STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4428	UC-01	17

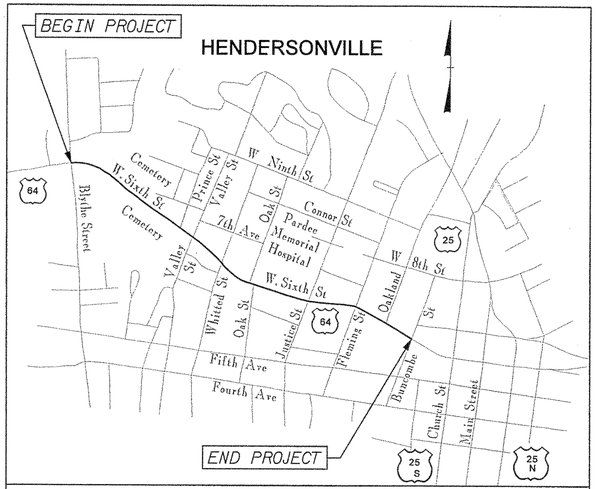
TIP PROJECT: U-4428

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

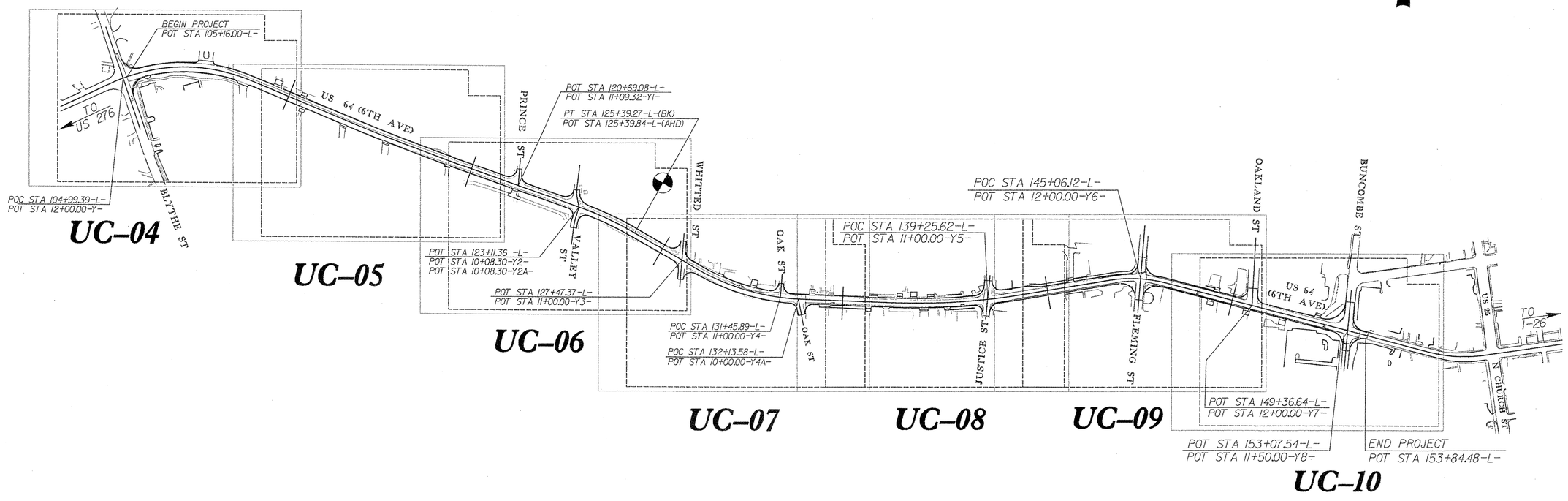
HENDERSON COUNTY

LOCATION: US 64 (6TH AVENUE) FROM BLYTHE STREET TO BUNCOMBE STREET

TYPE OF WORK: UTILITIES CONSTRUCTION



VICINITY MAP SHOWING LOCATION OF STATE PROJECT U-4428



INDEX OF SHEETS

SHEET NO.	***DESCRIPTION***
UC-01	***TITLE SHEET***
UC-02	***SYMBOLOGY SHEET***
UC-03	***GENERAL NOTES SHEET***
UC-04 TO UC-10	***PLAN SHEETS***
UC-11	***SANITARY PROFILE: -SS1-***
UC-12	***SANITARY PROFILE: -SS2-***
UC-13	***SANITARY PROFILES: -SS3-, -SS4-, -SS5-***
UC-14	***DETAILS - TRENCH***
UC-15 TO UC-16	***DETAILS - WATER***
UC-17	***DETAILS - SANITARY***

UTILITY OWNERS ON PROJECT

WATER - CITY OF HENDERSONVILLE

SANITARY SEWER - CITY OF HENDERSONVILLE

NORTH CAROLINA PROFESSIONAL SEAL 027166 ENGINEER KEVIN C. ZOEB

2008-05-06

UTILITY DESIGN:

MA Engineering CONSULTANTS, INC.
598 East Chatham Street, Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax. 919.297.0221

E: $FILES
TE: $DATES $TIMES

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-02

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

NORTH CAROLINA PROFESSIONAL SEAL 027667 ENGINEER KEVIN G. ZDEB

2008-05-06

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-03

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036661 ENGINEER KEVIN C. ZIDEK

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

REVISIONS

FILE: SFILES
DATE: $DATES $TIMES

GENERAL NOTES:

1. THE LOCATION, SIZE, AND MATERIAL TYPE OF THE EXISTING UTILITIES SHOWN ON THE PLANS HAVE BEEN OBTAINED FROM THE BEST AVAILABLE DATA AT THE TIME. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, ELEVATION, SIZE, DIRECTION, AND MATERIAL TYPE OF ALL EXISTING UTILITIES PRIOR TO ORDERING HIS MATERIALS.
2. CONTRACTOR SHALL NOTIFY NC ONE-CALL AT 1-800-632-4949 PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY SUCH THAT ALL EXISTING UTILITIES CAN BE MARKED. FURTHERMORE, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CONTACT ANY UTILITY OWNERS THAT ARE NOT MEMBERS OF NC ONE-CALL AND HAVE FACILITIES RESIDING WITHIN THE PROJECT LIMITS.
3. THE EXISTING WATER AND SEWER FACILITIES ARE TO REMAIN IN PLACE AND FUNCTIONING UNTIL THE NEW FACILITIES ARE CERTIFIED AS COMPLETE BY THE NCDOT RESIDENT ENGINEER.
4. ALL WATER AND SEWER IMPROVEMENTS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND STANDARD DRAWINGS OF THE NCDOT, DATED JULY 2006.
5. CONTRACTOR IS REQUIRED TO COMPLY WITH 15A NCAC 18C.906 – RELATION OF WATER MAINS TO SEWERS.
6. WATER AND SEWER IMPROVEMENTS SHALL BE CONSTRUCTED BY A NC LICENSED UTILITY CONTRACTOR.
7. CITY OF HENDERSONVILLE CONTACT INFORMATION:
   CONTACT PERSON: DENNIS FRADY, ASSISTANT UTILITIES DIRECTOR PHONE: (828) 697-3073
8. CONTRACTOR SHALL NOTIFY THE CITY OF HENDERSONVILLE 7 BUSINESS DAYS IN ADVANCE OF PERFORMING ANY TIE-IN WORK. CONTRACTOR SHALL NOTIFY ALL AFFECTED CUSTOMERS 24 HOURS IN ADVANCE OF SERVICE INTERRUPTIONS. CONTRACTOR SHALL NOTIFY ALL AFFECTED CRITICAL FACILITIES (I.E., HOSPITAL, SCHOOLS, MEDICAL FACILITIES, ETC.) 72 HOURS OR MORE IN ADVANCE OF SERVICE INTERRUPTION.
9. CONTRACTOR SHALL NOT OPERATE ANY VALVES ON THE EXISTING WATER SYSTEM. CONTRACTOR SHALL CONTACT THE CITY OF HENDERSONVILLE TO CONDUCT STRATEGIC OPERATION OF WATER VALVES FOR SERVICE INTERRUPTION IN ORDER TO PERFORM SPECIFIC TIE-IN OPERATIONS.

WATER MAIN NOTES:

1. ALL WATER MAIN, 4-INCHES AND LARGER, SHALL BE DUCTILE IRON PIPE (CLASS 350) WITH DUCTILE IRON PIPE FITTINGS.
2. ALL WATER MAIN, 2-INCHES IN DIAMETER, SHALL BE PVC (DR 13.5.)
3. ALL WATER SERVICES, 2-INCHES IN DIAMETER AND SMALLER, SHALL BE COPPER PIPE CONFORMING TO ASTM B 88 SOFT ANNEALED TYPE K.
4. ALL PROPOSED WATER SERVICE LINES SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF PROPOSED WATER METERS.
5. EXISTING WATER METERS TO REMAIN SHALL BE "RECONNECTED" TO THE NEW WATER MAIN WITH NEW WATER SERVICE LINES.
6. ALL PROPOSED WATER METERS SHALL BE LOCATED AT THE RIGHT-OF-WAY LINE.
7. PROPOSED 12-INCH WATER MAIN SHALL BE LOCATED TYPICALLY AT 11 FEET LEFT OF THE PROPOSED CENTERLINE OF US 64.
8. ALL PROPOSED HYDRANTS SHALL BE LOCATED 2 FEET BEHIND THE SIDEWALK OR, 5 FEET BEHIND THE BACK OF CURB.
9. WHERE SHOWN ON THE PLANS, A PUBLIC UTILITY EASEMENT (PUE) SHALL EXTEND 10 FEET FROM THE CENTER OF THE HYDRANT, AS NEEDED BEYOND THE RIGHT-OF-WAY LINE, TO ALLOW FOR CONSTRUCTION AND MAINTENANCE OF THE HYDRANT.
10. REMOVED HYDRANTS BECOME THE PROPERTY OF THE CONTRACTOR FOR PROPER DISPOSAL. THESE HYDRANTS SHALL NOT BE USED AS NEW HYDRANTS IN THE PROPOSED CONSTRUCTION.
11. CONTRACTOR SHALL CONNECT OUTLET SIDE OF NEW WATER METER TO THE EXISTING CUSTOMER SERVICE LINE OUTSIDE THE RIGHT-OF-WAY LINE.
12. CONTRACTOR SHALL RETURN ALL REMOVED WATER METERS TO THE CITY OF HENDERSONVILLE. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL OTHER PARTS, PIPING AND BOXES.
13. EXISTING WATER SERVICE LINES BETWEEN THE EXISTING WATER MAIN AND THE REMOVED WATER METER SHALL BE ABANDONED IN PLACE OR REMOVED AS NEEDED AS PER NCDOT SPECIFICATIONS.
14. ANY BENDS OF WATER PIPE NOT SPECIFICALLY CALLED OUT WITH A 90, 45, 22.5, OR 11.25 DEGREE BEND FITTING, SHALL BE CONSTRUCTED BY DEFLECTION OF PIPE JOINTS IN ACCORDANCE WITH THE PIPE MANUFACTURER'S SPECIFICATIONS.
15. ALL FITTINGS (BENDS, TEES, REDUCERS, PLUGS, ETC.) SHALL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINED JOINT CONSTRUCTION AND/OR CONCRETE THRUST RESTRAINTS AS DETAILED ON THESE DRAWINGS, OR AS DIRECTED BY THE RESIDENT ENGINEER.
16. CONTRACTOR SHALL TIE-IN PROPOSED DUCTILE IRON PIPE TO EXISTING CAST IRON PIPE USING MECHANICAL JOINT CONNECTION SUCH AS MEGA-LUG OR APPROVED EQUAL.
17. ALL WATER SERVICES 2-INCHES AND SMALLER SHALL BE INSTALLED UNDER ACTIVE ROADS BY TRENCHLESS METHOD, AS DIRECTED BY THE RESIDENT ENGINEER.
18. AIR RELEASE VALVE SHALL BE, CRISPIN MODEL C-10 COMBINATION AIR AND VACUUM VALVE WITH 1-INCH NPT INLET. THE VALVE SHALL BE LOCATED IN A METER BOX OUTSIDE THE ROAD AND BEHIND THE CURB AND GUTTER OR SIDEWALK.

GRAVITY SANITARY SEWER MAIN NOTES:

1. ALL GRAVITY SEWER MAIN SHALL BE PVC (DR-35), EXCEPT WHEN:
   (1) 18-INCHES MINIMUM CLEARANCE CAN NOT BE MAINTAINED WITH WATER MAIN.
   (2) WATER CROSSES UNDER SANITARY SEWER.
   (3) LESS THAN 3 FEET OF COVER TO TOP OF SANITARY SEWER PIPE IS MAINTAINED.
   IN THE ABOVE CASES, THE SEWER MAIN SHALL BE D.I.P. (CLASS 350) WITH CEMENT MORTAR FROM MANHOLE TO MANHOLE.
2. ALL GRAVITY SEWER MAIN SHALL BE CONSTRUCTED IN A STRAIGHT LINE BETWEEN MANHOLES.
3. ALL PROPOSED SANITARY MANHOLES SHALL BE PRECAST CONCRETE WITH AN INSIDE DIAMETER OF 4 FEET. MANHOLES SHALL HAVE AN INSIDE DIAMETER OF 5 FEET WHERE 12-INCH DIAMETER LINES CONNECT TO A MANHOLE.
4. ALL SERVICE LATERALS SHALL BE 6-INCH PVC (DR-35) FROM THE WYE IN THE GRAVITY SEWER MAIN TO THE CLEAN-OUT AT THE PROPOSED RIGHT-OF-WAY LINE AND TIE-IN TO THE EXISTING SERVICE LATERAL.
5. WHERE NEEDED, SERVICE LATERALS SHALL REDUCE TO 4-INCH PVC (DR-35) UPSTREAM OF THE NEW CLEAN-OUT.
6. WHERE A NEW MANHOLE IS TO BE INSTALLED AND CONNECTED TO AN EXISTING SEWER MAIN, THE NEW MANHOLE SHALL BE INSTALLED WITH A 20 FOOT LENGTH OF PVC (DR-35) PIPE AND TIE-IN TO THE EXISTING VITRIFIED CLAY PIPE VIA USE OF A FLEXIBLE COUPLING AS MANUFACTURED BY FERNCO JOINT SEALER COMPANY OR APPROVED EQUAL.
7. CONTRACTOR SHALL EMPLOY A PUMP AND HAUL METHOD TO BYPASS SECTIONS OF GRAVITY SEWER MAIN UNDER CONSTRUCTION. CONTRACTOR SHALL PUMP WASTE FROM A MANHOLE, UPSTREAM OF THE CONSTRUCTION, INTO A TANKER AND REINTRODUCE THE WASTE BACK INTO THE SAME SYSTEM AT A MANHOLE DOWNSTREAM OF THE CONSTRUCTION. CONTRACTOR SHALL COORDINATE ALL ASPECTS OF THIS OPERATION WITH THE CITY OF HENDERSONVILLE PRIOR TO BEGINNING ANY SAID WORK. ALL TRANSPORTING OF WASTEWATER SHALL BE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF NCDOT, THE LOCAL MUNICIPALITY, AND OTHER AGENCIES WITH JURISDICTION.

