

REQUEST FOR BOARD ACTION

Henderson County Board of Commissioners

Meeting Date: November 5, 2007

Subject: Water Line Extensions

Attachments:

1. Water Line Extension – Cummings Cove, Sunset Court Mountain Top (Phase I)
2. Water Line Extension- Wilson Ridge

Summary of Request:

The City of Hendersonville has requested that the County comment on the proposed water line extensions. City of Hendersonville Project Summary Sheets, with vicinity maps, engineer's reports, project maps, and county review sheets, are attached for Board review and action.

Board Action Request:

Action by the Board of Commissioners is needed to either grant or deny this request. If the Board decides to approve the requested extension the following motion has been provided.

Suggested Motion:

I move that the Board approve the water line extensions for Cummings Cove and Wilson Ridge, and direct Staff to convey the County's comments to the City of Hendersonville.

**PROJECT SUMMARY
WATER UTILITY EXTENSION
Little Sunset Court**

October 9, 2007

To: Honorable Mayor and Members of City of Council

From: Water & Sewer Department Staff

RE: STAFF RECOMMENDATION FOR ACCEPTANCE OF
WATER UTILITY EXTENSION AGREEMENT (WUEA)

This is a project to extend lines to provide water service to a **proposed single family development to serve a total of 3 lots**. This project is located **within the existing Cummings Cove Development**. This project is under the reviewing jurisdiction of **Henderson County** and is located within the **RTA – Rural/Urban Transition Area**. This project **will not** involve an IBT (Interbasin Transfer) from the French Broad River Basin. The entire cost of the proposed water line extension is to be paid for by **Cummings Cove Company of Hendersonville, NC**.

This project requires approximately **400** linear feet of water line sized as following:

Approximate Length:	Description:
400 lf	2" PVC SDR 13.5

Fire Protection will be provided by the installation of **0** fire hydrant(s).

The Reviewing Jurisdiction, listed below, has completed their review of this utility extension request in regard to their adopted land use plan or in terms of its future impact on existing land uses for that local government.

Reviewing Jurisdiction: **Henderson County**

Approved Disapproved (See attached letter provided to the City by the Reviewing Jurisdiction)

Narrative Comments Provided: Yes No

Signing Official: _____
(Print)

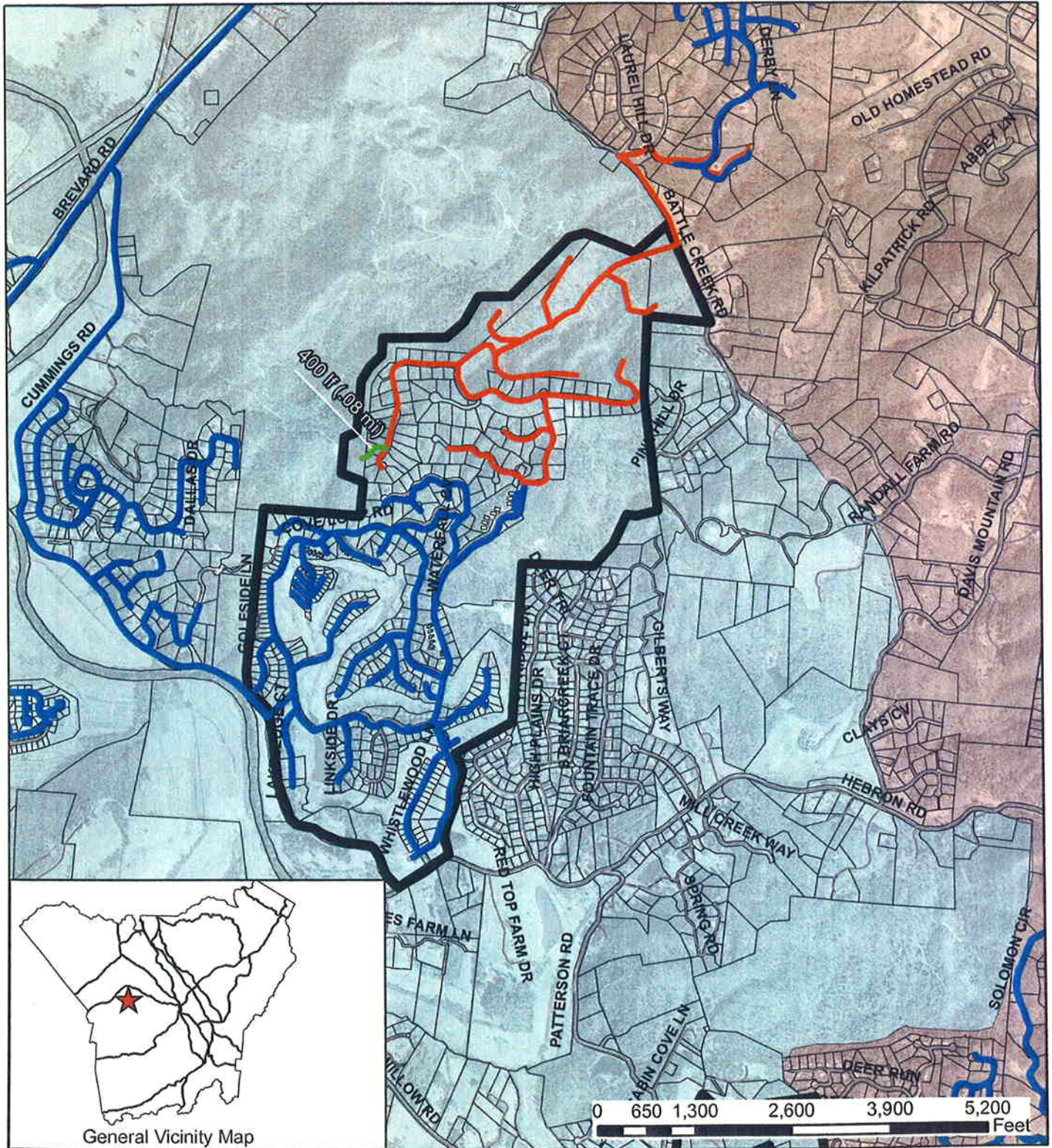
Date: _____

Based on the above information, the Water & Sewer Department has the capacity to support this additional infrastructure and associated connections and hereby recommends approval of said project contingent upon final approval of construction plans and specifications by the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggested wording for motion is as follows:

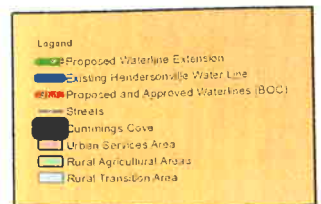
"I move to accept this Water Utility Extension Project and to authorize the City Manager to execute the associated Water Utility Extension Agreement on behalf of the City."

Water and Sewer Department:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Henderson Co. Commissioners:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____



Cummings Cove, Sunset Court, Mountain Top (Phase I)

DEVELOPER: CUMMINGS COVE COMPANY, LLC
 OWNER: CUMMINGS COVE COMPANY, LLC
 AGENT: WILLIAM R. BUIE
 ZONING: OPEN USE
 WATERSHED: NONE
 WATER SYSTEM: PUBLIC
 SEWER SYSTEM: PRIVATE
 ROAD SYSTEM: PRIVATE AND PUBLIC



ENGINEER'S REPORT

FOR

CUMMINGS COVE GOLF & COUNTRY CLUB

MOUNTAIN TOP AREA – LITTLE SUNSET COURT
WATER SYSTEM IMPROVEMENTS

CITY OF HENDERSONVILLE
HENDERSON COUNTY, NORTH CAROLINA



PREPARED BY:

9/24/07

WILLIAM G. LAPSLEY & ASSOCIATES, P.A.
CONSULTING ENGINEERS
TWO TOWN SQUARE
BILTMORE PARK – SUITE 320
ASHEVILLE, NORTH CAROLINA

SEPTEMBER 2007

ENGINEER'S REPORT
CUMMINGS COVE GOLF & COUNTRY CLUB
MOUNTAIN TOP AREA – LITTLE SUNSET COURT
WATER SYSTEM IMPROVEMENTS

1. NAME AND ADDRESS OF APPLICANT

City of Hendersonville
P.O. Box 1760
Hendersonville, NC 28793

2. PROJECT DESCRIPTION & INTRODUCTION

This project is located off Mountain Morning Trail at Cummings Cove Golf & Country Club. The project involves the extension of approximately 400 LF of 2" water line to serve 3 houses on the new Little Sunset Court in the revised Phase 1 of the Mountain Top Area of Cummings Cove Golf & Country Club. The water system users are all residential in nature.

3. DESCRIPTION OF FUTURE SERVICE AREAS

This extension will serve Little Sunset Court in revised Phase 1 of the Mountain Top Area of Cummings Cove only. The extension will not serve future extensions.

4. PRESENT AND ANTICIPATED WATER DEMANDS

There is currently no water demand at the site. This addition to the development will add 3 lots. Expected water usage is 1200 gallons per day.

5. CHARACTER OF THE SOURCE OF SUPPLY

The water supply for this project is from the City of Hendersonville Water Treatment Plant.

6. AGREEMENTS TO PURCHASE WATER

Not Applicable

7. USEFUL LIFE OF FACILITIES

The useful life of the water lines for this project is expected to be 30 years minimum.

8. MAXIMUM DAILY TREATED WATER SUPPLY AND MAXIMUM DAILY DEMAND

The maximum daily treated water supply for the City of Hendersonville water plant is 12 MGD. The average demand is 7.2 MGD, with a daily peak (for the year) of 9.5 MGD.

9. IDENTIFICATION & DESCRIPTION OF THE SERVICE AREA

The service area for this project is Little Sunset Court in the Mountain Top Area of Cummings Cove, Revised Phase 1. This property is currently forest land.

10. CONSIDERATION OF ALTERNATIVES TO CONSTRUCTING A NEW WATER SYSTEM

Not applicable

11. POPULATION RECORDS AND TRENDS

According to the Office of State Planning, The population of the City of Hendersonville in 1998 was 9,538 persons. The growth rate from 1990 to 1998 was 30.9%.

12. PRESENT AND FUTURE YIELD FROM THE SOURCES OF SUPPLY

The City of Hendersonville Water Plant currently draws water from the Mills River. The present and future yield of the source of supply is expected to be adequate for the City of Hendersonville's needs.

