| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-1 |
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CUMBERLAND COUNTY

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| ITEM NUMBER | DESCRIPTION | UNIT | QUANTITY | FOOTNOTES TO THE ITEM TO BE SHOWN ON PLANS/SPECS |
|---|---|---|---|---|
| | | | | (NUMBERED FOOTNOTES LOCATED AT THE BOTTOM OF THIS ITEM LIST) |
| 795-03.02 | 2 IN PVC WATER LINE | L.F. | 320 | 1 |
| 795-03.04 | 4 IN PVC WATER LINE | L.F. | 680 | 1 |
| 795-03.05 | 6 IN PVC WATER LINE | L.F. | 3500 | 1 |
| 795-03.06 | 8 IN PVC WATER LINE | L.F. | 3000 | 1 |
| 795-03.07 | 10 IN PVC WATER LINE | L.F. | 3400 | 1 |
| 795-03.08 | 12 IN PVC WATER LINE | L.F. | 160 | 1 |
| 795-05.74 | BORE/JACK 6 IN STEEL CASING PIPE-ROCK | L.F. | 100 | 10 |
| 795-05.75 | BORE/JACK 8 IN STEEL CASING PIPE-ROCK | L.F. | 130 | 10 |
| 795-05.76 | BORE/JACK 10 IN STEEL CASING PIPE-ROCK | L.F. | 310 | 10 |
| 795-05.79 | BORE/JACK 16 IN STEEL CASING PIPE-ROCK | L.F. | 115 | 10 |
| 795-05.80 | BORE/JACK 18 IN STEEL CASING PIPE-ROCK | L.F. | 120 | 10 |
| 795-05.81 | BORE/JACK 20 IN STEEL CASING PIPE-ROCK | L.F. | 100 | 10 |
| 795-06.01 | CONNECT TO 2 IN WATER LINE | EACH | 2 | 3 |
| 795-06.03 | CONNECT TO 4 IN WATER LINE | EACH | 4 | 3 |
| 795-06.04 | CONNECT TO 6 IN WATER LINE | EACH | 8 | 3 |
| 795-06.05 | CONNECT TO 8 IN WATER LINE | EACH | 8 | 3 |
| 795-06.06 | CONNECT TO 10 IN WATER LINE | EACH | 12 | 3 |
| 795-06.07 | CONNECT TO 12 IN WATER LINE | EACH | 2 | 3 |
| 795-07.01 | 4 IN X 4 IN TAPPING SLEEVE AND VALVE | EACH | 2 | 4 |
| 795-07.03 | 6 IN X 6 IN TAPPING SLEEVE AND VALVE | EACH | 2 | 4 |
| 795-07.04 | 8 IN X 4 IN TAPPING SLEEVE AND VALVE | EACH | 2 | 4 |
| 795-07.05 | 8 IN X 6 IN TAPPING SLEEVE AND VALVE | EACH | 1 | 4 |
| 795-07.08 | 10 IN X 6 IN TAPPING SLEEVE AND VALVE | EACH | 1 | 4 |
| 795-08.01 | 2 IN GATE VALVE ASSEMBLY | EACH | 1 | 5 |
| 795-08.03 | 4 IN GATE VALVE ASSEMBLY | EACH | 1 | 5 |
| 795-08.04 | 6 IN GATE VALVE ASSEMBLY | EACH | 5 | 5 |
| 795-08.05 | 8 IN GATE VALVE ASSEMBLY | EACH | 7 | 5 |
| 795-08.06 | 10 IN GATE VALVE ASSEMBLY | EACH | 3 | 5 |
| 795-08.25 | Electronic Control Valve Vault w/Bypass | EACH | 1 | 6 |
| 795-09.09 | RELOCATE/RE-CONNECT SERVICE ASSEMBLY | EACH | 56 | INCLUDES ALL MATERIALS, LABOR & EQUIPMENT FOR REMOVAL OF EXISTING WATER SERVICE METER ASSEMBLY AND |
| | | | | INSTALLING AT NEWLY IDENTIFIED LOCATION |
| 795-09.10 | SAMPLE TAP | EACH | 16 | INCLUDES ALL MATERIALS, LABOR & EQUIPMENT FOR INSTALLATION OF TAP ON WATER LINE FOR |
| | | | | WATER SAMPLING PURPOSES. COST OF ACTUALLY SAMPLING IS INCLUDED IN COST OF PIPE. |
| 795-11.04 | RELOCATE FIRE HYDRANT | EACH | 4 | INCLUDES ALL MATERIALS, LABOR, AND EQUIPMENT TO DISCONNECT AND RELOCATE EXISTING FIRE HYDRANT TO A NEW LOCATION |
| 795-13.01 | DI FITTINGS | LBS | 1241 | INCLUDES FITTINGS, GLANDS & RESTRAINT DEVICES DESCRIBED IN POUNDS |

FOOTNOTE 1:
INCLUDES ALL MATERIALS, LABOR, EQUIPMENT FOR COMPLETE INSTALLATION OF PIPE INCLUDING BUT NOT LIMITED TO TRAFFIC CONTROL, MATERIALS, EQUIPMENT, EXCAVATION IN BOTH UNCONSOLIDATED AND ROCK, REMOVAL AND REPLACEMENT OF UNSUITABLE SOIL, ENVELOPE/BEDDING MATERIAL, BACKFILLING, FLOWABLE FILL, THRUST BLOCKING, CONCRETE DEADMAN, PIPE FUSION, TRACER WIRE, WARNING TAPE, APPURTENANCES, TEMPORARY/PERMANENT SHORING, MAINTAINING THE TRENCH, TESTING, FLUSHING, DISINFECTION, BACTERIOLOGICAL SAMPLING, TEMPORARY/PERMANENT SURFACE RESTORATION, AND ANY OTHER LABOR OR MATERIAL REQUIRED TO COMPLETE THE WORK AS SPECIFIED ON THE PLANS.

FOOTNOTE 2:
INCLUDES ALL MATERIALS, LABOR, EQUIPMENT, AND TRAFFIC CONTROL, INCLUDING BUT NOT LIMITED TO FLUID CONTAINMENT FOR COMPLETE HORIZONTAL DIRECTIONAL DRILLING INSTALLATION OF CASING PIPE OR UNCASED CARRIER PIPE IN BOTH UNCONSOLIDATED SOIL OR ROCK. IF CASING PIPE HAS CARRIER PIPE, THE CARRIER PIPE SHALL BE PAID AT THE OPEN CUT ITEM.

FOOTNOTE 3:
INCLUDES ALL MATERIALS, LABOR, AND EQUIPMENT NECESSARY FOR CONNECTING TO AN EXISTING WATER LINE INCLUDING TRAFFIC CONTROL.

FOOTNOTE 4:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT INCLUDING BUT NOT LIMITED TO TAPPING SLEEVE, VALVE, VALVE BOX, BOX ADJUSTMENT, VALVE BOX COLLAR, VALVE MARKER, EXCAVATION, BEDDING, BACKFILL, BLOCKING AND RESTRAINT, TAP OF EXITING LINE , AND TRAFFIC CONTROL.

FOOTNOTE 5:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT INCLUDING BUT NOT LIMITED TO FITTINGS, VALVE, VALVE STEM EXTENSIONS, VALVE BOX AND COVER, BOX ADJUSTMENT, VALVE BOX COLLAR, VALVE MARKER, EXCAVATION, BEDDING, BACKFILL, BLOCKING, AND TRAFFIC CONTROL.

FOOTNOTE 6:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT INCLUDING BUT NOT LIMITED TO MACHINERY, TOOLS OR APPARATUS NECESSARY FOR INSTALLATION OF ASSEMBLIES AS DESCRIBED IN THE PLANS AND SPECS EXCEPT FOR SERVICE LINE WHICH IS PAID SEPARATELY FOR EACH FOOT INSTALLED.

FOOTNOTE 7:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT FOR COMPLETE INSTALLATION OF SERVICE LINE OR CASING FOR SERVICE LINE ON LONG SIDE AND SHORT SIDE OF MAIN.

FOOTNOTE 8:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT FOR COMPLETE INSTALLATION OF UNIT OR LUMP SUM ITEM AS SPECIFIED ON BID FORM.

FOOTNOTE 9:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT FOR REMOVAL OF ITEM.

FOOTNOTE 10:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT INCLUDING BUT NOT LIMITED TO CASING PIPE, PIPE SPACERS, CASING END SEALS, FITTINGS, TRACER WIRE, WARNING TAPE, UTILITY LINE MARKERS AND TRAFFIC CONTROL. IF CASING PIPE HAS CARRIER PIPE, THE CARRIER PIPE SHALL BE PAID AT THE OPEN CUT ITEM.

FOOTNOTE 11:
INCLUDES ALL MATERIALS, LABOR AND EQUIPMENT, SETUP AND TRAFFIC CONTROL.

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COUD MAY BE CONTACTED AT 931-484-6987.

## UTILITY INFORMATION

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555
(931) 484-6987
CONTACT: EVERETT BOLIN, JR.

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

NOTES & UTILITY OWNER

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-2 |
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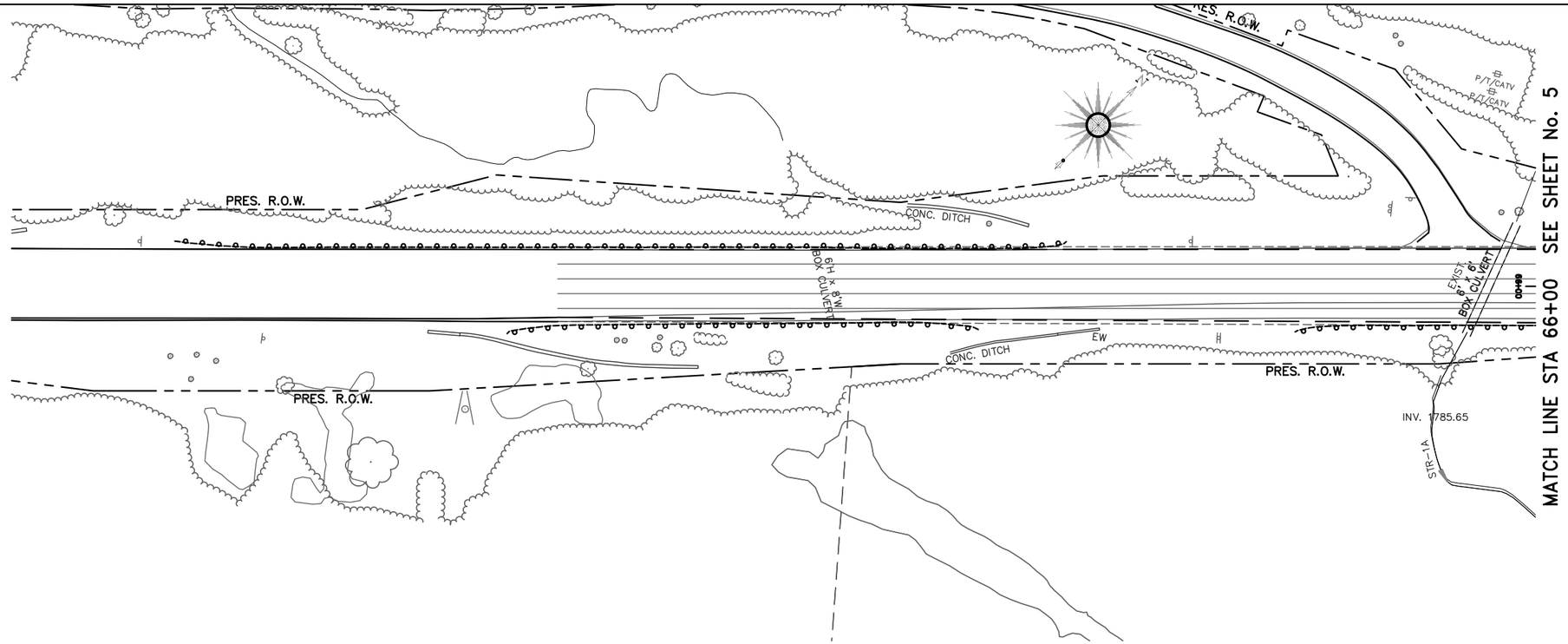
CUMBERLAND COUNTY

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NO WATERLINE RELOCATION IN THIS AREA

BARRY R. FIELD
REGISTERED ENGINEER
3-17-14
CUMBERLAND
NO. 21568
STATE OF TENNESSEE

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 56+00 TO STA. 66+00
SCALE: 1"=50'

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-3 |
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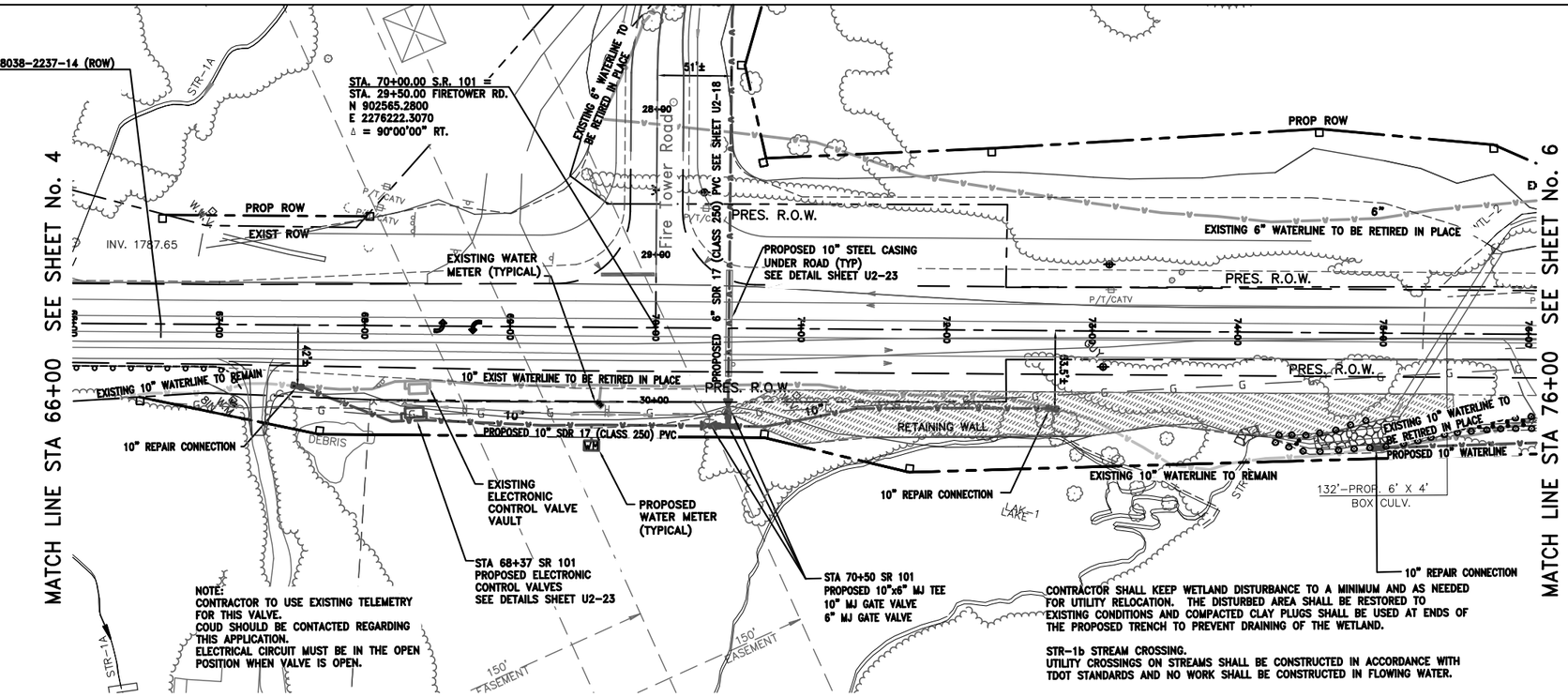
CUMBERLAND COUNTY




NOTE:
CONTRACTOR TO USE EXISTING TELEMETRY FOR THIS VALVE.
COUD SHOULD BE CONTACTED REGARDING THIS APPLICATION.
ELECTRICAL CIRCUIT MUST BE IN THE OPEN POSITION WHEN VALVE IS OPEN.

CONTRACTOR SHALL KEEP WETLAND DISTURBANCE TO A MINIMUM AND AS NEEDED FOR UTILITY RELOCATION. THE DISTURBED AREA SHALL BE RESTORED TO EXISTING CONDITIONS AND COMPACTED CLAY PLUGS SHALL BE USED AT ENDS OF THE PROPOSED TRENCH TO PREVENT DRAINING OF THE WETLAND.

STR-1b STREAM CROSSING.
UTILITY CROSSINGS ON STREAMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH TDOT STANDARDS AND NO WORK SHALL BE CONSTRUCTED IN FLOWING WATER.

