Supply Water Sources
Land Trust Conservation Properties
Lands Managed Conservation Open Space
City of High Point
FORSYTH
GUILFORD
DAVIDSON
PEABODY FOREST S/D
SANDY RIDGE RD
CLINARD FARMS RD
KENDALE WOODS ESTATES
KENDALE RD
SQUIRE DAVIS RD
JOHNSON ST
BARROW RD
Deep River Community Park
SKEET CLUB RD
North Ramp
Oak Hollow Lake
Festival Park
Oak Hollow Park
N MAIN ST
Lindale Farm
Oakview Park
311
74
68
40
0
0.5
1 Miles

Land Use Plan Map for the High Point Planning Area



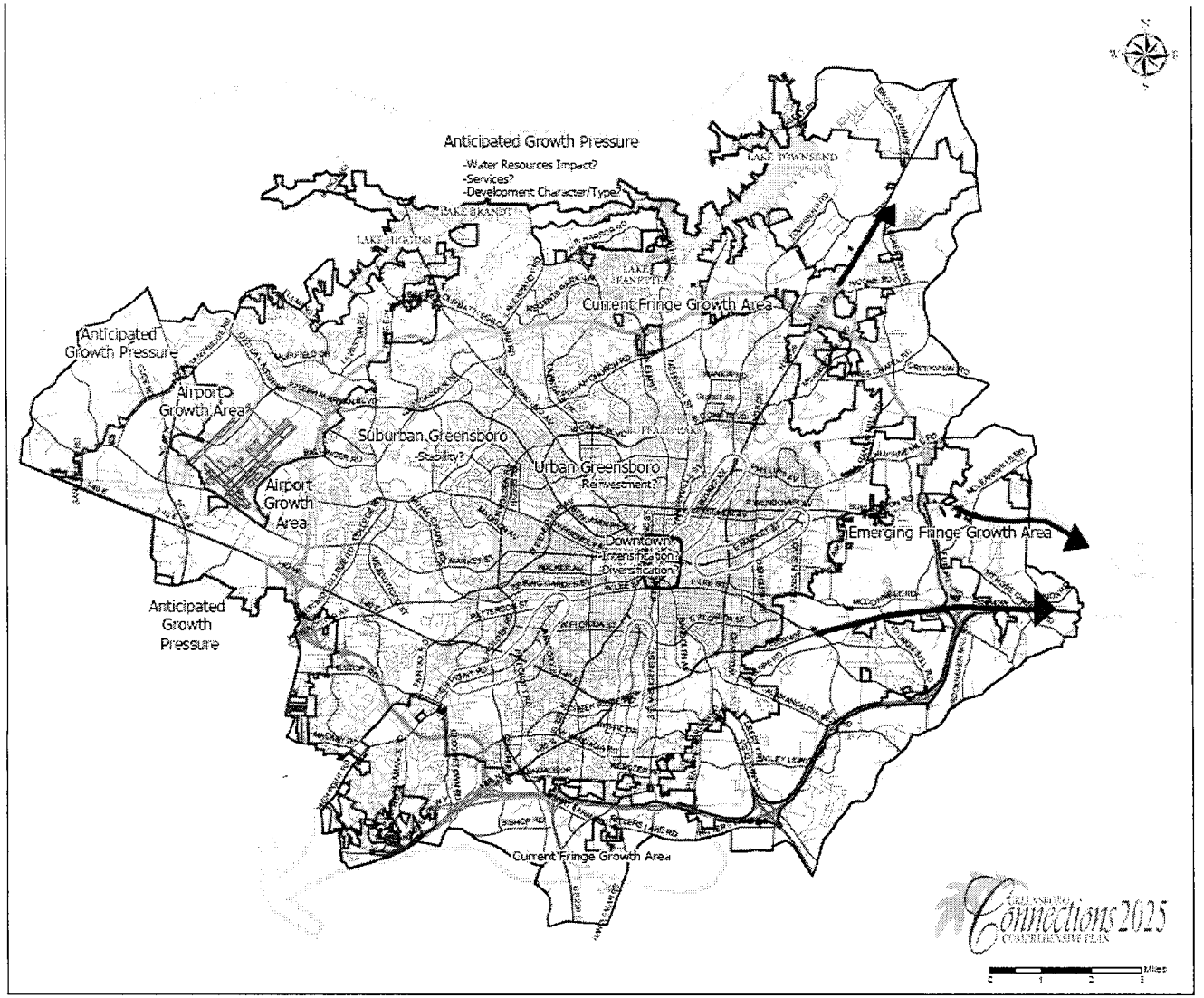


Figure 3-3
Plan Section 3.1.3

Trend Growth Scenario

Urban Loop Phases
- By 2002
- By 2004
- By 2005
- By 2008
- By 2012
- By 2014 and beyond

- Downtown
- Reinvestment Corridors
- Growth Corridors
- Major Streets
- Streets

- Greensboro City Limits
- Water Sewer Boundary
- Airport Property
- Existing Runways
- Lakes
- Major Streets
- Streets

September 2001

Subject: **ponds on skeet club rd**
Date: Thu, 08 Sep 2005 10:44:18 -0400
From: Sue Homewood <Sue.Homewood@ncmail.net>
Organization: NC DENR - Winston-Salem Regional Office
To: Deanna Riffey <driffey@dot.state.nc.us>

Deanna,

I talked to some folks in Raleigh about the stormwater ponds we looked at on Skeet Club Rd. on 8/31/05.

For the pond between the shopping center and townhomes near the intersection of Skeet Club Rd and Eastchester Dr:

DWQs interpretation is that this a man-made conveyance. Under 15A NCAC 02B .0250(2)(a), a man-made conveyance....the does not receive drainage from other conveyances or streams is exempt, unless it delivers runoff directly to waters classified.... The pond's outfall went into a rip-rap man-made channel, not a classified stream. Therefore this stormwater pond would not be subject to buffers.

For the man-made ditch that the pond drained to: the ditch did deliver drainage directly to a classified stream, so the short ditch section is subject to buffers.

Pond #7
Station Y31
12+00

The second pond we looked at was adjacent to Poplar Creek Dr. This is the one that looked more like a wetland when we were there on 8/31:

If we call this a man-made conveyance, under (2)(a) again, it drained to an ephemeral feature, therefore it would not be subject to the buffers. If we call it a wetland, it would not be subject to the buffers.

The ditch/modified channel downstream of the road (upstream and downstream of the road looked very different, so I treated them differently) that I previously rated, would be subject to the buffers because it outlets directly to a classified stream. However, I incorrectly informed you earlier that this feature would not be subject to the buffers, and DWQ will not change that call now. I'm letting you know in case its possible to make any changes to the plans that would protect those buffers, and also for future similar situations.

Please let all the others that were with us that day in the field know the outcome of the questions we all had. I appreciate your patience in waiting for a formal answer. Hopefully we'll all learn these rules together (and then they are bound to change). If you need anything else from me for this project, let me know. See you at the hydraulics meeting.

Sue

Sue Homewood <Sue.Homewood@NCmail.net>
NC DENR
WSRO

Highway Stormwater

(Version 1.2; Released July 2012)

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

Project/TIP No.: U-3615B **County(ies):** Guilford

General Project Information

Project No.:	U-3615B	**Project Type:**	Roadway Widening	**Date:**	6/6/2012
NCDOT Contact:	Randy Henegar	**Contractor / Designer:**	Randy Henegar		
Address:	1590 Mail Service Center Raleigh, NC 27699-1590	**Address:**			
Phone:	(919)-707-6726	**Phone:**	(919)-707-6726		
Email:	rhenegar@ncdot.gov	**Email:**	rhenegar@ncdot.gov		
City/Town:	High Point	**County(ies):**	Guilford		
River Basin(s):	Cape Fear	**CAMA County?**	No		
Primary Receiving Water:	Oak Hollow Lake	**NCDWQ Stream Index No.:**	17-3-(0.7)		
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**	Water Supply IV (WS-IV)			
	Supplemental:				
Other Stream Classification:	None				
303(d) Impairments:	None				
Buffer Rules in Effect	Randleman Lake				

Project Description

Project Length (lin. Miles or feet):	3.478 mi.	**Surrounding Land Use:**	Residential/Commercial

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	ac.	ac.
Typical Cross Section Description:	4 LANE CURB AND GUTTER	2 LANE SHOULDER SECTION
Average Daily Traffic (veh/hr/day):	Design/Future: 9600	Existing: 9600
General Project Narrative:	Widening of SR 1820 (Skeet Club Road) from West of SR 1818 (Johnson Street) to NC 68 (Eastchester Drive). This project will be adding hazardous spill basins throughout the project all having sluice gates and some of which are equiped with level spreaders, grass swales, and/or a bypass pipe. Preformed scour holes and grass swales where utilized where appropriate.	