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-04

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027861 ENGINEER KEVIN C. ZIBEL

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham, Street, Suite 137
Cary, N. C. 27511

NAD 83

REVISIONS

FILE: $FILES
DATE: $DATES
$TIMES

3
GRACE LUTHERAN CHURCH
9569205039
DB 457 PG 603

6
GRACE LUTHERAN CHURCH
9568298929
DB 670 PG 679

POT STA 11+24.94 -Y-
CONSTRUCTION LIMITS

20' BST WOODMONT DR

BLYTHE ST

CONC ROCK WALL

SEWER PUMP STATION

BST

RIP RAP

STA. 105+39 -L- LT 39
PROPOSED FIRE HYDRANT

STA. 105+39 -L- LT 11
PROPOSED 12x12x6 HYDRANT TEE

PROPOSED 12-INCH D.I.
WATER LINE (675 LF)

LIGHT POST

GROUND LIGHTS

18" CMP

REMOVE

34' BST EXIST. 24" CONC WATER MAIN

4" SVL

KRISTA MATEAKI
9568292828
DB 1184 PG 784

JOHN CALVIN LANCE
9567291813
DB 938 PG 091

10' BST

GR

STA. 104+84 -L- LT 11
PROPOSED 12-INCH TAPPING VALVE

11 FT (TYP.)

34' BST

US 64 (6TH AVE)

15" CB

JB

18" RCP

DI-10

12" RCP

CONC

GUY WIRE & ANCHOR

24" CONC

12" CMP

EXIST. 8" CI

EX. 8" CI

TRAFFIC BOX

DI-11

10"PLST

WALL

DI-12

6"PLST

15" RCP

27' BST

24' BST

CB

BEGIN - STA. 103+00 -L-

POT STA 104+74 -L-
CONSTRUCTION LIMITS

6' WOOD FENCE

WATER MH
RIM=2202.64

SMH
RIM=2201.52

4" SVL

EXIST. 6" CI WATER MAIN

EXIST. 24" CONC WATER MAIN

POT STA 12+80.23 -Y-
CONSTRUCTION LIMITS

13' BST

16' BST

BLYTHE ST

LP

CONC

BST PARKING

1 STORY BRICK & FRAME BUILDING

4
PG, LLC
9568294761
DB 1195 PG 711

5
EDNEY INVESTMENTS LLC
9568296743
DB 1005 PG 551

DECORATIVE METAL LIGHT POLE WITH U/G SERVICE

2
CONNIE T CLARIS
9568292672
DB 434 PG 311

7
MEDWEST, LLC
DB 1323 PG 575

MATCH LINE - SHEET UC-05 STA. 111+50 -L-

FOR TRENCH DETAILS
SEE SHEET UC-14

FOR WATER DETAILS
SEE SHEETS UC-15, UC-16

30' 0' 30' 60'

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-05

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 27866 ENGINEER KEVIN C. ZOLTE

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

NAD 83

REVISIONS

FILE: SFILES
DATE: SDATES
STIMES

10
GRACE EVANGELICAL LUTHERAN CHURCH
9568390940
DB 801PG 063

MATCH LINE - SHEET UC-04 STA. 111+50 -L-

REMOVE WATER METER

GRAVEL PARKING LOT

1

STA. 112+23-L- LT 11
PROPOSED 12x12x8 TEE
WITH (1) 12-INCH GATE VALVE.

PROPOSED 8-INCH D.I. WATER LINE
(46 LF RESTRAINED JOINT)

ABANDON 1-INCH UTILITY PIPE
(230 LF OF WATER LINE)

14' BST

15'

CB

1"GALV

REMOVE

FLASHING SCHOOL ZONE SIGN

PUE

REMOVE WATER METER
ABANDON 1-INCH UTILITY PIPE

7
MEDWEST, LLC
DB 1323 PG 575

CEMETERY

STA. 112+36 -L- RT 26
PROPOSED FIRE HYDRANT

STA. 112+23 -L- RT 26
PROPOSED 8x8x6 TEE WITH
(1) 8-INCH GATE VALVE (STUB)
PLUG END OF 8-INCH GATE VALVE.
REFER TO "HYDRANT STUB OUT & PLUG" DETAIL

11
OAKDALE CEMETERY
CITY OF HENDERSONVILLE
9568394279

10
GRACE EVANGELICAL LUTHERAN CHURCH
9568390940
DB 801PG 063

REMOVE
12" CMP

20.5' BST

11FT (TYP.)

115

GUY ANCHOR

12
STUART J & STACI W BLATT
9568394683
DB 1045 PG 010

PROPOSED 12-INCH D.I. WATER LINE (750 LF)

STA. 118+00 -L- LT 24
PROPOSED 1-INCH AIR RELEASE VALVE
SEE DETAIL ON SHEET UC-15

STA. 117+55 -L- LT 24
PROPOSED FIRE HYDRANT

CONC BLOCK WALL

US 64 (6TH AVE)

22' BST

15' BST

TBI

STA. 117+55 -L- LT 11
PROPOSED 12x12x6 HYDRANT TEE

MATCH LINE - SHEET UC-06 STA. 119+00 -L-

FOR TRENCH DETAILS
SEE SHEET UC-14

FOR WATER DETAILS
SEE SHEETS UC-15, UC-16

30' 0' 30' 60'

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-06

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027867 ENGINEER KEVIN C. ZDER

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

SEE SHEET UC-11 FOR SANITARY SEWER PROFILE

NAD 83

OAKDALE CEMETERY
9568394279
13

OAKDALE CEMETERY
9568394279
14

OAKDALE CEMETERY
CITY OF HENDERSONVILLE
9568394279
11

HENDERSON ASSOCIATES LLC
9568492302
DB 959 PG 275
16

HENDERSONVILLE HOUSING AUTHORITY
9568491081
15

MATCH LINE – SHEET UC-05 STA. 119+00 -L-

MATCH LINE – SHEET UC-07 STA. 126+50 -L-

POT STA 10+47.78 -Y1-
CONSTRUCTION LIMITS

PT STA 10+87.97 -Y2A-
CONSTRUCTION LIMITS

POC STA 9+32.67 -Y2-
PROPOSED UTILITY CONSTRUCTION LIMITS

POC STA 9+42.67 -Y2-
CONSTRUCTION LIMITS

PROPOSED 12-INCH D.I. WATER LINE (752 LF)

STA. 09+42.67 -Y2- RT 08
TIE PROPOSED 8-INCH D.I.P. TO EXISTING 2" PVC WITH 2" THREADED PLUG

STA. 09+32.67 -Y2- RT 09
PROP. 8x8x6 HYDRANT TEE

STA. 122+81 -L- LT 27
STA. 09+14 -Y2A- RT 13
PROP. 8-INCH 11.25 DEG. BEND
PROP. 8-INCH D.I. WATER LINE
(45 LF OF RESTRAINED JOINT PIPE)

STA. 09+29 -Y2- LT 19
PROPOSED FIRE HYDRANT

STA. 123+20 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

STA. 124+20 -L-
PROPOSED SMH A-5
4-FT DIA UTILITY MANHOLE

STA. 122+81 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

ABANDON 2-INCH UTILITY PIPE
(105 LF OF WATER LINE)

STA. 10+46 -Y2A- LT 08
PROP. 8-INCH 11.25 DEG. BEND
PROP. 8-INCH D.I. WATER LINE
(79 LF OF RESTRAINED JOINT PIPE)

STA. 10+78 -Y2A- LT 11
TIE PROPOSED 8-INCH D.I.P. TO EXISTING 2" PVC WITH 2" THREADED PLUG.

REMOVE UTILITY MANHOLE

ABANDON 8-INCH (VC) UTILITY PIPE
(229 LF OF SEWER MAIN - THIS SHEET)
(318 LF OF SEWER MAIN BETWEEN MANHOLES)

ABANDON 6-INCH (CI) UTILITY PIPE
(364 LF OF WATER LINE)

REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE

8-INCH SANITARY GRAVITY SEWER (PVC) - 229 LF
(350 LF OF GRAVITY SEWER BETWEEN MANHOLES)

PROPOSED 12-INCH D.I. WATER LINE (TYP.)

SANITARY SEWER PROFILE -SSI-

PRINCE DR
19' BST

US 64 (6TH AVE)
120'
11 FT (TYP.)

VALLEY ST
19' BST

VALLEY ST
25' BST

LATERAL DITCH 1

DITCH 2

CB 15" 22' BST

CB 15"

CB EX-12" VC

EX-6" CI

EX-8" VC

EX-12" RCP

EX-2" HVC

GUY LANCHOR

GRASS

LP

125'

15"

22' BST

FOR TRENCH DETAILS SEE SHEET UC-14

FOR WATER DETAILS SEE SHEETS UC-15, UC-16

FOR SAN. SEWER DETAILS SEE SHEET UC-17

30' 0' 30' 60'

REVISIONS

FILE: SFILES
DATE: SDATES
STAKES

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-07

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZOLES

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N.C. 27511

NAD 83

SEE SHEETS UC-11, UC-12 FOR SANITARY SYSTEM PROFILE

REVISIONS

FILE: SFILES
DATE: SDATES STIMES

POT STA 10+27.84 -Y3-
CONSTRUCTION LIMITS

STA. 10+38 -Y3-
TIE-IN PROPOSED 8-INCH D.I.P. TO EXISTING 6-INCH C.I. WITH 8x6 REDUCER

PROPOSED 12-INCH D.I. WATER LINE - 745 LF

ABANDON 6-INCH UTILITY PIPE (758 LF OF C.I. WATER LINE)

8-INCH SANITARY GRAVITY SEWER (PVC) - 121LF (350 LF OF GRAVITY SEWER BETWEEN MANHOLES)

MATCH LINE - SHEET UC-06 STA. 126+50 -L-

ABANDON 8-INCH UTILITY PIPE (89 LF OF VC SEWER MAIN - THIS SHEET) (318 LF OF SEWER MAIN BETWEEN MANHOLES)

STA. 127+31 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

REMOVE FIRE HYDRANT

REMOVE UTILITY MANHOLE

ABANDON 6-INCH UTILITY PIPE (127 LF OF C.I. WATER LINE)

STA. 11+30 -Y3- RT 06
PROPOSED 8-INCH 22.5 DEG. BEND
PROPOSED 8-INCH D.I. WATER LINE
(73 LF OF RESTRAINED JOINT PIPE)

STA. 11+52 -Y3- RT 19
PROPOSED FIRE HYDRANT

STA. 11+62 -Y3- RT 07
TIE-IN PROPOSED 8-INCH D.I.P. TO EXISTING 6-INCH C.I. WITH 8x6 REDUCER

POT STA 11+72.46 -Y3-
CONSTRUCTION LIMITS

STA. 10+62 -Y3-
PROPOSED 8-INCH 22.5 DEG. BEND
PROPOSED 8-INCH D.I. WATER LINE
(49 LF OF RESTRAINED JOINT PIPE)

STA. 127+55 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

STA. 127+70 -L-
PROPOSED SMH A-4
4-FT DIA UTILITY MANHOLE

STA. 127+80 -L- LT 30
PROPOSED 3/4-INCH WATER METER
AND 3/4-INCH COPPER WATER SERVICE

REMOVE WATER METER - 2 EACH
ABANDON 3/4-INCH UTILITY PIPE - 51LF

STA. 11+52 -Y3- RT 07
PROPOSED 8x8x6 HYDRANT TEE

8-INCH SANITARY GRAVITY SEWER (PVC) - 130 LF

STA. 129+00 -L- RT 4.5
PROPOSED SMH A-3
4-FT DIA UTILITY MANHOLE

8-INCH SANITARY GRAVITY SEWER (PVC) - 185 LF

STA. 129+40-L- LT 11
RECONNECT 2-INCH WATER METER
(COPPER WATER SERVICE WITH
2-INCH VALVE AT SADDLE.)
EXISTING 2-INCH WATER METER
AND VAULT TO REMAIN.