13. PROPOSED WATER TREATMENT PROCESSES

Not Applicable

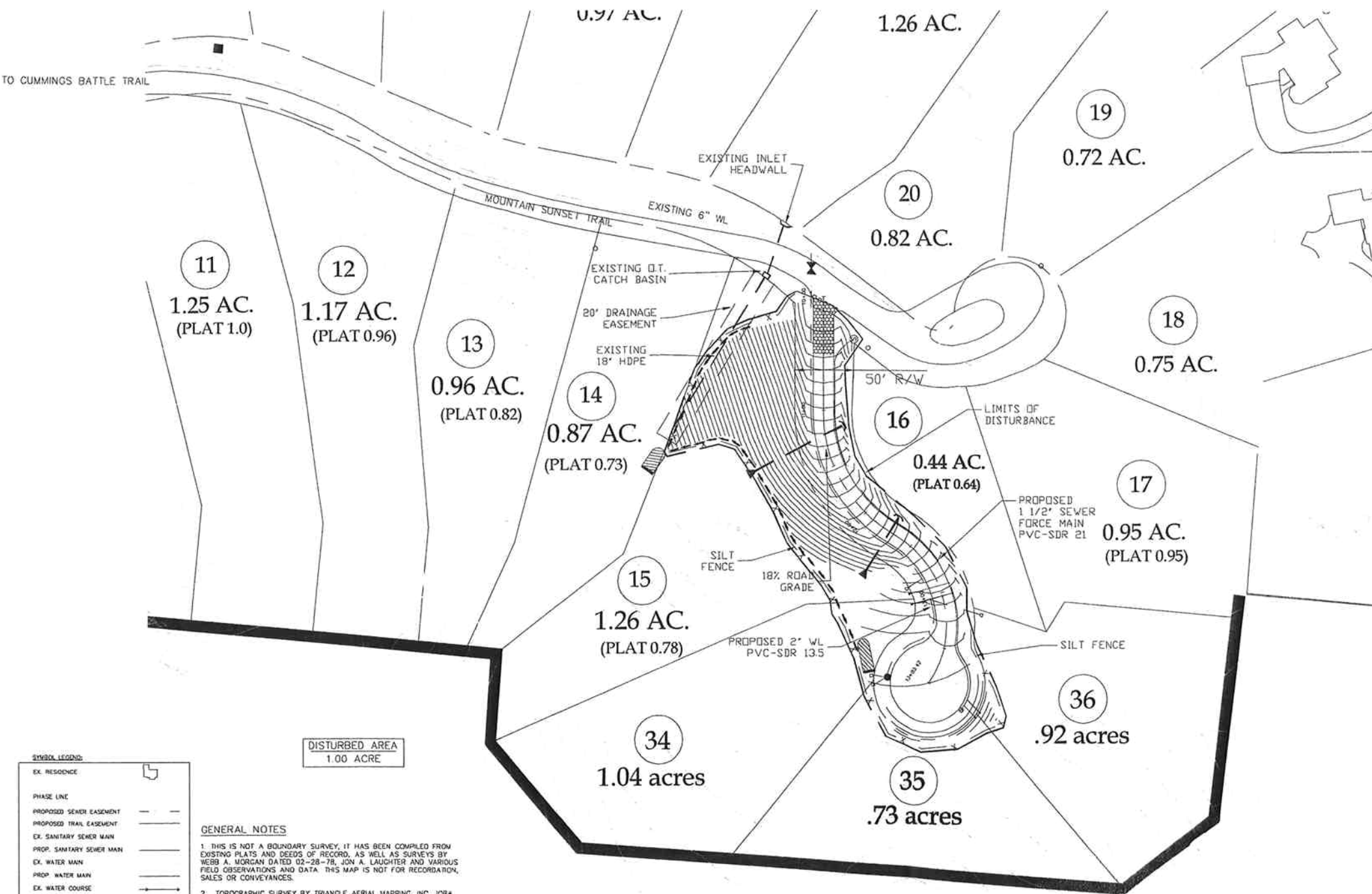
14. DESIGN BASIS

The design basis for this project is to provide adequate flow and 30 psi minimum throughout the system.

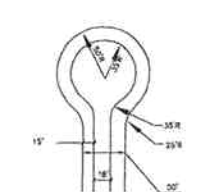
15. PRIORITIZED LIST OF INFRASTRUCTURE IMPROVEMENTS

Not applicable

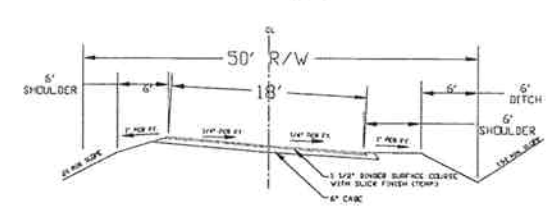
THIS INFORMATION HAS BEEN TRANSMITTED BY WILLIAM G. LAPSLEY & ASSOCIATES IN ELECTRONIC FORMAT AND SHALL NOT BE CONSIDERED A CERTIFIED DOCUMENT.



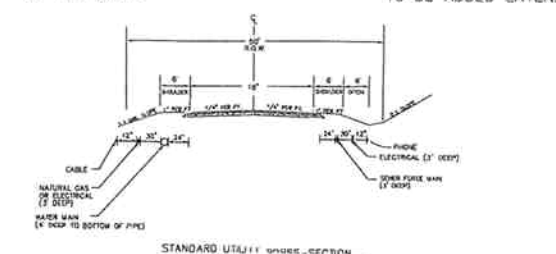
VICINITY MAP
N.T.S.



CUL-DE-SAC DETAIL
N.T.S.



LOCAL ROAD SECTION
NOTE: SUPERELEVATED TO THE SOUTH.
NOTE: 1 1/4" S9.5B TO BE ADDED LATER.



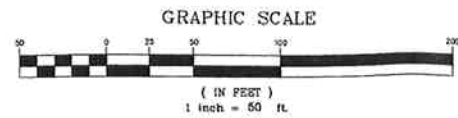
STANDARD UTILITY CROSS-SECTION
N.T.S.

SYMBOL LEGEND

EX. RESIDENCE	
PHASE LINE	
PROPOSED SEWER EASEMENT	
PROPOSED TRAIL EASEMENT	
EX. SANITARY SEWER MAIN	
EX. WATER MAIN	
PROP. WATER MAIN	
EX. WATER COURSE	
WATERSHED	
RIGHT-OF-WAY	
EX. STORM PIPE	
EX. STORM STRUCTURES	
PROP. STORM PIPES	
PROP. STORM STRUCTURES	
EX. SS MANHOLE	
PROP. SS MANHOLE	
EX. FIRE HYDRANT	
PROP. FIRE HYDRANT	

- GENERAL NOTES**
- THIS IS NOT A BOUNDARY SURVEY, IT HAS BEEN COMPILED FROM EXISTING PLATS AND DEEDS OF RECORD, AS WELL AS SURVEYS BY WEBB A. MORGAN DATED 02-28-78, JON A. LAUCHTER AND VARIOUS FIELD OBSERVATIONS AND DATA. THIS MAP IS NOT FOR RECORDATION, SALES OR CONVEYANCES.
 - TOPOGRAPHIC SURVEY BY TRIANGLE AERIAL MAPPING, INC. JOB# 97046 DATED 1-25-98.
 - ALL SUBDIVISION LOT REGULATIONS AND BUILDING GUIDELINES INCLUDING SETBACKS ARE GOVERNED BY THE CUMMING'S COVE COMMUNITY ASSOCIATION. THESE STANDARDS MAY BE AMENDED OR UPDATED FROM TIME TO TIME.
 - ALL EXISTING AND PROPOSED SEWER MAINS SHALL HAVE A 20' EASEMENT ON CENTER.
 - ALL EXISTING STORM DRAINAGE PIPE IS 18".
 - WATER TANK FOR FIRE PROTECTION IS LOCATED IN PHASE 7 (PREVIOUSLY PHASE 3).
 - ALL PROPOSED STORM DRAINAGE PIPE ARE 18" HDPE.
 - ROLLED EROSION CONTROL FABRIC IS REQUIRED ON ALL SLOPES COMPLETED BETWEEN THE DATES OF OCTOBER 15TH AND MARCH 15TH.

DISTURBED AREA
1.00 ACRE



OWNER/APPLICANT
CUMMING'S COVE COMPANY, LLC
#20 CUMMING'S COVE PARKWAY
HENDERSONVILLE, NC 28739
CONTACT: SHANNON GINN
828-891-1512

WILLIAM G. LAPSLEY & ASSOCIATES P.A.
Consulting Engineers & Land Planners
Two Town Square Blvd., Suite 200
Asheville, North Carolina 28803
(828) 687-7179 • Fax (828) 687-7170
www.wgla.com

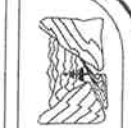
NC ONE CALL CENTER
CALL BEFORE YOU DIG
1-800-632-4949



Revisions

9/20/07	EXPRESS REVIEW
9/21/07	SEASONAL FABRIC

date: 09/15/07
job: 05100
drawn: JLJ



WILLIAM G. LAPSLEY & ASSOCIATES P.A.
CONSULTING ENGINEERS & LAND PLANNERS
ASHEVILLE, NORTH CAROLINA

CUMMING'S COVE
GOLF & COUNTRY CLUB
HENDERSON COUNTY
NORTH CAROLINA

LITTLE SUNSET COURT
DEVELOPMENT PLAN
MTN. TOP PHASE 1 REVISED

sheet
1 of 5

G:\USERS\Dom\DWG-2007\BATTLE CREEK-07113\AUTOCAD\dwg\LSC-DEVELOPMENT PLAN.dwg, 10/16/2007 9:59:44 AM, 1:106.084

**HENDERSON COUNTY
REVIEW OF CITY WATER LINE EXTENSIONS**

Project Name: Little Sunset Court (Mountain Top Area of Cummings Cove, Phase I)
 Size of Water Line (Main & Distribution Pipe Size): 400 lf of 2" PVC SDR 13.5
 County Staff Reviewing Extension: Rocky Hyder, Fire Marshall; Alexis Baker, Planner; Autumn Radcliff, Senior Planner

Has the project been reviewed under the **County Subdivision Ordinance**? Yes No N/A
 Date reviewed: 8/16/2005
 Action: Phase I and II master plan was approved with conditions by Planning Board
 Conditions: Water Supply plans approved by appropriate agencies
 Comments: _____

Has the project been reviewed under the **County Manufactured Park Ordinance**? Yes No N/A
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

Has the project been reviewed under the **County Zoning Ordinance (i.e. Special-Use or Conditional-Use Permit)**? Yes No N/A
 Date reviewed: 8/16/2005
 Action: Reviewed as open use. At time of application and approval, it was in compliance. New zoning for area is R2-MH
 Conditions: _____
 Comments: _____

Is the project subject to **any other County Land Use Ordinance**? Yes No N/A
 If yes, explain: In 2005, reviewed under Watershed Water Supply Ordinance—30 foot vegetative buffer from perennial streams

Does the project conform with the **2020 Henderson County Comprehensive Plan (CCP)**? Yes No N/A

Does the project have **adequate hydrant location and spacing**? Yes No N/A

Description of **hydrant type and thread**: Mueller Centurion – National Standard Thread
 Does the estimated flow rate (gpm) meet **fire protection standards**? Meets standard for structural spacing of more than 100 feet. Yes No N/A

BOARD OF COMMISSIONERS APPROVAL

- Approved
- Not Approved
- Conditional Approval (See Comments)

Date of Board Review: _____
 Comments: _____

**PROJECT SUMMARY
WATER UTILITY EXTENSION
Wilson Ridge**

September 24, 2007

To: Honorable Mayor and Members of City of Council

From: Water & Sewer Department Staff

RE: STAFF RECOMMENDATION FOR ACCEPTANCE OF
WATER UTILITY EXTENSION AGREEMENT (WUEA)

This is a project to extend lines to provide water service to a **proposed single family residential subdivision consisting of 10 lots**. This project is located **off Eade Road**. This project is under the reviewing jurisdiction of **Henderson County** and is located within the **RTA – Rural/Urban Transition** planning area. This project **will not** involve an IBT (Interbasin Transfer) from the French Broad River Basin. The entire cost of the proposed water line extension is to be paid for by **Wilson Ridge LLC of Elon, NC**.

This project requires approximately **990** linear feet of water line sized as following:

Approximate Length:	Description:
450 LF	8" DIP CL 350
140 LF	6" DIP CL 350
400 LF	2" PVC SDR 13.5

Fire Protection will be provided by the installation of **one (1)** fire hydrant.

The Reviewing Jurisdiction, listed below, has completed their review of this utility extension request in regard to their adopted land use plan or in terms of its future impact on existing land uses for that local government.