SMP
Revised 6/10/13

References

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
4&5	170+67-L- (LT & RT)	Stream	Perennial						Culvert		
4&5	170+06 -L- (LT&RT) / 172+39 -L- (LT&RT)	Buffer	Randleman Lake						Culvert		
5&6	180+59 -L- (LT&RT) / 188+46 -L- (LT&RT)	Stream	Perennial						Culvert & Fill		
5&6	177+99 -L- (LT) / 187+30 -L- (LT)	Buffer	Randleman Lake						Fill		
6	187+99 -L- (LT) / 188+46 -L- (LT)	Open Water	Perennial						Fill		
6	187+45 -L- (LT) / 196+55-L- (LT)	Buffer	Randleman Lake						Fill		
6&7	197+50 -L- (LT) / 204+26 -L- (LT)	Stream	Perennial						Fill		
6&7	197+50 -L- (LT) / 205+22-L- (LT)	Buffer	Randleman Lake						Fill		
7	199+27 -L-(RT) / 199+95 -L- (LT)	Stream	Perennial						Culvert		
7	198+75 -L-(RT) / 200+23 -L-(RT)	Buffer	Randleman Lake						Culvert		
7	208+63 -L- (LT)	Stream	Perennial						Culvert		
7	208+02 -L-(LT) / 209+14 -L-(LT)	Stream	Perennial						Culvert		
8	218+72-L- (LT&RT) / 219+72 -L- (LT&RT)	Wetland	Riverine Swamp Forest						Fill		
8	221+97 -L-(LT) / 222+25 -L-(LT)	Stream	Perennial						Excavation		
8	221+87 -L-(LT) / 223+01 -L-(LT)	Buffer	Perennial						Excavation		
9	231+60-L-(RT) / 232+27-L-(LT)	Stream	Perennial						Excavation/Fill & Culvert		
9	230+94-L-(LT) / 232+87-L-(RT)	Buffer	Randleman Lake								

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
9	232+00-L- (LT) 232+80-L-(LT)	Wetland	Unknown						Fill		
9	232+87-L-(LT) 236+40-L-(LT)	Open Water	Lake						Fill & Stabilization		
9	232+87-L-(LT) 236+40-L-(LT)	Buffer	N/A								
9	237+28 -L- 239+38 -L-	Open Water	Lake						Fill & Stablilization		
9&10	237+28-L-(LT) 239+38-L-(LT)	Buffer	Randleman Lake						Fill & Stablilization		
10	240+14-L- (LT) 240+31-L-(LT)	Wetland	Non-Riverine Swamp Forest						Fill Stablilization Clearing		
10	240+18-L- (RT) 240+35-L-(RT)	Open Water	Lake						Excavation		
10	240+18-L- (RT) 240+81-L-(RT)	Buffer	Randleman Lake						Excavation		
10	12+20 -Y35- (LT & RT)	Open Water & Stream	Lake & Perennial						Culvert		
10	11+52-L- (RT) 12+86-L- (LT)	Buffer	Randleman Lake						Culvert		
10	246+25 -L- (LT) 246+54 -L- (LT)	Stream	Perennial						Temp. Excavation		
10	246+09 -L- (LT) 246+54 -L- (LT)	Buffer	Randleman Lake						Excavation		
11	266+36 -L- (LT & RT)	Stream	Perennial						Culvert		
11	265+24-L- (LT) 266+91 -L-(RT)	Buffer	Randleman Lake						Fill/Excavation/ Stabilization/Cl		
12	273+60 -L- (RT)	Stream	Perennial						Temp. Excavation		
12	271+16-L-(RT) 273+92-L-(RT)	Buffer	Randleman Lake						Excavation & Clearing		
12	275+43-L-(RT) 276+59-L-(RT)	Open Water	Pond						Fill & Stablilization		

* List all stream and surface water impact locations regardless of jurisdiction or size.

Equalizer Pipes to be noted as a minimization of impacts.

All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: U-3615B **County(ies):** Guilford

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
4	176+40 -L- (LT)	PFSH	Class 'B'	2.60	Pipe	18	8.0	4.0
9	11+34 -Y34- (LT)	PFSH	Class 'B'	0.30	Pipe	15	1.5	1.2
10	13+18 -Y35- (LT)	PFSH	Class 'B'	0.10	Pipe	15	0.5	0.4

Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: U-3615B **County(ies):** Guilford

Swales

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
6	183+73 -L- 185+78-L-	186+01 -L-	2.0	3:1	3:1	2.43	243	192	0.30%	9.2	1.3	11.7	1.7	No
6	186+57 -L- 185+78 -L-	186+01 -L-	2.0	3:1	3:1	0.62	62	76	0.40%	2.3	0.5	3.0	0.6	No
6	189+53 -L- 190+45 -L-	N/A	2.0	3:1	3:1	0.78	78	90	0.56%	3.0	1.5	3.8	1.6	No
9	234+68 -L- 231+65 -L-	231+98 -L-	0.0	3:1	3:1	3.00	300	323	0.54%	8.8	1.9	11.2	2.0	No
16	329+27 -L- 331+59 -L-	N/A	4.0	4:1	3:1	2.00	200	232	0.80%	7.7	2.0	9.8	2.1	No
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Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

For swale at sta. 183+73 -L- to sta. 185+78 -L- the minimum criteria was not meet due to a lack of real estate available.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: U-3615B **County(ies):** Guilford

Other Stormwater Control Measures

Sheet No.	Station	SCM Type	Drainage Area (ac)	Required / Minimum Treatment			Design Treatment		All Design Criteria Met?
	183+00 -L-(Rt)	Hazardous Spill Basin	2.10	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	5120.00	cf	7650.00	cf	Yes
	191+50 -L-(Lt)	Hazardous Spill Basin	0.80	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	2293.00	cf	2300.00	cf	Yes
	202+00 -L- (Lt)	Hazardous Spill Basin	3.28	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	6560.00	cf	6700.00	cf	Yes
	222+00_L- (Rt)	Hazardous Spill Basin	5.10	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	7240.00	cf	7320.00	cf	Yes
	234+50-L-(Rt)	Hazardous Spill Basin	2.30	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	4000.00	cf	4120.00	cf	Yes
	242+00-L-(Rt)	Hazardous Spill Basin	4.40	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	6910.00	cf	7350.00	cf	Yes
	267+00-L-(Lt)	Hazardous Spill Basin	4.90	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	6500.00	cf	6590.00	cf	Yes
	272+00-L-(Lt)	Hazardous Spill Basin	5.90	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	8060.00	cf	8070.00	cf	Yes
	306+00-L-(Rt)	Hazardous Spill Basin	4.60	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	6530.00	cf	6620.00	cf	Yes
	314+50-L-(Rt)	Hazardous Spill Basin	2.20	2yr, tc=10 min, td= 5 min storm runoff + 10,000 gal (cf)	3380.00	cf	3390.00	cf	Yes
	202+00 -L- (Lt)	Level Spreader	4.60	10-year Storm, Level Spreader Length (ft)	67.60	ft	70.00	ft	Yes
	222+00 -L- (Lt)	Level Spreader	5.20	10-year Storm, Level Spreader Length (ft)	65.00	ft	65.00	ft	Yes
	242+00-L-(Rt)	Level Spreader	4.51	10-year Storm, Level Spreader Length (ft)	50.00	ft	50.00	ft	Yes
	267+00 -L- (Lt)	Level Spreader	4.54	10-year Storm, Level Spreader Length (ft)	71.50	ft	75.00	ft	Yes
	272+00 -L-(Rt)	Level Spreader	5.90	10-year Storm, Level Spreader Length (ft)	117.00	ft	120.00	ft	Yes

Additional Comments

* Equalizer Pipes to be noted as a minimization of impacts.

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STATION (FROM/TO)	STRUCTURE SIZE / TYPE	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	170+06/172+39 -L-	2@66" RCP	X			3854	1931						
2	177+99/187+30 -L-(LT)	RELOCATE CHANNEL	X		X	4787	2292		36705	22604			
2A	187+45/196+55-L-(LT)	ROCK FILL IN POND			X				1369	9662			
2B	192+48 -L-(LT)	RIPRAP PAD			X		51						
3	197+50/205+22-L-(LT)	NAT. STREAM DESIGN			X				52487	31125		45810	29829
3A	198+75/200+23 -L-(RT)	2@54" RCP	X			2216	623						
3B	208+02/209+14 -L-(LT)	48" RCP	X			6967	4638						
3C	202+96-L-(LT)	LEVEL SPREADER			X		64						
4	221+87 /223+01-L-(LT)	2' BASE DITCH(BYPASS)			X	1166	998						
5	230+94/232+87-L-(LT&RT)	30" RCP	X		X	8784	5141		175	877			
SUBTOTALS=:						27774	15738		90736	64268		45810	29829

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34962.1.1 (U-3615B)

Sheet 11 of 12

6/6/2013

Revised 6/10/13

Rev. May 2006

BUFFER IMPACTS SUMMARY

			IMPACT										BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE					
SITE NO.	STATION (FROM/TO)	STRUCTURE SIZE / TYPE	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
6	237+28 /239+38-L-	BRIDGE APPROACH	X			3478	1674						
6A	240+18/240+81 -L-(RT)	"V" DITCH (BYPASS)			X	1271	834						
7	11+52/12+86-L-(LT&RT)	42" RCP	X			3933	2411						
8	265+24/266+91-L-(LT&RT)	8'X8' RCBC	X						8902	4658			
8A	271+16/273+92 -L-(RT)	30" & 24" RCP				1226	2536		1385	1493			
SUBTOTALS=:	THIS SHEET					9908	7455		10287	6151			
SUBTOTALS=:	SHEET 1					27774	15738		90736	64268		45810	29829
TOTALS=:						**37683**	**23193**		**101023**	**70419**		**45810**	**29829**

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34962.1.1 (U-3615B)

Revised 10/10/13 6/6/2013

SHEET 12 OF 12

Rev. May 2006

Revised 9/10/13

Permit Drawing
Sheet 21 of 27

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

$$$$USERNAME$$$$
$$$$SYSTIME$$$$

100' 0' 100'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 8

265+00.53

SCSta. 266+50.53

V-DITCH
SEE DETAIL "1"
DDE 6 CY
5 TONS
CLASS "B" RIPRAP
14 SY FILTER FABRIC

V-DITCH
SEE DETAIL "1"
DDE 8 CY
7 TONS
CLASS "B" RIPRAP
12 SY FILTER FABRIC

13 TONS
CLASS "B" RIPRAP
23 SY FILTER FABRIC

-Y40-

PCSta. 10+45.28

-Y40-PCSta. 11+51.54

CITY OF HIGH POINT

LYNN SHORES

LEVEL SPREADER SEE DETAIL SHT. 5-E

RICHARD POSTIFF

SEE SHEET 2-K FOR INTERSECTION DETAILS
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 27 FOR -Y36-, -Y37N-, -Y37S-, -Y38-, -Y39-, -Y40-S PROFILES

EDWIN V. GOMEZ
PETER M. CULLEN
LEONARD EINHORN
KENNETH D. MILLER
DALE E. WATERSON
ARTHUR ENNIS HUDGINS
CHIQUITA TILLMAN MCALLISTER
CHRISTINE B. BENDER
THOMAS C. AMICO
CHRISTINE B. GRAY
SHARON B. CHAMBERLAIN
MARK & SUZANNE BLEVINS
JAMES HARVEY ELLER
JAMES W. VAN SICKLE
ALBERT & ELIZABETH
STEPHEN F. ASHWORTH
JOHN A. MCKINNON
RICKY D. LYLES
SAMUEL STEVEN KELLY

DETAIL 1
STANDARD 'V' DITCH
(Not to Scale)

FROM STA. 266+25 TO STA. 266+67 -L- (LT) (EST. 8 CY EXC.)
FROM STA. 266+62 TO STA. 266+85 -L- (LT) (EST. 6 CY EXC.)