ABANDON 2-INCH UTILITY PIPE - 41 LF

STA. 128+44 -L- LT 30
PROPOSED 3/4-INCH WATER METER
AND 3/4-INCH COPPER WATER SERVICE

ABANDON 8-INCH UTILITY PIPE (288 LF OF VC SEWER MAIN)

REMOVE WATER METER - 2 EACH
ABANDON 3/4-INCH UTILITY PIPE - 27 LF

STA. 129+73-L- LT 30
PROPOSED 3/4-INCH
WATER METER AND 3/4-INCH
COPPER WATER SERVICE

REMOVE UTILITY MANHOLE

ABANDON 8-INCH UTILITY PIPE (121LF OF VC SEWER MAIN)

STA. 130+84 -L- RT 5
PROPOSED SMH A-2
4-FT DIA UTILITY MANHOLE

ABANDON 6-INCH UTILITY PIPE (73 LF OF C.I. WATER LINE)

STA. 131+44 -L-
PROPOSED SMH A-1
4-FT DIA UTILITY MANHOLE
8-INCH SANITARY GRAVITY SEWER (PVC) - 20 LF
(NORTH SIDE OF PROPOSED MANHOLE)
REMOVE UTILITY MANHOLE
ABANDON 8-INCH UTILITY PIPE - 22 LF
(NORTH SIDE OF EXISTING MANHOLE)
REFER TO SEWER NOTE 6 ON SHEET U-2

POT STA 10+48.13 -Y4-
PROPOSED CONSTRUCTION LIMITS

POT STA 10+35 -Y4-
PROPOSED UTILITY CONSTRUCTION LIMITS

STA. 10+45 -Y4- RT 08
TIE-IN PROPOSED 8-INCH DIP
TO EXISTING 6-INCH C.I.
WITH 8x6 REDUCER
PROPOSED 8-INCH D.I.
WATER LINE - 44 LF
(RESTRAINED JOINT PIPE)

SAN. SEWER PROFILE -SS1-
8-INCH SANITARY GRAVITY
SEWER (PVC) - 60 LF

ABANDON 8-INCH UTILITY PIPE (69 LF OF VC SEWER MAIN)

REMOVE UTILITY MANHOLE

ABANDON 6-INCH UTILITY PIPE (52 LF OF C.I. WATER LINE)

STA. 10+40 -Y4A- LT 21
PROPOSED FIRE HYDRANT

STA. 10+63 -Y4A- LT 02
TIE-IN PROPOSED 8-INCH DIP
TO EXISTING 6-INCH C.I. WITH 8x6 REDUCER
PROPOSED 8-INCH D.I. WATER LINE
(73 LF OF RESTRAINED JOINT PIPE)

POT STA 10+60.24 -Y4A-
CONSTRUCTION LIMITS

POT STA 11+44 -Y4A-
PROPOSED UTILITY CONSTRUCTION LIMITS

STA. 133+03 -L- LT 30
PROPOSED 3/4-INCH WATER METER
AND 3/4-INCH COPPER WATER SERVICE

REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE - 28 LF

STA. 131+35 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

SANITARY SEWER PROFILE -SS2-
8-INCH SANITARY GRAVITY
SEWER (PVC) - 91LF

STA. 132+23 -L- LT 11
PROPOSED 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

STA. 132+35 -L-
PROPOSED SMH A-6
4-FT DIA UTILITY MANHOLE

8-INCH SANITARY GRAVITY SEWER (PVC) - 165 LF (360 LF OF GRAVITY SEWER BETWEEN MANHOLES)

ABANDON 8-INCH UTILITY PIPE (187 LF OF VC SEWER MAIN - THIS SHEET) (522 LF OF SEWER MAIN BETWEEN MANHOLES)

MATCH LINE - SHEET UC-08 STA. 134+00 -L-

REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE - 5 LF

STA. 133+40 -L- RT 30
PROPOSED 3/4-INCH WATER METER
AND 3/4-INCH COPPER WATER SERVICE

REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE - 8 LF

STA. 132+88 -L- RT 30
PROPOSED 3/4-INCH WATER METER
AND 3/4-INCH COPPER WATER SERVICE

STA. 10+40 -Y4A- LT 02
PROPOSED 8x8x6 HYDRANT TEE

FOR TRENCH DETAILS SEE SHEET UC-14

FOR WATER DETAILS SEE SHEETS UC-15, UC-16

FOR SAN. SEWER DETAILS SEE SHEET UC-17

30' 0' 30' 60'

ST PAUL TABERNACLE AME ZION CHURCH
9568496126
DB 433 PG 593

GARY C & CINY C JONES
9568495137
DB1116 PG265

ST PAUL TABERNACLE AME ZION CHURCH
9568497028
DB 731PG 357

Y M C A
9568486759
DB 423 PG 345

TOM A PINNER
9568489931
DB 508 PG 375

REGIONAL PROPERTIES & GEN PARTNERSHIP
9568580952
DB 816 PG 168

SSCO TOP=283.50

N. WHITTED

US 64 (6TH AVE)

LATERAL DITCH 37

TENNIS COURTS

GUY POLE

GUY ANCHOR

N OAK ST.

EX-SEWER

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-08

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029661 ENGINEER KEVIN C. ZOLEB

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

NAD 83

SEE SHEET UC-11 FOR SANITARY SEWER PROFILE

REVISIONS

FILE: SFILES
DATE: $DATES
STAKES

MATCH LINE - SHEET UC-07 STA. 134+00 -L-

MATCH LINE - SHEET UC-09 STA. 141+50 -L-

POT STA 10+30.41 -Y5-
BEGIN CONSTRUCTION

POT STA 11+62.12 -Y5-
CONSTRUCTION LIMITS

POT STA 13+16 -Y5-
PROPOSED UTILITY CONSTRUCTION LIMITS

24
2SBKB

ABANDON 8-INCH UTILITY PIPE (335 LF OF VC SEWER MAIN - THIS SHEET) (522 LF OF SEWER MAIN BETWEEN MANHOLES)

REMOVE WATER METER - 2 EACH ABANDON 3/4-INCH UTILITY PIPE

STA. 134+10 -L- LT 30 PROP. 3/4-INCH WATER METER AND 3/4-INCH COPPER WATER SERVICE

INFO W/ GROUND LIGHTS

STA. 135+95 -L- PROP. SMH A-7 4-FT DIA UTILITY MANHOLE

SAN. SEWER PROFILE -SS2- PROP. 8-INCH SAN. GRAVITY SEWER (PVC) - 195 LF (360 LF OF GRAVITY SEWER BETWEEN MANHOLES)

OFFICE BLDG. 26

STA. 135+70 -L- LT 26 PROP. FIRE HYDRANT

19

24 RETAIN

18" RCP

15 REMOVE WATER METER ABANDON 1-INCH UTILITY PIPE

16

17

STA. 135+55 -L- LT 30 PROP. 1-INCH WATER METER AND 1-INCH COPPER SERVICE LINE

PUE

EX-8"VC

US 64 (6TH AVE)

EX-6" CI

RETAIN REMOVE

22

23

BST GROUND LIGHTS

INFO W/ GRND LTS

GRAVEL

DWELLING

REMOVE FIRE HYDRANT REMOVE WATER METER ABANDON 3/4-INCH UTILITY PIPE

ABANDON 6-INCH UTILITY PIPE (520 LF OF C.I. WATER LINE)

STA. 135+70 -L- LT II PROP. 12x12x6 HYDRANT TEE

REMOVE WATER METERS - 2 EACH ABANDON 3/4-INCH UTILITY PIPE

STA. 137+07 -L- RT 30 PROP. 3/4-INCH WATER METER AND 3/4-INCH COPPER WATER SERVICE

27 6TH AVENUE, LLC 9568582920 DB 12211 PG 642

STA. 135+08 -L- RT 30 PROP. SANITARY SEWER CLEAN-OUT TIE TO EXISTING SERVICE LINE AT PROPERTY LINE. REMOVE EXISTING SERVICE LINE INSIDE R/W.

REMOVE WATER METER ABANDON 3/4-INCH UTILITY PIPE

STA. 135+18 -L- RT 30 PROP. 3/4-INCH WATER METER. AND 3/4-INCH COPPER WATER SERVICE

STA. 137+47 -L- RT 30 PROP. SANITARY SEWER CLEAN-OUT TIE TO EXISTING SERVICE LINE AT PROPERTY LINE. REMOVE EXISTING SERVICE LINE INSIDE R/W.

REMOVE WATER METER ABANDON 3/4-INCH UTILITY PIPE

TREND FOUNDATION, INC 9568583847 DB 592 PG 377

STA. 138+02 -L- RT 30 PROP. SANITARY SEWER CLEAN-OUT TIE TO EXISTING SERVICE LINE AT PROPERTY LINE. REMOVE EXISTING SERVICE LINE INSIDE R/W.

MEDICAL BUILDING ASSOC, PARTNERSHIP 9568594038 DB 1032 PG 078

28

PROP. 8-INCH SANITARY GRAVITY SEWER (DIP) 242 LF

18

STA. 10+41 -Y5- RT 05 TIE-IN PROP. 12-INCH D.I.P. TO EXISTING 6-INCH C.I. WITH 12x6 REDUCER

STA. 10+60 -Y5- RT 28 PROP. FIRE HYDRANT

ABANDON 6-INCH UTILITY PIPE (140 LF OF C.I. WATER LINE)

STA. 139+27 -L- LT II PROP. 12x12x12 TEE WITH: (2) 12-INCH GATE VALVE

STA. 139+15 -L- LT II PROP. 12x12x8 TEE WITH: (1) 8-INCH GATE VALVE

OFFICE BLDG.

ABANDON 8-INCH UTILITY PIPE (188 LF OF VC SEWER MAIN)

REMOVE UTILITY MANHOLE

STA. 138+37 -L- PROP. SMH A-8 4-FT DIA UTILITY MANHOLE

EX-6" CI STONE WALL

30' BST

3" PVC

29

8-INCH SAN. GRAVITY SEWER (DIP) - 85 LF

EXIST. SIGNAL BOX TO BE RELOCATED BY OTHERS

REMOVE FIRE HYDRANT

STA. 139+15 -L- RT 21 PROP. 8-INCH 11.25 DEG. BEND. PROP. 8-INCH D.I. WATER LINE - 90 LF (RESTRAINED JOINT PIPE)

ISBKD

30 BRICK PLANTER & SIGN

ALEXANDER & BAILEY CLINIC 9568584960 DB 443 PG 049

STA. 11+80 -Y5- RT 02 TIE-IN PROP. 8-INCH D.I.P. TO EXIST. 6-INCH C.I. WITH 8x6 REDUCER

STA. 138+10 -L- RT 30 PROP. 3/4-INCH WATER METER. AND 3/4-INCH COPPER WATER SERVICE

REMOVE WATER METERS - 2 EACH ABANDON 3/4-INCH UTILITY PIPE

JUSTICE STREET

EX-6" CI

15" CMP

30' BST

JOSEPHINE RIVERA ORR DB 496 PG 153

WCCC PROPERTIES, LLC 9568596059 DB 1032 PG 078

28 32

STA. 10+60 -Y5- RT 05 PROPOSED 12x12x6 HYDRANT TEE

STA. 10+67 -Y5- RT 05 PROPOSED 12-INCH 11.25 DEG. BEND. PROP. 12-INCH D.I. WATER LINE - 49 LF (RESTRAINED JOINT PIPE)

ISFD

REMOVE UTILITY MANHOLE

PROP. 12-INCH D.I. WATER LINE - 748 LF

STA. 140+67 -L- LT 41 PROP. 3/4-INCH WATER METER. AND 3/4-INCH COPPER WATER SERVICE

REMOVE WATER METERS - 3 EACH ABANDON 3/4-INCH UTILITY PIPE

48" PICKET FENCE

GUY CB

EX-4" CI

140

11FT (TYP.)

27

STA. 139+20 -L- RT 17 STA. 11+16 -Y5- RT 02 PROP. SMH A-09 4 FT DIA UTILITY MANHOLE

ISFD 31

ABANDON 4-INCH UTILITY PIPE (231 LF OF C.I. WATER LINE)

SANITARY SEWER PROFILE -SS2- PROP. 8-INCH SANITARY GRAVITY SEWER (DIP) - 55 LF

STA. 11+72 -Y5- RT 02 PROP. SMH A-10 4 FT DIA UTILITY MANHOLE

24

SIDNEY E KIRKLEY 9568586983 DB 594 PG 259

RETAIN

EX-8" VC JUSTICE ST

25' BST

SANITARY SEWER SYSTEM -SS2-

PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 135 LF ABANDON 8-INCH UTILITY PIPE (201 LF OF VC SEWER MAIN)

STA. 13+06 -Y5- RT 02 PROP. SMH A-11 4 FT DIA UTILITY MANHOLE REMOVE UTILITY MANHOLE

FOR TRENCH DETAILS SEE SHEET UC-14

FOR WATER DETAILS SEE SHEETS UC-15, UC-16

FOR SAN. SEWER DETAILS SEE SHEET UC-17

30' 0' 30' 60'