Reviewing Jurisdiction: **Henderson County (sent to County 9-24-07)**

Approved Disapproved (See attached letter provided to the City by the Reviewing Jurisdiction)

Narrative Comments Provided: Yes No

Signing Official: _____
(Print)

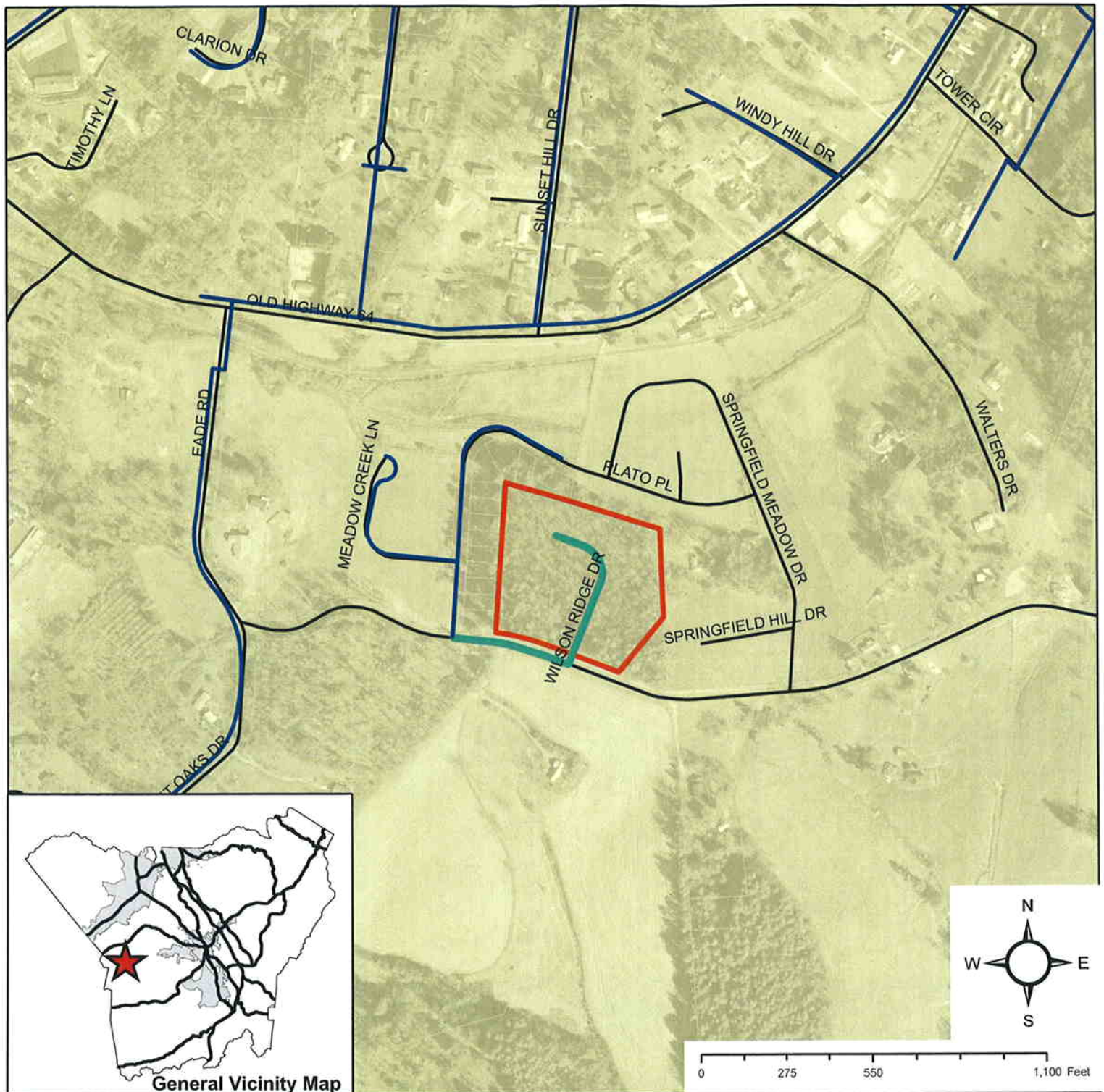
Date: _____

Based on the above information, the Water & Sewer Department has the capacity to support this additional infrastructure and associated connections and hereby recommends approval of said project contingent upon final approval of construction plans and specifications by the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggested wording for motion is as follows:

"I move to accept this Water Utility Extension Project and to authorize the City Manager to execute the associated Water Utility Extension Agreement on behalf of the City."

Water and Sewer Department:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Henderson Co. Commissioners:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____









Wilson Ridge

OWNER/DEVELOPER: Richard Kiser, Wilson Ridge LLC
 ZONING: R-1
 SEWER SYSTEM: Private Individual Septic
 ROAD SYSTEM: Private

The proposed water line extension connects to the water line along Plato Place. While not shown on the map the City of Hendersonville Water & Sewer Department indicated this line connects to the north on Old Hwy. 64

Legend

-  Existing Hendersonville Water Line
-  Proposed Water Line Extension
-  Streets
-  Wilson Ridge
-  Rural/Urban Transition Area
-  Parcels

ENGINEER'S LETTERHEAD

PROJECT NARRATIVE

TO: Lee Smith, Utilities Director
Water & Sewer Department
City of Hendersonville

FROM: **ODOM, HOLLIFIELD, & ASSOCIATES, ENGINEERING, INC.**
SCOTT ROACH, PROJECT MANAGER
DAVID ODOM, P.E.

DATE: **Monday, September 10, 2007**

SUBJECT: **WILSON RIDGE SUBDIVISION**
#9528-46-5332
WATER UTILITY EXTENSION

An extension of the existing water main(s) located **off the corner of Eade Road and Plato Place (Private Road)** is required to provide water service to the above referenced project. This project is proposed to be a **single family residential** development. The water extension will serve a total of ten (10) lots. The proposed site is currently owned and being developed by:

Richard Kiser, Owner
Wilson Ridge LLC
303 Forest View DR.
Elon, NC 27244
336-584-1721
kiserp@elon.edu

The sewer service for this project will be provided by individual septic.

At the present time, Richard Kiser will be responsible for signing the Water Utility Extension Agreement (WUEA) with the City of Hendersonville.

The project will consist of APPROX 450LF OF 8" DIP, 575LF OF 6" DIP AND 540LF OF 2" SDR 13.5 PVC W/ GV's, FHA, AND OTHER APPURTENANCES. For more information regarding this proposed project see the accompanying preliminary plans.

This project is estimated to be completed **30** days after final grading has been completed, assuming favorable weather conditions. I, or an authorized representative of my company, will be observing and monitoring the progress of construction for this project. Should you have any questions, concerns or comments regarding this project please feel free to contact me at 828-247-4495.

**WILSON RIDGE SUBDIVISION
WATERMAIN EXTENSION**

ENGINEER'S REPORT

APPLICANT NAME ADDRESS

CITY OF HENDERSONVILLE
P.O. Box 1670
Hendersonville, NC 28793

PROJECT DESCRIPTION and NARRATIVE

Wilson Ridge is a single-family residential homes subdivision. The proposed subdivision is located off Eade Road between Plato Place and Springfield Meadows Drive.

The proposed plan and permit provides for the development of 10 lots.

CURRENT PROJECT NARRATIVE

The proposed water main extension which includes 2", 6", and 8" water mains with valves, tees, and other appurtenances will serve only one (1) neighborhood of 10 lots.

WATER PROJECT SUMMARY

AIR RELEASE VALVE	1 EA
FIRE HYDRANT ASSEMBLY	1 EA
2" SDR 13.5 WATER MAIN	540 LF
6" DIP WATER MAIN	575 LF
8" DIP WATER MAIN	450 LF ✓

*400 } Per Dennis
140 } Frady.
9/24/07*

IDENTIFICATION AND DESCRIPTION of the SERVICE AREA

The service area is for the proposed Wilson Ridge Subdivision only.

FUTURE SERVICE AREAS

The proposed water main extension shall be "stubbed out" for additional connection beyond the entrance to the proposed subdivision.

PRESENT AND ANTICIPATED WATER DEMAND

The proposed water demand for the proposed subdivision is approximately 3600 GPD (10 homes @ 360 GPD).

CHARACTER of the WATER SUPPLY SOURCE

The water supply of the is project shall be the City of Hendersonville Water Treatment Plant.

AGREEMENTS TO PURCHASE WATER

Not applicable.

FACILITES USEFUL LIFE

For this project, the expected useful life is at least thirty (30) years.

MAXIMUM DAILY TREATED WATER SUPPLY AND MAXIMUM DAILY DEMAND

The maximum daily treated water supply for the City of Hendersonville WTP is 12 MGD. The average demand is approximately 7.2 MGD with a daily peak of 9.5 MGD.

CONSIDERATION of ALTERNATIVES to CONSTRUCTING A NEW WATER SYSTEM.

Not Applicable

POPULATION RECORDS AND TRENDS

In 1998 the population of Hendersonville was 9538, and the growth rate from 1990 to 1998 was approximately 31%. According to the Office of State Planning in Raleigh, the population of the City is 12,237.

PRESENT AND FUTURE YIELD FROM the SOURCE of SUPPLY

The Hendersonville WTP draws water from the Mills River. This supply of water source is expected to be adequate for the future needs of the City.

PROPOSED WATER TREATMENT PROCESSES

Not Applicable

DESIGN BASIS

The design basis for this project is to meet or exceed minimum pressure and flow requirements as stated in the Rules Governing Public Water Systems.(RGPWS).

PRIORITIZED LIST of INFRASTRUCTURE IMPROVEMENTS

Not applicable.



COPY

SECTION 01500	SPECIAL CONDITIONS
SECTION 02100	CLEARING & GRUBBING
SECTION 02200	WASTE MATERIAL DISPOSAL
SECTION 02800	RESTORATION OF SURFACES
SECTION 03450	TRENCH EXCAVATION
SECTION 05050	BITUMINOUS PAVEMENT REPAIRS
SECTION 05100	AGGREGATE BASE COURSE
SECTION 07110	SEWER PIPE AND APPURTENANCE MATERIALS
SECTION 07120	SEWER PIPE INSTALLATION
SECTION 07400	BORE AND ENCASEMENT
SECTION 07900	TESTING

01500.1 LIMITS OF CONSTRUCTION

The Contractor shall confine all operations and personnel to the limits of construction as shown on the plans. There shall be no disturbance whatsoever of any areas outside the limits of construction.

01500.2 CLEANLINESS

The Contractor shall maintain the work and project grounds free from rubbish, debris and waste materials during all phases of the work.

Immediately upon completion of the work but prior to final acceptance, the Contractor shall remove all rubbish, debris, temporary structures, equipment, excess or waste materials and shall leave the work and project grounds in a neat and orderly condition that is satisfactory to the Engineer and Owner.

01500.3 CONSTRUCTION SURVEYING

All work shall be constructed in accordance with the lines, grades and elevations shown on the plans or as given by the Engineer in the field. The Contractor shall be fully responsible for maintaining alignment and grade. Principal controlling points and base lines for locating the principal components of the work together with a suitable number of benchmarks adjacent to the work will be provided by the Engineer. From this information, the Contractor shall verify benchmarks and develop and make all detailed surveys needed for construction. The Contractor shall protect and safeguard all points, stakes, grade marks, monuments and benchmarks at the site of the work and shall re-establish, at his own expense, any marks which are removed or destroyed due to his construction operations.

01500.4 EQUIPMENT AND MATERIAL STORAGE

The Contractor shall plan his activities so that all materials and equipment can be stored within the limits of construction.

01500.5 CONTROL OF EROSION, SILTATION AND POLLUTION

- A. The Contractor shall take whatever measures necessary to minimize soil erosion and siltation, water and air pollution caused by his operations. The Contractor shall also comply with the applicable regulations of all legally constituted authorities relating to pollution prevention and control.

The Contractor shall keep himself fully informed of all such regulations which in any way affect the conduct of the work, and shall at all times observe and comply with all such regulations. In the event of conflict between such regulations and the requirements of the specifications, the more restrictive requirements shall apply.

The Engineer will limit the area over which clearing and grubbing, excavation, borrow, and embankment operations are performed whenever the Contractor's operations do not make effective use of construction practices and temporary measures which will minimize erosion, or whenever construction operations have not been coordinated to effectively minimize erosion, or whenever permanent erosion control features are not being completed as soon as permitted by construction operations.