NAD 83'95

100' 0' 100'
GRAPHIC SCALE

SITE 8

LEVEL SPREADER SEE DETAIL SHT. 5-E

13 TONS CLASS "B" RIPRAP 23 SY FILTER FABRIC

MATCHLINE STA 267+00.00
SHEET 12

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

REVISIONS

9/29/09 R/W REVISION: REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES.
2/29/12 R/W REVISION: REMOVED PERMANENT DRAINAGE EASEMENT AND REVISED RIGHT OF WAY ON PARCEL 13; REMOVED PERMANENT DRAINAGE EASEMENT TO RIGHT OF WAY AND REMOVED PERMANENT UTILITY EASEMENT ON PARCEL 15; CHANGED PERMANENT DRAINAGE EASEMENT TO TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 17, 19, AND 21; - SLK
4/17/13 R/W REVISION: ADDED TEMPORARY CONSTRUCTION EASEMENT FROM -L- STA. 187+89 TO 190+31 LEFT ON PARCEL 15. - SLK

8/17/99

NAD 83 95

-L-
PIs Sta 183+08.94
θs = 3° 26' 15.9"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

PI Sta 185+93.34
Δ = 21° 14' 35.1" (RT)
D = 4° 35' 01.2"
L = 463.45'
T = 234.42'
R = 1,250.00'
DS = 50 MPH
SE = 0.04

PIs Sta 188+72.39
θs = 3° 26' 15.9"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

DETAIL 3
ROCK FILL IN POND
(Not to Scale)
Proposed
Existing
Rock Armour Fill
3.0'
Elev.= 834.50
1.0'
N.W.S. Elev.= 833.50
Rock Fill To Berm
SEE GEOTECH FOR ROCK SIZE AND QUANTITY
FROM STA. 187+99 TO STA. 188+46 -L-

GRASS SWALE DATA
b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.56%
min. d = 1.5'
V10 = 1.57 fps
V2 = 1.48 fps
therefore, d10 = 0.89'
d2 = 0.82'
min. length of swale = 78'
req. L = 89'
I2 = 4.4 in./hr., Q2 = 3.0 cfs
I10 = 5.6 in./hr., Q10 = 3.75 cfs
DA = 0.78 ac.
Tc = 10 min.
Avg. c = 0.86

DETAIL 9
(Not to Scale)
Natural Ground
d
b
Min. d = 2 Ft.

DETAIL AB
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Filter Fabric
Fill Slope
*When B is > 6.0'
Std. No. 876.01
Type of Liner= CLASS "B" Rip-Rap
Min. D= 3.5 Ft.
d= 3.5 Ft.
B= 6.0 Ft.
b= 5.0 Ft.
FROM STA. 182+10 TO STA. 187+11 -L- (LT)

13 LEE VARRICK MOORE, JR
DB 5101 PG 0102
PB 077 PG 055

14 GARLAND A. BLAIR, JR
DB 2991 PG 729
DB 6854 PG 801
PB 056 PG 134

15 JASON ERIC HARRIS
DB 4273 PG 0377
PB 077 PG 055

16 CLAUDE EUGENE LEWIS
DB 4842 PG 0459
PB 080 PG 089

17 WILLIAM J. NAGY
DB 4664 PG 1594
PB 077 PG 055

18 MOHAMMAS & GHULAN KHAN
DB 6721 PG 344
PB 138 PG 149

19 LINDA SIMMONS MANSFIELD
DB 4614 PG 1042
PB 077 PG 055

20 KEITH & SARAH CHARLES
DB 6093 PG 2252
PB 145 PG 073

21 CHAE HUN CHA
DB 5292 PG 1985
PB 122 PG 061

22 ROBERT C. HIGHTOWER
DB 3819 PG 1218
PB 093 PG 083

KAREN & KEVIN DILL
DB 6121 PG 1424
PB 093 PG 083

-L- ST Sta.189+72.37
Station Equation
Sta 189+72.37 BK =
Sta.189+75.30 AH

-L- POT Sta.193+98.77 =
-Y30A- POT Sta. 10+00.00

-L- POT Sta.191+82.28 =
-DRIVEWAY- POT Sta.10+00.00

1 TON CLASS "B" RIPRAP
5 SY FILTER FABRIC

3 TONS CLASS "I" RIPRAP
2 SY FILTER FABRIC

1 TONS CLASS "B" RIPRAP
5 SY FF

42" CONC RETAINING WALL

HIGH POINT CITY LIMITS (IN)

ROCK FILL IN POND
SEE DETAIL "3"

325' TRANSITION

200' TRANSITION

100' TAPER

5' CONCRETE SIDEWALK (TYP.)

2'-6" C&G (TYP.)

GRASS SWALE
SEE DETAIL "9"

LATERAL BASE DITCH
SEE DETAIL AB

330' STORAGE

PLACE SAFETY FENCE AROUND SPRING HOUSE

52 TONS CLASS "B" RIPRAP
7 SY FILTER FABRIC

HISTORICAL SPRING HOUSE
NOT TO BE DISTURBED

"THE CONTRACTOR SHALL FULLY RESTORE EASEMENT AREA TO A CONDITION EQUAL TO OR BETTER THAN WHAT EXISTED PRIOR TO THE PROJECT"

HISTORICAL PROPERTY BOUNDARY

TOE PROTECTION W/ PSRM LINER

STREAM RELOCATION
SEE NATURAL STREAM DESIGN PLANS

-L- PT Sta. 10+63.92
-L- PC Sta. 10+93.71
-L- POT Sta. 11+49.99
-L- ST Sta.189+72.37
-L- CS Sta.188+22.37

PC Sta 10+46.38
PT Sta. 11+15.02

-Y30A- POT Sta. 11+72.72
END CONSTRUCTION
-Y30A- POT Sta. 12+29.44

-DRIVEWAY- STA.191+82 RT.

PI Sta 10+55.41
Δ = 33° 29' 38.5" (LT)
D = 190° 59' 09.4"
L = 17.54'
T = 9.03'
R = 30.00'

PI Sta 11+04.83
Δ = 40° 42' 12.1" (RT)
D = 190° 59' 09.4"
L = 21.31'
T = 11.13'
R = 30.00'

MATCHLINE STA 184+00.00

MATCHLINE STA 198+00.00 SHEET 4

N 85° 46' 36.2" E

SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 26 FOR -Y30A- PROFILE
SEE SHEET 28 FOR -DRIVEWAY- PROFILE

DETAIL 9
(Not to Scale)
GRASS SWALE DATA (from basin #1)
b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.3%
min. d = 2'
V10 = 1.65 fps
V2 = 1.55 fps
therefore, d10 = 1.54'
d2 = 1.41'
min. length of swale = 192'*
req. L = 243'
I2 = 4.4 in./hr., Q2 = 9.2 cfs
I10 = 5.6 in./hr., Q10 = 11.7 cfs
DA = 2.43 ac.
Tc = 10 min.
Avg. c = 0.86
* Maximum length possible

GRASS SWALE DATA
b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.4%
min. d = 2'
V10 = 0.55 fps
V2 = 0.52 fps
therefore, d10 = 1.34'
d2 = 1.23'
min. length of swale = 76'
req. L = 62'
I2 = 4.4 in./hr., Q2 = 2.3 cfs
I10 = 5.6 in./hr., Q10 = 3.0 cfs
DA = 0.62 ac.
Tc = 10 min.
Avg. c = 0.86

DETAIL 14
TOE PROTECTION
(Not to Scale)
Natural Ground
2:1 OR FLATTER
Fill Slope
d= 1Ft.
Type of Liner= PSRM
FROM STA. 194+50 TO STA. 195+96 -L- (RT)
FROM STA. 196+15 TO STA. 197+96 -L- (RT)
FROM STA. 198+09 TO STA. 198+26 -L- (RT)

PUE AREA WILL HAVE DUAL USE.
PDE WILL BE FROM R/W LINE TO LIMITS SHOWN FOR PDE.

(DDE 2027 CY)

06-JUN-2013 07:17
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PROJECT REFERENCE NO.	SHEET NO.
U-3615B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. NAME CHANGE ON PARCEL 38 AND AND COMBINE WITH PARCEL 41.
3. NAME CHANGE ON PARCEL 42.