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**WATERLINE LEGEND**

- NEW INSTALLATION
- EXISTING TO REMAIN
- TEMPORARY RELOCATION/INSTALLATION
- TO BE REMOVED OR RETIRED IN PLACE

**CALL BEFORE YOU DIG**

UTILITIES PROTECTION CENTER
IN
TENNESSEE
CALL
1 - 800 - 351 - 1111
THREE WORKING DAYS BEFORE YOU DIG

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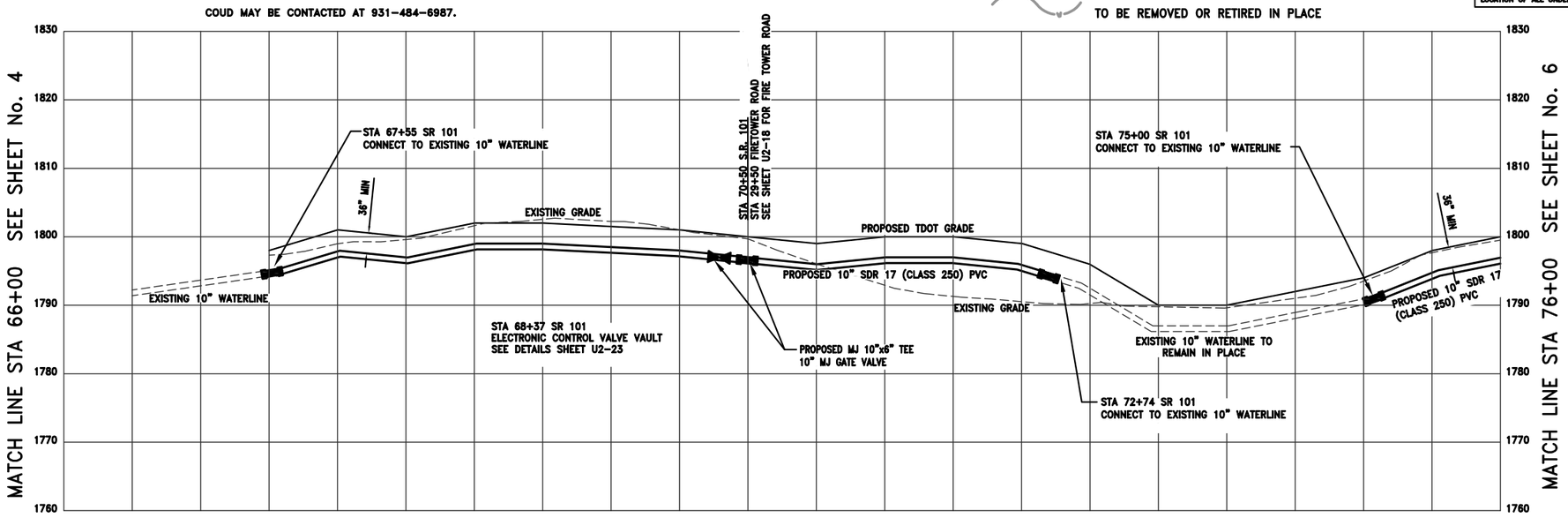


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BARRY R. FIELD REGISTERED ENGINEER No. 21562 STATE OF TENNESSEE
3-17-14

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STA. 66+00 TO STA. 76+00
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1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-4 |
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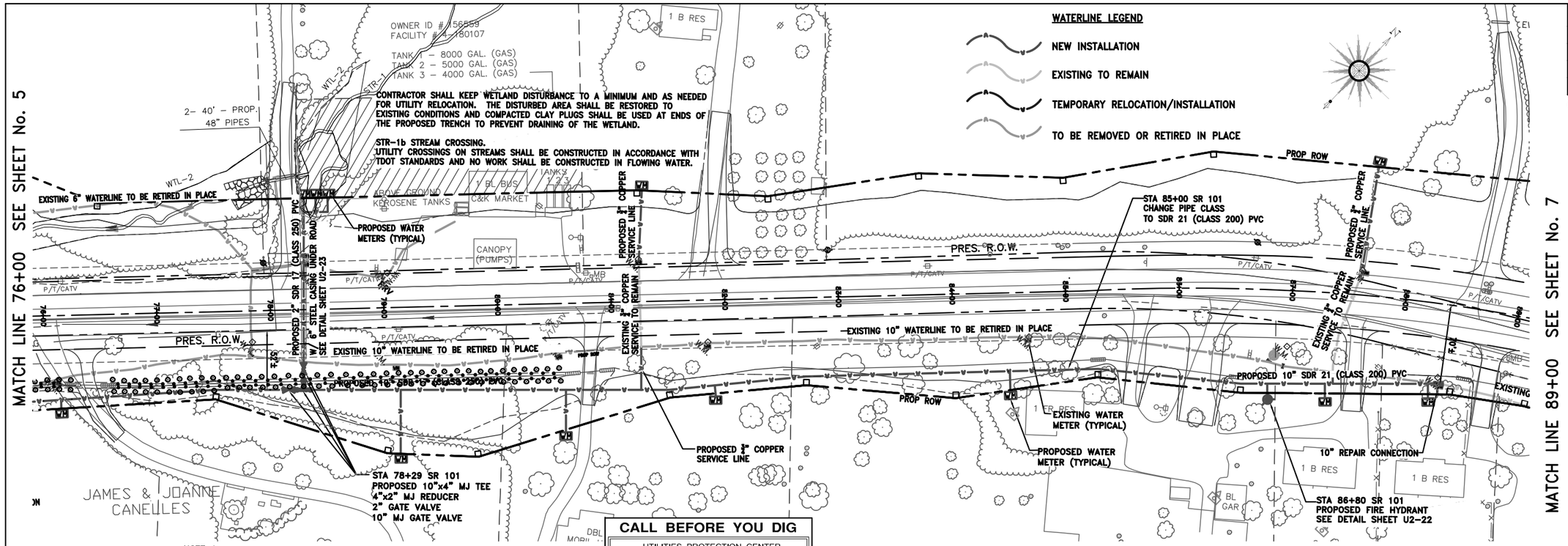
CUMBERLAND COUNTY

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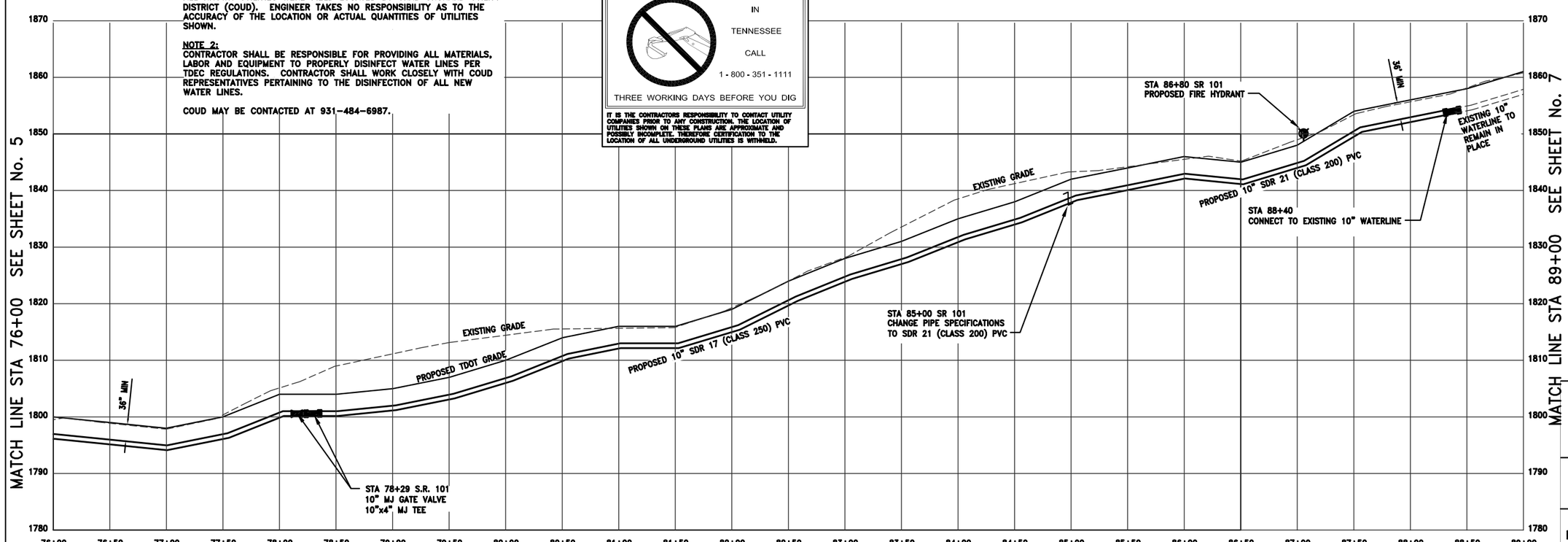


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CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
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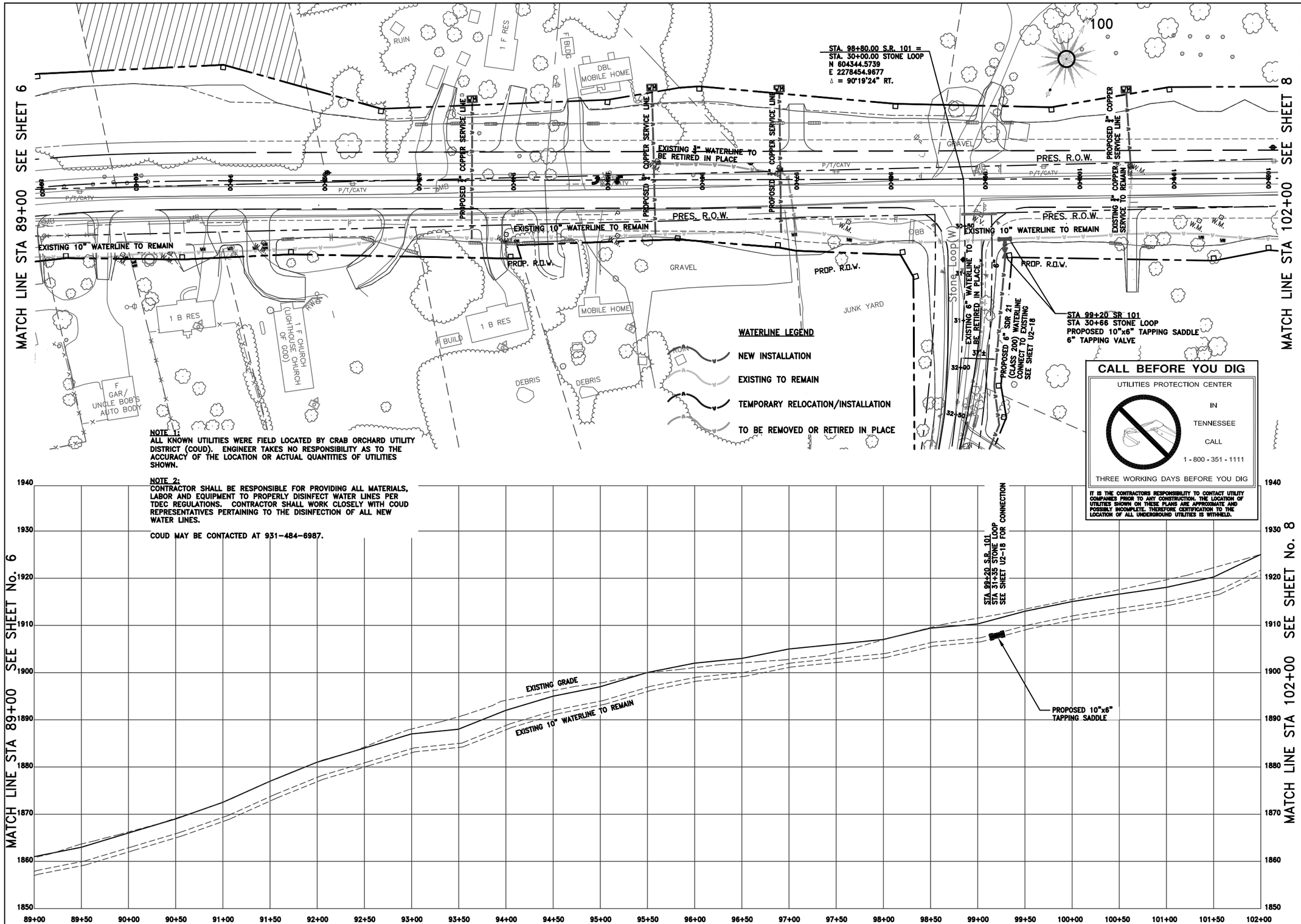
CUMBERLAND COUNTY

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BARRY R. FIELD
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No. 21562
STATE OF TENNESSEE
3-17-14

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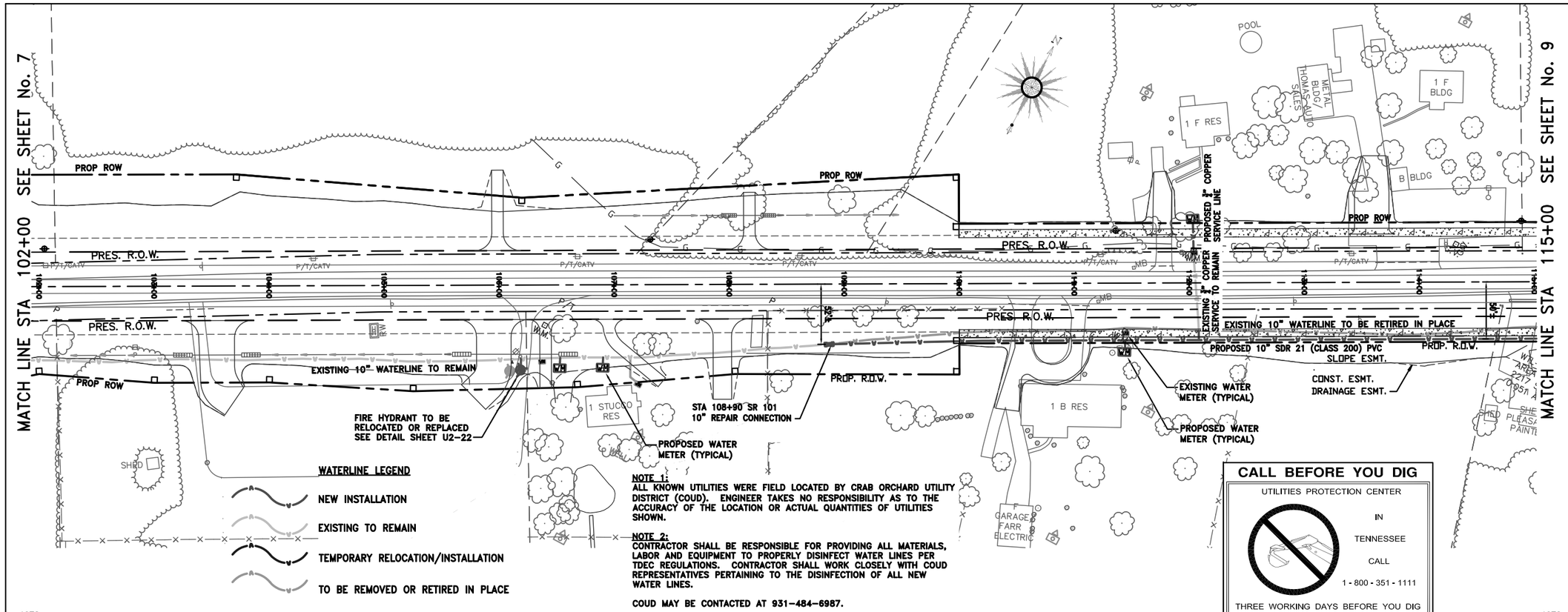
CUMBERLAND COUNTY

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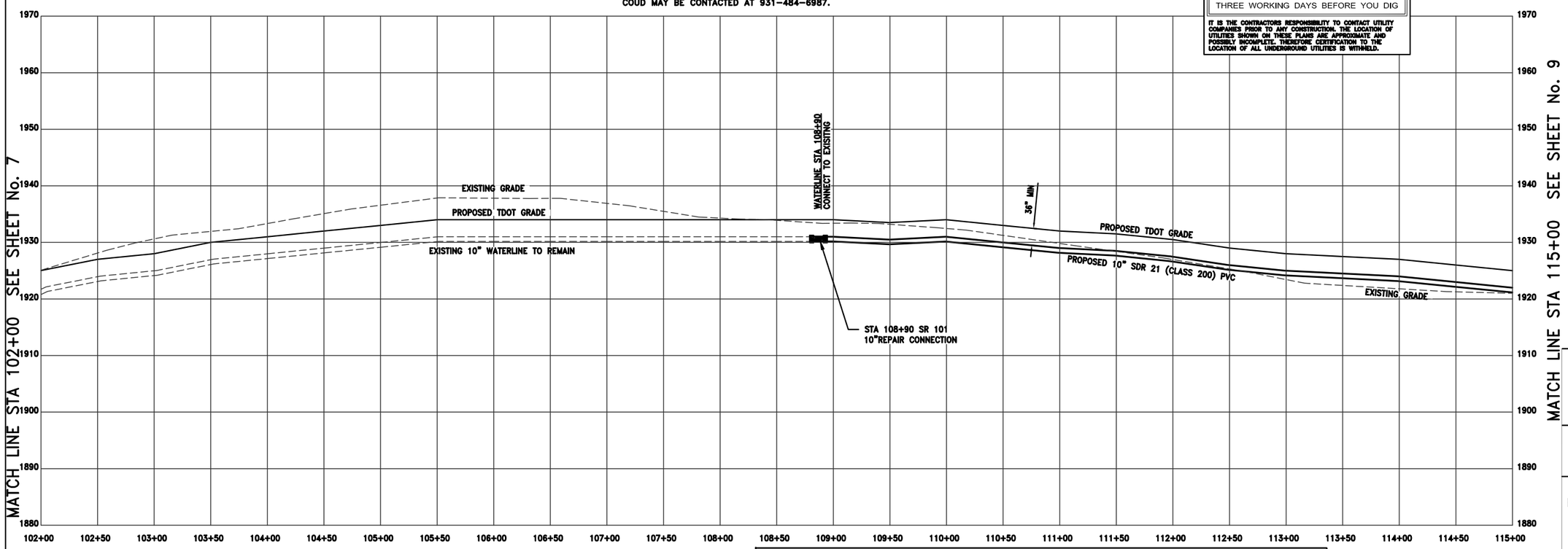