B. The Contractor shall control dust throughout the life of the project within the project area and at all other areas affected by the construction of the project, including, but not specifically limited to, unpaved secondary roads, haul roads, access roads, disposal sites, borrow and material pits, and production sites. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property.

01500.6 **TRAFFIC CONTROL**

The Contractor shall provide, erect, and maintain all necessary devices to control traffic and protect the public, the work and workers. All traffic control shall be provided as established in The Manual of Uniform Traffic Control Devices and any and all supplements of the North Carolina Department of Transportation.

In special cases, additional traffic control may be required as directed by the Engineer or by the North Carolina Department of Transportation.

01500.7 **ENCROACHMENT/EASEMENT AGREEMENTS**

It shall be the responsibility of the contractor to abide by any and all conditions of any and all easements and/or encroachments which are necessary for the accommodation of the work.

01500.8 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

02100.1 **SCOPE**

Clearing and grubbing shall consist of the removal and satisfactory disposal of all trees, brush, stumps, logs, grass, weeds, roots, decayed vegetative matter, posts, fences, stubs, rubbish and all other objectionable matter resting on or protruding through the original ground surface and occurring within the construction limits or right-of-way of any excavation, borrow area, or embankment.

02100.2 **GENERAL**

Clearing and grubbing operations shall be completed sufficiently in advance of grading operations as may be necessary to prevent any of the debris from the clearing and grubbing operations from interfering with the excavation or embankment operations. All work under this section shall be performed in a manner which will cause minimum soil erosion. The Contractor shall perform such erosion control work, temporary or permanent, as may be directed by the Engineer in order to satisfactorily minimize erosion resulting from clearing and grubbing operations.

02100.3 **CLEARING**

The work of clearing shall be performed within the limits established by the plans, specifications, or the Engineer. Clearing shall consist of the cutting, removal, and satisfactory disposal of all wooded vegetation and debris.

Individual trees, groups of trees, and vegetation to be left standing will be clearly marked on the plans or in the field by the engineer. Individual trees and groups of trees designated to be left standing within cleared areas shall be trimmed of all branches to necessary to prevent interference with construction operations. All limbs and branches required to be trimmed shall be neatly cut close to the trunk of the tree or to main branches. When oaks or elms are trimmed during a critical time of year (usually spring for oaks, or throughout the growing season for elms) some type of wound dressing should be applied to the cut. Individual trees, groups of trees, and other vegetation, to be left standing shall be thoroughly protected from damage incidental to construction operations by the erection of barriers or by such other means as the circumstances may require.

Clearing operations shall be conducted so as to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and so as to provide for the safety of employees and others. When such damages occur, all damaged areas shall be repaired, removed or otherwise resolved utilizing generally accepted practices at the Contractor's expense.

02100.4 **GRUBBING**

The work of grubbing shall be performed within the limits established by the plans, specifications, or the Engineer. Grubbing shall consist of the complete removal and satisfactory disposal of all grassy vegetative matter, root mat, ball and root, soil material high in organic content and surface debris.

Perform the following as part of the work of grubbing:

1. Remove and dispose of crops, weeds, and other annual growth.
2. Remove and dispose of surface debris such as fences, steps, walls, chimneys, column footings, other footings, foundation slabs, basements, other foundation components, signs, junked vehicles, and other rubble and debris.

02100-1

3. Fill holes and depressions.
4. Cut off and plug at the right of way or construction limits any private water or sewer line intercepted during the construction of the project.
5. Cut off and remove from the right of way or construction area any septic tank or portion thereof intercepted within the right of way or construction area during the construction of the project.

02100.5

DISPOSAL OF CLEARED AND GRUBBED MATERIAL

Remove from the project and properly dispose of all vegetation, roots, stumps, tree laps, and timber remaining on the project by a satisfactory method.

When vegetation is disposed of by burning, burn in such a manner as to prevent injury to property within or outside of the right of way. Comply with all local, state, and federal laws, ordinances, and regulations when burning. Secure all necessary burning permits. Perform all burning under the constant care of a competent watchmen. Do not allow smoldering or dense smoke to occur during burning.

02100.6

PAYMENT

The contract prices shall include full compensation for all costs incurred under this section.

02200.1 **DESCRIPTION**

The work covered by this section consists of the disposal of waste and debris in accordance with the requirements of these specifications. Waste will be considered to be all excavated, grubbed or removed materials which are not utilized in the construction of the project.

02200.2 **GENERAL REQUIREMENTS**

Waste shall be disposed of in areas that are outside of the project area and provided by the Contractor, unless otherwise required by the plans or special provisions or unless disposal within the project area is permitted by the Engineer.

The Contractor shall maintain the earth surfaces of all waste areas, both during the work and until the completion of all seeding and mulching or other erosion control measures specified, in a manner which will effectively control erosion and siltation.

The following requirements shall also be applicable to all waste or disposal areas other than active public waste or disposal areas:

1. Rock waste shall be shaped to contours which are comparable to and blend in with the adjacent topography where practical, and shall be covered with a minimum six (6) inch thick layer of earth material either from project waste or from borrow.
2. Earth waste shall be shaped to contours which are comparable to and blend in with the adjacent topography where practicable, but in no case will slopes steeper than 2:1 be permitted.
3. Construction debris, grubbed debris and all broken pavement and masonry shall be covered with a minimum six (6) inch thick layer of earth waste material from the project or borrow. The completed waste area shall be shaped as required above for disposal of earth waste.
4. Seeding and mulching shall be performed over all earth or earth covered waste areas.
5. Where the Engineer has granted permission to dispose of waste and debris within the project area, the Engineer's approval of said disposal will be necessary to insure the satisfactory appearance of the completed project.

Disposal of waste or debris in active public waste or disposal areas will not be permitted without prior approval by the Engineer. Such disposal will not be permitted when, in the opinion of the Engineer, it will result in excessive siltation or pollution.

02200.3 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

02800.1 **SCOPE**

This section covers the furnishing of all labor, equipment and materials necessary for the proper restoration of existing surfaces disturbed or damaged as a result of construction operations which are not specifically scheduled or specified for topsoil and seeding, paving, landscaping or other surfacing.

02800.2 **GENERAL**

In general, the types of replacement included in this section are seeding along pipelines, concrete sidewalks, driveways, roadways, ditches, lawns and landscaped areas, curb and gutter.

Any damage to existing structures shall be repaired using materials and workmanship equal to those of original construction.

02800.3 **SEEDING ALONG PIPELINES**

All ground surfaces along pipelines, which are not classified as lawns, landscaped areas, or pavement areas, but would be classified as open fields, shall be raked smooth and seeded in accordance with Section 1060 of the NCDOT Standard Specifications for Roads and Structures. Large rocks, clumps of earth and excessive spoil material shall be removed from the area prior to seeding.

Shoulders of all roads shall be restored as specified in section 02800.8 for lawns and landscaped areas.

Wooded areas, not classified as lawns shall be restored to as near their original condition as possible.

02800.4 **CONCRETE SIDEWALKS**

Concrete walks removed in connection with, or damaged as a result of, construction operations under the Contract shall be replaced with new construction. Sidewalks are to be constructed in accordance with City of Hendersonville Sidewalk Requirements.

02800.5 **DRIVEWAYS**

Unpaved driveways shall be surfaced with not less than 4 inches of ABC, and topped with 2" of material equal to that found in the original condition. Driveways shall be left better than their original condition.

Concrete driveways are to be constructed in accordance with Section 848 of the NCDOT Standard Specifications for Roads and Structures. Concrete drives shall be replaced with Class B concrete and shall have equal thickness and reinforcing steel to that of the original drive or a thickness of 6 inches, whichever is greater. Prior to placing the concrete a 6 inch aggregate base course shall be placed in the drive area.

Bituminous drives shall be restored with a 6 inch aggregate base course and a 2 inch surface course, as defined in section 5050 Bituminous Pavement Repairs.

02800.6 **ROADWAY REPLACEMENT**

Bituminous pavements shall be covered under section 5050 Bituminous Pavement Repairs.

Concrete Roadways are to be constructed in accordance with Section 848 of the NCDOT Standard Specifications for Roads and Structures. Portland cement concrete roadways shall be replaced with Class B Concrete and shall have equal thickness and reinforcing steel as the original roadway. An aggregate of 6 inches shall be placed prior to the placing of concrete.

Differential settlement of restored pavements shall be corrected immediately.

02800.7 **DITCHES**

Ditches shall be reestablished to the original grade and line. The surface of all ditches shall be returned to the same condition as found before commencing work, unless shown otherwise on plans.

02800.8 **LAWNS AND LANDSCAPED AREAS**

Lawns and landscaped areas shall be regraded and replaced as follows:

- A. Contours shall be restored to preconstruction grades.
- B. Lawn replacement shall be in accordance with the Section 1660 of the NCDOT Standard Specifications for Roads and Structures. Topsoiled areas shall be replaced with topsoil of equal quality and quantity.
- C. Landscaped areas shall be replaced with shrubs, hedges, ornamental trees, flowers, or other items to original condition.

02800.9 **CURB AND GUTTER**

Curb and gutter removed with, or damaged as a result of construction operations, injured or disturbed by the Contractor, his agents, or employees, shall be replaced with new construction in accordance with section 846 of the NCDOT Standard Specifications for Roads and Structures latest edition.

02800.10 **DAMAGE TO STRUCTURES**

Any damage to existing structures shall be repaired by using materials and workmanship equal to those of original construction. Extensively damaged structures, where the structural stability has been affected or which cannot be repaired in a suitable fashion shall be replaced entirely. Replacement shall not commence until approval of the plan of replacement has been given by the Engineer. Replacement costs shall be responsibility of the Contractor.

02800.11 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

03450.1 **DESCRIPTION**

The work covered by this section consists of the excavation and satisfactory disposal of all materials excavated in the construction of trenches.

Trenches will be defined as all excavation for the installation of storm sewers, sanitary sewers, waterlines, manholes, catch basins, hydrants, gate valves, sewer services, water taps, drainage structures, drainage ditches and other unclassified excavation as may be deemed necessary by the Engineer.

03450.2 **GENERAL**

In general, construct all portions of the excavations so that the safe slope of the earth is not exceeded. Comply with OSHA standards – 29 CFR, PART 1926, SUBPART P and provide a competent person on site to supervise the excavation at all times. Properly and adequately protect any part of the excavation from caving or slipping by the use of sloping, benching, shoring, and shielding as necessary. Install all shoring in trench excavations so that it may be withdrawn in stages on both sides of the trenches to prevent lateral movement of the pipe as the backfilling progresses, except where the Engineer permits the shoring to be left in place at the contractor's request. Cut off any sheeting left in place at least twenty-four inches below finished grade wherever directed. Remove and properly dispose of the cut off material. Wherever necessary, in quicksand, soft or wet ground, or for the protection of surrounding structures and property, drive sheeting to such depth below the bottom of the excavation as may be necessary. The Contractor may use dewatering in lieu of sheeting to stabilize the banks or for protection at the discretion of the Contractor. Take all measures necessary to keep surface water out of the foundations and trenches by approved methods for surface drainage.

Keep all excavations free of water while the work is in progress. Water may be removed by pumps or the use of underdrains, whichever will produce the above results. Deposit all excavated material in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Leave hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls unobstructed and accessible at all times. Keep gutters clear or use other satisfactory provisions for street drainage. Do not obstruct natural watercourses. Take whatever measures necessary to control erosion and keep silt runoff from contaminating adjoining property.

03450.3 **EXCAVATED MATERIALS**

Excavated materials to be used for backfill will be approved by the Engineer. Where stockpiling of excavated material is required, the Contractor shall take whatever measures necessary to control erosion and prevent silt runoff.

03450.4 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

05050.1 **SCOPE**

The work covered by this section consists of repairs to existing pavement which are necessary in order to provide a safe, passable, and convenient condition for traffic, or to replace pavement which has been removed in order to remove or to place pipe lines. Repairing of existing pavement shall include but not be limited to the saw cutting of the existing pavement to a neat vertical joint and uniform line; the removal and disposal of pavement, base, and subgrade material as approved or directed by the Engineer; the coating of the area to be repaired with a tack coat; and the replacement of the removed material with asphalt plant mix.