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-09

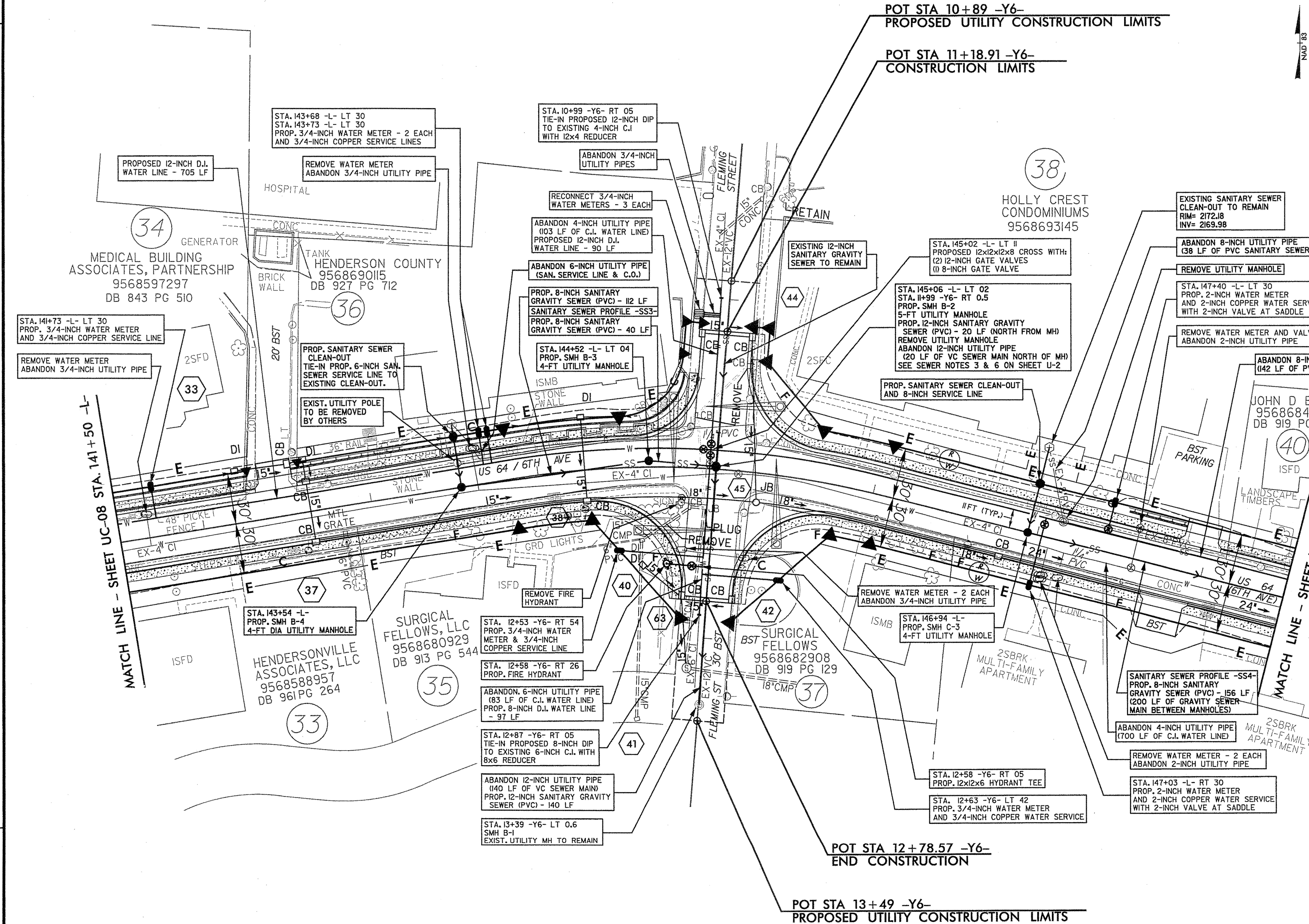
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2008-05-06

MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N.C. 27511

SEE SHEET UC-12 FOR SANITARY SEWER PROFILE



POT STA 10+89 -Y6-
PROPOSED UTILITY CONSTRUCTION LIMITS
POT STA 11+18.91 -Y6-
CONSTRUCTION LIMITS
NAD 83
STA. 143+68 -L- LT 30
STA. 143+73 -L- LT 30
PROP. 3/4-INCH WATER METER - 2 EACH AND 3/4-INCH COPPER SERVICE LINES
STA. 10+99 -Y6- RT 05
TIE-IN PROPOSED 12-INCH DIP TO EXISTING 4-INCH C.I WITH 12x4 REDUCER
PROPOSED 12-INCH D.I. WATER LINE - 705 LF
REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE
ABANDON 3/4-INCH UTILITY PIPES
RECONNECT 3/4-INCH WATER METERS - 3 EACH
ABANDON 4-INCH UTILITY PIPE (103 LF OF C.I. WATER LINE)
PROPOSED 12-INCH D.I. WATER LINE - 90 LF
ABANDON 6-INCH UTILITY PIPE (SAN. SERVICE LINE & C.O.)
PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 112 LF
SANITARY SEWER PROFILE -SS3-
PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 40 LF
STA. 144+52 -L- LT 04
PROP. SMH B-3
4-FT UTILITY MANHOLE
PROP. SANITARY SEWER CLEAN-OUT
TIE-IN PROP. 6-INCH SAN. SEWER SERVICE LINE TO EXISTING CLEAN-OUT.
EXIST. UTILITY POLE TO BE REMOVED BY OTHERS
STA. 141+73 -L- LT 30
PROP. 3/4-INCH WATER METER AND 3/4-INCH COPPER SERVICE LINE
REMOVE WATER METER
ABANDON 3/4-INCH UTILITY PIPE
HOSPITAL
34
MEDICAL BUILDING ASSOCIATES, PARTNERSHIP
9568597297
DB 843 PG 510
GENERATOR
TANK
HENDERSON COUNTY
9568690115
DB 927 PG 712
36
BRICK WALL
20' BST
2SFD
33
ISMB
STONE WALL
36" RAIL
US 64 / 6TH AVE
EX-4" CI
48" PICKET FENCE
MTL GRATE
STONE WALL
GRD LIGHTS
37
38
40
63
41
42
44
45
EXISTING 12-INCH SANITARY GRAVITY SEWER TO REMAIN
RETAIN
FLEMING STREET
EX-4" CI
EX-12" VC
REMOVE
PLUG
REMOVE
JB
38
HOLLY CREST CONDOMINIUMS
9568693145
STA. 145+02 -L- LT 11
PROPOSED 12x12x12x8 CROSS WITH: (2) 12-INCH GATE VALVES (1) 8-INCH GATE VALVE
STA. 145+06 -L- LT 02
STA. 11+99 -Y6- RT 0.5
PROP. SMH B-2
5-FT UTILITY MANHOLE
PROP. 12-INCH SANITARY GRAVITY SEWER (PVC) - 20 LF (NORTH FROM MH)
REMOVE UTILITY MANHOLE
ABANDON 12-INCH UTILITY PIPE (20 LF OF VC SEWER MAIN NORTH OF MH)
SEE SEWER NOTES 3 & 6 ON SHEET U-2
PROP. SANITARY SEWER CLEAN-OUT AND 8-INCH SERVICE LINE
EXISTING SANITARY SEWER CLEAN-OUT TO REMAIN
RIM= 2172.18
INV= 2169.98
ABANDON 8-INCH UTILITY PIPE (38 LF OF PVC SANITARY SEWER LINE)
REMOVE UTILITY MANHOLE
STA. 147+40 -L- LT 30
PROP. 2-INCH WATER METER AND 2-INCH COPPER WATER SERVICE WITH 2-INCH VALVE AT SADDLE
REMOVE WATER METER AND VALVE
ABANDON 2-INCH UTILITY PIPE
ABANDON 8-INCH UTILITY PIPE (142 LF OF PVC SANITARY SEWER LINE)
JOHN D BELL, MD
9568684097
DB 919 PG 736
40
ISFD
BST PARKING
LANDSCAPE TIMBERS
MATCH LINE - SHEET UC-10 STA. 148+50 -L-
MATCH LINE - SHEET UC-08 STA. 141+50 -L-
11FT (TYP.)
US 64 (6TH AVE)
BST
STA. 143+54 -L-
PROP. SMH B-4
4-FT DIA UTILITY MANHOLE
REMOVE FIRE HYDRANT
ISFD
HENDERSONVILLE ASSOCIATES, LLC
9568588957
DB 961 PG 264
33
SURGICAL FELLOWS, LLC
9568680929
DB 913 PG 544
35
STA. 12+53 -Y6- RT 54
PROP. 3/4-INCH WATER METER & 3/4-INCH COPPER SERVICE LINE
STA. 12+58 -Y6- RT 26
PROP. FIRE HYDRANT
ABANDON 6-INCH UTILITY PIPE (83 LF OF C.I. WATER LINE)
PROP. 8-INCH D.I. WATER LINE - 97 LF
STA. 12+87 -Y6- RT 05
TIE-IN PROPOSED 8-INCH DIP TO EXISTING 6-INCH C.I. WITH 8x6 REDUCER
ABANDON 12-INCH UTILITY PIPE (140 LF OF VC SEWER MAIN)
PROP. 12-INCH SANITARY GRAVITY SEWER (PVC) - 140 LF
STA. 13+39 -Y6- LT 0.6
SMH B-1
EXIST. UTILITY MH TO REMAIN
FLEMING ST 30' BST
18" CMP
SURGICAL FELLOWS
9568682908
DB 919 PG 129
37
ISMB
REMOVE WATER METER - 2 EACH
ABANDON 3/4-INCH UTILITY PIPE
STA. 146+94 -L-
PROP. SMH C-3
4-FT UTILITY MANHOLE
2SBRK MULTI-FAMILY APARTMENT
SANITARY SEWER PROFILE -SS4-
PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 156 LF (200 LF OF GRAVITY SEWER MAIN BETWEEN MANHOLES)
ABANDON 4-INCH UTILITY PIPE (700 LF OF C.I. WATER LINE)
REMOVE WATER METER - 2 EACH
ABANDON 2-INCH UTILITY PIPE
STA. 147+03 -L- RT 30
PROP. 2-INCH WATER METER AND 2-INCH COPPER WATER SERVICE WITH 2-INCH VALVE AT SADDLE
STA. 12+58 -Y6- RT 05
PROP. 12x12x6 HYDRANT TEE
STA. 12+63 -Y6- LT 42
PROP. 3/4-INCH WATER METER AND 3/4-INCH COPPER WATER SERVICE
POT STA 12+78.57 -Y6-
END CONSTRUCTION
POT STA 13+49 -Y6-
PROPOSED UTILITY CONSTRUCTION LIMITS

FOR TRENCH DETAILS SEE SHEET UC-14

FOR WATER DETAILS SEE SHEETS UC-15, UC-16

FOR SAN. SEWER DETAILS SEE SHEET UC-17

30' 0' 30' 60'

REVISIONS

FILE: $FILES DATE: $DATES $TIMES

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-10

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027669 KEVIN C. ZOES

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N.C. 27511

NAD 83

SEE SHEET UC-12 FOR SANITARY SEWER PROFILE

REVISIONS

POT STA 11+36.15 -Y7- CONSTRUCTION LIMITS

POT STA 11+16 -Y7- PROPOSED UTILITY CONSTRUCTION LIMITS

POT STA 10+43.96 -Y8- CONSTRUCTION LIMITS

POT STA 10+24 -Y8- PROPOSED UTILITY CONSTRUCTION LIMITS

STA. 11+53 -Y7- LT 13
PROP. HYDRANT TEE

ABANDON 6-INCH UTILITY PIPE
(82 LF OF C.I. WATER LINE)

STA. 149+40 -L- LT 11
PROP. 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

STA. 11+26 -Y7- LT 15
TIE PROP. 8-INCH D.I.P. WATER LINE TO EXISTING 6-INCH C.I. WITH 8x6 REDUCER
PROP. 8-INCH D.I.P. WATER LINE
64 LF OF RESTRAINED JOINT PIPE

STA. 11+53 -Y7- LT 27
PROP. FIRE HYDRANT

STA. 149+49 -L- LT 32
PROPOSED SMH C-1
4 FT DIA UTILITY MANHOLE
PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 20 LF
ABANDON 8-INCH UTILITY PIPE
(32 LF OF VC SEWER MAIN, NORTH OF EXISTING UTILITY MANHOLE)
REFER TO SEWER NOTE 6 ON SHEET U-2

REMOVE FIRE HYDRANT

STA. 149+76.32 -L- LT 32
PROP. SANITARY SEWER CLEAN-OUT

SANITARY SEWER PROFILE -SS5-
PROP. 6-INCH SANITARY GRAVITY SEWER (PVC) - 151 LF

REMOVE WATER METER - 2 EACH
ABANDON 3/4-INCH UTILITY PIPE

STA. 150+32 -L- LT 30
PROPOSED 3/4-INCH WATER METER AND 3/4-INCH COPPER WATER SERVICE

REMOVE UTILITY MANHOLE

STA. 150+97 -L- LT 32
EXIST. SMH C-4
(MANHOLE TO REMAIN)
RIM = 2163.54
IN = 2161.19 (N)
OUT = 2161.09 (S)-PLUG
OUT = 2161.09 (W)

REMOVE FIRE HYDRANT
BASE AND PIPE

REMOVE WATER METER
ABANDON 3/4-INCH
UTILITY PIPE

STA. 10+34 -Y8- RT 04
TIE PROP. 8-INCH D.I.P. WATER LINE TO EXISTING 8-INCH C.I.