02/25/13 R/W REVISION: THE PDE WAS REVISED AROUND RELOCATED BASIN #5 ON PARCELS 34 AND 38 AND PDE WAS ADDED FROM -L- STA. 241+36.00 TO STA. 241+68.00 RT. ON PARCEL 34. - TEM

-Y35-PCSta. 10+00.00
-Y35-POCSta. 10+22.26
BEGIN CONSTRUCTION

-Y35-
PI Sta 11+10.23
Δ = 6° 51' 33.6" (LT)
D = 3° 06' 54.2"
L = 220.20'
T = 110.23'
R = 1,839.32'

-L-
PI Sta 241+78.43
Θs = 0° 54' 01.3"
Ls = 110.00'
LT = 73.33'
ST = 36.67'

-L-
PI Sta 242+96.11
Δ = 2° 39' 07.6" (LT)
D = 1° 38' 13.3"
L = 162.01'
T = 81.02'
R = 3,500.00'
DS = 50 MPH
SE = 0.03

-L-
PI Sta 244+13.77
Θs = 0° 54' 01.3"
Ls = 110.00'
LT = 73.33'
ST = 36.67'

-L-
PI Sta 248+06.60
Θs = 4° 37' 14.3"
Ls = 150.00'
LT = 100.03'
ST = 50.03'

-L-
PI Sta 253+07.94
Δ = 5° 46' 45.8" (RT)
D = 6° 09' 39.0"
L = 840.46'
T = 451.38'
R = 930.00'
DS = 50 MPH
SE = 0.04

SR 1834 KENDALE RD.
EST. 2013 / 2033 AADT

3024 / 5184
14104 / 19464 -L- SR 1820
1084 / 1644
1940 / 3540
14960 / 21360 -L- SR 1820

NAD 83/95

CITY OF HIGH POINT
DB 2389 PG 0658
PB 71 PG 55

-Y35-PTSta. 12+20.20

-L- CSSta. 243+77.10

-L- STSta. 244+87.10

-L- TSSta. 247+06.56

-L- SCSta. 248+56.56

HIGH POINT CITY LIMITS (OUT)
HIGH POINT CITY LIMITS (IN)

GLENN A. SEWARD
DB 1939 PG 0653

CHRIST COMMISSION MINISTRY INTERNATIONAL INC
DB 6472 PG 1936

BL- PINC 237+09.86
U3615-7

BL- PINC 246+82.38=
BY36- POT 10+86.84
U3615-8

-L- POCSta. 242+13.32=
-Y35- POTSta. 14+56.98

-L- SCSta. 242+15.09

-L- TSSta. 241+05.09

DANIEL JOSEPH ENNIS
DB 4719 PG 1302
PB 82 PG 105

BETTY H. THOMPSON
DB 5700 PG 1380
PB 82 PG 105

BETTY H. THOMPSON
DB 5765 PG 1567

CITY OF HIGH POINT
PB 71 PG 55

MATCHLINE STA 240+00.00 SHEET 9

MATCHLINE STA 253+00.00 SHEET 11

N 63°49'06" E 228.71'

S63°30'44"W

S88°05'38"W 16.02'

N89°35'15"E 310.51'

S89°33'23"W 290.27'

N25°08'05"E 40.00'

N25°08'05"E 179.66'

PROPOSED SIGNAL

SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y35- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
U-3615B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/2909
2. NAME CHANGE ON PARCELS 43, 44, 45, 46, 48, 49, 51, 52, 53, 56, 59, AND 60.
3. PDE LINE SHIFT ON PARCEL 58.
4. NAME CHANGE ON PARCELS 902, 903 AND 909 TO NCDOT.
5. 7/23/12 R/W REVISION: REVISED CONSTRUCTION EASEMENT AND LABELS; PROPOSED CATCH BASIN SHIFTED AND NAME CHANGE ON PARCEL 57. – SLK
6. 4/17/13 R/W REVISION: ADDED TCE FROM –L– STA. 258+69 RIGHT TO –Y37S– STA. 11+40 LEFT; CREATED PARCEL 53Z. – SLK.
7. 5/31/13 R/W REVISION: CONVERTED TDE TO PDE FROM –L– STA. 265+81.00 TO STA. 266+30.00 LT. AND –L– STA. 266+15.00 TO STA. 266+50.53 RT. CREATING PARCEL 34Z. – PJS.

-L-
PI Sta 253+07.94
Δ = 51° 46' 45.8" (RT)
D = 6° 09' 39.0"
L = 840.46'
T = 451.38'
R = 930.00'
DS = 50 MPH
SE = 0.04

-L-
PIs Sta 257+47.06
θs = 4° 37' 14.3"
Ls = 150.00'
LT = 100.03'
ST = 50.03'

-L-
PIs Sta 266+00.54
θs = 2° 02' 46.6"
Ls = 150.00'
LT = 100.01'
ST = 50.01'

-Y39-
PI Sta 12+19.09
Δ = 29° 55' 03.0" (LT)
D = 6° 59' 14.2"
L = 428.17'
T = 219.09'
R = 820.00'

-Y37N-
PI Sta 14+00.24
Δ = 25° 49' 44.9" (LT)
D = 13° 06' 36.9"
L = 197.01'
T = 100.21'
R = 437.03'

-Y37N- POT Sta. 10+00.00

SEE SHEET 2-K FOR INTERSECTION DETAILS
SEE SHEET 22 FOR –L– PROFILE
SEE SHEET 27 FOR –Y36–, –Y37N–, –Y37S–, –Y38–, –Y39–, –Y40– PROFILES

NAD 83/95

BY36-78 POT 5+00.00

BL-37 PINC 25+88.40

BY36-79 PINC 8+83.21

BY37-80 PINC 8+01.00

BL-38 PINC 255+93.19=
BY38- PINC 5+00.00=
BY39- PINC 9+23.17=
BY40- PINC 5+00.00

BL- PINC 262+68.85=
BY37- PINC 9+46.10
(POINT NOT SET)

BY38-81 PINC 6+31.42

BY40-82 PINC 10+87.84

BY39-83 PINC 11+67.92

BL-39 RINC 261+16.28

-L- POT Sta. 258+16.11=
-Y37S- PT Sta. 10+00.00

-L- SCSta. 256+97.03

-Y37N- PCSta. 13+00.03

-Y37N- PCSta. 14+15.00
BEGIN CONSTRUCTION

-L- PCSta. 258+18.85=
-Y37N- POT Sta. 15+59.71

-L- SCSta. 258+47.03

-L- PCSta. 258+69.00=
-Y37S- PTSta. 11+67.72

-Y37S- PCSta. 11+52.85
END CONSTRUCTION

-L- PCSta. 261+86.90=
-Y39- POT Sta. 14+81.24

-Y39- PCSta. 13+31.00
BEGIN CONSTRUCTION

-L- PCSta. 263+73.00=
-Y40- POT Sta. 10+00.00

-L- TSSta. 265+00.53

-L- SCSta. 266+50.53

-Y38- PCSta. 11+44.26=
-Y38- POT Sta. 10+00.00

-Y38- PTSta. 11+53.84

-Y38- PCSta. 11+63.00
END CONSTRUCTION

-Y40- PCSta. 10+15.00
BEGIN CONSTRUCTION

-Y40- PTSta. 11+51.54

-Y40- PCSta. 11+98.75
END CONSTRUCTION

-Y40- PCSta. 12+99.90

-Y40-
PI Sta 13+50.82
Δ = 2° 02' 11.2" (RT)
D = 2° 00' 00.0"
L = 101.82'
T = 50.92'
R = 2,864.79'

PI Sta 12+35.37
Δ = 36° 57' 05.1" (RT)
D = 16° 08' 22.8"
L = 228.95'
T = 118.61'
R = 355.00'

PI Sta 15+09.17
Δ = 14° 01' 22.9" (LT)
D = 12° 13' 54.2"
L = 114.64'
T = 57.61'
R = 468.42'

PI Sta 10+98.27
Δ = 19° 07' 32.8" (LT)
D = 10° 55' 07.1"
L = 106.34'
T = 53.67'
R = 318.57'

MATCHLINE STA. 253+00.00 SHEET 10

MATCHLINE STA. 267+00.00 SHEET 12

SR 1820 SHEET CURB ROAD 240 BST

SR 1820 SHEET CURB ROAD 240 BST

BRADBURY WAY 240' BST

WALASH CT 240' BST

SR 1833 BARROW RD.
EST. 2013 AADT
6300
8300
14960
21560
3124
3284
3176
5016
6064
23644

EXISTING SIGNAL

LEVEL SPREADER SEE DETAIL SHT. 2-E

CBS OF HIGH POINT 29 TH NC 55

RICKY D. LYLES DB 3877 PG 1212 PB 082 PG 045

TERRY LYNN SHORES DB 4278 PG 0274 PB 082 PG 045

CITY OF HIGH POINT DB 3430 PG 0744 PB 085 PG 148

NCDOT DB 6463 PG 0928 PB 082 PG 045

NCDOT DB 6430 PG 0744 PB 085 PG 148

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 22 FOR –L– PROFILE
SEE SHEET 27 FOR –Y41– PROFILE

NAD 83'95

REVISIONS

8/17/99

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. NAME CHANGE ON PARCELS 63, 67, 69, 70, 71, 74 AND 75.
3. KEEP EXISTING DRIVE OPEN ON PARCEL 65.
4. NAME CHANGE ON PARCELS 76 AND DRIVE ENTRANCE CHANGE.
5. NAME CHANGE ON PARCEL 911 TO NCDOT.

5/1412 R/W REVISION: COMBINED PARCELS 64, 65 & 66 INTO PARCEL 64. – SLK

-L-
PI Sta 271+96.23
Δ = 29° 07' 59.5" (LT)
D = 2° 43' 42.2"
L = 1,067.79
T = 545.70'
R = 2,100.00'
DS = 50 MPH
SE = 0.04

-L-
PIs Sta 277+68.32
θs = 2° 02' 46.6"
Ls = 150.00'
LT = 100.01'
ST = 50.01'

MATCHLINE STA 267+00.00 SHEET 11

MATCHLINE STA 281+00.00 SHEET 13

-L- ST Sta 278+68.32

-L- CSSta. 277+18.32

-L- POT Sta. 278+33.93=
-Y4I- POT Sta. 10+00.00

-Y4I- POT Sta. 11+75.00
END CONSTRUCTION

BL-40
PINC 267+68.54

BL-4I PINC 273+22.65=
BY4I-1POT 5+00.00

BY4I-89 POT 9+29.44=
-Y4I-POT Sta. 14+51.01

DETAIL 3
ROCK FILL IN POND
(Not to Scale)

Proposed
Existing
Rock Armour Fill
3.0'
Elev.= 829.60
Rock Fill To Berm
1.0'
N.W.S. Elev.= 828.60

SEE GEOTECH FOR ROCK SIZE AND QUANTITY
FROM STA. 275+42 TO STA. 276+60 -L-

28-MAY-2013 11:47
R:\Roadway\Proj\u3615b_rdy_psh_sh12.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. PROPERTY LINE CHANGE (ALREADY SENT IN) ON PARCEL 103. COMBINE WITH PARCEL 104 AND CHANGE PORTION OF PUE TO DUE.
3. CHANGE PORTION OF PUE TO DUE ON PARCEL 106.