05050.2 **GENERAL**

Construction of the subgrade, base course and paving shall be undertaken immediately after completion of all underground piping and structures, all curbs and gutters, all yard piping, conduits and other facilities passing beneath paved areas, and all structural slabs and foundations required within or adjacent to the paved areas.

The repairs shall be made in accordance with the plans, or as approved or directed by the Engineer.

05050.3 **WEATHER LIMITATIONS**

Bituminous mixtures shall not be placed during rainy weather, when the subgrade or base course is frozen or shows any evidence of excess moisture nor when the moisture on the surface to be paved would prevent proper bond nor when the air temperature is less than 40 degrees F. in the shade away from artificial heat.

05050.4 **MATERIALS.**

The repair shall consist of a 6 inch aggregate base course and a 2 inch surface course unless otherwise shown on the plans.

05050.5 **CONSTRUCTION METHODS.**

Repair of existing pavement shall be done as approved or directed by the Engineer. The work shall be coordinated with all other work and operations.

Where traffic is to be maintained, the removal or installation of pipe shall be done in sections so that half the width of the roadway will be available to traffic. Immediately upon completion of the pipeline crossing the paved area, the pavement repair shall be made.

05050.6 **TESTS**

All of the above work will be subject to thickness and compaction tests as deemed necessary by the Engineer. Such tests will be at the Expense of the Contractor.

05050.7 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

05050-1

05100.1 SCOPE

The work covered by this section consists of the construction of a base composed of an approved aggregate material hauled to the site, placed on the site, compacted, and shaped to conform to the lines, grades, depths, and typical sections shown on the plans or established by the Engineer.

05100.2 MATERIALS

- A. Aggregate base course materials shall consist of crushed stone or uncrushed gravel, or other similar material having hard, strong, durable particles free of adherent coatings.

The Contractor shall furnish aggregate base course material produced in accordance with the requirements indicated herein for Type A, aggregate unless otherwise specified in the special provisions.

All aggregates shall be from approved sources. Sources will not be approved unless the material has satisfactory soundness and satisfactory resistance to abrasion. Satisfactory soundness will be considered to be a weighted average loss of not greater than 15 percent when subject to 5 alternations of the sodium sulfate soundness test in accordance with AASHTO T104. Satisfactory resistance to abrasion will be considered to be a percentage of wear of not greater than 55 percent when tested in accordance with AASHTO T96.

- B. Aggregates shall be handled in such a manner as to minimize segregation.

Sites for aggregate stockpiles shall be grubbed and cleaned prior to storing aggregates, and the ground surface shall be firm, smooth, and well drained. A cover of at least 3 inches of aggregate shall be maintained over the ground surface in order to avoid the inclusion of soil or foreign material. Stockpiles shall be built in such a manner as to minimize segregation. When it is necessary to operate trucks or other equipment on a stockpile in the process of building the stockpile, it shall be done in a manner approved by the Engineer.

Stockpiles of different types or sizes of aggregates shall be spaced far enough apart, or else separated by suitable walls or partitions, to prevent the mixing of the aggregates.

Any method of stockpiling aggregates which allows the stockpile to become contaminated with foreign matter or causes excessive degradation of the aggregate will not be permitted. Excessive degradation will be determined by sieve tests of samples taken from any portion of the stockpile over which equipment has been operated, and failure of such samples to meet all grading requirements for the aggregate will be considered cause for discontinuance of such stockpiling procedure.

- C. Gradation: All standard sizes of aggregates shall meet the gradation requirements when tested in accordance with AASHTO T27.

05100.3 HAULING AND PLACING AGGREGATE BASE MATERIALS

The aggregate material shall be spread on the subgrade to a uniform loose depth and without segregation.

05100-1

Where the required compacted thickness of base is 8 inches or less the base material may be spread and compacted in 1 layer. Where the required compacted thickness of base is more than 8 inches, the base material shall be spread and compacted in 2 or more approximately equal layers. The minimum compacted thickness of any one layer shall be approximately 4 inches.

Each layer of material shall have approved by the engineer prior to placing succeeding layers of base material or pavement. Each layer is subject to being sampled, and tested at the engineer's request. The contractor shall pay for failed tests.

No base material shall be placed on frozen subgrade or base. Hauling equipment shall not be operated on subgrade or a previously completed layer of base material soft enough to rut or weave beneath the equipment.

The maximum speed of trucks hauling or traveling over any part of the subgrade or base shall be 5 miles per hour.

The Contractor shall utilize methods of handling, hauling, and placing which will minimize segregation and contamination. If segregation occurs, the Engineer may require that changes be made in the Contractor's methods to minimize segregation, and may also require mixing on the road which may be necessary to correct any segregated material. No additional compensation will be allowed for the work of road mixing as may be required under this provision. Aggregate which is contaminated with foreign materials to the extent the base course will not adequately serve its intended use shall be removed and replaced by the Contractor at no additional cost to the Owner. The above requirements will be applicable regardless of the type of aggregate placed and regardless of prior acceptance.

05100.4 SHAPING AND COMPACTION

Immediately after the placing of a layer of the base, the Contractor shall begin machining and compacting the layer. Each layer shall be maintained to the required cross section during compaction and each layer shall be compacted to the required density prior to placing the next layer.

Each layer of the base shall be compacted to a density equal to at least 100 percent of that obtained by compacting a sample of the material in accordance with AASHTO T180. Copies of these modified testing procedures are available upon request from the NCDOT Materials and Tests Unit.

The base material shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test methods. The Contractor shall dry or add moisture to the material when required to provide a uniformly compacted and acceptable base.

The final layer of the base material shall be shaped to conform to the lines, grades, and typical sections shown on the plans or established by the Engineer. When completed the base course shall be smooth, hard, dense, unyielding, and well bonded.

05100.5 TOLERANCES

After final shaping and compacting the base, the Engineer will check the surface of the base for conformance to grade and typical section and will determine the base thickness.

The thickness of the base shall be within a tolerance of plus or minus 1/2 inch of the base thickness required by the plans.

05100.7 **PAYMENT**

The contract prices shall include full compensation for all costs incurred under this section.

05100-3

SECTION 07110

**SEWER PIPE (GRAVITY) - MANHOLES
AND APPURTENANCE MATERIAL**

07110.1 **SCOPE**

These specifications shall apply to the materials to be furnished and installed to complete the sanitary sewer line installations in accordance with the plans. All pipe, manholes and appurtenances shall be of the class and type as indicated on the plans, within the approved materials list and designated herein.

07110.2 **GENERAL**

No unapproved materials will be delivered to the job site.

All materials shall be first quality, new and unused with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs, and other imperfections, and true to theoretical shapes and forms throughout. All materials shall be subject to the inspection of the Engineer at the plant, trench, or other point of delivery, for the purpose of culling and rejecting material that does not conform to the requirements of these specifications. Such material shall be marked by the Engineer, and the Contractor shall remove it from the project site upon notice being received of its rejection.

Specifications cited refer to the latest revision under the same specification number, or to superseding specifications under a new number.

07110.3 **HANDLING AND STORING MATERIALS**

The Contractor shall use care unloading materials to avoid damage. Material shall not be rolled or dragged over gravel or rock during handling. The Contractor shall store pipe bundles on flat surfaces with uniform support. Stored pipe shall be protected from prolonged exposure (six months or more) to sunlight with a suitable covering (canvas or other opaque material). Air circulation shall be provided under any covering. The Contractor shall store the fittings and appurtenances on skids above storm drainage level and deliver for installation after the trench is excavated. Gaskets shall not be exposed to oil, grease, ozone (produced by electric motors), excessive heat and direct sunlight. When any material is damaged during transporting, unloading, handling or storing, the Engineer will reject the material as being unfit for installation. Any suitable undamaged portions may be used.

If any defective material is discovered after installation, it shall be removed and replaced with sound material or shall be repaired by the Contractor in an approved manner at his own expense.

07110.4 **PIPE**

A. Ductile Iron Pipe

Ductile Iron Pipe shall be manufactured in accordance with ANSI Specification A 21.51. All Ductile Iron Pipe shall be Class 350 unless otherwise specified and shall be lined with cement mortar not less than 1/16 inch thick conforming to ANSI Specification A 21.4.

Slip or push-on joints shall be manufactured in accordance with ANSI Specification A 21.11. Bells of "slip" joint pipe shall be contoured to receive a bulb shaped circular rubber gasket, and plain ends shall have a slight taper to facilitate installation. The lubricant used in making up the joints shall be furnished by the pipe manufacturer.

07110-1

B. Polyvinyl Chloride (PVC) Pipe

PVC Pipe shall meet the requirements of ASTM D 3034 and be suitable for use as a gravity sewer conduit. The standard dimension ratio (DR) shall be 35 unless otherwise specified. The pipe shall be furnished in standard laying lengths of 20 feet and 12.5 feet.

All PVC pipe joints shall be of an integral bell and spigot of the same material as the pipe with a solid cross-section rubber o-ring conforming to ASTM C-443. Service saddles and other fittings shall be supplied by the pipe manufacturer and shall be of the same material and type of construction as the pipe material.

All non-ferrous sewerline shall have a 14 gauge copper tracer wire Type "THNN" laid beneath the waterline for the purpose of locating such lines.

C. Steel Casing Pipe

See Section 7400.

07110.5

MANHOLE ASSEMBLIES

Assemblies include precast base, precast riser if necessary, precast cone or flat slab lid, o-ring rubber gaskets for joints between sections, grade ring, manhole rim and lid.

Sanitary Sewer Manholes shall conform to Section 1525 of NCDOT Standard Specifications for Roads and Structures and Roadway Standard Drawing 840.52 and the standard detail drawing. The grade rings and foundation shall conform to the standard detail drawing.

The quality of materials, the process of manufacture, and the finished manhole sections shall be subject to inspection and approval by the Engineer or his inspector.

The minimum inside diameter of the manhole shall be four (4) feet. Steps shall be provided where necessary as shown on the detail. Minimum compressive strength of concrete for all sections shall be 4000 psi. Maximum allowable absorption of concrete shall be eight (8) percent.

The base section shall be precast with inverts and invert channels. Invert channels shall be constructed of concrete in a semicircular section conforming to the inside diameter of the outlet sewer. Changes in size of pipe or grade shall be made gradually and change in direction constructed by using true curves. Each manhole shall be provided with such channels for all connecting sewer pipes. Each invert shall be fitted with a Lock Joint flexible manhole sleeve. If the invert diameter exceeds the available sleeve diameter, the invert shall be sealed with an expanding type or non-shrink type grout. Non-shrink type grout shall be used to seal between the pipe ends and inverts creating a flush surface on the inside wall of the base section.

The riser section shall be precast and included when necessary as shown on the plans.

The cone section shall be precast with a minimum 24" diameter opening.

The flat slab top shall be used for shallow manholes in non-traffic bearing areas. Cast iron manhole rims shall be cast into slab tops for access into manholes.

O-ring shall conform to ASTM C-443.

07110-2

Grade rings shall be made of injection molded high density polyethylene (HDPE) as manufactured by LADTECH, Inc. or an approved equal. Grade rings shall be sealed together if stacked, sealed to the tops of the cone sections or flat slab tops, and sealed to the manhole rims. The sealant used shall be EZ-STIK Butyl Rubber Sealant in rope form or EZ-STIK #3 Butyl Rubber Sealant in trowelable form as manufactured by Press-Seal Corporation or an approved equal. Sealant material must meet or exceed the requirements of Federal Specification TT-S-001657, ASTM C-990 and AASHTO M-198.