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CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 102+00 TO STA. 115+00
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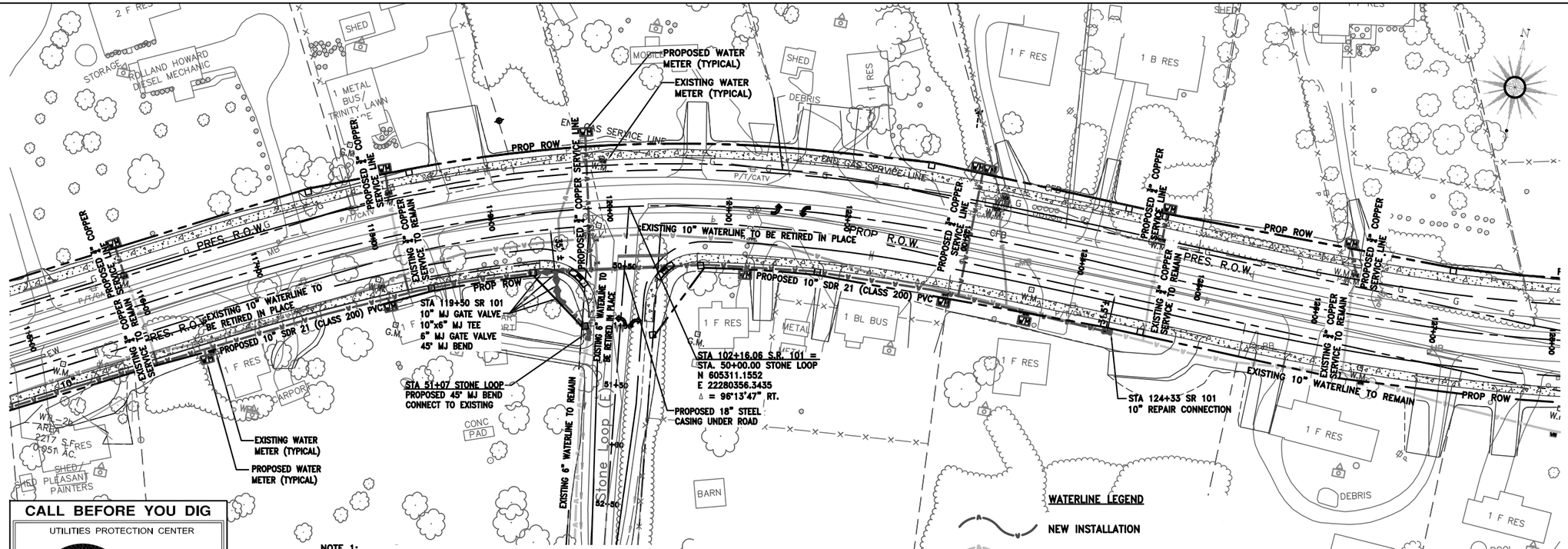
CUMBERLAND COUNTY

MATCH LINE 115+00 SEE SHEET No. 8

MATCH LINE 128+00 SEE SHEET No. 10

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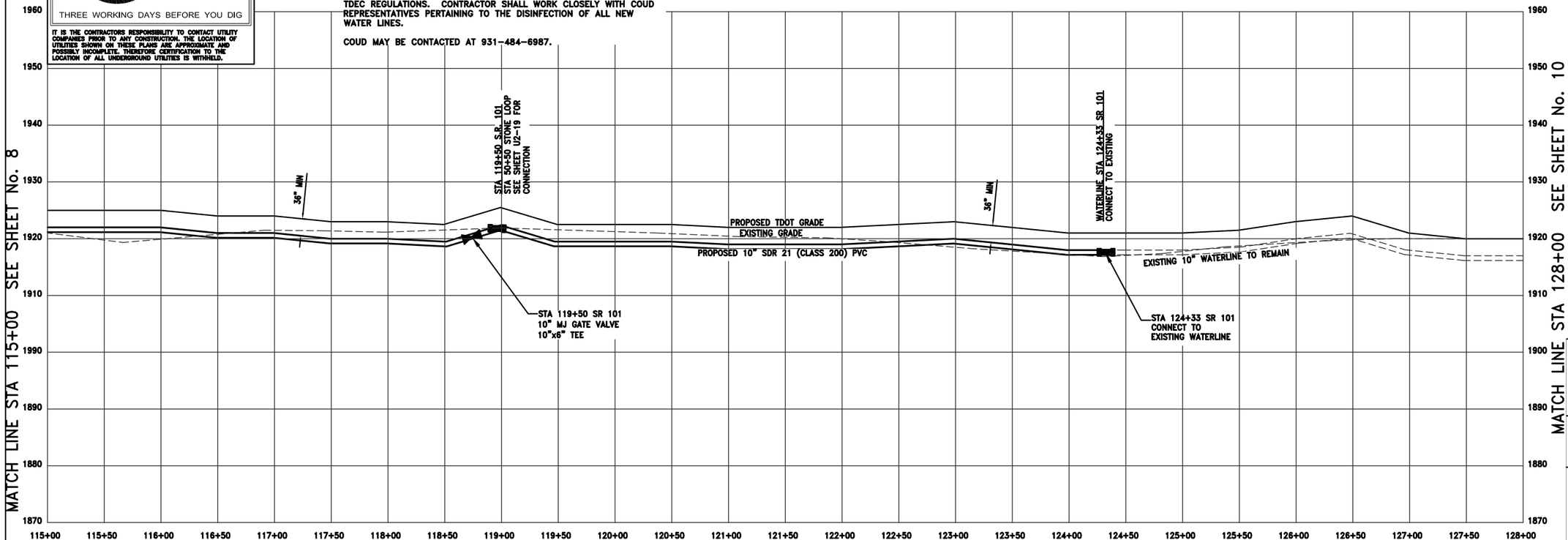


MATCH LINE STA 115+00 SEE SHEET No. 8

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BARRY R. FIELD REGISTERED ENGINEER No. 21562 STATE OF TENNESSEE 3-17-14

# CRAB ORCHARD UTILITY DISTRICT

2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

## S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 115+00 TO STA. 128+00
SCALE: 1"=50'

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-8 |
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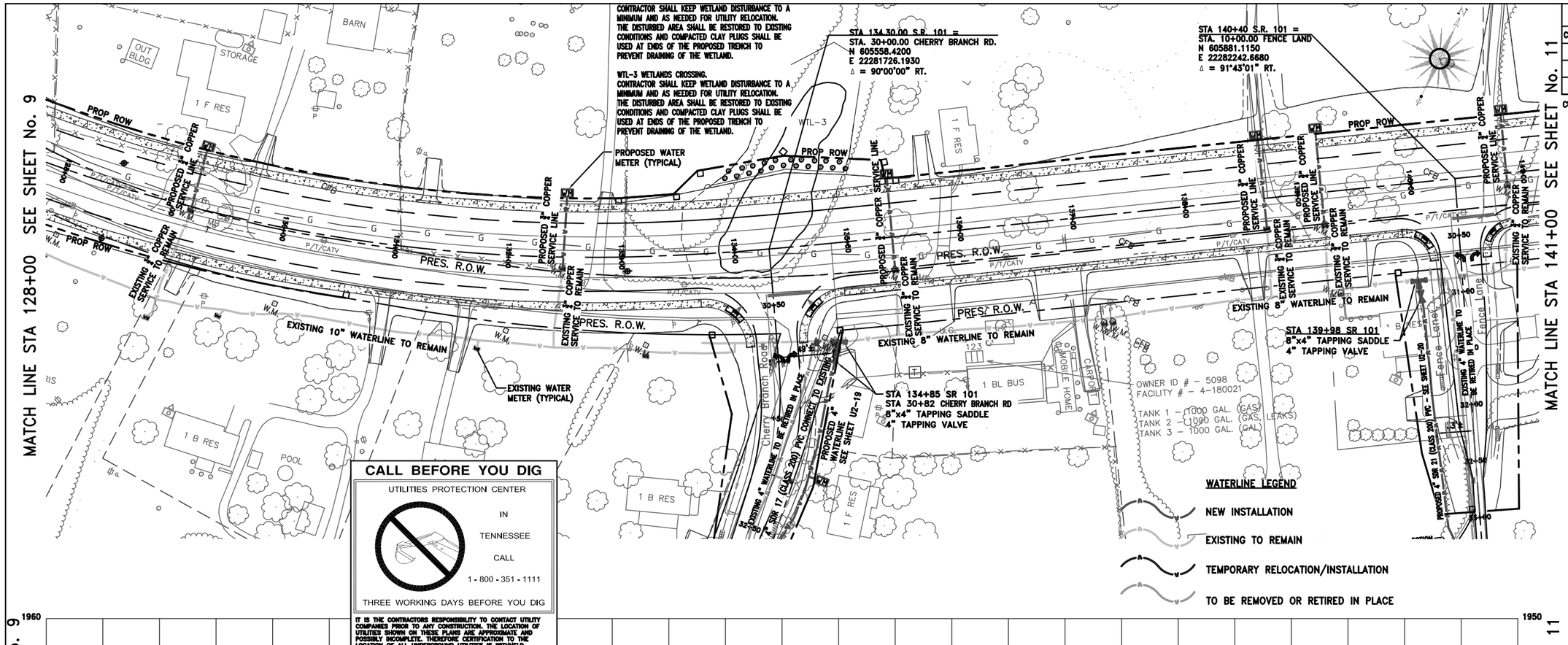
CUMBERLAND COUNTY




**CALL BEFORE YOU DIG**

UTILITIES PROTECTION CENTER

IN

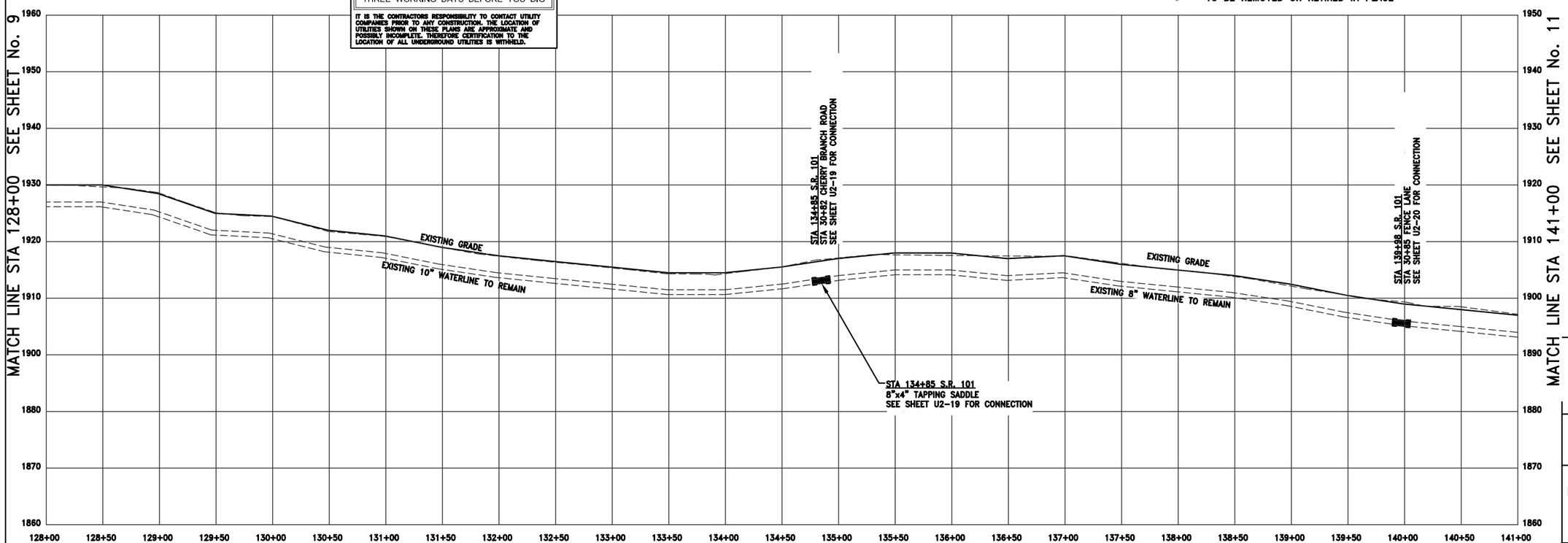
TENNESSEE

CALL

1 - 800 - 351 - 1111

THREE WORKING DAYS BEFORE YOU DIG

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION. THE LOCATION OF UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES IS WITHHELD.




BARRY R. FIELD
REGISTERED ENGINEER
COMMISSION No. 21562
STATE OF TENNESSEE
3-17-14

# CRAB ORCHARD UTILITY DISTRICT

2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

## S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS

FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 128+00 TO STA. 141+00

SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-9 |
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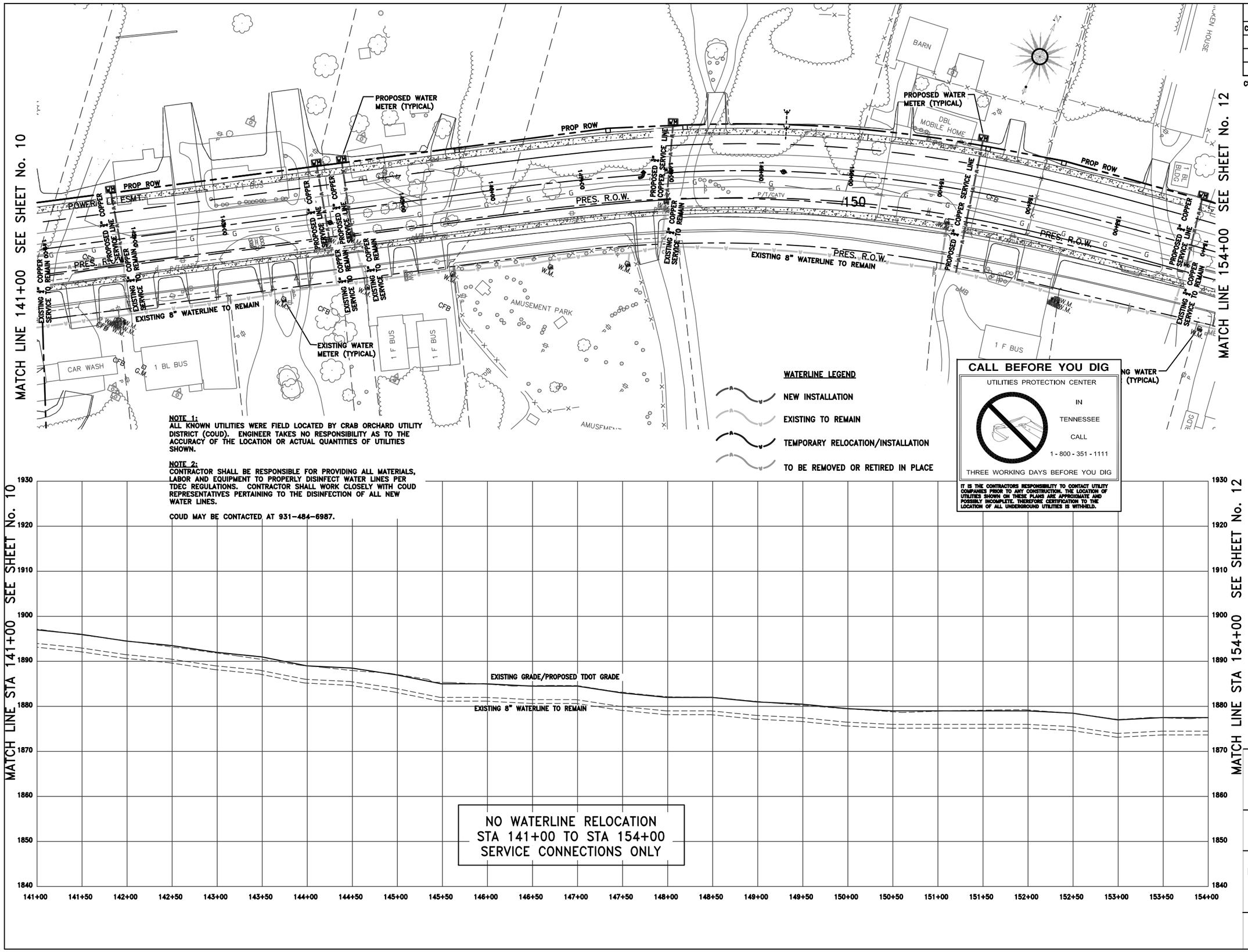
CUMBERLAND COUNTY



CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 141+00 TO STA. 154+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-10 |
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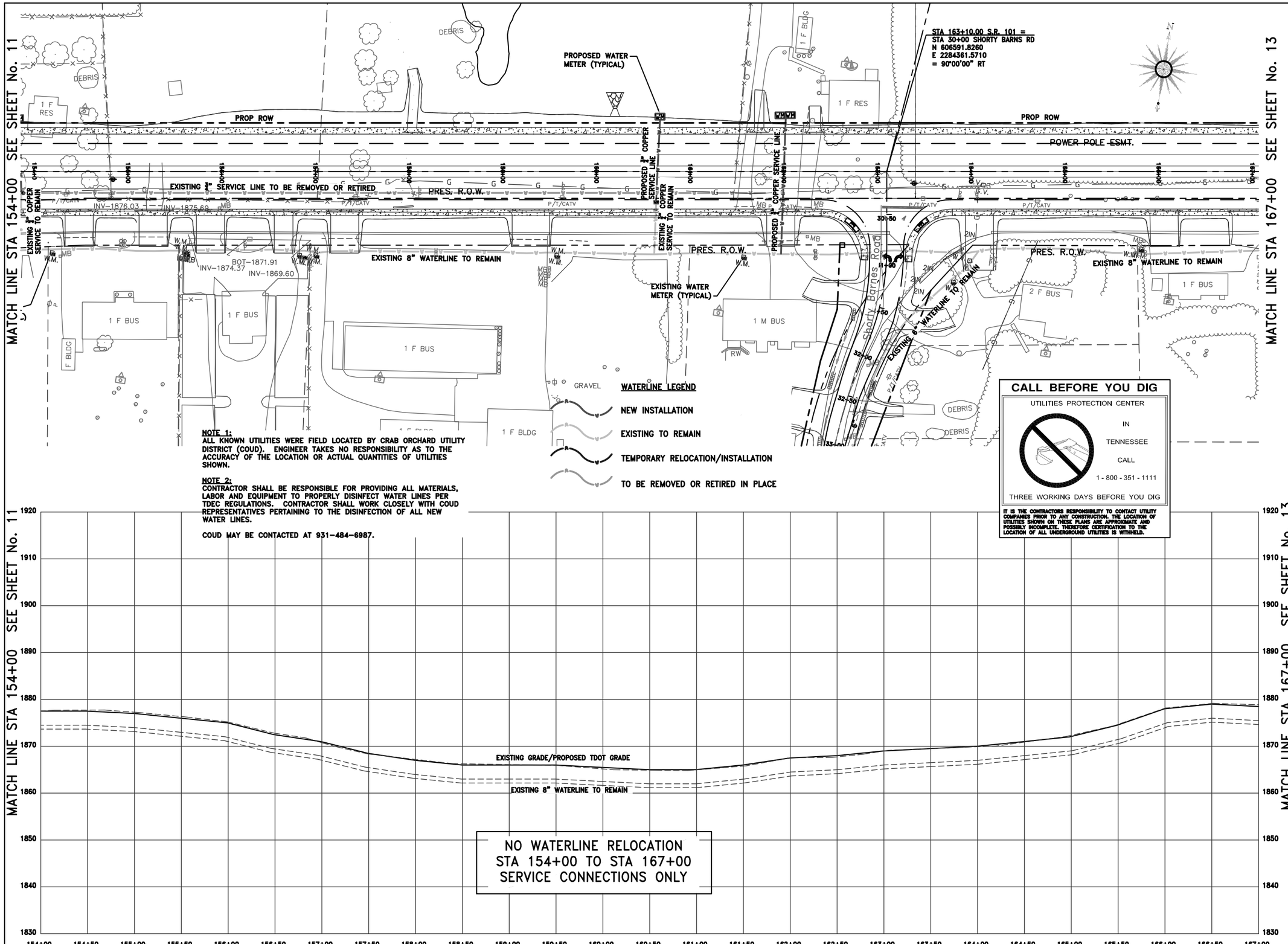
CUMBERLAND COUNTY




NOTE 1:
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COUD MAY BE CONTACTED AT 931-484-6987.

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TENNESSEE
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NO WATERLINE RELOCATION
STA 154+00 TO STA 167+00
SERVICE CONNECTIONS ONLY

BARRY R. FIELD
REGISTERED ENGINEER
No. 21582
STATE OF TENNESSEE
10-17-14

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 154+00 TO STA. 167+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-11 |
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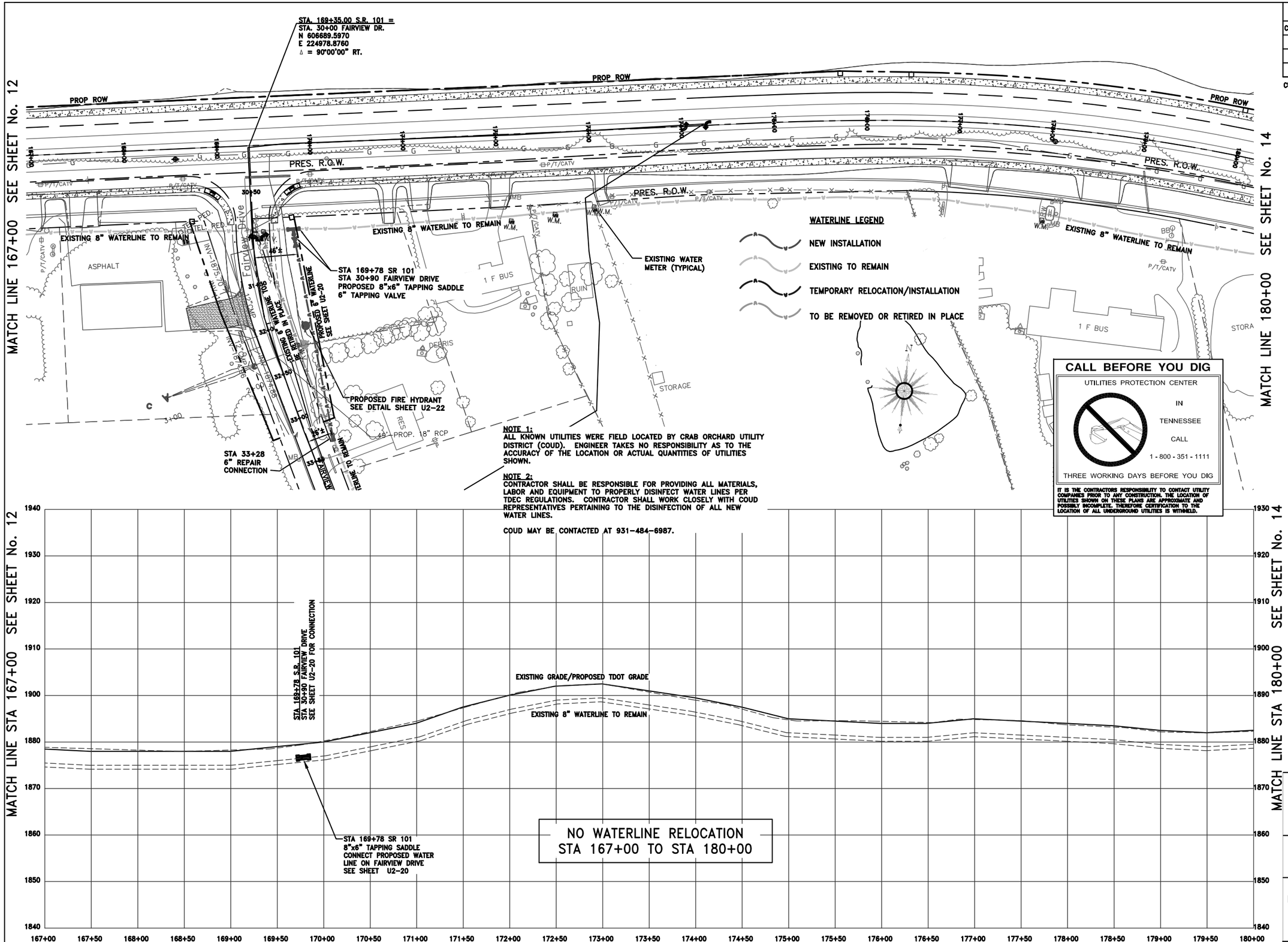
CUMBERLAND COUNTY

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CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 167+00 TO STA. 180+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-12 |
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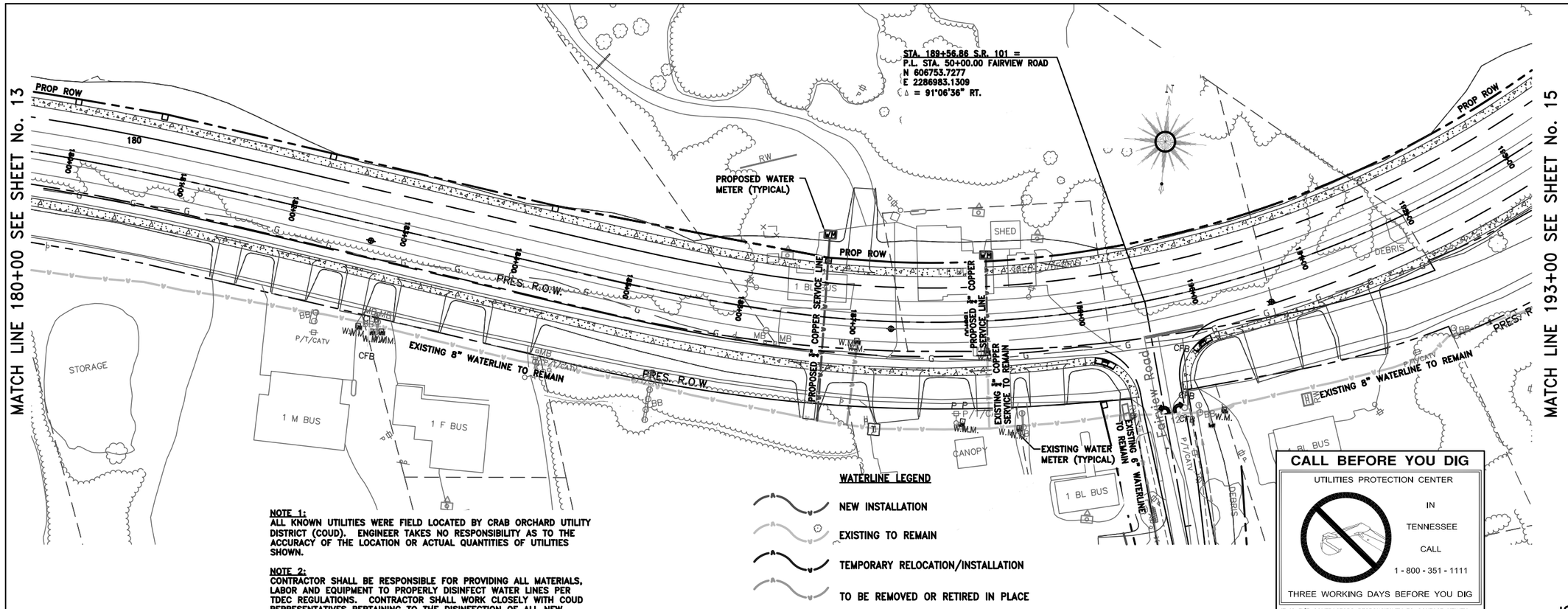
CUMBERLAND COUNTY

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IN TENNESSEE CALL

1 - 800 - 351 - 1111

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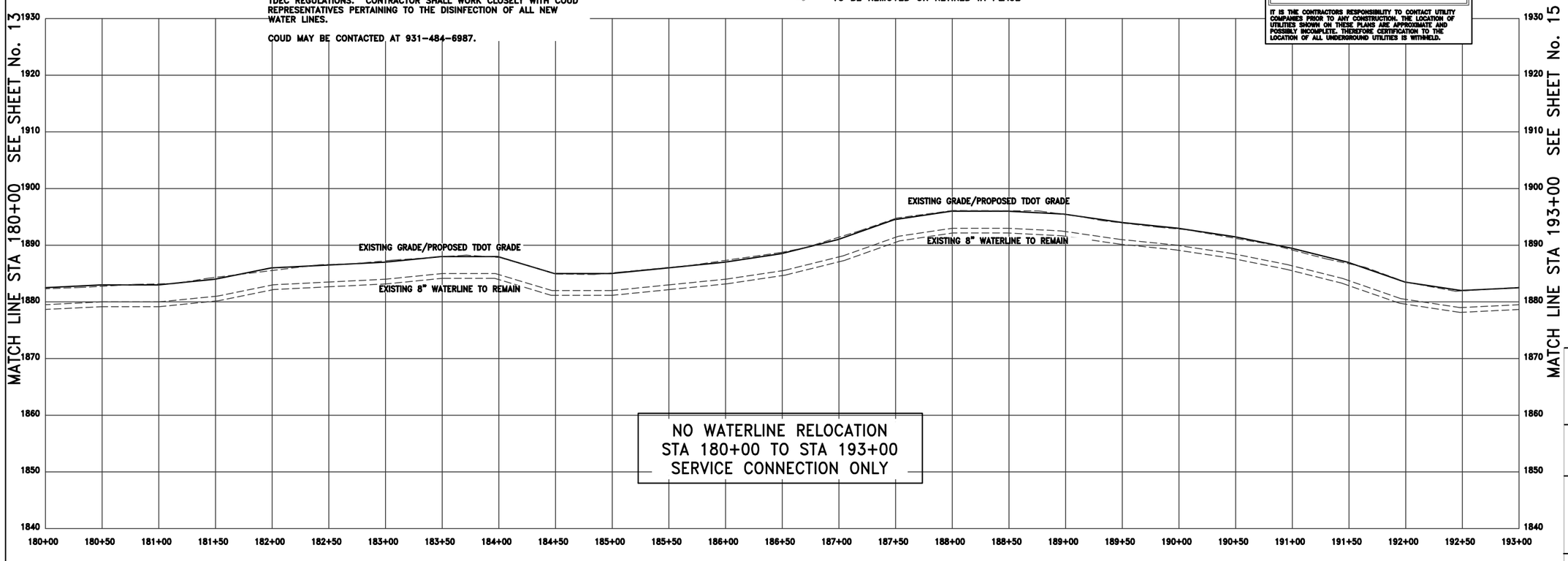


NO WATERLINE RELOCATION
STA 180+00 TO STA 193+00
SERVICE CONNECTION ONLY

BARRY R. FIELD
REGISTERED ENGINEER
No. 21562
STATE OF TENNESSEE
8-17-14

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 180+00 TO STA. 193+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-13 |
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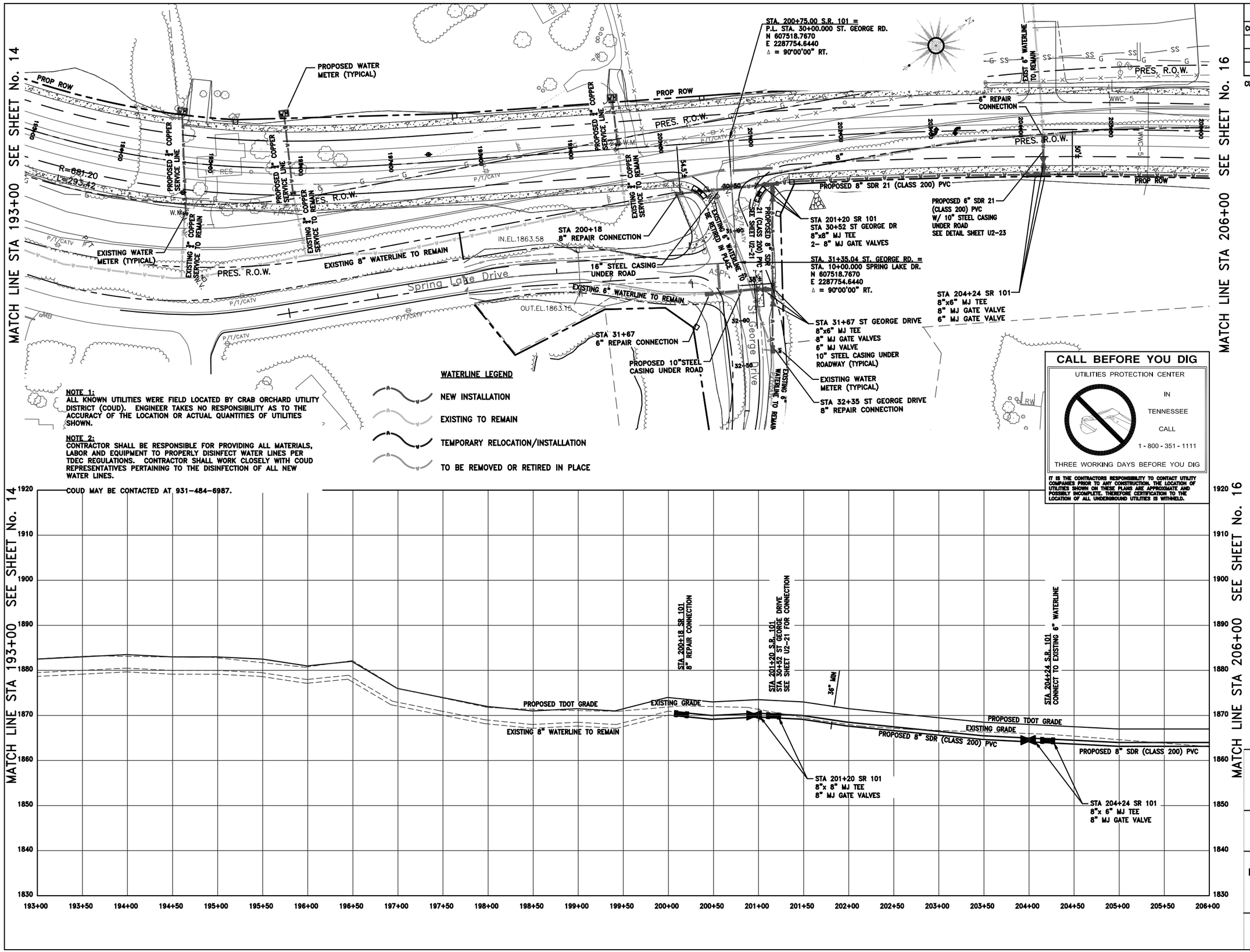
CUMBERLAND COUNTY