STA. 10+52 -Y8- RT 04
PROP. 8-INCH 11.25 DEGREE BEND
PROP. 8-INCH D.I.P. WATER LINE
103 LF OF RESTRAINED JOINT PIPE

ABANDON 8-INCH UTILITY PIPE
(94 LF OF PVC SEWER MAIN)

REMOVE UTILITY MANHOLE

REMOVE WATER METER
ABANDON 2-INCH UTILITY PIPE

STA. 148+71 -L- RT 30
PROP. 2-INCH WATER METER AND 2-INCH COPPER SERVICE LINE WITH 2-INCH VALVE AT SADDLE

ABANDON 4-INCH UTILITY PIPE
(458 LF OF C.I. WATER LINE)

PROP. 8-INCH SANITARY GRAVITY SEWER (PVC) - 44 LF
(200 LF OF GRAVITY SEWER MAIN BETWEEN MANHOLES)

STA. 148+94 -L-
PROP. SMH C-2
4 FT DIA UTILITY MANHOLE

SANITARY SEWER PROFILE -SS4-
PROP. 8-INCH SANITARY GRAVITY SEWER (D.I.) - 61 LF

REMOVE WATER METER
ABANDON
3/4-INCH
UTILITY PIPE

REMOVE UTILITY MANHOLE

STA. 149+54 -L- RT 30
PROPOSED 3/4-INCH WATER METER AND 3/4-INCH COPPER WATER SERVICE

ABANDON 6-INCH UTILITY PIPE
(157 LF OF PVC SEWER MAIN)

STA. 150+34 -L- LT 11
RECONNECT 1-INCH WATER METER
(PROP. 1-INCH COPPER SERVICE.)
ABANDON. 2-INCH UTILITY PIPE

PROP. 12-INCH D.I. WATER LINE - 438 LF

STA. 152+88 -L- LT 11
PROP. 12x12x8 TEE WITH:
(1) 8-INCH GATE VALVE
(1) 12-INCH GATE VALVE

STA. 153+10 -L- RT 05
PROP. 2-INCH TAPPING SADDLE WITH 2-INCH VALVE
TIE-IN TO EXISTING 2-INCH GALV. STEEL WATER LINE

STA. 153+10 -L- RT 21
STA. 11+71 -Y8- RT 01
PROP. 8-INCH 11.25 DEG BEND
PROP. 8-INCH D.I.P. WATER LINE
75 LF OF RESTRAINED JOINT PIPE

REMOVE FIRE HYDRANT

STA. 11+96 -Y8- RT 34
PROP. FIRE HYDRANT

STA. 10+34 -Y8- RT 04
TIE PROP. 8-INCH D.I.P. WATER LINE TO EXISTING 8-INCH C.I.

ABANDON 8-INCH UTILITY PIPE
119 LF OF C.I. WATER LINE

STA. 153+10 -L- LT 11
PROP. 12x12x8 TEE WITH:
(1) 12-INCH GATE VALVE
(1) 8-INCH GATE VALVE

STA. 153+31 -L- LT 11
PROP. 12-INCH, 22.5 DEG BEND

STA. 153+47 -L- LT 06
PROP. 12-INCH, 22.5 DEG BEND

STA. 154+02 -L- LT 06
PROP. 12-INCH LINE PLUG
PROP. 12-INCH D.I.P. WATER LINE
94 LF OF RESTRAINED JOINT PIPE

EXIST. 2-INCH GALV. STEEL UTILITY PIPE TO REMAIN

ABANDON 8-INCH UTILITY PIPE
60 LF OF C.I. WATER LINE

STA. 153+08 -L- RT 30
STA. 011+80 -Y8- RT 02
PROP. HYDRANT TEE

EXIST SSMH
RIM=2164.78
INV IN=2158.43(NE)
OUT=2158.43(SW)

POT STA 154+12 -L-
PROPOSED UTILITY CONSTRUCTION LIMITS

POT STA 153+84 -L-
CONSTRUCTION LIMITS

POT STA 12+24.50 -Y8-
CONSTRUCTION LIMITS

MATCH LINE - SHEET UC-09 STA. 148+50 -L-

US 64 (16TH AVE)

OAKLAND ST

BUNCOMBE ST

42 ROMAN CATHOLIC DIO/CHARLOTTE 9568698292 DB 927 PG 712

45 ROMAN CATHOLIC DIO/CHARLOTTE 9568781986 DB 926 PG 782

WILLIAM E PENNY 9568781950 DB 905 PG 624

41 JEFFREY LANE COOPER 9568685858 DB 1006 PG 036

43 STEPHEN F. FRANKS 9568686872 DB 1199 PG 397

44 FIRST BAPTIST CHURCH OF HENDERSONVILLE 9568687256 DB 1036 PG 679

46 FIRST UNITED METHODIST CHURCH DB 950 PG 545 9568781654

FOR TRENCH DETAILS SEE SHEET UC-14

FOR WATER DETAILS SEE SHEETS UC-15, UC-16

FOR SAN. SEWER DETAILS SEE SHEET UC-17

30' 0' 30' 60'

FILE: SFILES
DATE: SDATES
STAKES

7/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-11

UTILITY DESIGN ENGINEER

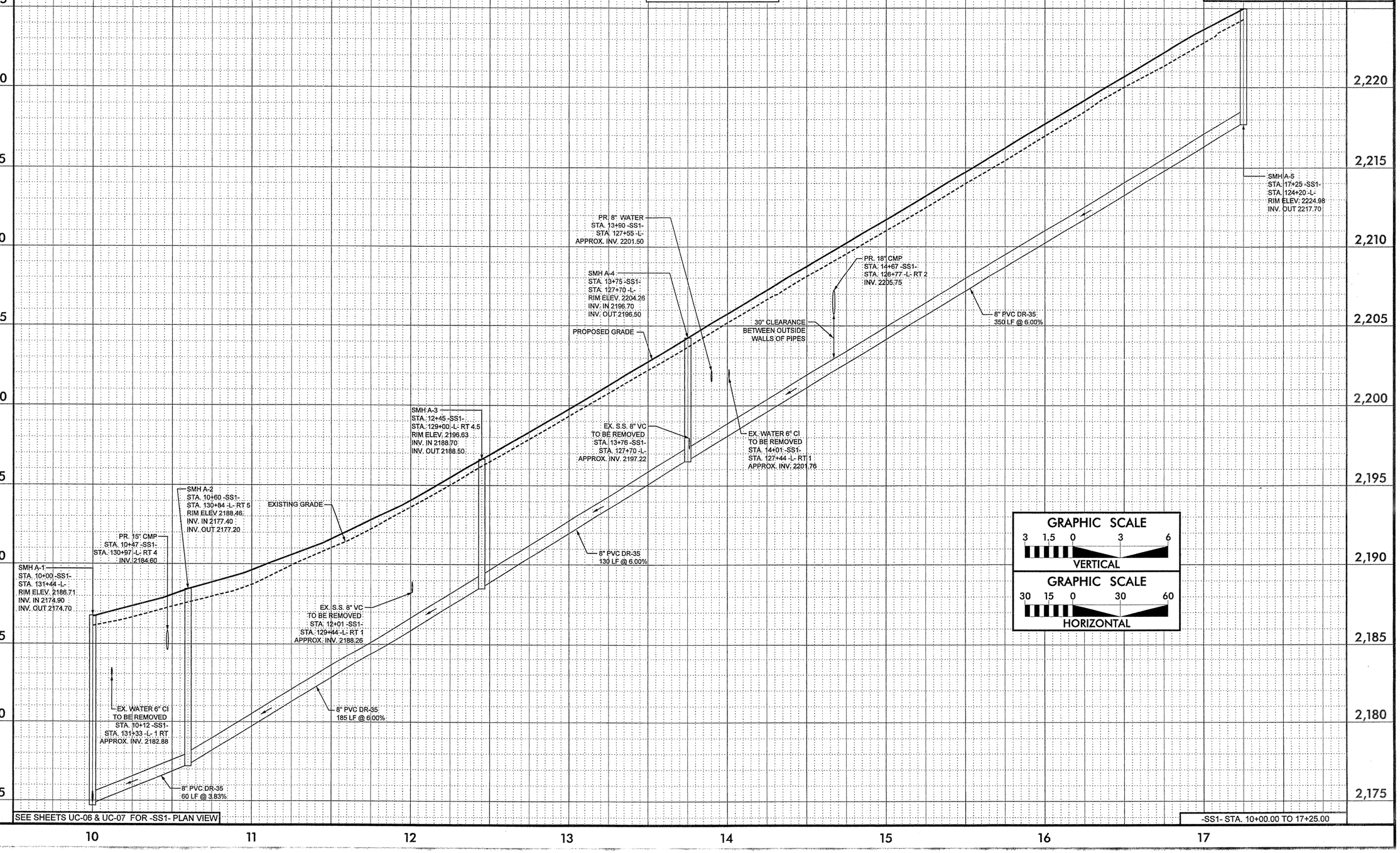
NORTH CAROLINA PROFESSIONAL SEAL 027681 ENGINEER KEVIN C. ZOEB

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

-SS1-

8" SAN. SEWER MAIN
SMH A-1 TO A-5



GRAPHIC SCALE
3 1.5 0 3 6
VERTICAL

GRAPHIC SCALE
30 15 0 30 60
HORIZONTAL

SEE SHEETS UC-06 & UC-07 FOR -SS1- PLAN VIEW

-SS1- STA. 10+00.00 TO 17+25.00

FILE: SFILES
DATE: SDATES
STIMES

7/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-12

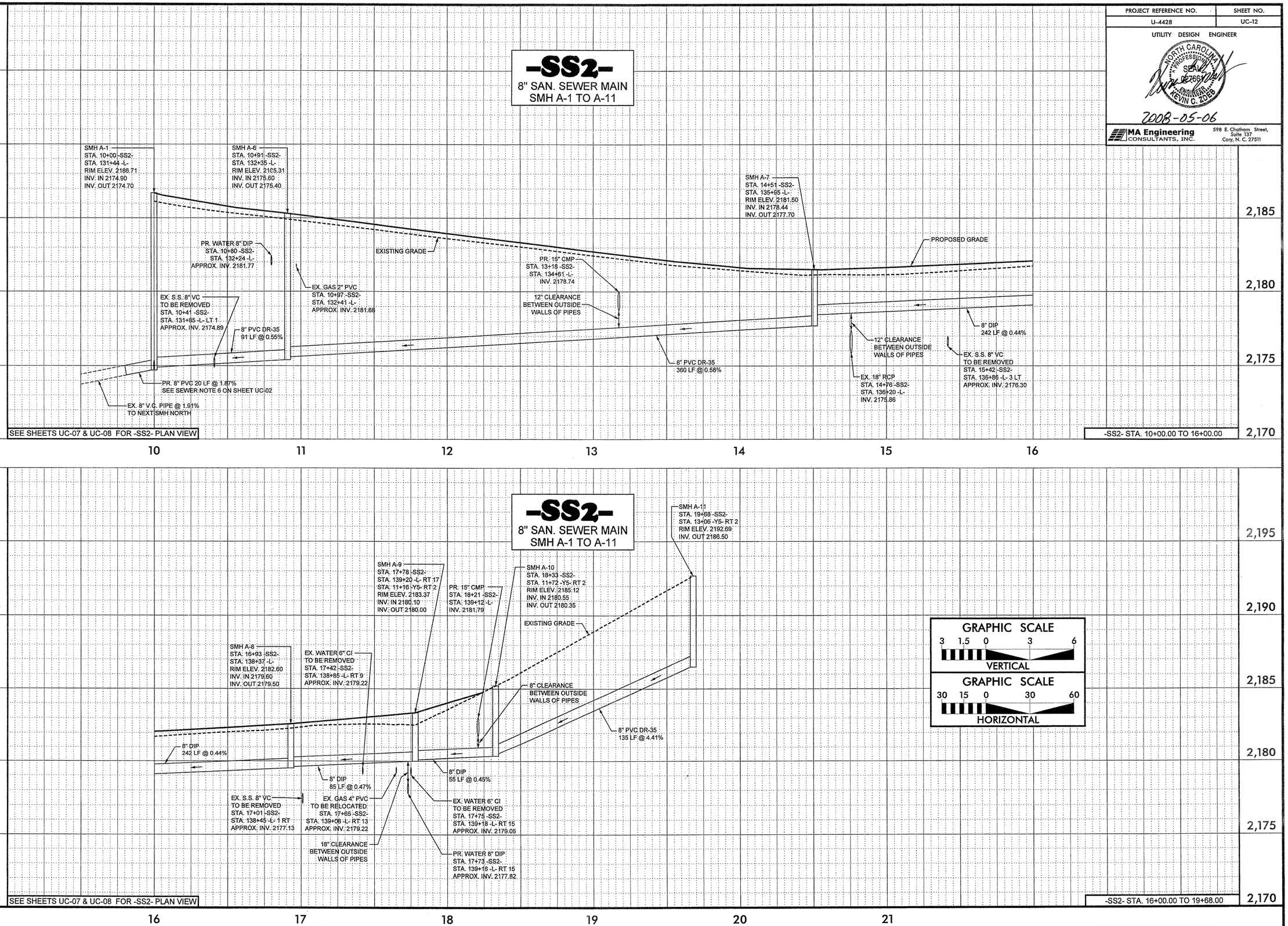
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027667 ENGINEER KEVIN C. ZOES

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham, Street, Suite 137
Cary, N. C. 27511

-SS2-
8" SAN. SEWER MAIN SMH A-1 TO A-11



SEE SHEETS UC-07 & UC-08 FOR -SS2- PLAN VIEW

-SS2- STA. 10+00.00 TO 16+00.00

-SS2-
8" SAN. SEWER MAIN SMH A-1 TO A-11

SEE SHEETS UC-07 & UC-08 FOR -SS2- PLAN VIEW

-SS2- STA. 16+00.00 TO 19+68.00

GRAPHIC SCALE
3 1.5 0 3 6
VERTICAL

GRAPHIC SCALE
30 15 0 30 60
HORIZONTAL

FILE STATE STATES STATES

7/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-13

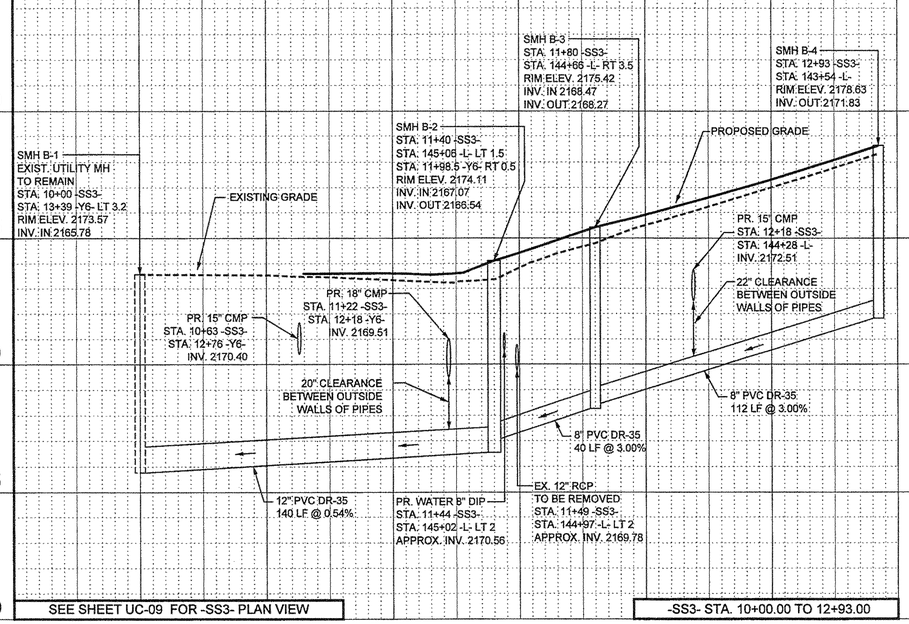
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