Manhole rims and lids are to be manufactured by US Foundry Corporation, part number RCR-2001 or an approved equal. Manhole lids shall be cast with the words "SANITARY SEWER" as shown on the plans.

07110.6

DROP MANHOLE ASSEMBLIES

Assemblies include precast base, precast riser if necessary, precast cone or flat slab lid, o-ring rubber gaskets for joints between sections, grade ring, manhole rim and lid.

Sanitary Sewer Manholes shall conform to Section 1525 of NCDOT Standard Specifications for Roads and Structures and Roadway Standard Drawing 840.52 and the standard detail drawing. The grade rings and foundation shall conform to the standard detail drawing.

The quality of materials, the process of manufacture, and the finished manhole sections shall be subject to inspection and approval by the Engineer or his inspector.

The minimum inside diameter of the manhole shall be four (4) feet. Steps shall be provided where necessary as shown on detail. Minimum compressive strength of concrete for all sections shall be 4000 psi. Maximum allowable absorption of concrete shall be eight (8) percent.

The base section shall be precast with inverts and invert channels. Invert channels shall be constructed of concrete in a semicircular section conforming to the inside diameter of the outlet sewer. Changes in size of pipe or grade shall be made gradually and change in direction constructed by using true curves. Each manhole shall be provided with such channels for all connecting sewer pipes. Each invert shall be fitted with a Lock Joint flexible manhole sleeve. If the invert diameter exceeds the available sleeve diameter, the invert shall be sealed with an expanding type or non-shrink type grout. Non-shrink type grout shall be used to seal between the pipe ends and inverts creating a flush surface on the inside wall of the base section.

The riser section shall be precast and included when necessary as shown on the plans.

The cone section shall be precast with a minimum 24" diameter opening.

The flat slab top shall be used for shallow manholes in non-traffic bearing areas. Cast iron manhole rims shall be cast into slab tops for access into manholes.

O-ring shall conform to ASTM C-443.

Each precast concrete section shall be joined together with an o-ring rubber gasket conforming to ASTM C-443. Each joint shall be sealed with mortar on the inside of the manhole.

Outside drop assemblies shall include all necessary fittings required to drop sewage into the lower line. All fittings shall be ferrous material with necessary blocking for the drop connection.

07110-3

Grade rings shall be made of injection molded high density polyethylene (HDPE) as manufactured by LADTECH, Inc. or an approved equal. Grade rings shall be sealed together if stacked, sealed to the tops of the cone sections or flat slab tops, and sealed to the manhole rims. The sealant used shall be EZ-STIK Butyl Rubber Sealant in rope form or EZ-STIK #3 Butyl Rubber Sealant in trowelable form as manufactured by Press-Seal Corporation or an approved equal. Sealant material must meet or exceed the requirements of Federal Specification TT-S-001657, ASTM C-990 and AASHTO M-198.

Manhole rims and lids are to be manufactured by US Foundries part numbers as noted on the drawings. Manhole lids shall be cast with the words "SANITARY SEWER" as shown on the plans. The rim shall be aligned to fit the top section of the manhole, sealed, and properly anchored in place. A minimum of four (4) 5/8-inch hot-dipped galvanized carbon steel wedge anchors of the appropriate length with nuts and flat washers shall be used to anchor the rim to the top of the manhole.

07110.7 **MORTAR**

Mortar for masonry in sewer structures shall be a 1:2 cement:sand mix. Hydrated lime may be substituted for up to ten (10) percent of the cement by weight.

07110.8 **FLEXIBLE COUPLINGS**

A flexible coupling shall be required to join sewer pipe lines of dissimilar material. The coupling shall be made of virgin polyvinyl chloride (PVC) and shall be permanently resilient and impervious to all known soil conditions. The coupling shall provide a permanent leak proof seal approved by the Southern Building Code Congress. The flexible coupling shall be manufactured by Fernco Joint Sealer Company or equal as approved by the engineer.

07110.9 **SERVICE LATERAL**

The Contract Item Service Lateral includes service laterals at the locations shown constructed as shown on the detail "Service Lateral and Cleanout".

07110.10 **MEASUREMENT**

Measurement for the contract item PIPE of the various types and sizes will be by the linear foot installed.

Measurement for the contract item MANHOLE ASSEMBLIES will be by the number installed.

Measurement for the contract item SERVICE LATERAL will be by the number installed.

07110.11 **PAYMENT**

The contract prices will be paid for PIPE of the various types and sizes; MANHOLE ASSEMBLIES; and SERVICE LATERAL; which prices shall include full compensation for all costs incurred under this section.

SECTION 07120

SANITARY SEWER (GRAVITY) PIPE AND MANHOLE INSTALLATION

07120.1 SCOPE

The work covered under this section shall consist of furnishing all labor, equipment and services for the installation of gravity sanitary sewer lines and manholes as shown on the drawings and specified herein and in agreement with the General Conditions of these contract documents.

07120.2 APPLICABLE STANDARDS

NCDENR: Gravity Sewer Minimum Design Criteria

07120.3 SAW CUTTING ASPHALT

Refer to Section 05050 Bituminous Pavement Repairs.

07120.4 PREPARATION OF PIPE FOUNDATION

The preparation of the pipe bedding shall be in accordance with the typical trench cross-sections as shown on the plans for the type of pipe being installed.

The pipe foundation shall be prepared to be uniformly firm and shall be true to the lines and grades as shown on the plans. Any deviation or field adjustment will require the approval of the Engineer.

A space shall be excavated under and around each bell to sufficient depth to relieve it of any load and to allow ample space for filling and finishing the joint.

Where rock or boulders are encountered in the bottom of the trench, the same shall be removed to such depth that no part of the pipe, when laid to grade, will be closer to the rock or boulders than six (6) inches. A suitably tamped and shaped foundation of approved material shall be placed to bring the bottom of the trench to proper subgrade over rock or boulders.

Where the foundation material is found to be of poor supporting value, the Engineer may make minor adjustments in the location of the pipe to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned according to the undercut detail as shown on the plans or as directed by the Engineer. The selection of the type of backfill material to be used for foundation conditioning will be made by the Engineer.

The Contractor shall remove all water by pumping or bailing. No pipe shall be laid until the water has been removed from the trench. Water removed from the trench must be disposed of in such a manner as not to cause damage to work completed or in progress. All necessary measures will be taken to prevent erosion due to the dewatering process.

Do not lay pipe upon a foundation into which frost has penetrated, or at any time, that in the opinion of the Engineer, there is danger of the formation of ice or frost at the bottom of the excavation. The Engineer may at his discretion allow construction of the pipeline to continue under freezing conditions provided the Contractor promptly backfills the trench as directed.

07120.5 LAYING PIPE

All pipe and appurtenances are to be installed in strict accordance with the manufacturer's specifications and the contract material specifications. No pipe shall be

laid except in the presence of the Engineer or his inspector or with special permission from the Engineer. Proper tools, implements and facilities satisfactory to the Engineer shall be provided and used for the safe and proper laying of the pipe. The pipe interior, sealing surfaces, fittings and other accessories shall be kept clean. All pipe and appurtenances will be lowered into the trench piece by piece in such a manner as to provide safe working conditions. The pipe shall be laid on the prepared foundation providing a uniform flow line along the pipe. Pipe shall be removed if broken, damaged or displaced during the laying of pipe or backfilling the trench.

The laying shall start at the bottom of the slope and proceed upward with the bell end of the pipe upgrade.

When cutting short lengths of pipe, a pipe cutter as approved by the Engineer will be used and care will be taken to make the cut at right angles to the center line of the pipe or on the exact skew as shown on the plans. In the case of push-on pipe, the cut ends shall be tapered with a portable grinder, or coarse file to match the manufactured taper.

During times when pipe laying is not in progress, the open ends of pipe shall be closed and no trench water or other material shall be permitted to enter the pipe.

All pipe laid on a grade of ten (10) percent or greater shall require thrust blocking and keying as shown on the drawings and standard details.

Where sewer pipe lines of dissimilar materials are joined, a flexible coupling shall be used as specified in Section 07110.8.

7120.6

MANHOLE INSTALLATION

Sanitary sewer manholes shall be installed at the end of each line, at all changes in grade, size, or alignment, at all intersections, and at distances not greater than 300 feet apart as shown on the contract drawings.

All manholes are to be installed in strict accordance with the manufacturer's specifications and the contract material specifications. No manhole shall be installed except in the presence of the Engineer or his inspector or with special permission from the Engineer. Proper tools, implements and facilities satisfactory to the Engineer shall be provided and used for the safe and proper installation of each manhole section. The manhole interior, sealing surfaces, fittings and other accessories shall be kept clean. All manhole sections and appurtenances will be lowered into the trench piece by piece in such a manner as to provide safe working conditions. The manhole shall be installed on a prepared foundation of six (6) inches of washed stone. The foundation shall be prepared so as to provide a firm, level area on which to place the manhole base section. When poor foundation soil is encountered or excess groundwater exists the foundation shall be excavated twelve (12) inches below the final subgrade elevation backfilled with washed stone to provide a proper foundation. Manhole sections shall be removed if broken, damaged or displaced during the placing of the various sections or backfilling the trench.

Pipe openings shall be exactly aligned to that of the pipe entering and leaving the manhole. The sewer pipe lines shall be placed in the manhole openings, properly aligned, and set to grade. Pipe shall be connected to the manholes using lock joint flexible manhole sleeves. Non-shrink type grout shall be used to seal between the pipe ends and inverts creating a flush surface on the inside wall of the base section. For large diameter pipe where a flexible rubber sleeve is not available the pipe line shall be sealed into the manhole using an expanding type or non-shrink type grout.

O-rings shall be installed between each manhole section.

Manhole steps shall be properly spaced as shown in the standard detail drawing. Grade rings shall be sealed together if stacked, sealed to the tops of the cone sections or flat slab tops, and sealed to the manhole rims. The sealant must conform to section 07110.5.

The rim shall be aligned to fit the top section of the manhole, sealed, and properly anchored in place. The sealant must conform to section 07110.5. A minimum of four (4) 5/8-inch hot-dipped galvanized carbon steel wedge anchors of the appropriate length with nuts and flat washers shall be used to anchor the rim to the top of the manhole.

07120.7 **MANHOLE INVERTS**

Use of cast in place invert channels must be approved by the engineer. Invert channel shall be U-shaped with a height of eight-tenths (0.8) of the diameter and be a smooth continuation of the pipe. The benches shall be constructed with a slope of one (1) inch per foot to the channel. The invert channel shall be constructed with minimum of 2000 psi concrete. Where the alignment changes directions at the manhole, the invert channel shall be constructed with a smooth curve with as large a radius as the diameter of the manhole will allow.

07120.8 **MANHOLE VENTS**

Where designated on the plans, a four (4) inch diameter vent pipe shall be installed as an integral part of the manhole. The vent pipe is to be tapped in to the upper most section of the manhole, anchored in concrete and extended vertically to the elevation shown on the drawings. The pipe shall have a reverse bend and screen to prohibit rain and foreign materials from entering pipe. The pipe material shall be Schedule 40 Galvanized Steel with two coats of epoxy paint approved by the Engineer.

07120.10 **RELATIONSHIP OF WATER AND SEWER SYSTEMS**

The contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0906

Lateral separation of sewer and water lines shall be a minimum of 10 feet unless existing conditions prevent a 10 foot lateral separation in which case:

The sewer line is laid in a separate trench, with the elevation of the top of the sewer line at least 18 inches below the bottom of the water line.

The sewer line is laid in the same trench, with the water line located at one side on a bench of undisturbed earth, and with the elevation of the top of the sewer line at least 18 inches below the bottom of the water line.

When the sewer line crosses under a water line, the sewer line shall be laid with the top of the sewer line at least 18 inches below the bottom of the water line. When existing conditions prevent an 18 inch minimum separation both the sewer and water lines shall be ferrous material for a distance of 10 feet on both sides of the point of crossing.