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CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 193+00 TO STA. 206+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-14 |
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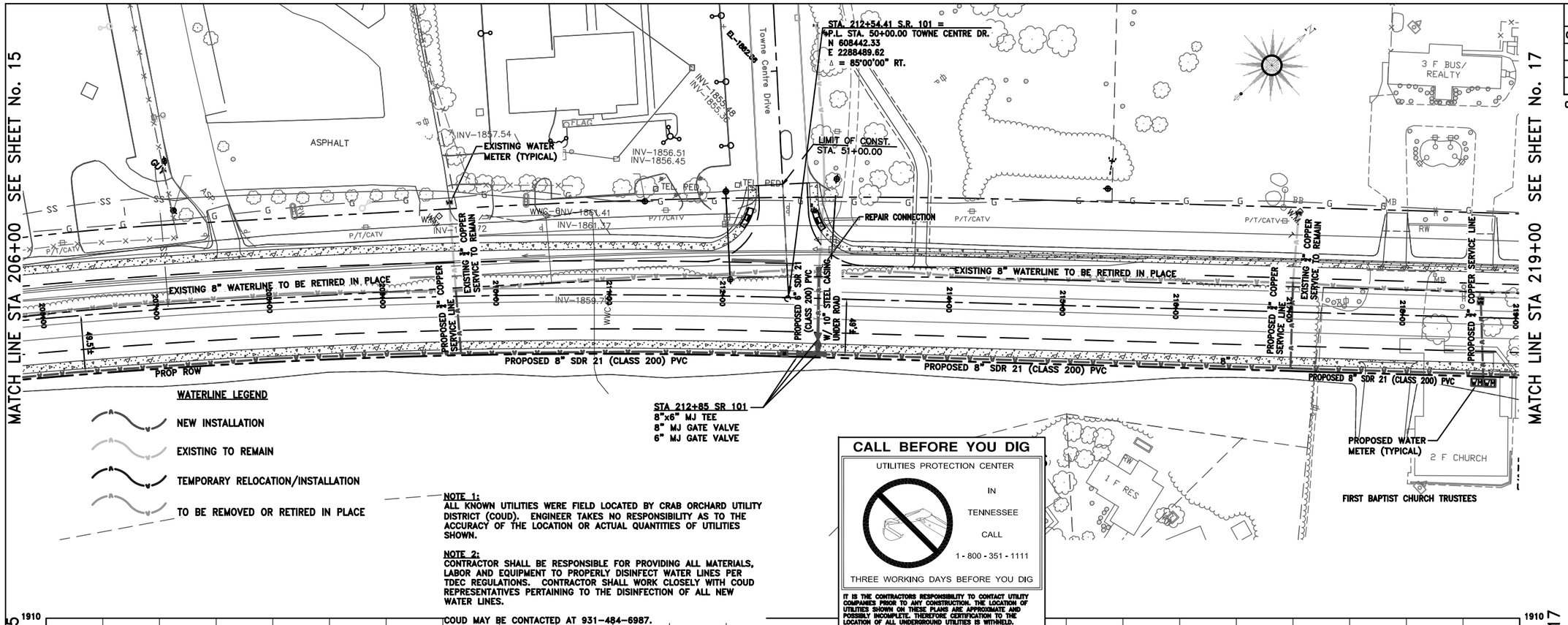
CUMBERLAND COUNTY




**WATERLINE LEGEND**

- NEW INSTALLATION
- EXISTING TO REMAIN
- TEMPORARY RELOCATION/INSTALLATION
- TO BE REMOVED OR RETIRED IN PLACE

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IN TENNESSEE CALL

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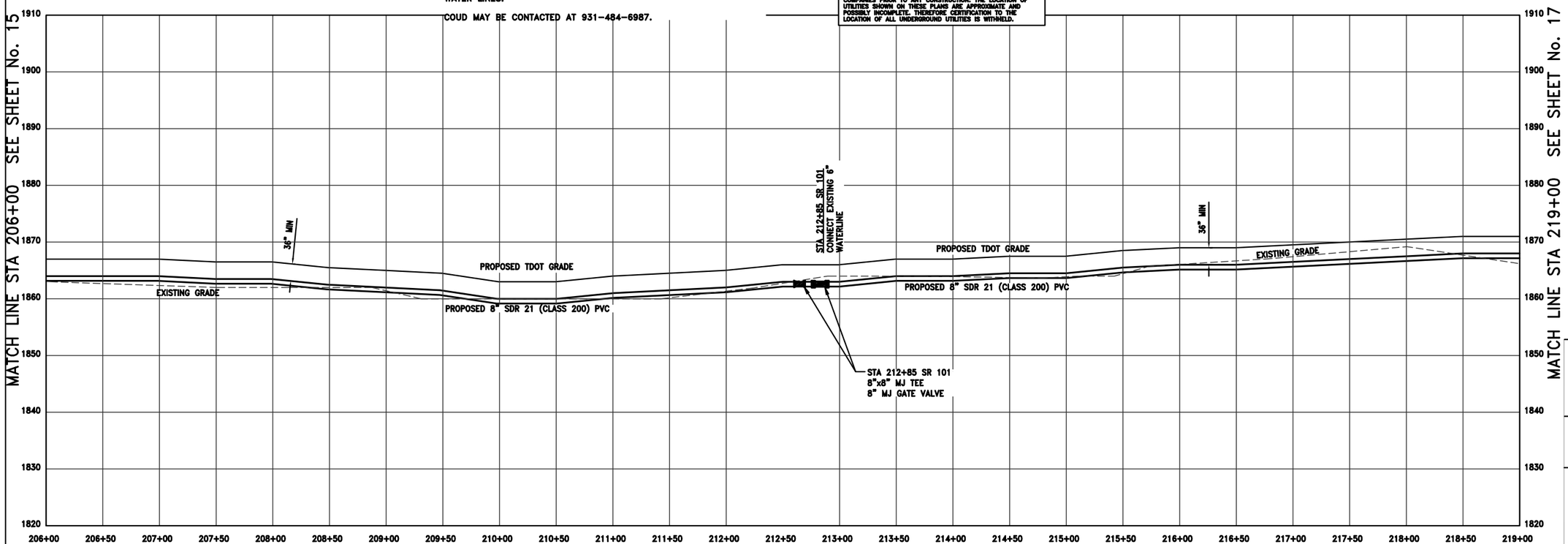

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 206+00 TO STA. 219+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-15 |
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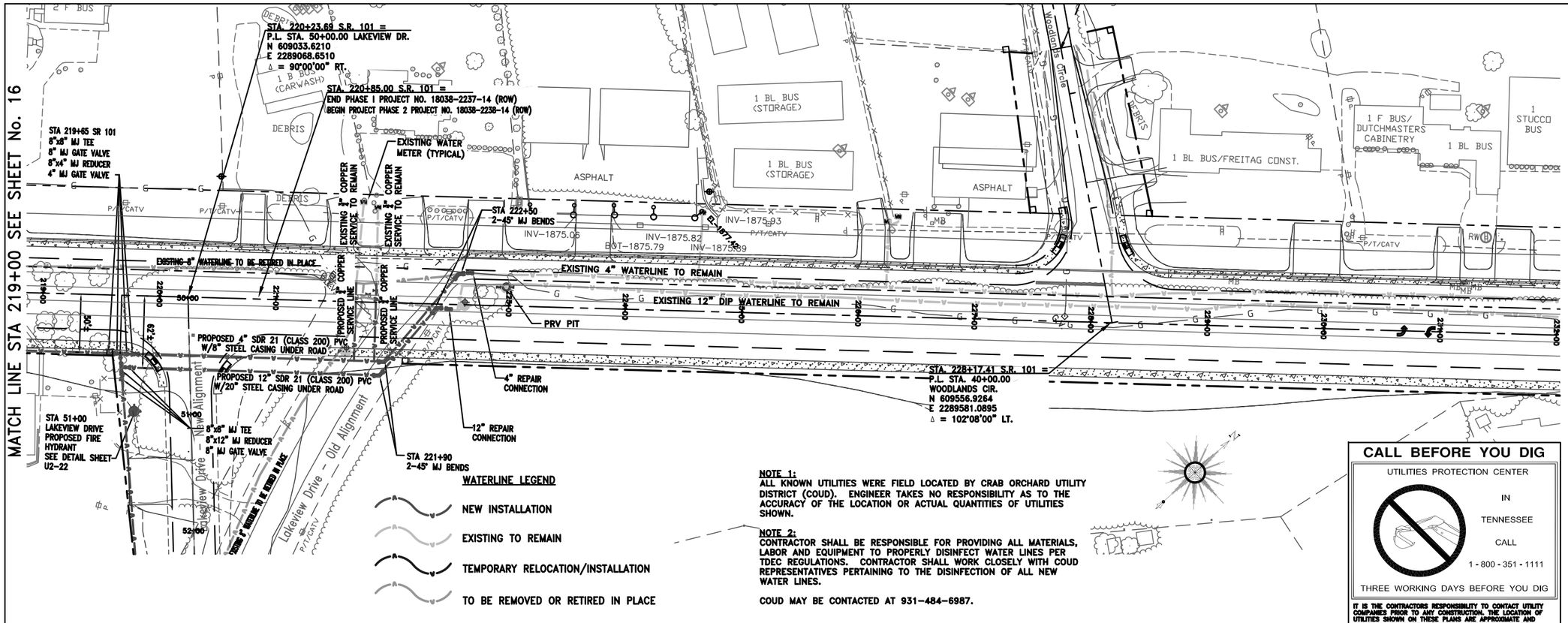
CUMBERLAND COUNTY

MATCH LINE STA 219+00 SEE SHEET No. 16




MATCH LINE STA 232+00 SEE PHASE 2 DRAWINGS

**WATERLINE LEGEND**

- NEW INSTALLATION
- EXISTING TO REMAIN
- TEMPORARY RELOCATION/INSTALLATION
- TO BE REMOVED OR RETIRED IN PLACE

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1 - 800 - 351 - 1111

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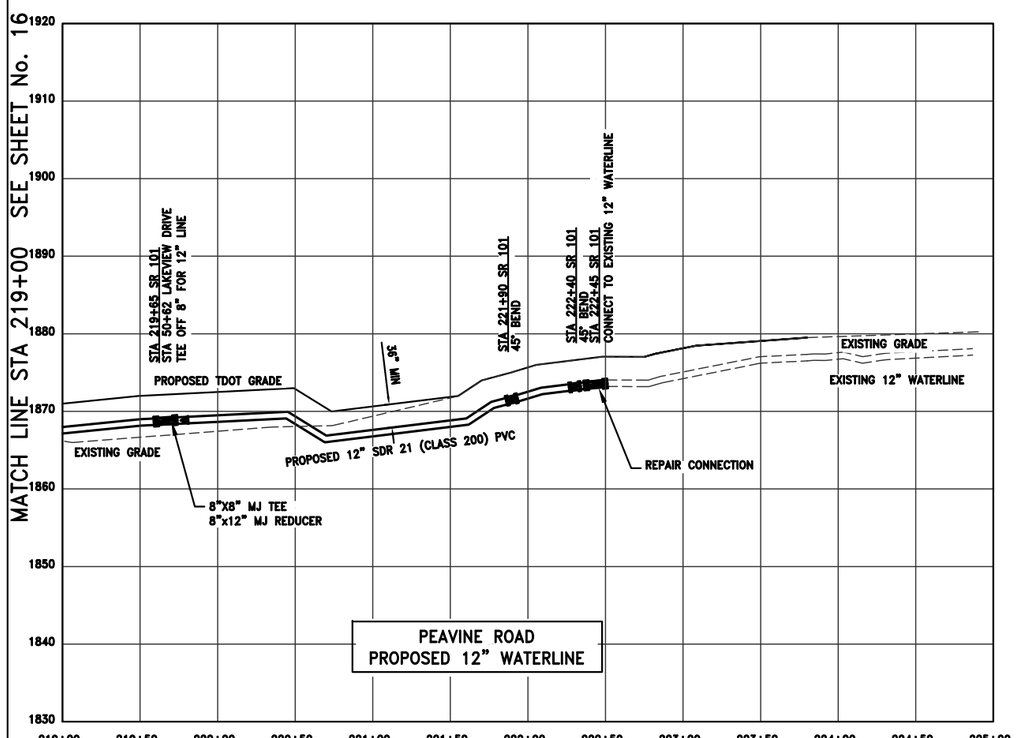
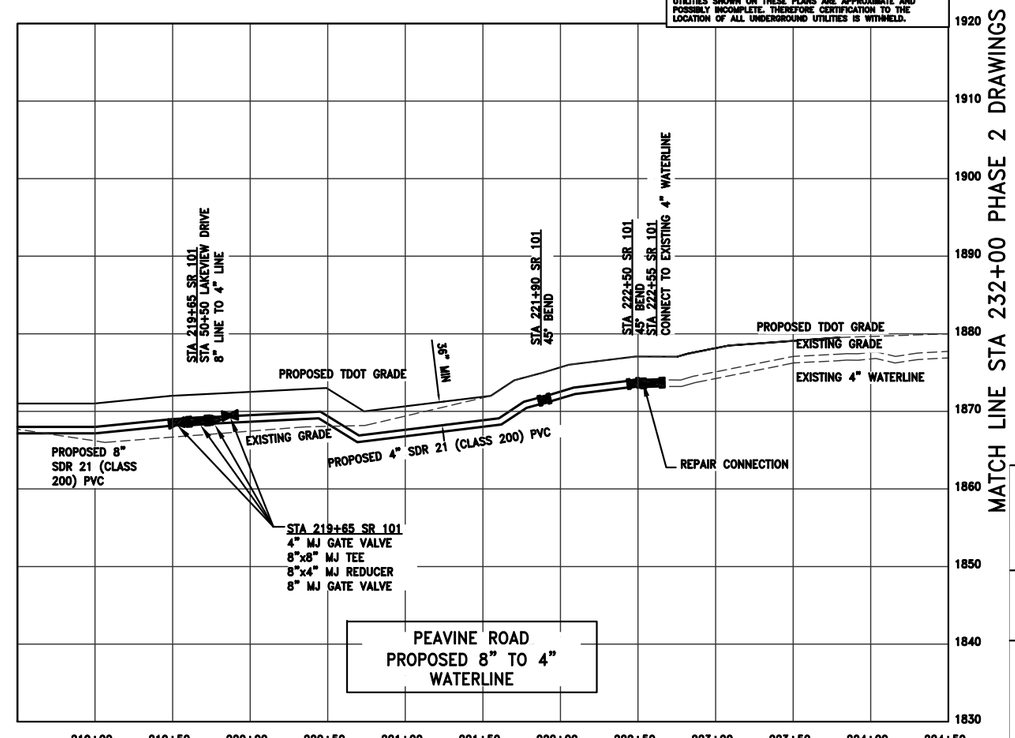