12/1812 - R/W REVISIONS; CHANGED PUE TO DUE FROM -L- STA. 307+05.00 RIGHT ON PARCEL 103; ADDED PDE FROM -L- STA. 302+90.00 TO STA. 305+20.00 RIGHT CREATING PARCEL 103Z; THE NEW PDE REPLACES TCE FROM -L- STATION 303+51.36 TO 304+38.00 RIGHT.

NAD 83 95

SEE SHEET 23 FOR -L- PROFILE

-L-
PIs Sta 307+31.62
Δs = 4°31' 24.2"
Ls = 150.00'
LT = 100.03'
ST = 50.03'

MATCHLINE STA 295+00.00 SHEET 13

MATCHLINE STA 308+00.00 SHEET 15

CITY OF HIGH POINT (IN)
12.78' S86°55'19"E
CITY OF HIGH POINT (OUT)

CITY OF HIGH POINT (IN)
N00°28'45"W 143.56'

THOMAS EDWARD DRAPER
DB 3487 PG 2065
PB 107 PG 71

CITY OF HIGH POINT (OUT)
108.60' S86°28'08"E
CITY OF HIGH POINT (IN)

CITY OF HIGH POINT (IN)
N00°28'45"W 165.48'

CITY OF HIGH POINT
DB 3567 PG 0823
DB 3429 PG 863
PB 105 PG 075

ANGELA SMITH CUMMINGS
DB 9248 PG 0659
PB 109 PG 104

RAY C. CROMER, JR
DB 4485 PG 178

COVENANT CHURCH UNITED METHODIST
DB 5444 PG 0516

COVENANT CHURCH UNITED METHODIST
DB 3879 PG 0078
DB 3897 PG 1741
PB 88 PG 020

JEFFERY LEWIS PATTON
DB 3346 PG 0448

TIMOTHY L. ALBRIGHT
DB 4724 PG 0439
PB 89 PG 026

WATERFORD MEADOWS HOMEOWNERS ASSOC.
DB 5930 PG 0364
PB 89 PG 026

PAUL A. MOORE
DB 4538 PG 1609
PB ■ PG 132

BL-44
PINC 293+82.48

BM#17

S 88°23'05" E

S 87°27'20" E
174.70'

S 02°33'07" W
310.36'

N 84°39'36" W
165.14'

N 82°30'10" W
158.09'

N 07°29'40" W
204.07'

2SFD

1SFD

DECK

GR LOT

25BK CHURCH

POND

TENNIS CT

BASIN #8

PA BST

CONC

REMOVE

REMOVE EX. CB

RETAIN

CONVERT CB TO JB

REMOVE EX. CB & 24" CONC

REMOVE EX. 24" CONC

REMOVE EX. 4' CMP

REMOVE INV. EL = 867.44

REMOVE INV. EL = 870.44

5' MONOLITHIC ISLAND

5' CONCRETE SIDEWALK (TYP.)

2'-6" C&G (TYP.)

1'-6" C&G

END 2'6" C&G

END 5' SIDEWALK

END 5' SIDEWALK

END 2'-6" C&G & 5' SIDEWALK

2 GI (TYPE A)

24" CONC CB

18" RCP-IV

15" RCP-IV

16 TONS CLASS "B" RIPRAP 42 SY FILTER FABRIC

2' BASE DITCH

5 TONS CLASS "B" RIPRAP 14 SY FILTER FABRIC

5 TONS CLASS "B" RIPRAP 9 SY FILTER FABRIC

5 TONS CLASS "B" RIPRAP 14 SY FILTER FABRIC

CONC. ENDWALL AND SLUICE GATE

-L- TSSta. 306+31.59

-L- SCSta. 307+81.59

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/2909
2. NAME CHANGE ON PARCELS 120, 121, 124, 125 AND 126.
3. 5/31/13 R/W REVISION: REVISED PDE AND TDE ON PARCEL 125. - PJS

-L-
PI Sta 328+16.30
Δ = 1° 00' 09.9" (LT)
D = 0° 30' 00.0"
L = 200.55'
T = 100.28'
R = 11,459.16'
DS = 50 MPH
SE = NC

-L-
PI Sta 333+31.24
Δ = 1° 03' 02.2" (RT)
D = 0° 30' 00.0"
L = 210.12'
T = 105.06'
R = 11,459.16'
DS = 50 MPH
SE = NC

NAD 83'95

-L- PCSta. 327+16.02

-L- PTSta. 329+16.57

-L- PCSta. 332+26.18

-L- PTSta. 334+36.30

(120) SKEET CLUB DOWNS HOMEOWNERS ASSOC DB 4183 PG 114

(122) RAY H. COBLE, JR DB 4198 PG 1673

(122) RAY H. COBLE, JR DB 4149 PG 0374 PB 80 PG 081

(124) FOUNTAIN GROVE PROPERTIES, LLC DB 6405 PG 1832 PB 142 PG 042

(126) FOUNTAIN GROVE PROPERTIES, LLC DB 6405 PG 1832 PB 142 PG 042

(127) HIGH POINT RETIREMENT RESIDENCE LLC DB 5422 PG 0723 PB 144 PG 081

WESLEY KENNARD VERNON DB 3696, PG 0400 (PB 081 PG 038)

SUSAN C. INGOLD BELLAMY DB 5359 PG 2197 PB 081 PG 038

BL-48 PINC 320+91.19

BL-49 PINC 326+39.69

MATCHLINE STA 322+00.00 SHEET 15

MATCHLINE STA 336+00.00 SHEET 17

SEE SHEET 24 FOR -L- PROFILE

(121) HCRI SKEET CLUB MANOR PROPERTIES, LP DB 5953 PG 2236 PB 124 PG 083

(125) HCRI SKEET CLUB MANOR PROPERTIES, LP DB 5953 PG 2236 PB 130 PG 128

(128) BETHLEHEM LLC DB 4802 PG 0528 PB 127 PG 126

(129) R A L PROPERTIES DB 4397 PG 1405 PB 099 PG 055

DETAIL II
(Not to Scale)

GRASS SWALE DATA

b = 4'
m = 3:1 & 4:1
s = 0.8%
min. d = 2'
V10 = 2.13 fps
V2 = 1.97 fps
therefore, d10 = 0.71'
d2 = 0.63'
min. length of swale = 200'
L = 232

I2 = 4.4 in./hr., Q2 = 7.7 cfs
I10 = 5.6 in./hr., Q10 = 9.8 cfs
DA = 2.0 ac.
Tc = 10 min.
Avg. c = 0.86

3:\MAY-2013\12-27
R:\Mapping\U3615b\U3615b_rdy_psh_sh16.dgn
$$$$USERNAME$$$$

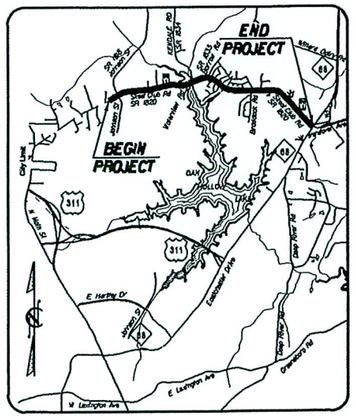
09/30/59

TIP PROJECT: U-3615B

CONTRACT:

$$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3615B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34962.1.1	STP-1820(2)	P.E.
34962.2.3	STP-1820(2)	R/W, UTL.