When the sewer line crosses over a water line both the sewer and water lines shall be ferrous material for a distance of 10 feet on both sides of the point of crossing. The sewer line shall be laid in such a manner as to maximize the distance between the crossing point and any joints.

07120.11 **BACKFILLING**

Methods of backfilling shall be in strict accordance with pipe manufacturer's specifications and these specifications. Where there is a conflict between the two, the manufacturer's specifications will be followed.

All backfill shall be from the excavated trench and shall be free from organic material and rocks larger than three inches in the largest dimension and shall contain more than 50 percent of ¾ inch or smaller material. Backfill shall be moisture conditioned to achieve a moisture content at or near the laboratory optimum moisture content. Backfill placed around pipes shall be placed in such a manner that the pipes will not be displaced or damaged. Backfill shall be placed in loose 6 inch layers, and compacted by mechanical means to ninety five (95) percent of the Standard Proctor Test. Backfill placed adjacent to pipes or appurtenances shall be compacted by hand operated power tampers. Jetting will not be allowed. All backfill material shall be approved by the Engineer.

Heavy equipment shall not be operated over any pipe until it has been properly backfilled and has a minimum cover as required by the plans. Where any part of the required cover is above the proposed finish grade, the Contractor shall place, maintain, and finally remove such material at no cost to the Owner.

The Contractor shall maintain all pipes installed in a condition that will function continuously from the time the pipe is installed until the project is accepted.

07120.12 **SELECT BACKFILL**

When the Engineer determines that material from the excavation is not suitable for backfill, select backfill shall be utilized and compensation will be negotiated under a change order.

07120.13 **PAYMENT**

With the exception of Select Backfill, the contract prices shall include full compensation for all costs incurred under this section.

07400.1 **DESCRIPTION OF WORK**

The work under this section consists of furnishing all materials, labor, equipment and services required for the complete installation of encasement pipe and carrier pipes under highways and railroads by boring and jacking as shown on the drawings and specified herein.

All work in connection with constructing encasement pipes under highways and railroads shall comply with all current requirements of governing highway and railroad Agencies. The Contractor shall be familiar with these requirements.

The Contractor shall inspect the locations at the proposed crossings and shall familiarize himself with the conditions under which the work will be performed, and with all necessary details and the suitability of his equipment and methods for the work required.

07400.2 **ENCASEMENT MATERIALS**

Encasement pipe shall be smooth wall welded steel conforming to ASTM A139, Grade B. Minimum pipe wall thickness shall be as follows:

Pipe Nominal Diameter (Inches)	Wall Thickness (Inches)
12 ¾	0.188
14 to 24	0.250
30	0.312
36	0.375

Casing pipe shall have the following minimum sizes:

Carrier Pipe Size (Inches)	Casing Pipe Size (Inches)
4	12 ¾
6	12 ¾
8	14
12	20
16	24

07400.3 **INSTALLATION OF ENCASEMENT**

Encasements shall be installed by boring and jacking unless field conditions require otherwise. It shall be the Contractor's responsibility to notify the Engineer immediately if conditions do not permit a jack and bore installation.

The encasement pipe shall be of the diameter indicated for the carrier pipe as shown on the drawing.

Installation of encasement pipe shall include all related work and services such as mobilization of equipment, constructing and maintaining working pits, right-of-way maintenance and restoration, traffic maintenance, mining, excavations, dewatering, sheeting, shoring and bracing for embankments, operating pits, and as elsewhere required shall be placed and maintained in order that work may proceed safely and expeditiously.

07400-1

Installation of the casing pipe shall be carried out without disturbance of the embankment, pavement, tracks, or other railroad or highway facilities and without obstructing the passage of traffic at any time.

The driven portions of the casing shall be advanced from the lower end of the casing unless specific permission to do otherwise is obtained by the Contractor from the Engineer.

The space between the encasement and the ground shall be filled with grout, sand or pea gravel, as directed by the Engineer. The Engineer will direct that this space be filled if the space is large enough to cause any earth settling.

Before the pipe is installed in the casing, approved spacers will be connected to the barrel of the pipe. After completion of the casing, the Contractor shall insert the pipeline in pre-jointed segments. No contact will be permitted between the casing and the carrier pipeline.

The boring machine shall be accurately aligned before the boring is commenced and the Contractor shall take such necessary steps as are required to accurately place the casing with respect to line and grade.

The leading edge of the steel casing shall be kept as close to the auger head as possible and shall be advanced at the same speed as the earth auger in order to minimize any unsupported holes in the earth.

7400.4

MEASUREMENT

Measurement for the contract item ROAD BORE for the various sizes shall be by the linear foot.

07400.4

PAYMENT

The contract prices will be paid for ROAD BORE for the various sizes, which prices shall include full compensation for all costs incurred under this section.

07400-2

07900.1 **SCOPE**

This section covers testing of the sanitary sewer system which includes all necessary labor, equipment, fittings, valves and appurtenances.

07900.2 **TESTING**

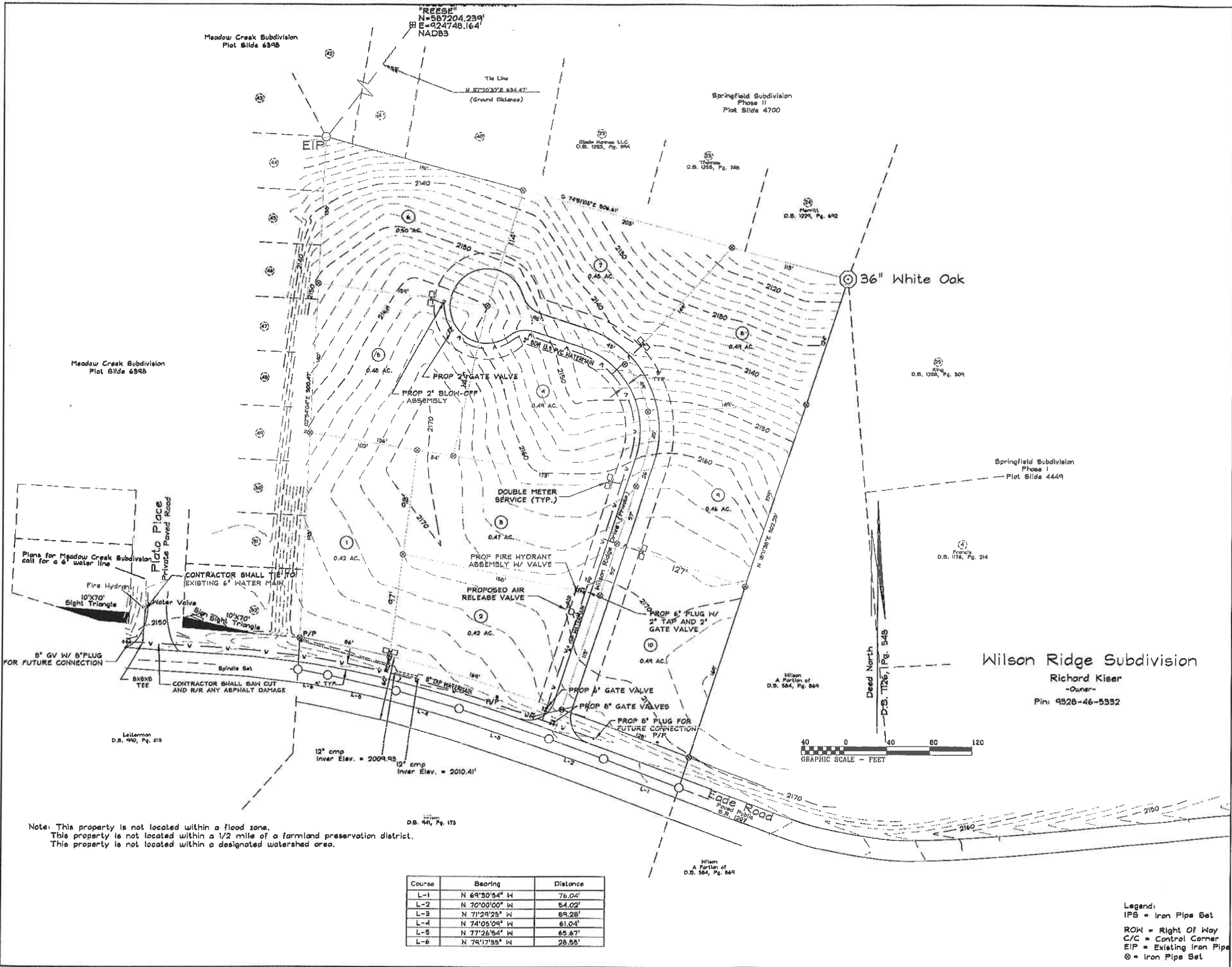
After the pipeline has been satisfactorily constructed, complete with the required services, and all other appurtenances, and the trench backfilled satisfactorily, and approved by the Engineer, it shall be subjected to a deflection test, and a leakage test per The North Carolina Division of Environmental Management, Gravity Sewer Minimum Design Criteria. The contractor shall submit a plan within two weeks after the begin construction date that describes the testing procedures in detail.

The Contractor shall notify the Engineer when the work is ready for testing. All testing shall be done in the presence of the Engineer.

Cracked or defective pipe, joints or fittings discovered in consequence of testing shall be removed and replaced with sound materials, and the test shall be repeated until the test results are satisfactory. Precautions shall be taken to remove or otherwise protect equipment in, or attached to, pipe to prevent damage or injury.

07900.3 **PAYMENT**

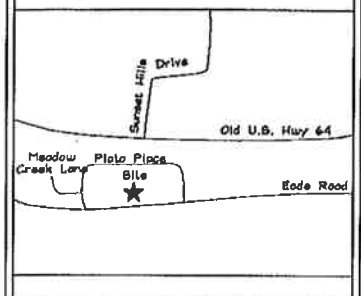
The contract prices shall include full compensation for all costs incurred under this section.



Course	Bearing	Distance
L-1	N 69°30'34" W	76.04'
L-2	N 70°00'00" W	54.02'
L-3	N 71°29'25" W	69.28'
L-4	N 74°05'09" W	61.04'
L-5	N 77°26'54" W	65.67'
L-6	N 79°17'55" W	28.55'

Note: This property is not located within a flood zone.
 This property is not located within a 1/2 mile of a farmland preservation district.
 This property is not located within a designated watershed area.

VICINITY MAP

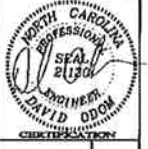


JOB NUMBER:
07084

REV	DATE	DESCRIPTION

GENERAL NOTES:

I HEREBY CERTIFY THAT THIS PLAN AND SPECIFICATION HAS BEEN PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ARCHITECT OR ENGINEER UNDER THE LAWS OF THE STATE OF NORTH CAROLINA AS SIGNIFIED BY MY HAND AND SEAL.