PEAVINE ROAD
PROPOSED 12" WATERLINE




PEAVINE ROAD
PROPOSED 8" TO 4" WATERLINE

BARRY R. FIELD
REGISTERED ENGINEER
No. 21562
STATE OF TENNESSEE
3-17-14

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 219+00 TO STA. 232+00
SCALE: 1"=50' H
1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-16 |
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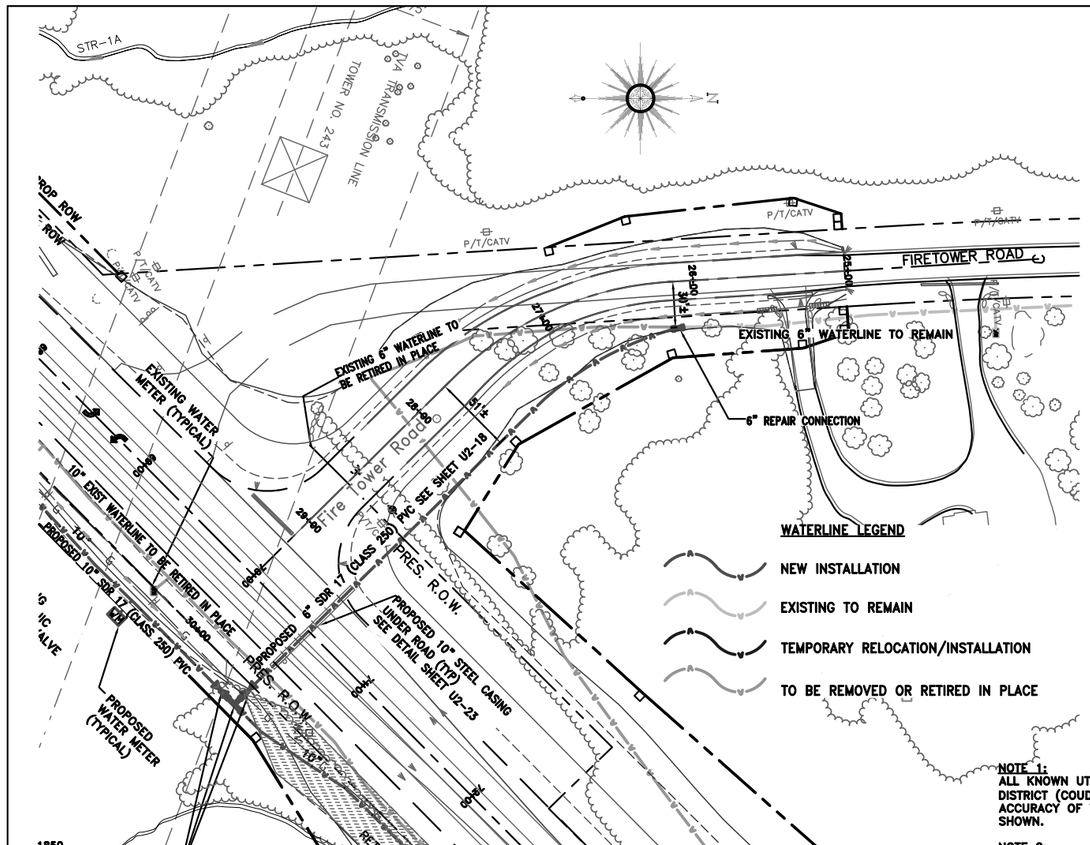
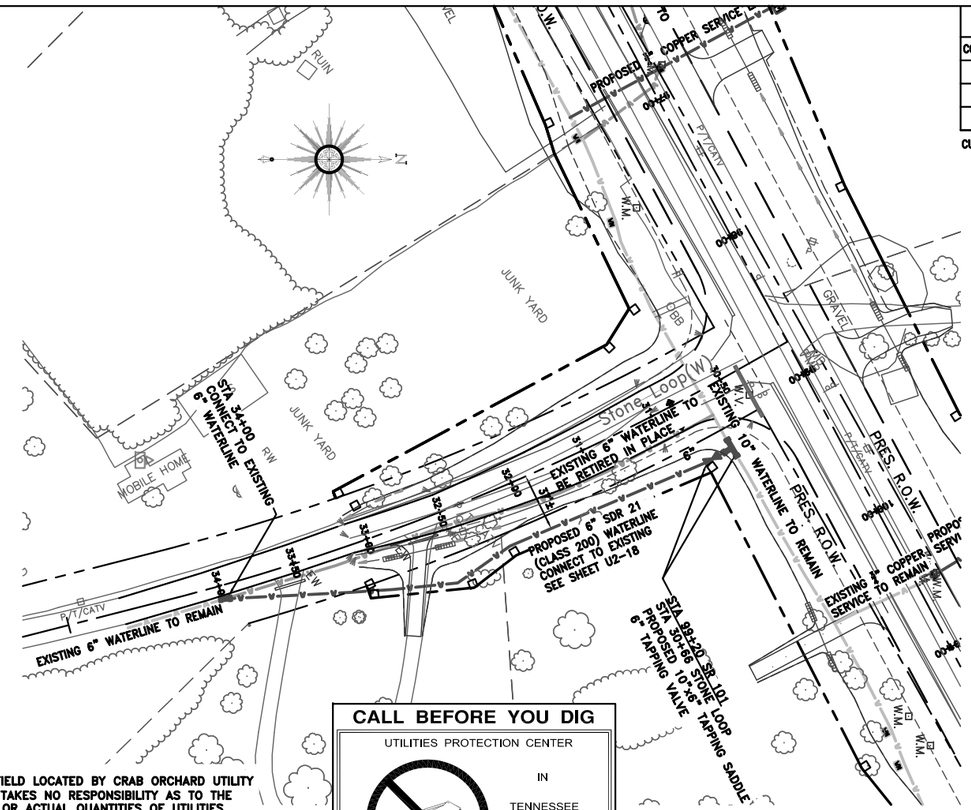
CUMBERLAND COUNTY

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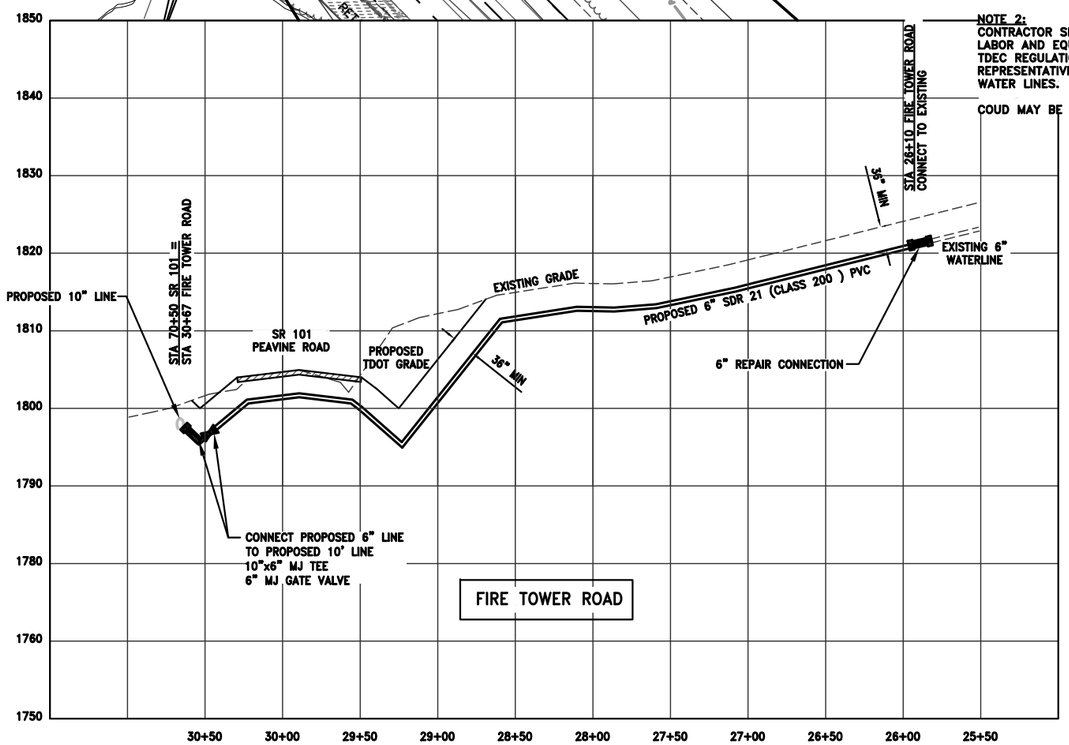


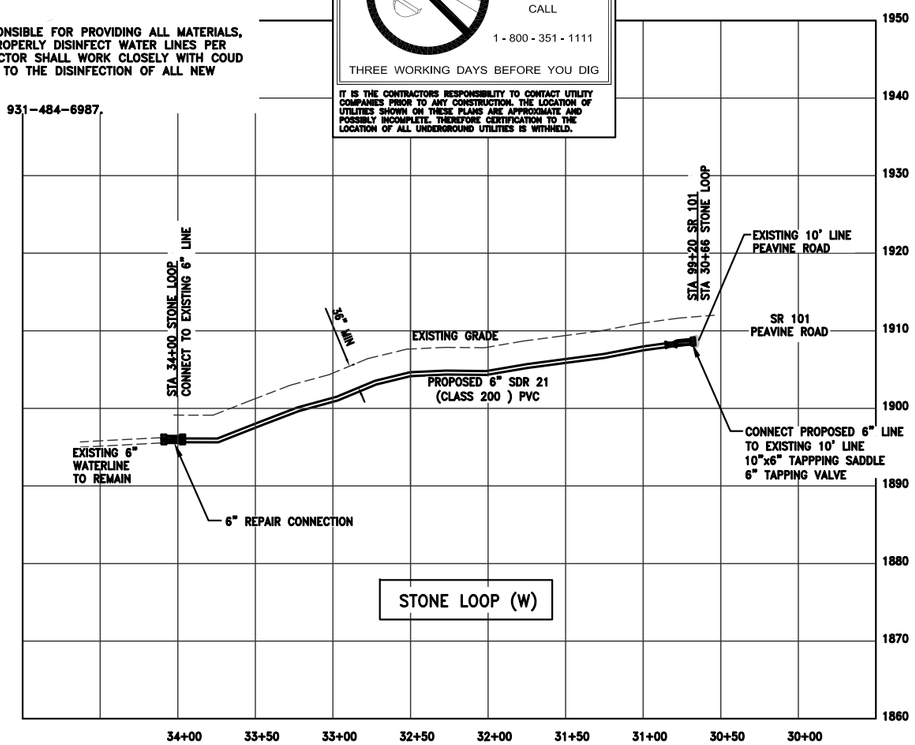


BARRY R. FIELD REGISTERED ENGINEER No. 21562 COMMERCE TENNESSEE STATE OF TENNESSEE
3-17-14

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

FIRE TOWER ROAD
STONE LOOP (WEST)
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 25+00 TO STA. 30+00
STA. 30+00 TO STA. 34+00
SCALE : 1"=50' H - 1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-17 |
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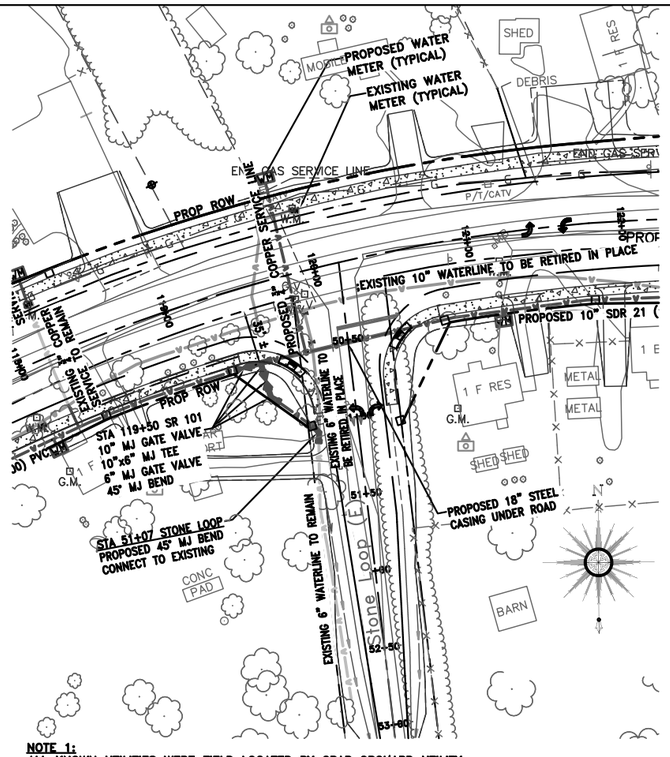
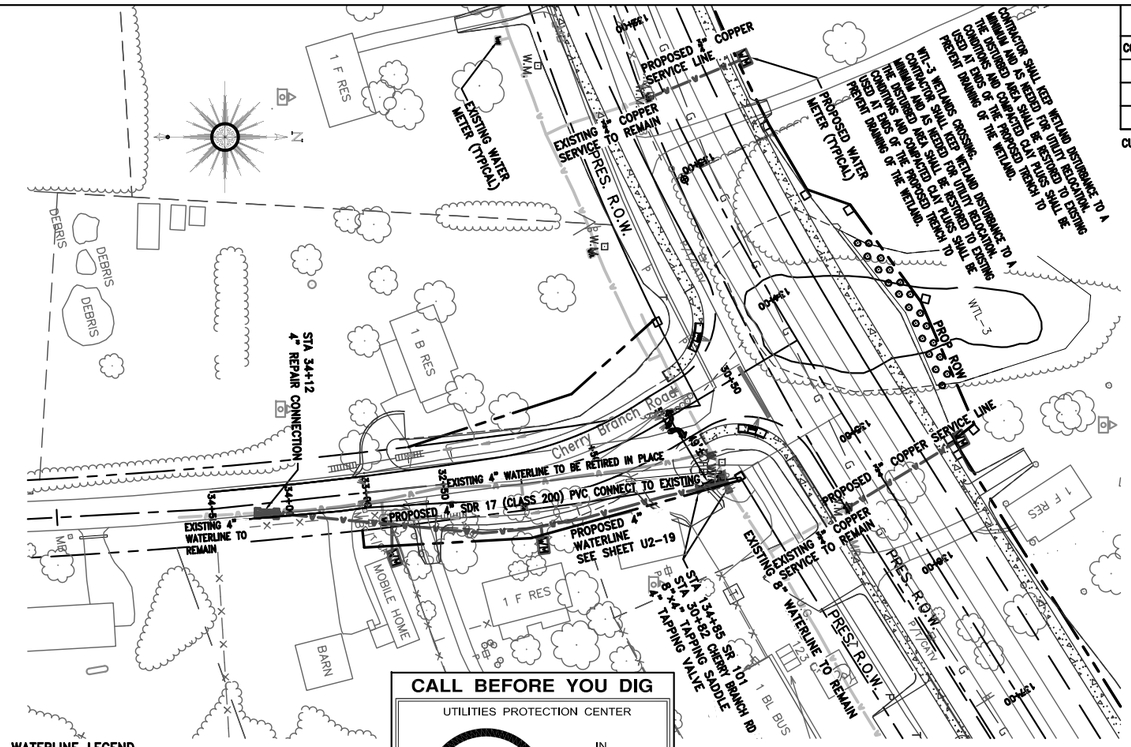
CUMBERLAND COUNTY

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IN

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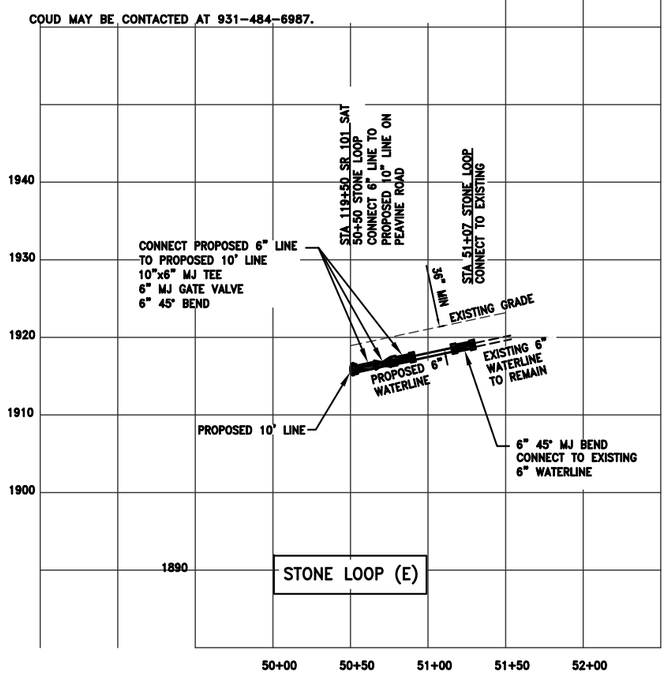
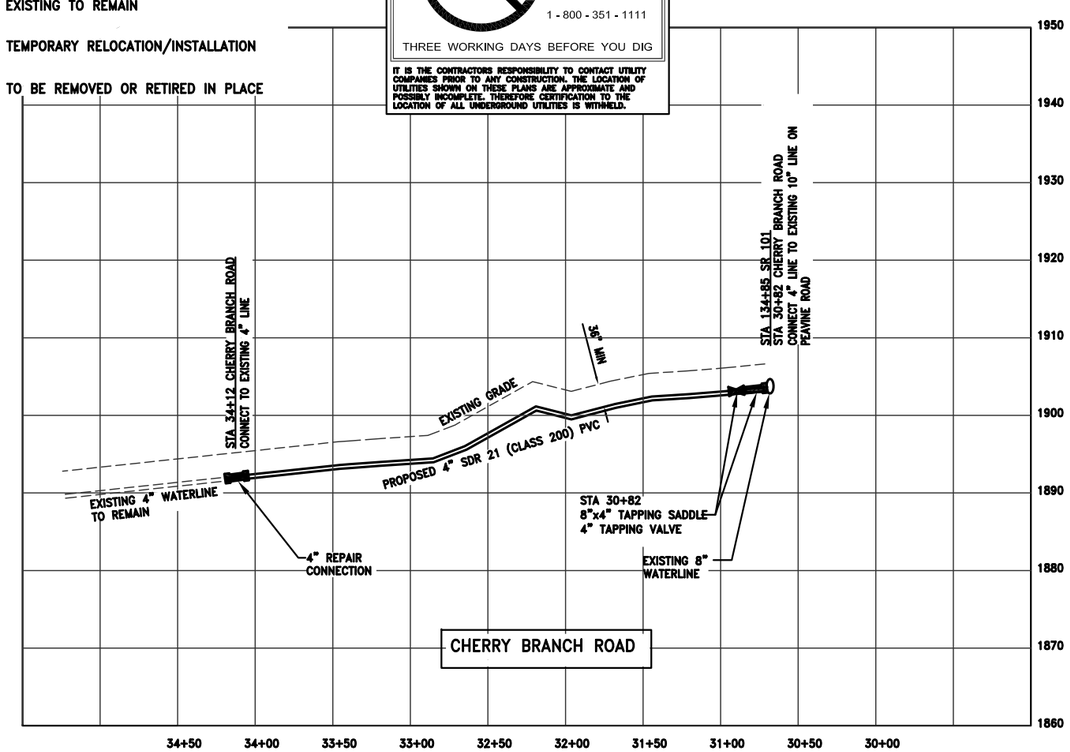


CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

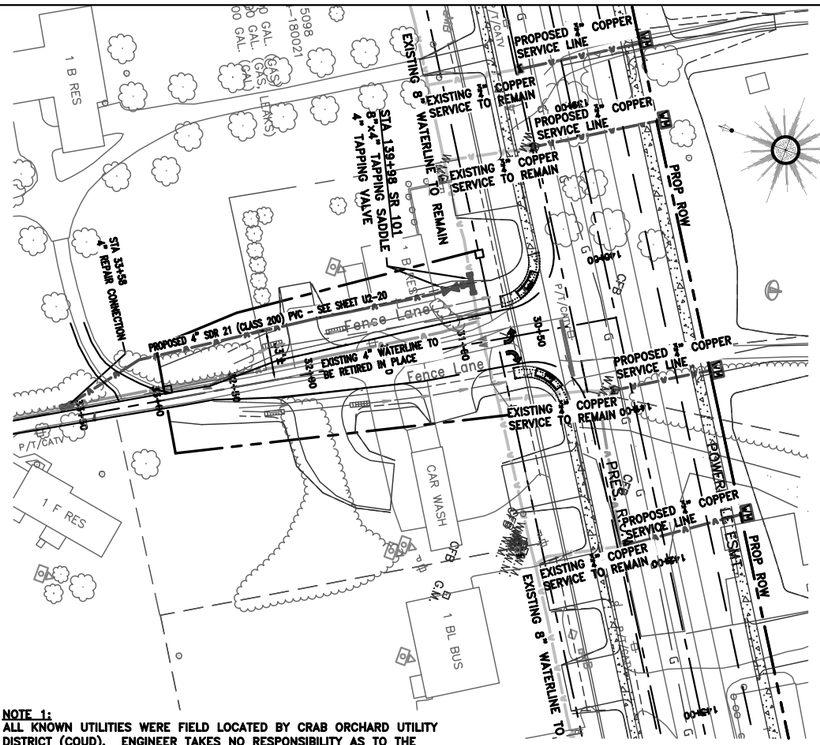
STONE LOOP (EAST END)
CHERRY BRANCH ROAD
WATERLINE RELOCATION

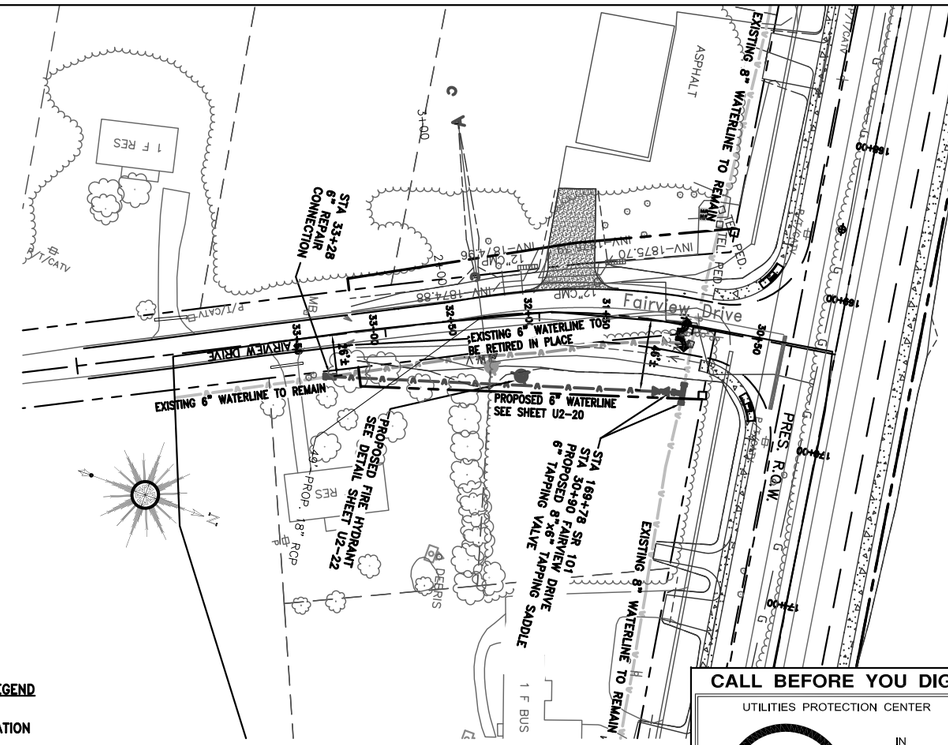
FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

STA. 50+50 TO STA. 51+50
STA. 30+00 TO STA. 34+50
SCALE : 1"=50' H - 1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-18 |
| | | | |
| | | | |
| | | | |

CUMBERLAND COUNTY




**NOTE 1:**
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COUD MAY BE CONTACTED AT 931-484-6987.

**WATERLINE LEGEND**

- NEW INSTALLATION
- EXISTING TO REMAIN
- TEMPORARY RELOCATION/INSTALLATION
- TO BE REMOVED OR RETIRED IN PLACE

**CALL BEFORE YOU DIG**

UTILITIES PROTECTION CENTER

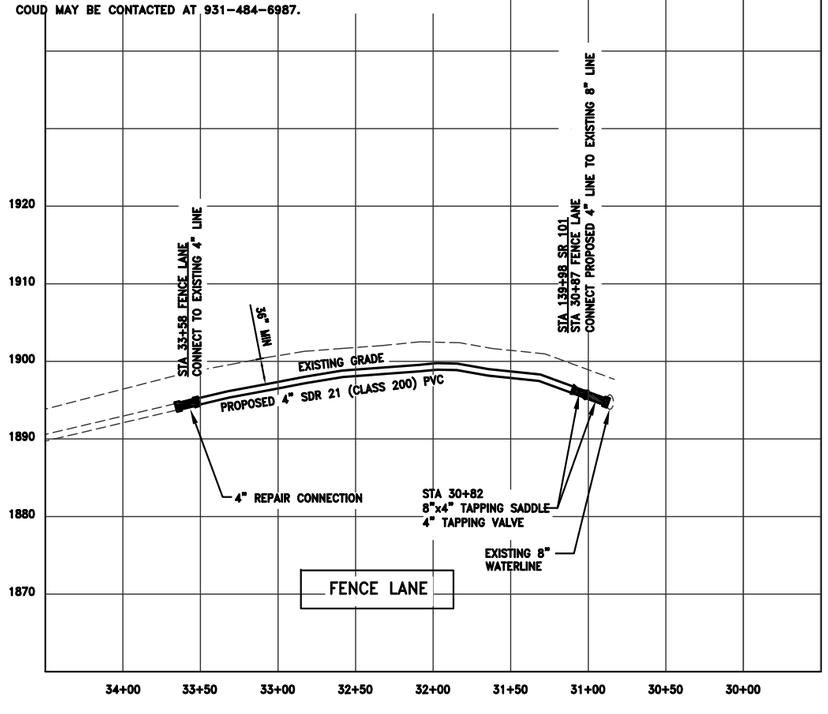
IN TENNESSEE

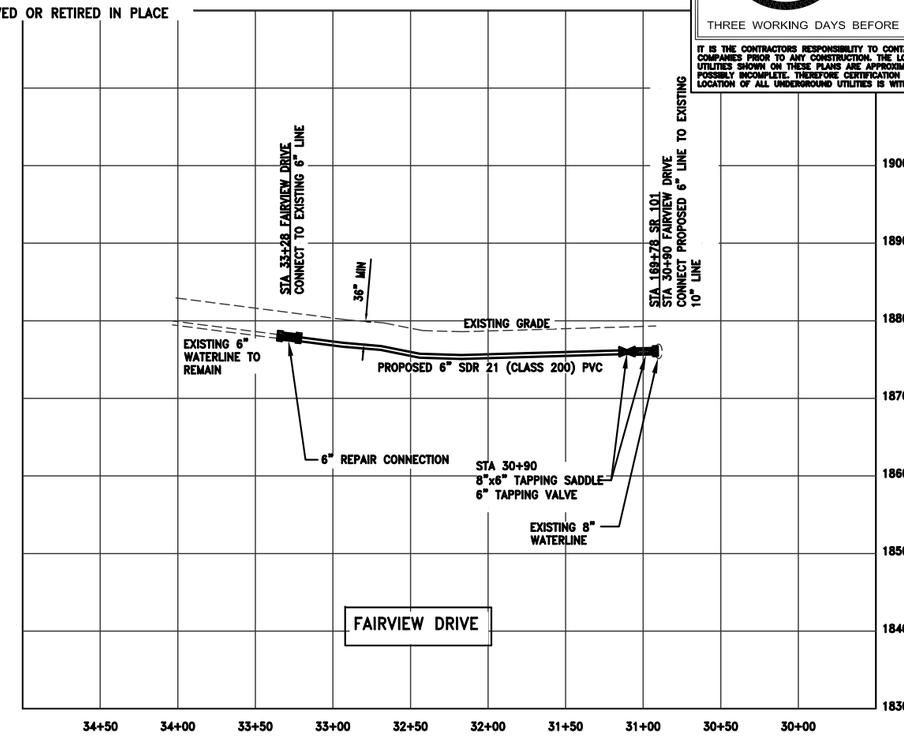
CALL

1 - 800 - 351 - 1111

THREE WORKING DAYS BEFORE YOU DIG

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION. THE LOCATION OF UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES IS WITHHELD.




BARRY A. FIELD
REGISTERED ENGINEER
No. 21562
STATE OF TENNESSEE
3-17-14

# CRAB ORCHARD UTILITY DISTRICT

2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

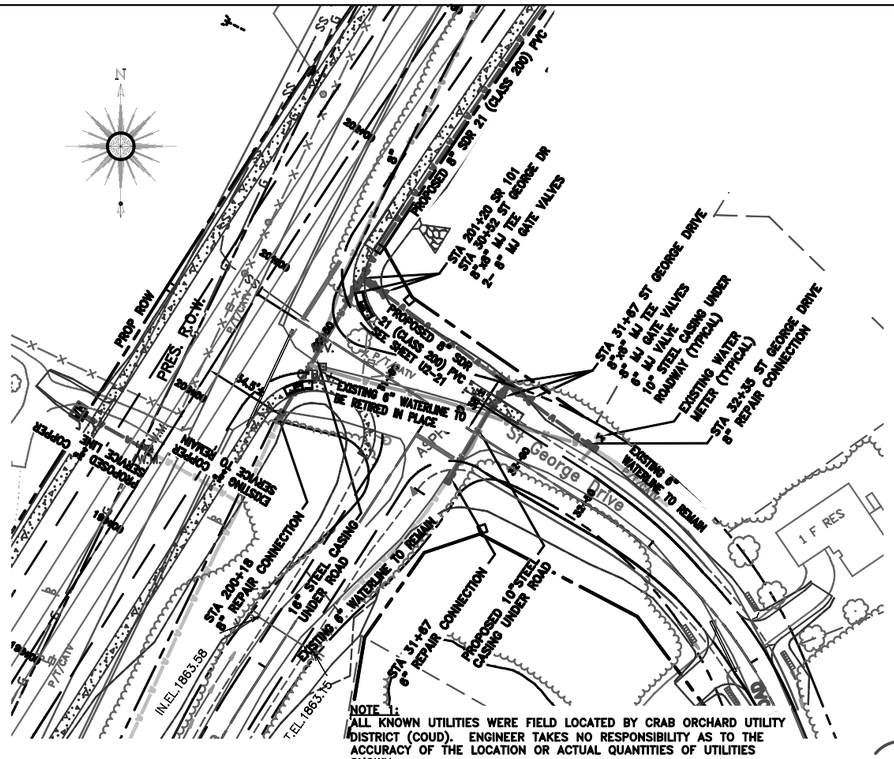
## FENCE LANE FAIRVIEW DRIVE WATERLINE RELOCATION

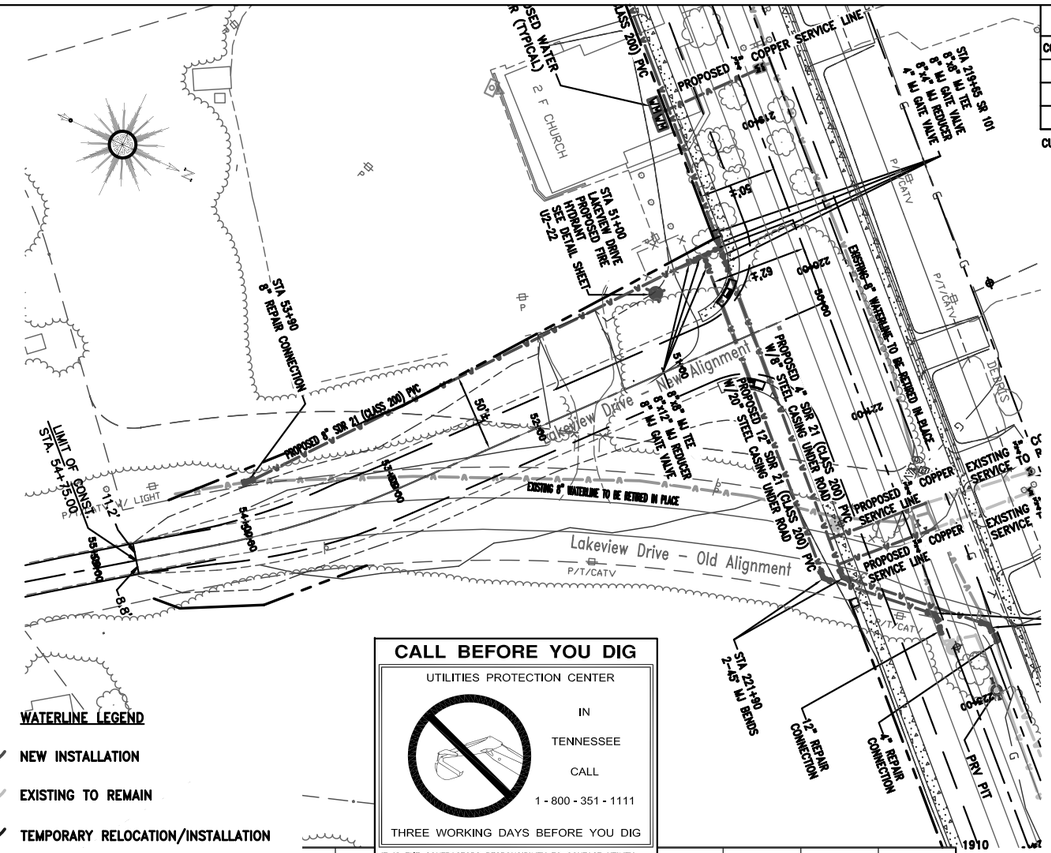

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071


STA. 30+00 TO STA. 34+00
STA. 30+00 TO STA. 34+00
SCALE : 1"=50' H - 1"=10' V

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-19 |
| | | | |
| | | | |
| | | | |

CUMBERLAND COUNTY

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WATERLINE LEGEND

NEW INSTALLATION

EXISTING TO REMAIN

TEMPORARY RELOCATION/INSTALLATION

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IN

TENNESSEE

CALL

1 - 800 - 351 - 1111

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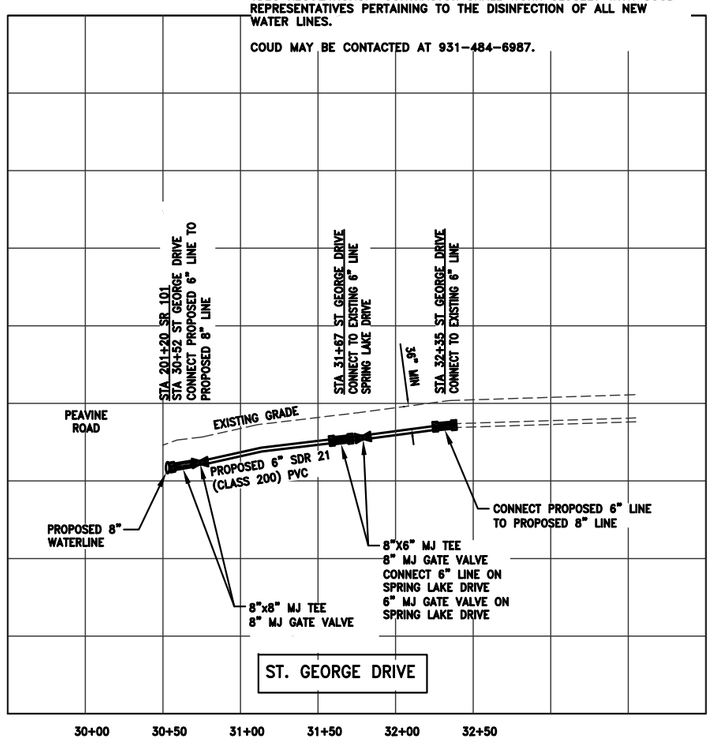
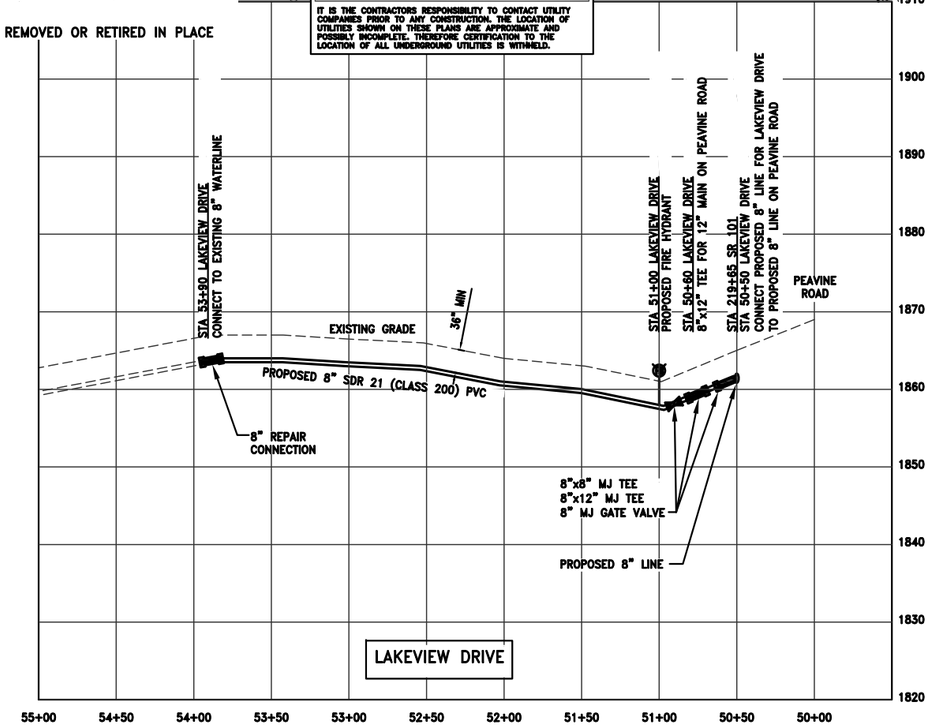