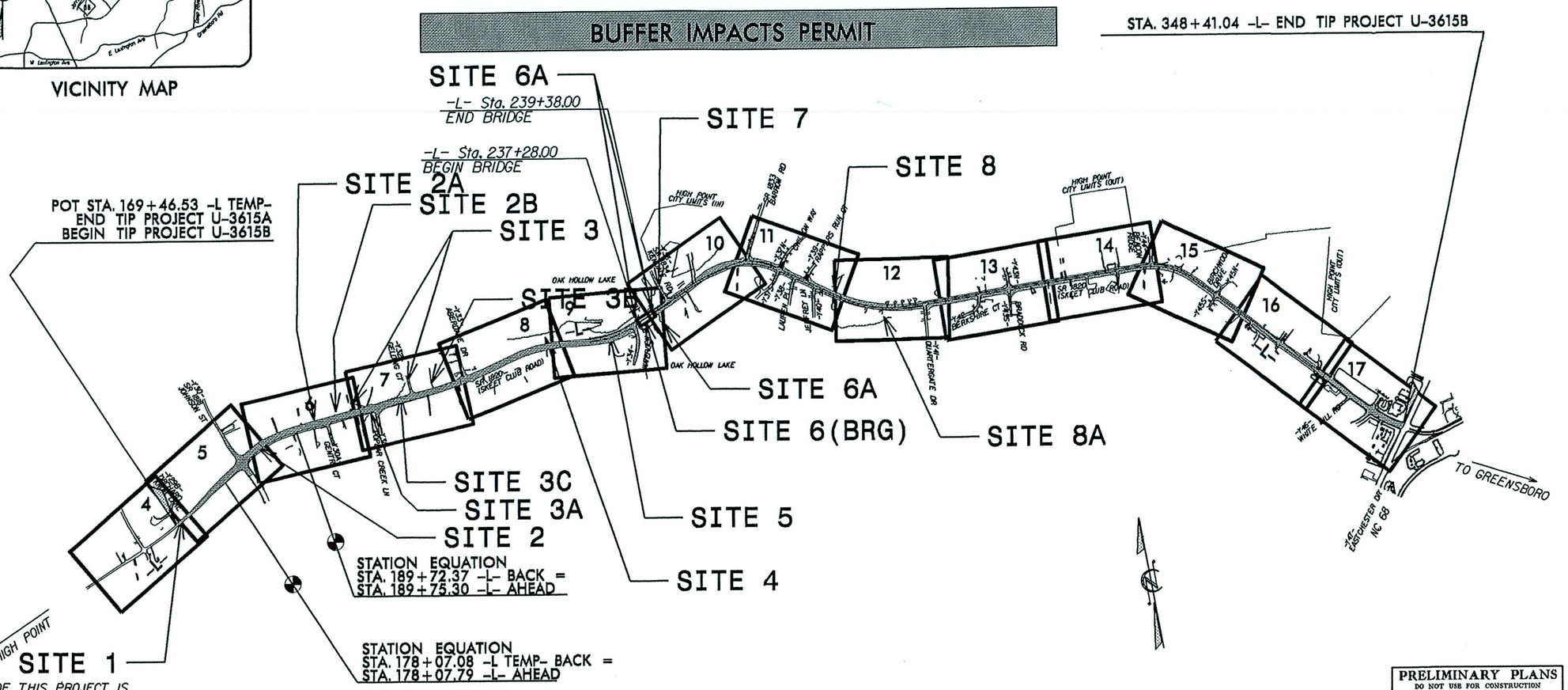
Buffer Drawing
Sheet 1 of 12

Revised 6/10/13

LOCATION: *SR 1820 (SKEET CLUB ROAD) FROM WEST OF SR 1818 (JOHNSON STREET) TO NC 68 (EASTCHESTER DRIVE).*

TYPE OF WORK: *PAVING, GRADING, DRAINAGE, CURB & GUTTER, STRUCTURE, CULVERT, SIGNING AND SIGNALS*

BUFFER IMPACTS PERMIT



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF CITY OF HIGH POINT

"CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III"

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2013 = 10860-23524
ADT 2035 = 17900-34700
DHV = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST =2% DUAL 3%
FUNC CLASS =
URBAN MINOR ARTERIAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3615B = 3.349 MI
LENGTH STRUCTURE TIP PROJECT U-3615B = 0.040 MI
TOTAL LENGTH OF TIP PROJECT U-3615B = 3.389 MI

Prepared for the North Carolina Department of Transportation in the Office of:
WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 144
Raleigh, N.C. 27606
License No. F-0377
Ph. 919 851 8077
Fax 919 851 8107

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 27, 2009

LETTING DATE: OCTOBER 15, 2013

NCDOT CONTACT: BRENDA L. MOORE, PE
ROADWAY DESIGN ENGINEERING COORDINATION SECTION PROJECT ENGINEER

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

U-3615B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 2 of 12
Revised 6/10/13

8/17/99

REVISIONS

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

STA. 169+46.53 POC -L- =
STA. 169+46.53 POC -L- TEMP
OFFSET = 21.07' RT.
END TIP PROJECT U-3615A
BEGIN TIP PROJECT U-3615B

SITE 1

-L- TSSta. 163+06.31

-L- STSta. 159+08.07

-L- CSSta. 158+12.07

-L-
PIs Std. 158+44.07
Θs = 0° 22' 00.1"
Ls = 96.00'
LT = 64.00'
ST = 32.00'

-L-
PIs ~~Sta. 163+70.31~~ Sta. 163+70.31
Θs = 0° 33' 00.1"
Ls = 96.00'
LT = 64.00'
ST = 32.00'

-L- TEMP
PI Sta 171+59.42
Δ = 6° 27' 19.5" (LT)
D = 1° 31' 04.5"
L = 425.31'
T = 212.89'
R = 3,775.00'
DS = 50 MPH
SE = 0.02

-L-
PI Sta 167+89.17
Δ = 8° 50' 6.49" (LT)
D = 1° 08' 45.3"
L = 772.19
T = 386.86'
R = 5,000.00'
DS = 50 MPH
SE = 0.02

ZONE 1 ALLOWABLE

ZONE 2 ALLOWABLE

ZONE 2 ALLOWABLE

ZONE 1 ALLOWABLE

MATCHLINE STA. 171+00.00 SHEET 5

HILDA H. PATTON

LARRY D. RANDOLPH

WILLIAM HAILEY

NORLAND P. FOURNIER

RODNEY G. KOCHER

CAREY DALE CLONTZ

BRADFORD M. LILLEY

KRISH PURSWANI

PATRICK THOMAS HANNON

JEFFERY L. BARKER

JAMES BO MURPHY

HARRISON A. LITTLE

LARRY DEAN STAMEY

JEFFERY A. SIMMONS

NICKIE J. KEENE

LARRY D. STAMEY

JOHN W. & JANE B. RIERSON

WALTER B. MCCRAW

BILLIE M. PATTERSON

JOYCE A. TRESCOT

TOWNHOUSE

EARL PAUL MCCRACKEN

ARNA EDWARDS

INDA M. STREETMAN

TEMPLE OF PRAYER PRAISE & DELIVERENCE INC

KEVOUNG H. KWON

ST. ANDREWS ON SKEET CLUB HOMEOWNERS ASSOC

NHAN VAN & NANCY LE

WILLIAM G. CURLIN

ST. ANDREWS ON SKEET CLUB HOMEOWNERS ASSOC.

WILLIAM MCLEAN

ENCE CURTIS

100' 0' 100'
GRAPHIC SCALE

$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$DGN$$$$$$$$

8/17/99

REVISIONS

RW REVISION: 9/29/12: REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES.

RW REVISION: 7/29/12: CHANGED PERMANENT DRAINAGE EASEMENT TO RIGHT OF WAY ON PARCEL 10- REMOVED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 12- REMOVED PERMANENT EASEMENT AND ADDED DRAINAGE UTILITY EASEMENT ON PARCEL 13.- SLK

RW REVISION: 6/29/12: CHANGED PERMANENT DRAINAGE EASEMENT AND REVISED RIGHT OF WAY ON PARCEL 11 TO EASEMENT, PERMANENT DRAINAGE EASEMENT AND REVISED RIGHT OF WAY ON PARCEL 13.- SLK

5/24/12 RW REVISION: CHANGED NAME ON PARCEL 002 TO ORCHARD KNOB OWNERS ASSOCIATION - SLK

$$$$$$$SYSTIME$$$$$$

$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	6
RW SHEET NO.	
ROADWAY DESIGNER Hunter Drawing	HYDRAULICS ENGINEER
Sheet 4 of 12	

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

REVISIONS

9/23/09 R/W REVISION: REVISED LABEL/ASSETS FOR EXISTING RIGHT-OF-WAY TO ACTUAL DISTANCES.
2/23/12 R/W REVISION: REMOVED PERMANENT DRAINAGE EASEMENT AND REVISED RIGHT OF WAY/EASEMENT ON PARCEL 15, CHANGED PERMANENT DRAINAGE EASEMENT TO RIGHT OF WAY AND REMOVED PERMANENT DRIVE EASEMENT ON PARCELS 17, 19, AND 21. - SLK
4/7/13 R/W REVISION: ADDED TEMPORARY CONSTRUCTION EASEMENT FROM -L- STA. 187+89 TO 190+31 LEFT ON PARCEL 15. - SLK

8/17/99

GRAPHIC SCALE 100' 0' 100'

NAD 83 95

SITE 2

SITE 2A

SITE 2B

SITE 3

SYSTEM 6

SYSTEM 5

-L- ST Sta.189+72.37

PC Sta. 10+46.38

PT Sta. 10+63.92

PC Sta. 10+93.71

POT Sta. 11+49.99

PT Sta. 11+15.02

CS Sta.188+22.37

-L- ST Sta.189+72.37

MATCHLINE STA 184+00.00 SHEET 3

MATCHLINE STA 198+00.00 SHEET 7

ZONE 1 MITIGABLE

ZONE 2 MITIGABLE

ZONE 2 ALLOWABLE

HIGH POINT CITY LIMITS

HISTORICAL PROPERTY BOUNDARY

ROCK FILL IN POND SEE DETAIL "3"

GRASS SWALE SEE DETAIL "9"

GRASS SWALE SEE DETAIL "9a"

V-DITCH SEE DETAIL "1"

TOE PROTECTION (PSRM LINER) SEE DETAIL "14"

BASIN #10 SEE DETAIL SHT. 2-F

3 TONS CLASS "1" RIPRAP 6 SY FILTER FABRIC

1 TON CLASS "B" RIPRAP 5 SY FILTER FABRIC

6.2 TONS CLASS "B" RIPRAP 7 SY FILTER FABRIC

21 TONS CLASS "B" RIPRAP 58 SY FILTER FABRIC

13 LEE VARRICK MOORE, JR

14 CARLAND A. BLAIR, JR

15 JASON ERIC HARRIS

16 CLAUDE EUGENE LEWIS

17 WILLIAM J. NAGY

18 MOHAMMAS & GHULAN KHAN

19 LINDA SIMMONS MANSFIELD

20 KEITH & SARAH CHARLES

21 CHAE HUN CHA

22 ROBERT C. HIGHTOWER

KAREN & KEVIN DILL

DETAIL AB
LATERAL BASE DITCH
(Not to Scale)

Min. D = 3.5 Ft.
d = 3.5 Ft.
S = 6.0 Ft.
b = 5.0 Ft.