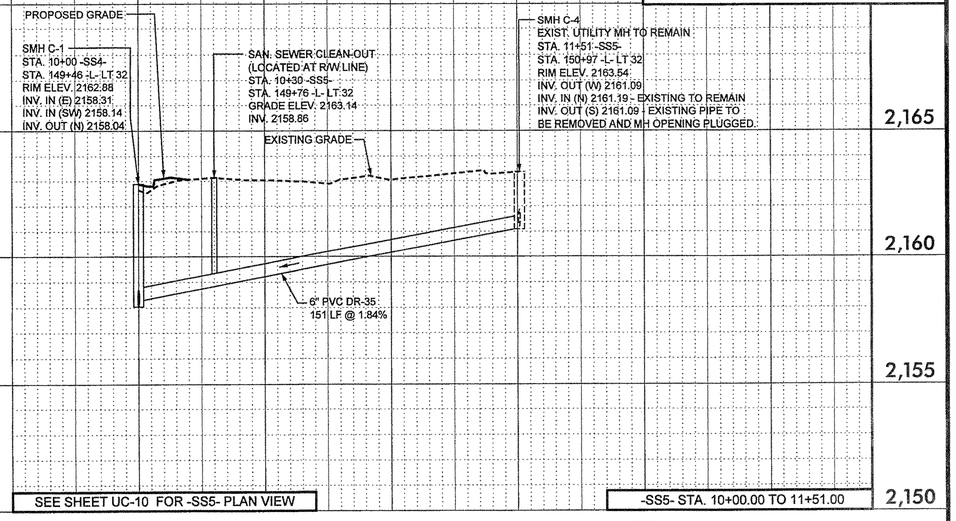
-SS3-
SAN. SEWER MAIN
SMH B-1 TO B-4



SEE SHEET UC-09 FOR -SS3- PLAN VIEW

-SS3- STA. 10+00.00 TO 12+93.00

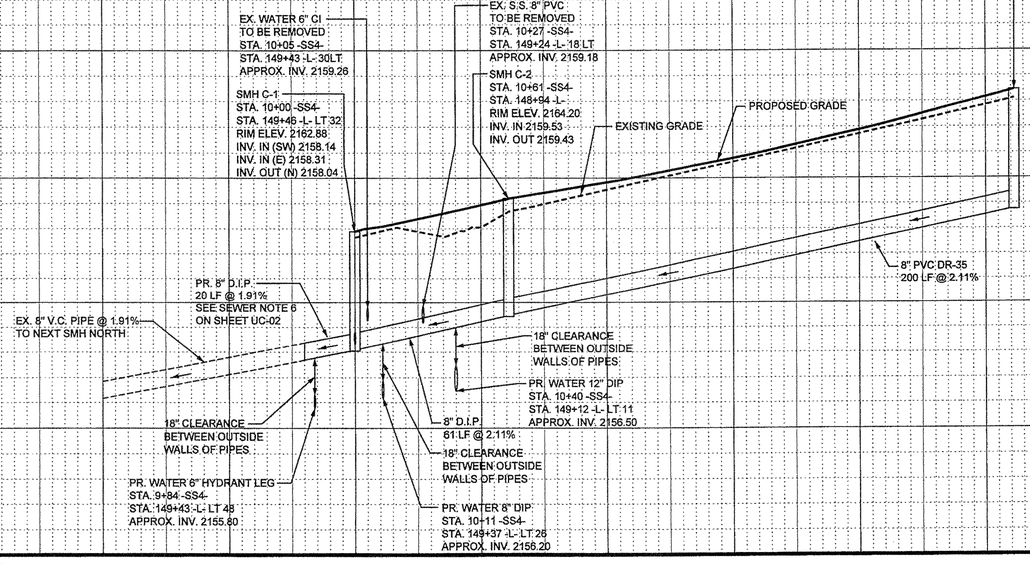
-SS5-
6" SAN. SEWER MAIN
SMH C-1 TO C-4



SEE SHEET UC-10 FOR -SS5- PLAN VIEW

-SS5- STA. 10+00.00 TO 11+51.00

-SS4-
8" SAN. SEWER MAIN
SMH C-1 TO C-3



GRAPHIC SCALE
3 1.5 0 3 6
VERTICAL

GRAPHIC SCALE
30 15 0 30 60
HORIZONTAL

SEE SHEETS UC-09 & UC-10 FOR -SS4- PLAN VIEW

-SS4- STA. 9+00.00 TO 12+61.00

FILE: STILES
DATE: STATES
STIMES

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-14

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027697 ENGINEER KEVIN C. ZUZEK

2008-05-06

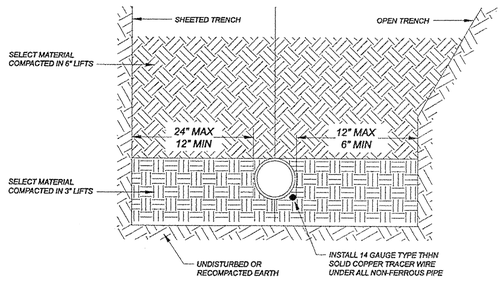
MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

REVISIONS

FILE: $FILE$
DATE: $DATE$ $TIME$

NOTES:
1. WHEN WATER MAIN IS ABOVE SEWER, BUT LESS THAN 18" CLEAR, WATER AND SEWER MAINS SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH MECHANICAL JOINTS FOR A LATERAL DISTANCE (AT RIGHT ANGLES TO THE SEWER) OF AT LEAST 10 FEET ON EACH SIDE OF THE SEWER.
2. WHERE WATER IS LAID UNDER SEWER, BOTH WATER AND SEWER PIPE SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE WITH MECHANICAL JOINTS FOR A LATERAL DISTANCE (AT RIGHT ANGLES TO THE SEWER) OF AT LEAST 10 FEET ON EACH SIDE OF THE SEWER.
3. SANITARY SEWER AND STORM SEWER WILL BE CONSIDERED THE SAME.

TYPICAL PIPE CROSSING AND PARALLELS
NTS



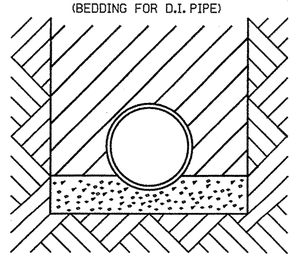
NOTES:
1. ALL SHORING & TRENCHING SHALL COMPLY WITH OSHA SAFETY STANDARDS FOR THE CONSTRUCTION INDUSTRY.
2. BELL HOLES NOT SHOWN.

GENERAL TRENCH DETAIL
NTS

MAXIMUM TRENCH WIDTH
AT TOP OF PIPE

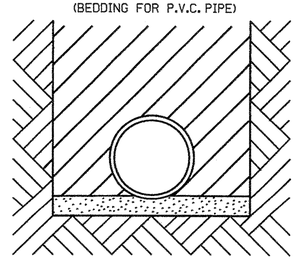
NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

TYPE "4"
(BEDDING FOR D.I. PIPE)



PIPE BEDDED IN SAND, GRAVEL OR CRUSHED STONE TO A DEPTH OF 1/8 PIPE DIAMETER, 4" MINIMUM UNDER PIPE. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL, IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

CLASS "C"
(BEDDING FOR P.V.C. PIPE)



PIPE BEDDED IN LOOSE MATERIAL, LIGHTLY TAMPED WITH A MINIMUM OF 6" UNDER PIPE. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL, IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

TYPICAL PIPE BEDDING DETAILS
NTS

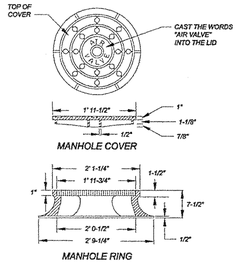
PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-15

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027861 ENGINEER KEVIN C. ZOEB

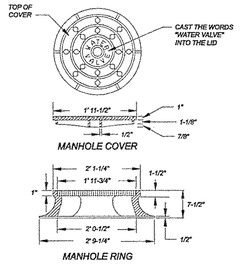
2008-05-06

MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N. C. 27511



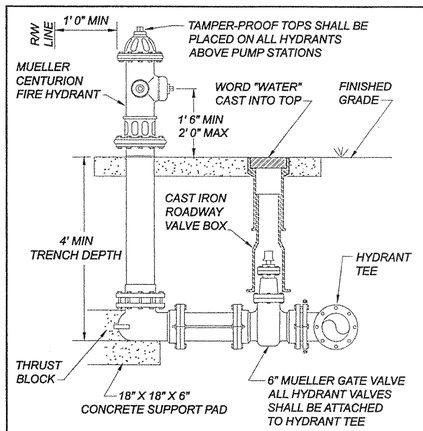
NOTE:
STANDARD MANHOLE RIM & LID BY US FOUNDRY, PART #USF 669 OR EQUAL

MANHOLE RING & COVER FOR AIR RELEASE VALVES
NTS



NOTE:
STANDARD MANHOLE RIM & LID BY US FOUNDRY, PART #USF 669 OR EQUAL

MANHOLE RING & COVER FOR WATER VALVES
NTS



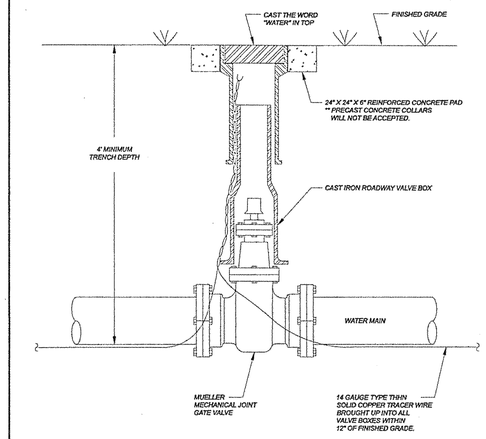
NOTE:1
CONTRACTOR IS REQUIRED TO POUR ONE 24" WIDE 6" THICK MONOLITHIC CONCRETE PAD REINFORCED WITH NUMBER 5 REBAR SPACED 8" APART BOTH WAYS BEGINNING 4" FROM EDGE. THE PAD SHALL EXTEND A MIN OF 8" BEYOND VALVE BOX & HYDRANT BARREL. THIS INSTALLATION IS REQUIRED ONLY WHEN VALVE & HYDRANT ARE WITHIN 3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

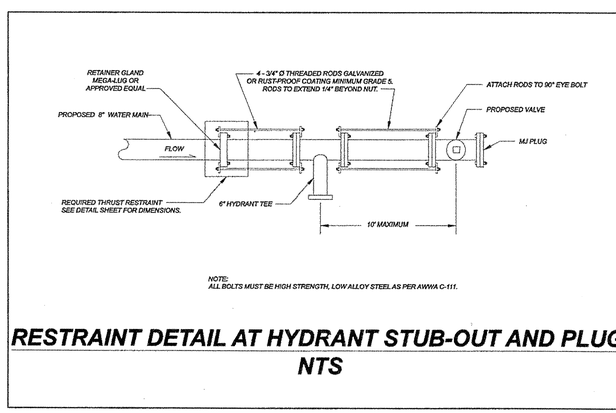
NOTE: 3
ALL HYDRANTS SHALL BE GIVEN A FRESH COAT OF MANUFACTURES STANDARD YELLOW PAINT AFTER INSTALLATION.

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

FIRE HYDRANT INSTALLATION
NTS

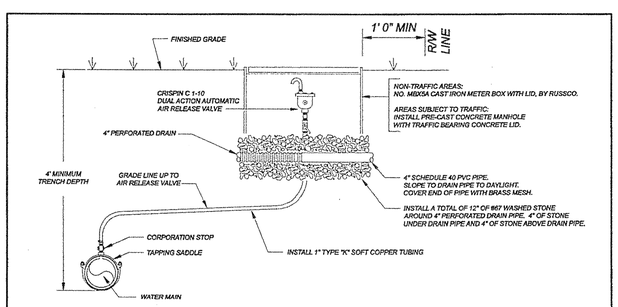


IN GROUND GATE VALVE DETAIL
NTS

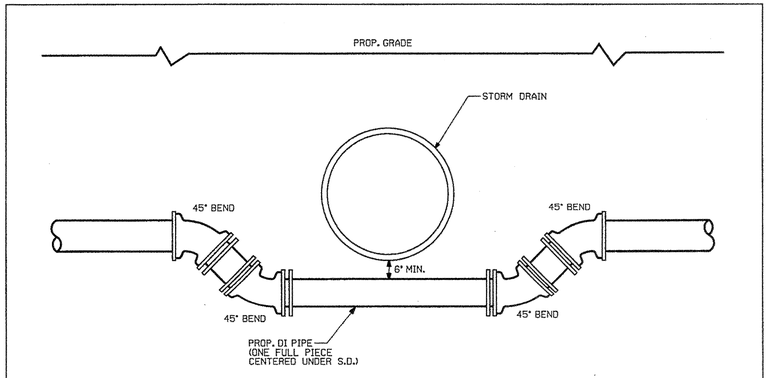


NOTE:
ALL BOLTS MUST BE HIGH STRENGTH, LOW ALLOY STEEL AS PER AWWA C-111.