LEGEND:

- PROP. WATERLINE
- PROP. SEWER LINE
- PROP. STORM WATER
- PROP. PROPERTY LINE
- PROP. GAS LINE
- PROP. FORCE MAIN
- PROP. CATCH BASIN
- 675 PROP. MAJOR CONTOUR
- 670 PROP. MINOR CONTOUR
- ⊙ PROP. INLET PROTECTION
- PROP. DENUDED LIMITS
- PROP. CLEAR/GRUB LIMITS
- PROP. BILT FENCE
- PROP. TEMP. DIVERSION DITCH
- EXIST. WATERLINE
- EXIST. SEWER LINE
- EXIST. STORM WATER
- EXIST. PROPERTY LINE
- EXIST. GAS LINE
- EXIST. FORCE MAIN
- EXIST. CATCH BASIN

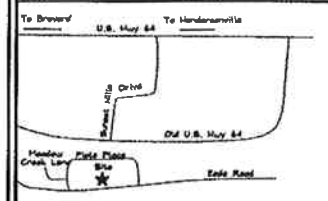
Legend:
 IPS = Iron Pipe Set
 ROW = Right Of Way
 C/C = Right Corner
 EIP = Existing Iron Pipe
 ⊙ = Iron Pipe Set

PROPOSED WATERMAIN EXTENSION
WILSON RIDGE SID
 HENDERSON COUNTY, NC
 OVERALL LAYOUT



SCALE: 1" = 40'
 DATE: 07/25/07
 DRAWN BY: BSR
 CHECKED BY: BSR
 PROJECT MGR: BSR
 SHEET:
1 OF 3

VICINITY MAP



Vicinity Map

GENERAL NOTES:

JOB NUMBER:

07084

DATE

BY

REV

DESCRIPTION

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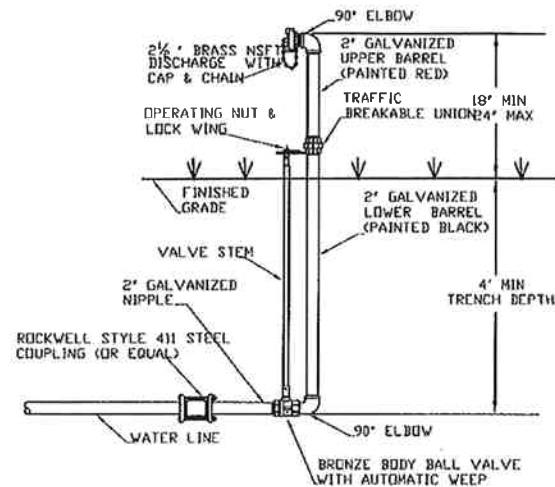
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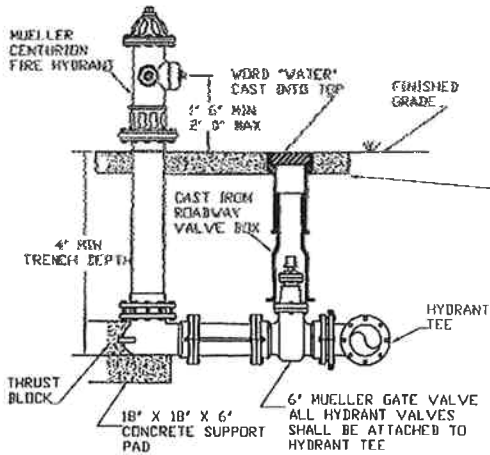
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NOTE:
1. PLACEMENT SHALL BE IN FRONT OF PROPERTY CORNERS IN CUL-DE-SACS
2. 14 GA, TYPE THIN SOLID COPPER TRACER WIRE SHALL BE INSTALLED, BROUGHT TO SURFACE & END WITH 3' COIL ON TOP OF THE BLOW-OFF VALVE.

BLOW OFF VALVE
NTS



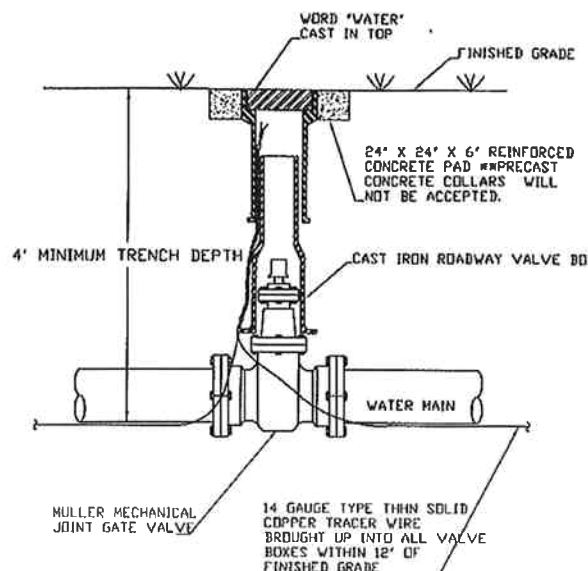
FIRE HYDRANT INSTALLATION
NTS

NOTE 1
CONTRACTOR IS REQUIRED TO POUR ONE 24" WIDE 6" THICK MONOLITHIC CONCRETE PAD REINFORCED WITH NUMBER 5 REBAR SPACED 8" APART BOTH WAYS BEGINNING 4" FROM EDGE. THE PAD SHALL EXTEND A MIN OF 8" BEYOND VALVE BOX & HYDRANT BARREL.
THIS INSTALLATION IS REQUIRED ONLY WHEN VALVE & HYDRANT ARE WITHIN 3 FEET OF EACH OTHER.

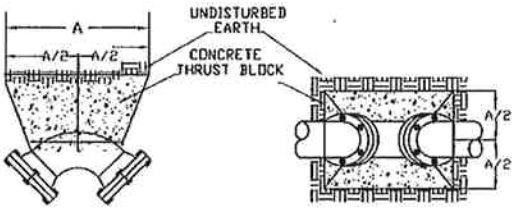
NOTE 2
WHEN VALVE & HYDRANTS ARE SEPARATED BY A ROAD, A 24" X 24" X 6" WIRE REINFORCED CONCRETE PAD SHALL BE INSTALLED AROUND EACH. PRE CAST CONCRETE COLLARS ARE NOT ACCEPTABLE.

NOTE 3
ALL HYDRANTS SHALL BE GIVEN A FRESH COAT OF MANUFACTURERS STANDARD YELLOW PAINT AFTER INSTALLATION.

NOTE 4
BACK FILL SHALL BE COMPACTED IN MAXIMUM 4" LIFTS AROUND VALVE BOX & HYDRANT BARREL.

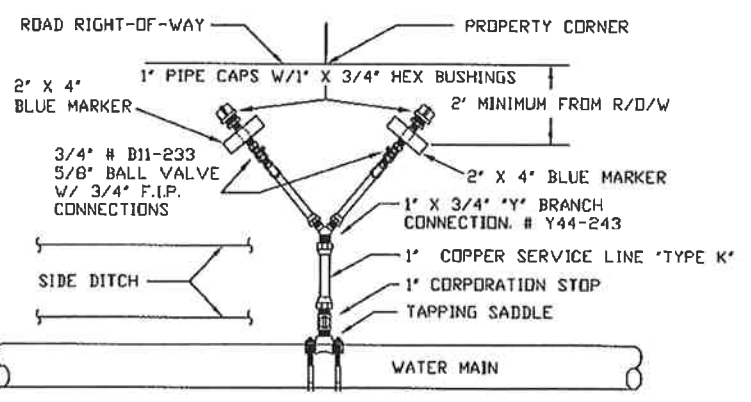


IN GROUND GATE VALVE DETAIL
NTS

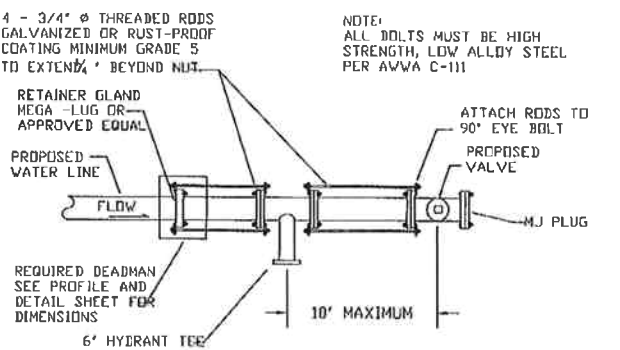


NOTE: INSTALL A LAYER OF 4MIL POLYETHYLENE BETWEEN THE CONCRETE AND THE FITTING.

TYPICAL THRUST BLOCK FOR BENDS
NTS

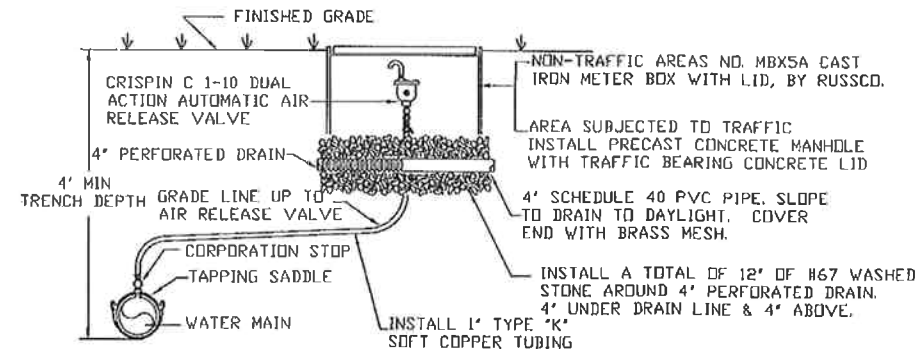


TYPICAL "Y" BRANCH CONNECTION
N.T.S.



RESTRAINT DETAIL AT HYDRANT STUBOUT AND PLUG
NTS

SIZE	VALUES FOR "A"				TEC
	11 1/4" BEND	22 1/2" BEND	45" BEND	90" BEND	
6"	12	12	12	16	16
8"	12	12	16	22	22
10"	12	14	20	28	28
12"	12	18	24	32	32
14"	14	20	28	38	38
16"	16	22	32	42	42
18"	18	26	36	48	48
20"	20	28	40	52	52
24"	24	34	46	64	64



TYPICAL AIR RELEASE VALVE
NTS CITY OF HENDERSONVILLE

LEGEND:

- PROP. WATERLINE
- PROP. SEWER LINE
- PROP. STORM WATER
- PROP. PROPERTY LINE
- PROP. GAS LINE
- PROP. FORCE MAIN
- PROP. CATCH BASIN
- PROP. MAJOR CONTOUR
- PROP. MINOR CONTOUR
- PROP. INLET PROTECTION
- PROP. DENUDED LIMITS
- PROP. CLEAR/GRUB LIMITS
- PROP. SILT FENCE
- PROP. TEMP. DIVERSION DITCH
- EXIST. WATERLINE
- EXIST. SEWER LINE
- EXIST. STORM WATER
- EXIST. PROPERTY LINE
- EXIST. GAS LINE
- EXIST. FORCE MAIN
- EXIST. CATCH BASIN

PROPOSED WATERMAIN EXTENSION
WILSON RIDGE SID
HENDERSON COUNTY, NC
DETAILS

152 East Main Street
Fayetteville, NC 28403
803-241-1495

SCALE: NTS
DATE: 07/25/07
DRAWN BY: BSR
CHECKED BY: BSR
PROJECT P&R: BSR
SHEET: 2 OF 3

**HENDERSON COUNTY
REVIEW OF CITY WATER LINE EXTENSIONS**

Project Name: Wilson Ridge
 Size of Water Line (Main & Distribution Pipe Size): Approx. 450LF of 8" DIP, 140LF of 6"DIP and 400LF of 2"SDR
 County Staff Reviewing Extension: Rocky Hyder, Fire Marshall; Parker Sloan, Planner; Autumn Radcliff, Senior Planner

Has the project been reviewed under the **County Subdivision Ordinance**? Yes No N/A
 Date reviewed: 10/11/07
 Action: _____
 Conditions: _____
 Comments: _____

Has the project been reviewed under the **County Manufactured Park Ordinance**? Yes No N/A
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

Has the project been reviewed under the **County Zoning Ordinance (i.e. Special-Use or Conditional-Use Permit)**? Yes No N/A
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

Is the project subject to **any other County Land Use Ordinance**? Yes No N/A
 If yes, explain: _____

Does the project conform with the **2020 Henderson County Comprehensive Plan (CCP)**? Yes No N/A

Does the project have **adequate hydrant location and spacing**? Yes No N/A
 Description of **hydrant type and thread**: Mueller Centurion – National Standard Thread

Does the estimated flow rate (gpm) meet **fire protection standards**? Meets standard for structural spacing of more than 31 feet. Yes No N/A

BOARD OF COMMISSIONERS APPROVAL

Approved
 Not Approved
 Conditional Approval (See Comments)

Date of Board Review: _____
 Comments: _____