*When S is > 6.0' Std. No. 876.01

Type of Liner= CLASS "B" Rip-Rap

FROM STA. 182+10 TO STA. 187+11 -L- (LT)

DETAIL 3
ROCK FILL IN POND
(Not to Scale)

Proposed Existing Rock Armour Fill — 3.0' — Elev.= 834.50 — Rock Fill To Berm — 10' — N.W.S. Elev.= 833.50

SEE GEOTECH FOR ROCK SIZE AND QUANTITY

FROM STA. 187+89 TO STA. 188+48 -L-

DETAIL 9
(Not to Scale)

GRASS SWALE DATA

b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.66%
min. d = 1.5'
V10 = 1.67 fps
V2 = 1.48 fps
therefore, Q10 = 0.89 cfs
Q2 = 0.82 cfs
min. length of swale = 76'
req. L = 69'

I2 = 4.4 in./hr., Q2 = 3.0 cfs
I10 = 6.6 in./hr., Q10 = 3.75 cfs
DA = 0.78 ac.
Tc = 10 min.
Avg. c = 0.88

Min. d = 2 Ft.

FROM STA. 189+53 TO STA. 190+45 -L- (LT)

DETAIL 9
(Not to Scale)

FROM STA. 183+78 TO STA. 185+78 -L- (RT)

GRASS SWALE DATA (from basin #1)

b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.3%
min. d = 2'
V10 = 1.66 fps
V2 = 1.55 fps
therefore, Q10 = 1.34'
Q2 = 1.41'
min. length of swale = 192'*
req. L = 243'

I2 = 4.4 in./hr., Q2 = 8.2 cfs
I10 = 6.6 in./hr., Q10 = 11.7 cfs
DA = 2.43 ac.
Tc = 10 min.
Avg. c = 0.86
* Maximum length possible

(DDE 2027 CY)

FROM STA. 185+78 TO STA. 186+87 -L- (RT)

GRASS SWALE DATA

b = 2'
m = 3:1 & 3:1, n = 0.040
s = 0.4%
min. d = 2'
V10 = 0.55 fps
V2 = 0.52 fps
therefore, Q10 = 1.34'
Q2 = 1.23'
min. length of swale = 76'
req. L = 62'

I2 = 4.4 in./hr., Q2 = 2.3 cfs
I10 = 6.6 in./hr., Q10 = 3.0 cfs
DA = 0.62 ac.
Tc = 10 min.
Avg. c = 0.86

DETAIL 9
(Not to Scale)

Min. d = 2 Ft.

FROM STA. 183+55 TO STA. 185+83 -L- (RT) (DDE 37 CY)

DETAIL 1
STANDARD "V" DITCH
(Not to Scale)

Min. D = 1.5 Ft.

DETAIL 14
TOE PROTECTION
(Not to Scale)

d= 1Ft.

Type of Liner= PSRM

FROM STA. 194+50 TO STA. 195+96 -L- (RT)
FROM STA. 196+15 TO STA. 197+96 -L- (RT)
FROM STA. 198+09 TO STA. 198+26 -L- (RT)

SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 26 FOR -Y30A- PROFILE
SEE SHEET 28 FOR -DRIVEWAY- PROFILE

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

PUE AREA WILL HAVE DUAL USE.
PDE WILL BE FROM R/W LINE TO LIMITS SHOWN FOR PDE.

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 5 of 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS

REVISIONS

SYSTIME
DGN
FSCRDAGE

-DRIVEWAY- STA.199+48.82 LT.
PI Sta 10+53.98
Δ = 50° 33' 42.6" (RT)
D = 57.2' 57' 28.1"
L = 8.82'
T = 4.72'
R = 10.00'

PI Sta 11+09.83
Δ = 15° 40' 55.5" (LT)
D = 19° 59' 09.4"
L = 8.22'
T = 4.13'
R = 30.00'

SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 26 FOR -Y31- & -Y32- PROFILES
SEE SHEET 28 FOR -DRIVEWAY- PROFILE

100' 0' 100'
GRAPHIC SCALE

-L-
PIs Sta 207+71.41
θs = 0° 26' 18.6"
Ls = 75.00'
LT = 50.00'
ST = 25.00'

-L-
PI Sta 211+98.99
Δ = 9° 23' 36.9" (LT)
D = 1° 10' 09.5"
L = 803.35'
T = 402.58'
R = 4,900.00'
DS = 50 MPH
SE = 0.02

NAD 83/95

-L- POT Sta.199+48.84=
-DRIVEWAY- POT Sta.10+00.00
PC Sta. 10+49.25
PT Sta. 10+58.08
PC Sta. 11+05.70
PT Sta. 11+13.91
POT Sta. 11+77.67

-Y32- POT Sta. 10+00.00
-Y32- PT Sta. 10+55.00
BEGIN CONSTRUCTION

-L- POT Sta. 205+75.82=
-Y32- POT Sta. 12+89.18

-L- POT Sta. 200+67.07=
-Y31- POT Sta. 10+00.00

-L- TS Sta. 207+21.41
-L- SC Sta. 207+96.41

-Y31- POT Sta. 12+00.00
END CONSTRUCTION

-Y31- POT Sta. 12+25.71

ZONE 1 MITIGABLE
ZONE 2 MITIGABLE

SITE 3C
SITE 3B
SITE 3A

21 CHAE HUN CHA
22 ROBERT C. HIGHTOWER
23 MICHAEL C. CLODFELTER
24 JAY & DAVONIA MICHAEL
25 GABLES ON SKEET CLUB HOMEOWNERS ASSOC. INC
26 DAVID & JULIA GALLOWAY
27 LESLIE RIERSON SMITH
28 VERNA H. HOUGHTALING
29 MARSHA & CURTIS INLOW
30 PATSY K. KIMSEY

ALEXANDER M. CATHEY
ROBERT & WILLIE PARKS
MATHEW W. TENHAEF
PRECEPT CONSTRUCTION LLC
LILLIAN POPE ATCHISON
BARBARA MAE DERMER-BECKER

MATCHLINE STA. 198+00.00 SHEET 6
MATCHLINE STA. 212+00.00 SHEET 8

SR 1820 SKEET CLUB ROAD

10948/17268 -L- SR 1820 50/50 300/300 11248/17568 -L- SR 1820
300/300
POPLAR CREEK LN.
EST. 2013 AADT
2033

ALLOWABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 2

DETAIL 2
STANDARD 2' BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D = 2 Ft.
B = 2 Ft.
FROM STA. 202+27 TO STA. 202+40 -L- (LT) (DDE 27 CY)

DETAIL 4
STANDARD 4' BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D =3.5Ft.
B = 4 Ft.
FROM STA. 200+34 TO STA. 200+87 -L-(LT) (DDE 146 CY)

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet 6 of 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

8/17/99

REVISIONS
REVISIONS
ACTUAL DISTANCES. 9/29/09

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL D
2. CHANGED PUE /PDE OVERLAP TO DUE ON PARCEL 32.
3. NAME CHANGE ON PARCELS 29 AND 32.
4. CHANGE PUE TO DUE CLOSED CLAIM ON PARCEL 32.
5. ADDED 3 - CURB CUTS ON PARCEL 32.
6. CHANGE PDE TO DUE ON PARCEL 31. (1-10-12) S.L.K.

$$$$$$SYSTIME$$$$$$
$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 7 of 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

NOTE:
NO DIRECT DISCHARGE INTO THE WATER FROM THE BRIDGE

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. ~~RAW CHANGE ON PARCEL 35.~~
3. ~~REVISED R/W TO PROPERTY LINE ADDED TDE ADDED NOTE TO PLANS FOR EXIST. FENCE~~
5/M12 R/W REVISION: NAME CHANGE TO ESTATE OF OLLIE MAE ALRED ON PARCEL 35. - SLK

8/17/99

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO ROADWAY

Sta. 237+28.00 BEGIN BRIDGE

Sta. 239+38.00 END BRIDGE

5' CONC. SIDEWALK TYPE III — 5.5' CONC. SIDEWALK — 15' — TYPE II — 5' CONC. SIDEWALK

26' C&G — 14' — 12' — 11' — 12' — 14' — 99' — 88' — 26' C&G

TYPE III — 5' — 5.5' CONC. SIDEWALK — 15' — TYPE III — 26' C&G 5' CONC. SIDEWALK

NAD 83/95

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

ZONE 1 MITIGABLE

ZONE 2 MITIGABLE

-L- TSSta. 229+35.99

-L- SCSta. 230+85.99

-L- CSSta. 226+16.66

-L- STSta. 227+66.66

-L- STSta. 236+92.18

-L- CS Sta. 235+42.18

ZONE 1 ALLOWABLE

ZONE 2 ALLOWABLE

ROCK FILL IN LAKE SEE DETAIL "3"

MATCHLINE STA. 226+00.00 SHEET 8

MATCHLINE SHEET TO STA. 240+00.00

SITE 5

SITE 6

OAK HOLLOW LAKE

SR 1820 SKEET CLUB ROAD

OLD MENDENHALL ROAD / OLD SKEET CLUB ROAD

WATERVIEW RD.

EST. 2013 / 2033 AADT

11448 / 17768 — 668 / 1788 — 3324 / 3484 — 14104 / 19464 — 3992 / 5272

SR 1820 — SR 1820

DETAIL 3
ROCK FILL IN LAKE
(Not to Scale)

Proposed — Existing — Rock Armour Fill — Filter Fabric — Rock Fill To Berm — 3.0' — Elev.= 803.30 — L0' — N.W.S. Elev.= 802.30

SEE GEOTECH FOR ROCK SIZE AND QUANTITY FROM STA. 232+21 TO STA. 234+89 -L-

DETAIL 5
BERM DITCH
(Not to Scale)

SLOPE STAKE — 5.0' — 4.0' — 5.0' — CLEARING LIMITS — 10.0' V.C. — 2d — D VAR. — Min. D = 1 Ft.