RESTRAINT DETAIL AT HYDRANT STUB-OUT AND PLUG
NTS



TYPICAL AIR RELEASE VALVE
NTS



PROPOSED WATER LINE AT STORM DRAINAGE
NTS

REVISIONS

FILE: SFILES
DATE: $DATE$ $TIMES$

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-16

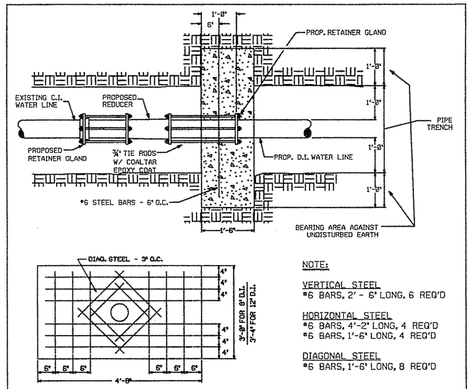
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027665 ENGINEER KEVIN C. ZOBEL

2008-05-06

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

REVISIONS



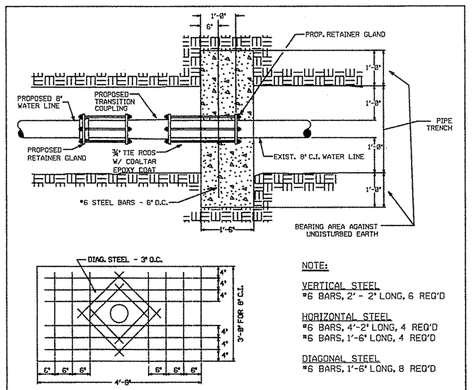
NOTE:

VERTICAL STEEL
#6 BARS, 2' - 6" LONG, 6 REQ'D

HORIZONTAL STEEL
#6 BARS, 4'-2" LONG, 4 REQ'D
#6 BARS, 1'-6" LONG, 4 REQ'D

DIAGONAL STEEL
#6 BARS, 1'-6" LONG, 8 REQ'D

THRUST RESTRAINT WITH RETAINER GLANDS FOR PROP. LARGE PIPE TO SMALL C.I. PIPE



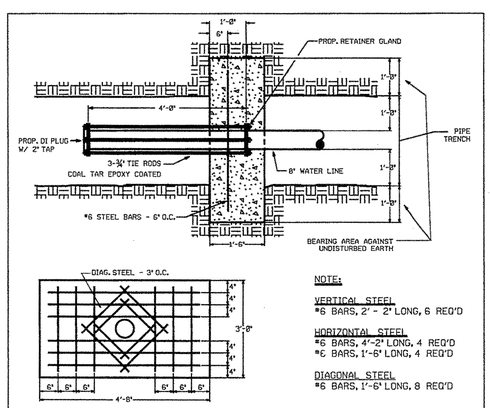
NOTE:

VERTICAL STEEL
#6 BARS, 2' - 2" LONG, 6 REQ'D

HORIZONTAL STEEL
#6 BARS, 4'-2" LONG, 4 REQ'D
#6 BARS, 1'-6" LONG, 4 REQ'D

DIAGONAL STEEL
#6 BARS, 1'-6" LONG, 8 REQ'D

THRUST RESTRAINT WITH RETAINER GLANDS FOR PROP. PIPE TO C.I. PIPE



NOTE:

VERTICAL STEEL
#6 BARS, 2' - 2" LONG, 6 REQ'D

HORIZONTAL STEEL
#6 BARS, 4'-2" LONG, 4 REQ'D
#6 BARS, 1'-6" LONG, 4 REQ'D

DIAGONAL STEEL
#6 BARS, 1'-6" LONG, 8 REQ'D

THRUST RESTRAINT WITH RETAINER GLAND FOR PROPOSED 2" BLOW-OFF ASSEMBLY

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT
(ALL AREAS GIVEN ARE IN SQUARE FEET)

PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF) 1000	2000	3000	4000	5000	6000	7000	8000
4"	11¼°	606	1	1	1	1	1	1	1	1
	22 1/2°	1,226	1	1	1	1	1	1	1	1
	45°	2,405	2	1	1	1	1	1	1	1
	90°	4,444	4	2	1	1	1	1	1	1
	TEE/PLUG	3,143	3	2	1	1	1	1	1	1
6"	11¼°	1,385	2	1	1	1	1	1	1	1
	22 1/2°	2,758	3	2	1	1	1	1	1	1
	45°	5,409	5	3	2	2	1	1	1	1
	90°	9,999	10	5	3	3	2	2	2	1
	TEE/PLUG	7,068	7	4	3	2	2	1	1	1
8"	11¼°	2,462	2	1	1	1	1	1	1	1
	22 1/2°	4,904	5	3	2	1	1	1	1	1
	45°	9,619	10	5	3	2	2	2	2	1
	90°	17,773	18	9	6	4	4	3	3	2
	TEE/PLUG	12,568	13	6	4	3	3	2	2	2
10"	11¼°	3,846	4	2	2	1	1	1	1	1
	22 1/2°	7,656	8	4	3	2	2	2	1	1
	45°	15,028	15	8	5	4	3	3	2	2
	90°	27,768	28	14	9	7	6	5	4	3
	TEE/PLUG	19,636	20	10	7	5	4	3	3	2
12"	11¼°	5,543	6	3	2	2	1	1	1	1
	22 1/2°	11,032	11	6	4	3	2	2	2	2
	45°	21,641	22	11	7	5	4	4	3	3
	90°	39,987	40	20	13	10	8	7	6	5
	TEE/PLUG	28,274	28	14	9	7	6	5	4	4
14"	11¼°	7,544	8	4	3	2	2	2	1	1
	22 1/2°	15,015	15	8	5	4	3	3	2	2
	45°	29,455	29	15	10	7	6	5	4	4
	90°	54,426	54	27	18	14	11	9	8	7
	TEE/PLUG	38,483	38	19	13	10	8	6	5	5
16"	11¼°	9,854	10	5	3	3	2	2	2	2
	22 1/2°	19,662	20	10	7	5	4	3	3	3
	45°	38,471	38	17	13	10	8	6	5	5
	90°	71,098	71	36	24	18	14	12	10	9
	TEE/PLUG	50,255	50	25	17	13	10	8	7	6

* INCLUDES 1.25 SAFETY FACTOR

VERTICAL RESTRAINT
(ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**

PIPE SIZE	RESTRAINING RODS NO.REQ'D	DIA.	DEGREE OF BEND 11¼°	22 1/2°	45°
4"	2	1/2"	0.25	0.50	0.75
6"	2	1/2"	0.50	1.0	1.75
8"	2	5/8"	0.75	1.50	3.0
10"	2	¾"	1.25	2.25	4.50
12"	2	7/8"	1.75	3.25	6.50
14"	4	5/8"	2.25	4.50	8.75
16"	4	¾"	3.0	6.0	11.50

**INCLUDES 1.50 SAFETY FACTOR

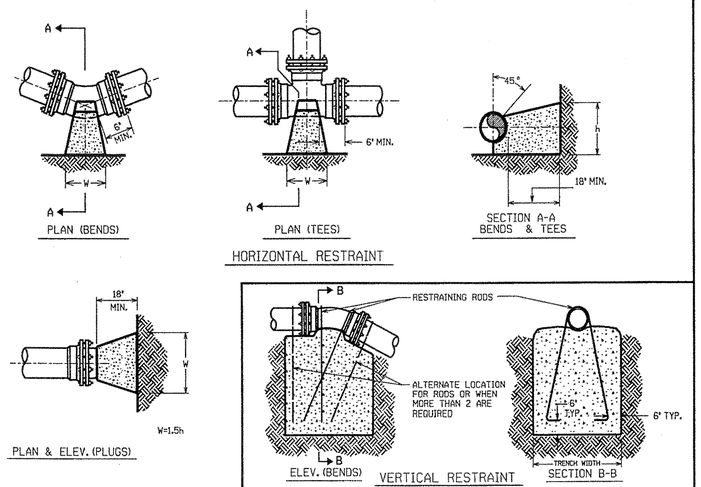
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS 'B'.
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES. (FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

REVISIONS NO.	DATE	DESCRIPTION

SHEET 2 OF 2

THRUST RESTRAINT FOR WATER MAINS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
RALEIGH, N.C.



THRUST RESTRAINT FOR PIPE LINES

RESTRAINED JOINT DESIGN TABLE

FITTING	REQUIRED RESTRAINED LENGTH (FT) OF BARE D.I. PIPE BY DEPTH OF COVER 3 FT	4 FT	5 FT	6 FT	7 FT
HORIZONTAL BENDS					
8 INCH DIA - 11.25 DEG	4	3	3	2	2
8 INCH DIA - 22.5 DEG	8	6	5	4	4
8 INCH DIA - 45 DEG	17	13	11	9	8
12 INCH DIA - 22.5 DEG OFFSET (12 FT BETWEEN THE 2 BENDS)	17	12	9	7	5
REDUCERS					
8x6	44	34	28	23	20
12x6	109	85	69	58	51
DEAD ENDS					
8 INCH DIA	106	82	67	56	48
12 INCH DIA	150	116	95	80	70
TEES					
8x8x6, RL = 10 FT	62	43	31	23	17
8x8x6, RL = 20 FT	41	22	10	2	0
8x8x6, RL = 30 FT	21	2	0	0	0
12x12x6, RL = 10 FT	51	32	21	13	7
12x12x6, RL = 20 FT	19	1	0	0	0
12x12x6, RL = 30 FT	0	0	0	0	0
12x12x8, RL = 10 FT	83	58	43	33	25
12x12x8, RL = 20 FT	59	35	20	10	2
12x12x8, RL = 30 FT	35	12	0	0	0
12x12x12, RL = 10 FT	134	101	80	65	54
12x12x12, RL = 20 FT	119	85	64	49	39
12x12x12, RL = 30 FT	103	69	48	34	23

ASSUMPTIONS

LAYING CONDITION = TYPE 4
SOIL DESIGNATION = ML
DESIGN PRESSURE = 200 PSI (TEST PRESSURE)
SAFETY FACTOR = 1.5

NOTES

1. RL = RUN LENGTH BETWEEN FIRST JOINTS OF PIPE ALONG THE RUN LINE OF TEE.
2. RESTRAINED LENGTH IS MEASURED AS FOLLOWS:
   A. HORIZONTAL BENDS: ALONG EACH SIDE OF BEND.
   B. HORIZONTAL BENDS - 22.5 DEG OFFSET: ALONG THE OUTER SIDE OF EACH BEND. ALL PIPE BETWEEN THE TWO BENDS SHALL BE RESTRAINED JOINT.
   C. REDUCERS: ALONG LARGER DIAMETER PIPE FROM REDUCER.
   D. DEAD ENDS: ALONG PIPE FROM THE PLUG.
   E. TEES: ALONG THE BRANCH PIPE FROM THE TEE .
3. WHEN IT IS NOT POSSIBLE TO INSTALL THE RESTRAINED LENGTHS AS NOTED BY THIS TABLE, CONTRACTOR SHALL INSTALL THE APPROPRIATE CONCRETE THRUST RESTRAINTS AS PER THE DETAILS HEREIN.

DRAWN BY: SFILES
DATE: SDATES

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UC-17

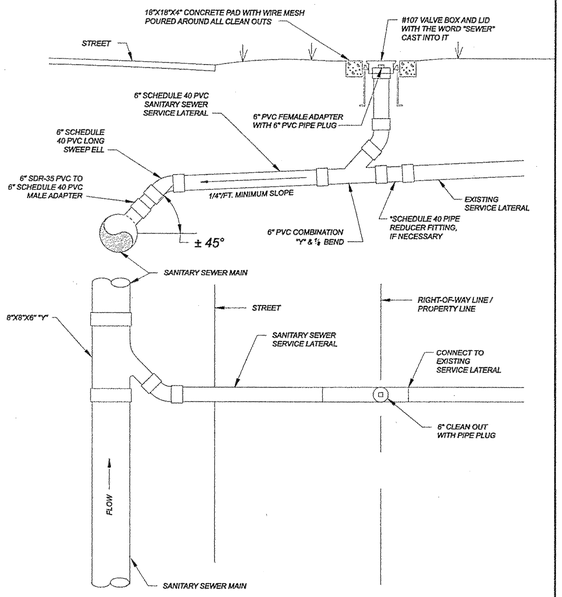
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027665 ENGINEER KEVIN C. ZOEB

2008-05-06

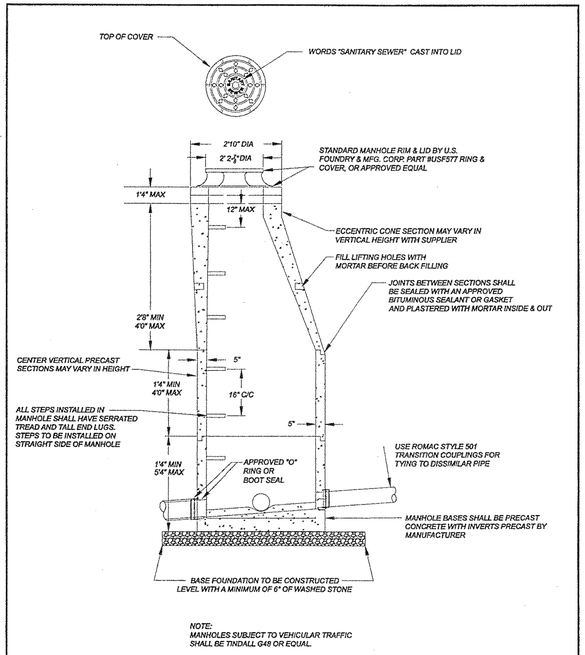
MA Engineering CONSULTANTS, INC.