FROM STA. 226+00 TO STA. 227+80 -L-(RT)
FROM STA. 227+80 TO STA. 229+75 -L-(RT)

DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground — 2d — D — 2d — 1'/Ft. — b — Fill Slope — Min. D = 1 Ft. — b = 3 Ft.

FROM STA. 229+75 TO STA. 231+00 -L- (RT)
DDE 19 CY

GRASS SWALE DATA (from basin #8)

b = 0'
z = 3:1
s = 0.64%
n = 0.040
min. d = 2'
Q10 = 2.03 cfs
Q2 = 1.91 cfs
therefore, d10 = 1.36'
Q2 = 1.24'
length of swale = 323'+
req. L = 300

I2 = 4.4 in./hr., Q2 = 8.8 cfs
I10 = 5.6 in./hr., Q10 = 11.2 cfs
DA = 3.0 ac.
Tc = 10 min.
Avg. c = 0.67

DETAIL 10
(Not to Scale)

Natural Ground — 3z — d — z — Natural Ground — b — Min. d = 2 Ft.

FROM STA. 234+68 TO STA. 231+98 -L- (RT)
(DDE 247 CY)

GRASS SWALE SEE DETAIL "10" DDE 210 CY

CONC. ENDWALL & SLUICE GATE SEE STD. 838.02

3 TONS CLASS "B" RIPRAP 11 SY FILTER FABRIC

5 TONS CLASS "B" RIPRAP 14 SY FILTER FABRIC

2 TONS CLASS "B" RIPRAP 7 SY FILTER FABRIC

FILL W/ FLOWABLE FILL

ISFD

FUEL STATION

BERM DITCH SEE DETAIL "5"

BERM DITCH SEE DETAIL "8"

LATERAL V DITCH SEE DETAIL "6" DDE 18 CY

CLASS II RIP RAP (TO ELEV. 805) (STR. PAY ITEM)

REMOVE EXISTING ROAD BED MATERIAL

CLASS II RIP RAP (TO ELEV. 805)

RIPRAP SEE DETAIL SHT. 12-E

100' 0' 100'
GRAPHIC SCALE

SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y34- PROFILE

$$$$$$$SYSTIME$$$$$$
$$$$$$$USERNAME$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing Sheet 8 of 12

Revised 6/7/13

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. NAME CHANGE ON PARCEL 38 AND 40 COMBINE WITH PARCEL 41.
3. NAME CHANGE ON PARCEL 42.

02/5/13 R/W REVISION: THE PDE WAS REVISED AROUND RELOCATED BASIN #5 ON PARCELS 34 AND 38 AND PDE WAS ADDED FROM -L- STA. 241+36.00 TO STA. 241+68.00 RT. ON PARCEL 34. - TEM

$$$$$$$SYSTIME$$$$$$
$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet 9 of 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 6/10/13

NAD 83/95

SITE 8

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

GRAPHIC SCALE 100' 0' 100'

SEE SHEET 2-I FOR INTERSECTION DETAILS
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 27 FOR -Y36-, -Y37N-, -Y37S-, -Y38-, -Y39-, -Y40- PROFILES

-L-
PI Sta 253+07.94
Δ = 51° 46' 45.8" (RT)
D = 6° 09' 39.0"
L = 840.46
T = 451.38'
R = 930.00'
DS = 50 MPH
SE = 0.04

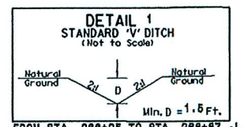
-L-
PIs Sta 257+47.06
θs = 4° 37' 14.3"
Ls = 150.00'
LT = 100.03'
ST = 50.03'

-Y37N-
PI Sta 14+00.24
Δ = 25° 49' 44.9" (LT)
D = 13° 06' 36.9"
L = 197.01'
T = 100.21'
R = 437.03'

-Y39-
PI Sta 12+19.09
Δ = 29° 55' 03.0" (LT)
D = 6° 59' 14.2"
L = 428.17'
T = 219.09'
R = 820.00'

-L-
PIs Sta 266+00.54
θs = 2° 02' 46.6"
Ls = 150.00'
LT = 100.01'
ST = 50.01'

DETAIL 1
STANDARD "V" DITCH
(Not to Scale)



FROM STA. 266+25 TO STA. 266+67 -L- (LT) (EST. 8 CY EXC.)
FROM STA. 266+82 TO STA. 266+85 -L- (LT) (EST. 8 CY EXC.)

ZONE 2 MITIGABLE
-L- SS Sta 265+00.53

ZONE 1 MITIGABLE

ZONE 1 MITIGABLE

ZONE 1 MITIGABLE

-L- POT Sta 263+43.83=
-Y40- POT Sta 10+00.00

-L- POT Sta 261+36.36=
-Y39- POT Sta 14+81.24

-L- POT Sta 258+18.65=
-Y37N- POT Sta 16+59.71

-L- POT Sta 253+16.11=
-Y37S- PI Sta 10+00.00

-Y37N- POS Sta 14+15.80
BEGIN CONSTRUCTION

-Y37N- PCS Sta 13+00.03

-Y37N- PT Sta 14+97.04

-Y39- POS Sta 13+31.00
BEGIN CONSTRUCTION

-Y39- PT Sta 14+28.17

-L- POT Sta 260+44.26=
-Y38- POT Sta 10+00.00

-Y38- PCS Sta 10+65.65

-Y38- PT Sta 11+53.06
END CONSTRUCTION

-Y40- PCS Sta 12+39.90

-Y40- PT Sta 11+51.53

-Y40- POT Sta 13+88.75
END CONSTRUCTION

-L- SS Sta 256+97.03

-L- SS Sta 266+50.53

-L- T54 RCP IV CB T48 RCP IV CB T48 RCP

-L- T48 RCP IV CB T48 RCP

-L- 15" RCP RETAIN

-L- 15" RCP

-L- 18" RCP

-L- 24" CMP

-L- 30" CMP

-L- 36" CMP

-L- 42" CMP

-L- 48" CMP

-L- 60" CMP

-L- 72" CMP

-L- 84" CMP

-L- 96" CMP

-L- 108" CMP

-L- 120" CMP

-L- 132" CMP

-L- 144" CMP

-L- 156" CMP

-L- 168" CMP

-L- 180" CMP

-L- 192" CMP

-L-

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing Sheet 10 of 12
Revised 6/10/13

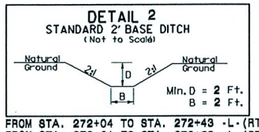
SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 27 FOR -Y41- PROFILE

8/17/99

REVISIONS

1. REVISED LABEL OFFSETS FOR EXISTING RIGHT OF WAY TO ACTUAL DISTANCES. 9/29/09
2. NAME CHANGE ON PARCELS 63, 67, 69, 70, 71, 74 AND 75. KEEP EXISTING DRIVE OPEN ON PARCEL 65
3. NAME CHANGE ON PARCELS 76 AND DRIVE ENTRANCE CHANGE.
4. NAME CHANGE ON PARCEL 911 TO NCDOT.
5. 8/4/12 R/W REVISION: COMBINED PARCELS 64, 65 & 66 INTO PARCEL 64. - SLK

DETAIL 2
STANDARD 2' BASE DITCH
(Not to Scale)



FROM STA. 272+04 TO STA. 272+43 -L-(RT) (DDE 30 CY)
FROM STA. 273+61 TO STA. 273+83 -L-(RT) (DDE 23 CY)

-L-
PI Sta 271+96.23
Δ = 29° 07' 59.5" (LT)
D = 2° 43' 42.1"
L = 1,067.79'
T = 545.70'
R = 2,100.00'
DS = 50 MPH
SE = 0.04

-L-
PIs Sta 277+68.32
θs = 2° 02' 46.6"
Ls = 150.00'
LT = 100.01'
ST = 50.01'

NAD 83/95

100' 0' 100'
GRAPHIC SCALE

-L- ST Sta 278+68.32
-L- CS Sta 277+18.32
-L- POT Sta 278+33.93
-Y41- POT Sta 10+09.00
-Y41- POT Sta 11+75.00 END CONSTRUCTION
-Y41- POT Sta 14+51.01
MATCHLINE STA 267+00.00 SHEET 11
MATCHLINE STA 281+00.00 SHEET 13
SR 1602 SWEET CLUB ROAD 22ft EST
EXISTING R/W
88°23'05" E
S 56° 42' 20" W 240.86'
OUTER BANK DRIVE

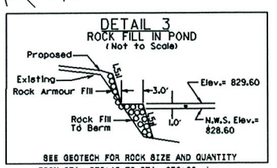
SPLITTER BOX SEE DETAIL ON SHT. 2-G
5 TONS CLASS "B" RIPRAP 16 SY FILTER FABRIC
BASIN #6 SEE DETAIL SHT. 2-F
GR SPLITTER BOX SEE DETAIL ON SHT. 2-G
BASIN #7 SEE DETAIL SHT. 2-F
5 TONS CLASS "B" RIPRAP 16 SY FILTER FABRIC
LEVEL SPREADER SEE DETAIL SHT. 2-F
8 TONS "B" RIPRAP 21 SY FILTER FABRIC
PROP 2' BASE DITCH SEE DETAIL "2" DDE 30 CY
2' BASE DITCH SEE DETAIL "2" DDE 30 CY
ROCK FILL IN POND SEE DETAIL "3"
STORM WATER DETENTION POND NON-JURISDICTIONAL FEATURE
SEE INTERSECTION DETAIL SHEET 2-J

ZONE 2 MITIGABLE
ZONE 1 MITIGABLE
ZONE 2 ALLOWABLE
ZONE 1 ALLOWABLE

SITE 8A

ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2

DETAIL 3
ROCK FILL IN POND
(Not to Scale)



SEE GEOTECH FOR ROCK SIZE AND QUANTITY
FROM STA. 275+42 TO STA. 276+80 -L-

$$$$$$$SYSTIME$$$$$$$
$$$$$$$