598 E. Chatham, Street, Suite 137 Cary, N. C. 27511



NOTES:
1. IF THERE IS A DRAINAGE DITCH, THE CLEAN OUT SHALL BE A MINIMUM OF 3' BEHIND IT.
2. EXISTING SERVICE LATERAL MAY BE 4" OR 6". WHERE NECESSARY, THE CONTRACTOR SHALL INSTALL A 6"x4" REDUCER FITTING TO MATCH THE EXISTING LATERAL PIPE DIAMETER.

SERVICE LATERAL AND CLEANOUT
NTS



NOTE:
MANHOLES SUBJECT TO VEHICULAR TRAFFIC SHALL BE TINDALL G48 OR EQUAL.

PRE CAST CONCRETE MANHOLE
NTS

SANITARY STRUCTURE TABLE

SMH	LOCATION	RIM ELEV.	INVERT OUT	INVERT IN
A-1	L- STA. 131+44	2186.71	EX-R (N) 2174.70	(W) 2174.90 (E) 2174.90
A-2	L- STA. 130+84 RT 5	2188.46	(E) 2177.20	(W) 2177.40
A-3	L- STA. 129+00 RT 4.5	2196.63	(E) 2188.50	(W) 2188.70
A-4	L- STA. 127+70	2204.26	(E) 2196.50	(W) 2196.70
A-5	L- STA. 124+20	2224.98	(E) 2217.70	NONE
A-6	L- STA. 132+35	2185.31	(W) 2175.40	(E) 2175.60
A-7	L- STA. 135+95	2181.50	(W) 2177.70	(E) 2178.44
A-8	L- STA. 138+37	2182.60	(W) 2179.50	(E) 2179.60
A-9	L- STA. 139+20 RT 17 Y5- STA. 11+16 RT 2	2183.37	(W) 2180.00	(S) 2180.10
A-10	Y5- STA. 11+72 RT 2	2185.12	(N) 2180.35	(S) 2180.55
A-11	Y5- STA. 13+06 RT 2	2192.69	(N) 2186.50	NONE
# B-1	Y6- STA. 13+39 LT 0.6	2173.57	EX (S) N/A	(N) 2165.78 EX (W) N/A
^ B-2	L- STA. 145+06 LT 2 Y6- STA. 11+99 RT 0.5	2174.11	(S) 2166.54	(W) 2167.07 EX-R (N) 2166.74
B-3	L- STA. 144+66 LT 4	2175.42	(E) 2168.27	(W) 2168.47
B-4	L- STA. 143+54	2178.63	(E) 2171.83	SL (N) 2172.10
C-1	L- STA. 149+46 LT 32	2162.88	R (N) 2158.04	(E) 2158.31 (SW) 2158.14
C-2	L- STA. 148+94	2164.20	(NE) 2159.43	(W) 2159.53
C-3	L- STA. 146+94	2168.45	(E) 2163.75	SL (N) 2163.95
# C-4	L- STA. 150+97 LT 32	2163.54	(W) 2161.09 * (S) 2161.09	EX (N) 2161.19

NOTES:
1. 4 FT DIA. MANHOLE TYPICAL.
2. ^ = 5 FT DIA. MANHOLE
3. # = EXISTING MANHOLE TO REMAIN.
4. * = EXISTING INVERT TO BE PLUGGED AND PIPE REMOVED.
5. EX = EXISTING INVERT AND PIPE TO REMAIN.
6. EX-R = EXISTING INVERT TO REMAIN, REPLACE 20 LF OF EXISTING PIPE.
7. R = REPLACE 20 LF OF EXISTING PIPE FROM MANHOLE.
8. N/A = NOT AVAILABLE
9. SL = SERVICE LINE

SANITARY PIPE TABLE

SANITARY PROFILE	FROM SMH	INVERT OUT	TO SMH	INVERT IN	PIPE LENGTH	PIPE SLOPE	PIPE MATERIAL	PIPE DIA (INCHES)
SS1	A-5	2217.70	A-4	2196.70	350	0.0600	PVC DR-35	8
	A-4	2196.50	A-3	2188.70	130	0.0600	PVC DR-35	8
	A-3	2188.50	A-2	2177.40	185	0.0600	PVC DR-35	8
	A-2	2177.20	A-1	2174.90	60	0.0383	PVC DR-35	8
SS2	A-11	2186.50	A-10	2180.55	135	0.0441	PVC DR-35	8
	A-10	2180.35	A-9	2180.10	55	0.0045	D.I.	8
	A-9	2180.00	A-8	2179.60	85	0.0047	D.I.	8
	A-8	2179.50	A-7	2178.44	242	0.0044	D.I.	8
	A-7	2177.70	A-6	2175.60	360	0.0058	PVC DR-35	8
	A-6	2175.40	A-1	2174.90	91	0.0055	PVC DR-35	8
SS3	B-4	2171.83	B-3	2168.47	112	0.0300	PVC DR-35	8
	B-3	2168.27	B-2	2167.07	40	0.0300	PVC DR-35	8
	B-2	2166.54	B-1	2165.78	140	0.0054	PVC DR-35	12
SS4	C-3	2163.75	C-2	2159.53	200	0.0211	PVC DR-35	8
	C-2	2159.43	C-1	2158.14	61	0.0211	D.I.	8
SS5	C-4	2161.09	C-1	2158.31	151	0.0184	PVC DR-35	6

REVISIONS

FILE: $FILES
DATE: $DATES $TIMES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4428	UO-1	

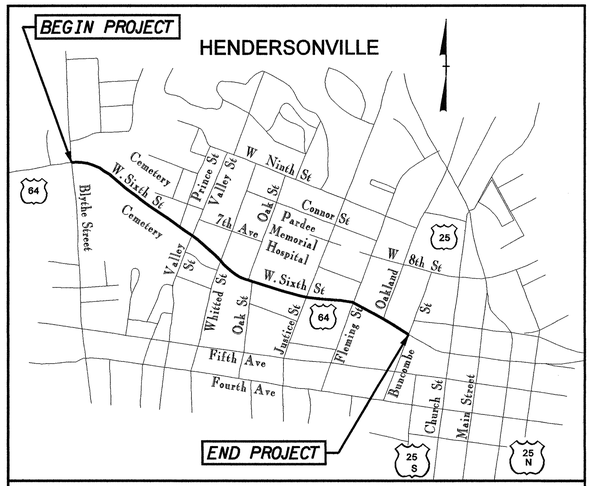
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

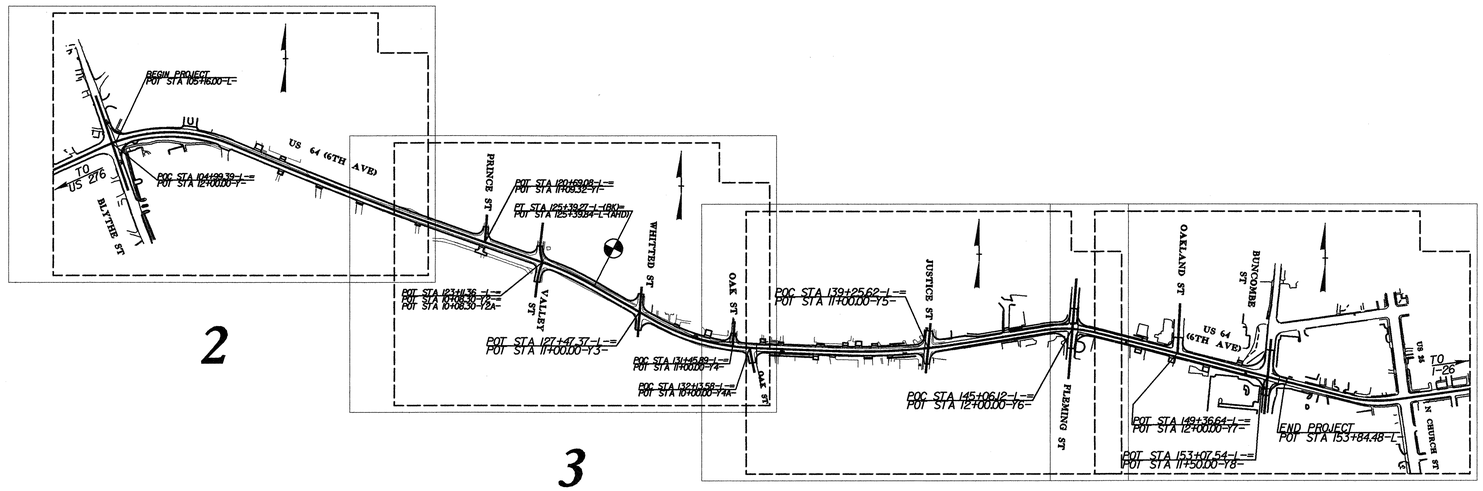
LOCATION: US 64 (6TH AVENUE) FROM BLYTHE STREET TO BUNCOMBE STREET

TYPE OF WORK: UTILITIES BY OTHERS

TIP PROJECT: U-4428



VICINITY MAP SHOWING
LOCATION OF STATE PROJECT U-4428



INDEX OF SHEETS

SHEET NO.	***DESCRIPTION***
UO-1	***TITLE SHEET***
UO-2 - UO-5	***UTILITIES BY OTHERS PLAN SHEETS***

UTILITY OWNERS ON PROJECT

POWER - DUKE ENERGY
TELEPHONE - BELL SOUTH
CABLE TV - MEDIA COMMUNICATIONS

UTILITY COORDINATOR:

MA Engineering CONSULTANTS, INC.
598 East Chatham Street, Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax. 919.297.0221

FILE: $FILE$
DATE: $DATE$ $TIME$

PROJECT REFERENCE NO.	SHEET NO.
U-4428	U0-2

UTILITIES BY OTHERS

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

7/2/99

REVISIONS

NAD 83

REMOVE

REMOVE

REMOVE INACTIVE POLE

REMOVE

MATCH LINE - SEE SHEET U0-3

50' 0' 50' 100'

FILE: #FILE#
DATE: $DATE$ $TIME$

PROJECT REFERENCE NO.	SHEET NO.
U-4428	U0-3

UTILITIES BY OTHERS

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

NAD 83

REVISIONS

7/2/99

FILE: 5FILES
DATE: 3DATES 5TIMES

MATCH LINE - SEE SHEET U0-2

MATCH LINE - SEE SHEET U0-4

PROPOSED TWO 4" U/G TEL CONDUIT

PROPOSED TWO 4" U/G TEL CONDUIT

REMOVE

REMOVE

US 64 (67TH AVE)

64 (67TH AVE)

PRINCE DR

VALLEY ST

CEMETERY

STONE WALL

BRICK WALL WITH METAL RAIL

ISFD

TENNIS COURTS

CHURCH BLDG

BRICK COLUMN

CB RIM=2173.14 COULD NOT OPEN

CB RIM=2177.40 COULD NOT OPEN

12" CMP INV=2187.33

12" CMP INV=2189.15

POLE

GUY ANCHOR

BRICK PEDESTAL

50' 0' 50' 100'

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UO-4

UTILITIES BY OTHERS

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

REVISIONS 7/2/99

NAD 83

MATCH LINE - SEE SHEET UO-3

MATCH LINE - SEE SHEET UO-5

NEW 12X6X7 TEL MANHOLE

SIX 4" CONDUIT

REMOVE

TWO 4" CONDUIT

THREE 4" CONDUIT

NEW 12X6X7 TEL MANHO'

SIX 4" CONDUIT

NEW 12X6X7 TEL MANHOLE

SIX 4" CONDUIT

NEW 12X6X7 TEL MANHOLE

NEW 12X6X7 TEL MANHOLE

TWO 4" CONDUIT

50' 0' 50' 100'

FILE: $FILE$
DATE: $DATE$
$TIME$

PROJECT REFERENCE NO.	SHEET NO.
U-4428	UO-5

UTILITIES BY OTHERS

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

7/2/99

REVISIONS

NAD 83

MATCH LINE - SEE SHEET UO-4

TWO 4" CONDUIT

REMOVE

THREE 4" CONDUIT

REMOVE

REMOVE

SSCO RIM=2172.08
INV=2169.98

SSMH RIM=2163.05
COULD NOT OPEN

SSMH RIM=2162.66
INV IN=2158.26(E)
INV OUT=2158.26(N)

SSMH RIM=2161.08
INV IN=2151.58(S)
INV OUT=2151.53(N)

DI
RIM=2159.99
INV=2157.99+/-
FULL OF DEBRIS

SSMH RIM=2163.54
INV IN=2161.19(N)
INV OUT=2161.09(S)

SSMH RIM=2164.78
INV IN=2158.43(NE)
INV OUT=2158.43(SW)

2 STORY WOOD BUILDING

2 STORY BRICK CHURCH

4 STORY BRICK CHURCH

5 STORY BRICK BLDG IST CITIZENS BANK

2 STORY BRICK APT BUILDING

3 STORY BRICK APT BUILDING

2SBRK MULTI-FAMILY APARTMENT

3SBRK

PARKING DECK

7TH AVENUE WEST

US 64 (6TH AVE W)

US 25 (N CHURCH ST)

50' 0' 50' 100'

FILE: $FILE$
DATE: $DATE$ $TIME$