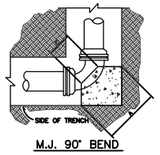

BARRY R. FIELDS
REGISTERED ENGINEER
COMMERCE No. 21662
STATE OF TENNESSEE
3-17-14

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

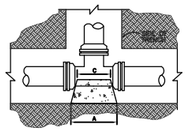
ST. GEORGE DRIVE
LAKEVIEW DRIVE
WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

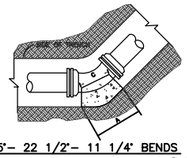
STA. 30+00 TO STA. 32+50
STA. 50+00 TO STA. 54+75
SCALE : 1"=50' H - 1"=10' V



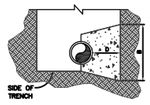

M.J. 90° BEND



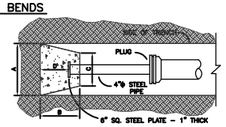
M.J. TEE



M.J. 45°– 22 1/2°– 11 1/4° BENDS




TYPICAL SECTION




M.J. PLUG

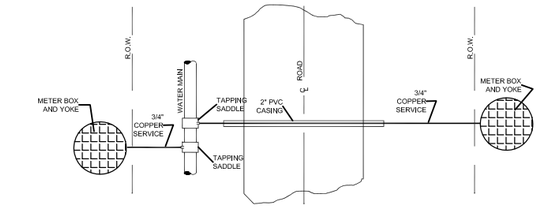
THRUST BLOCK DETAILS & DIMENSIONS

| 90° BEND | | | | | | | |
|---|---|---|---|---|---|---|---|
| SIZE | 2" | 4" | 6" | 8" | 10" | 12" | 18" |
| A | 16" | 16" | 26" | 33" | 40" | 50" | 70" |
| B | 16" | 16" | 24" | 33" | 40" | 50" | 70" |
| C | 9" | 9" | 12" | 12" | 15" | 16" | 22" |
| D | 8" | 8" | 12" | 16" | 20" | 25" | 24" |
| 45° BEND | | | | | | | |
| SIZE | 2" | 4" | 6" | 8" | 10" | 12" | 18" |
| A | 12" | 12" | 18" | 24" | 31" | 37" | 52" |
| B | 12" | 12" | 18" | 24" | 31" | 37" | 52" |
| C | 8" | 8" | 10" | 12" | 14" | 16" | 14" |
| D | 6" | 6" | 9" | 12" | 15" | 18" | 18" |
| 22-1/2° BEND | | | | | | | |
| SIZE | 2" | 4" | 6" | 8" | 10" | 12" | 18" |
| A | 9" | 9" | 13" | 18" | 23" | 26" | 40" |
| B | 9" | 9" | 13" | 18" | 23" | 26" | 40" |
| C | 8" | 8" | 10" | 12" | 14" | 16" | 15" |
| D | 4" | 4" | 6" | 9" | 11" | 13" | 16" |
| 11-1/4° BEND | | | | | | | |
| SIZE | 2" | 4" | 6" | 8" | 10" | 12" | 18" |
| A | 9" | 9" | 11" | 13" | 16" | 18" | 30" |
| B | 9" | 9" | 11" | 13" | 16" | 18" | 30" |
| C | 8" | 8" | 10" | 12" | 14" | 16" | 15" |
| D | 4" | 4" | 5" | 6" | 8" | 9" | 16" |

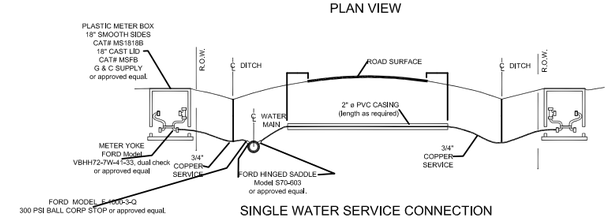
| TEE | | | | | | | |
|---|---|---|---|---|---|---|---|
| SIZE | | | | | | | |
| Main | 2"- 6" | 8"-12" | 8"- 10" | 12" | 12" | 12" | 18" |
| Branch | 2"- 6" | 2"- 6" | 8"- 10" | 2"- 6" | 8"- 10" | 12" | 16"-18" |
| A | 26" | 26" | 43" | 26" | 43" | 52" | 70" |
| B | 26" | 26" | 43" | 26" | 43" | 52" | 70" |
| C | 12" | 12" | 12" | 12" | 12" | 12" | 30" |
| D | 13" | 13" | 21" | 13" | 21" | 26" | 24" |
| PLUG | | | | | | | |
| SIZE | 2" | 4" | 6" | 8" | 10" | 12" | 18" |
| A | 26" | 26" | 26" | 34" | 43" | 52" | 70" |
| B | 26" | 26" | 26" | 34" | 43" | 52" | 70" |
| C | 12" | 12" | 12" | 12" | 12" | 12" | 30" |
| D | 11" | 11" | 11" | 15" | 22" | 32" | 32" |

NOTE: PIPE SHALL BE WRAPPED IN 5 MIL. PLASTIC WHERE THRUST BLOCKS ARE INSTALLED.

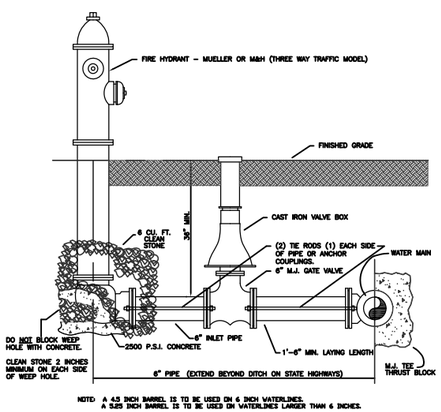
PLASTIC LINING SHALL NOT COVER OR IMPAIR THE FLOW OF WATER FROM THE WEEP HOLE ON A FIRE HYDRANT OR BLOW OFF HYDRANT ASSEMBLY.




PLAN VIEW




SINGLE WATER SERVICE CONNECTION




FIRE HYDRANT INSTALLATION

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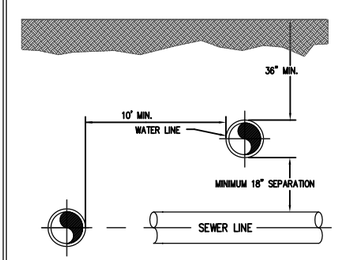
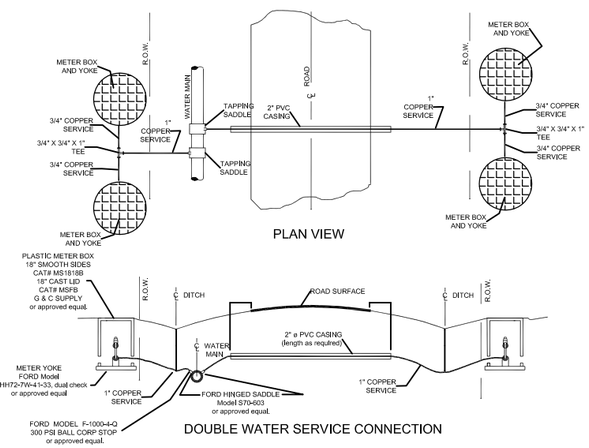
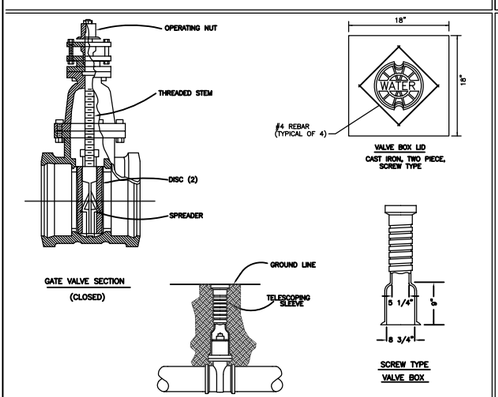



SEPARATION OF PIPED UTILITIES

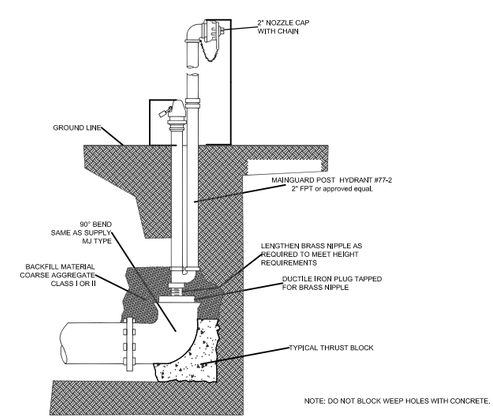



DOUBLE WATER SERVICE CONNECTION




VALVE & VALVE BOX

NOTE: WHENEVER A WATER VALVE IS ADJACENT TO A TEE IN THE WATER LINE THE WATER VALVE SHALL BE ATTACHED TO THE TEE USING RODDING OR ALL THREAD.




BLOW-OFF HYDRANT DETAIL

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-20 |
| | | | |
| | | | |
| | | | |

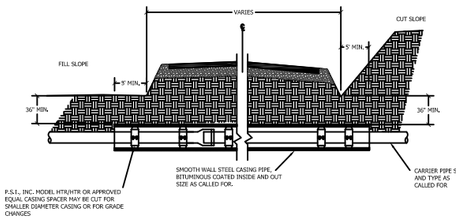
CUMBERLAND COUNTY

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD)
WATERLINE RELOCATION

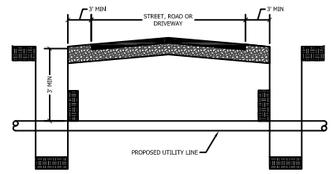
FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

DETAILS




A STATE HIGHWAY CROSSING
SCALE: N.T.S.

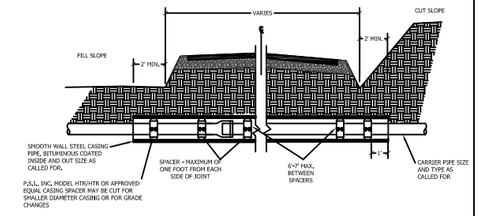
ALL CASINGS AND CONDUITS INSTALLED UNDER STATE ROADS SHALL MEET OR EXCEED THE MINIMUM AASHTO REQUIREMENTS.




B TYPICAL UNCASED BORE DETAIL
SCALE: N.T.S.

| STEEL CASING PIPE | CASING SIZE |
|---|---|
| NOMINAL PIPE SIZE (Diameter in Inches) | (Inside diameter in Inches) |
| 4 | 8-10 |
| 6 | 10-12 |
| 8 | 14-16 |
| 10 | 16-18 |
| 12 | 18-20 |
| 15 | 22-24 |

8/10 BORE & JACK DETAILS
SCALE: N.T.S.




C CITY / COUNTY ROADS AND PAVED DRIVEWAY
SCALE: N.T.S.

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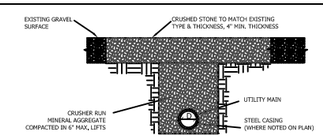
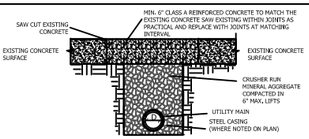
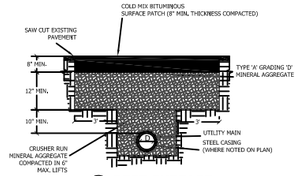


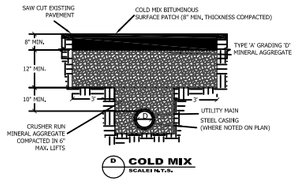

A GRAVEL ROADS
SCALE: N.T.S.



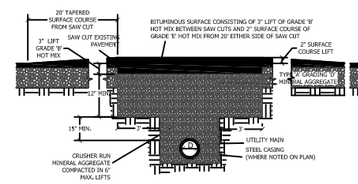

B CONCRETE
SCALE: N.T.S.



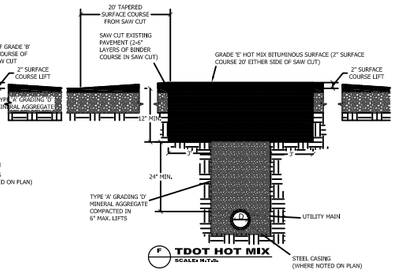

C DBST SURFACE
SCALE: N.T.S.




D COLD MIX
SCALE: N.T.S.



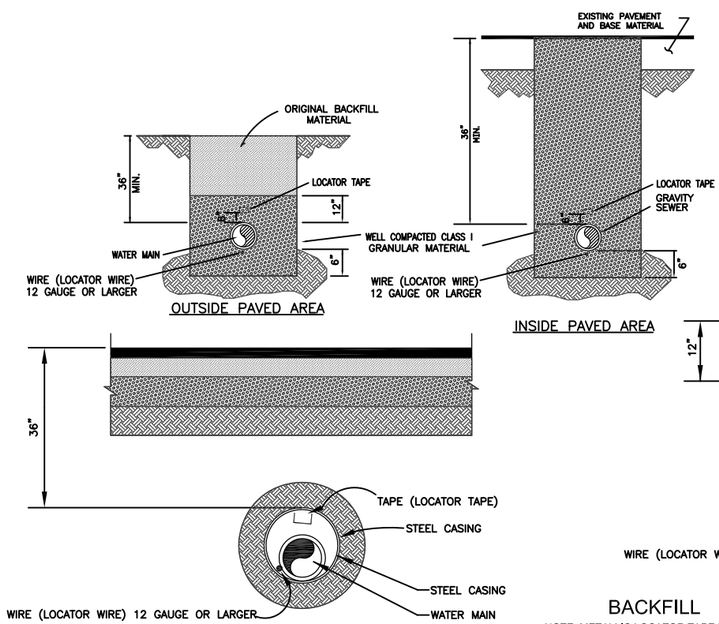

E HOT MIX
SCALE: N.T.S.



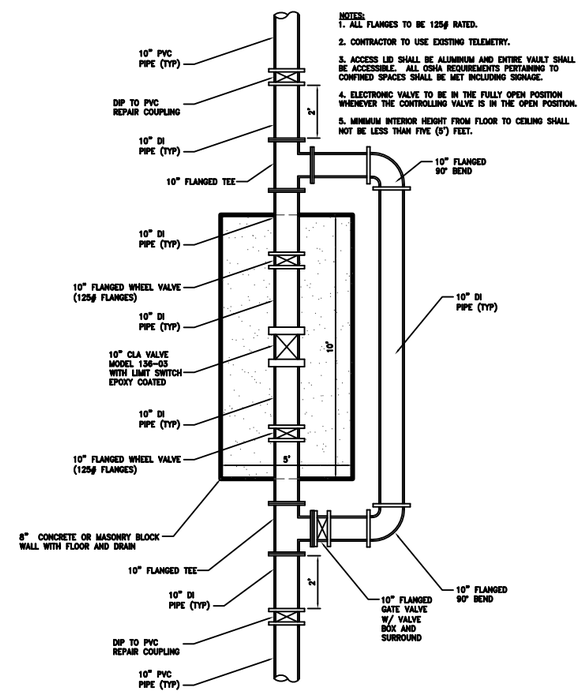

F TDOT HOT MIX
SCALE: N.T.S.

(NOTE: DEPTH OF COVER SHALL BE 36" ON TENNESSEE DEPARTMENT OF TRANSPORTATION RIGHT OF WAYS.

4/5 PAVEMENT REPLACEMENT DETAILS
SCALE: N.T.S.




NOTE: 36" MINIMUM COVER IN ALL TENNESSEE DEPARTMENT OF TRANSPORTATION RIGHT OF WAYS




NOTES:
1. ALL FLANGES TO BE 125# RATED.
2. CONTRACTOR TO USE EXISTING TELEMETRY.
3. ACCESS LID SHALL BE ALUMINUM AND ENTIRE VAULT SHALL BE ACCESSIBLE. ALL OSHA REQUIREMENTS PERTAINING TO CONFINED SPACES SHALL BE MET INCLUDING SIGNAGE.
4. ELECTRONIC VALVE TO BE IN THE FULLY OPEN POSITION WHENEVER THE CONTROLLING VALVE IS IN THE OPEN POSITION.
5. MINIMUM INTERIOR HEIGHT FROM FLOOR TO CEILING SHALL NOT BE LESS THAN FIVE (5') FEET.

ELECTRONIC VALVE VAULT DETAILS
NTS

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-21 |
| | | | |
| | | | |

CUMBERLAND COUNTY

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
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S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

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CROSSVILLE, TENNESSEE 38555
(931) 456-6071

DETAILS

| TYPE | YEAR | PROJECT NO. | SHEET NO. |
|---|---|---|---|
| CONSTRUCTION | 2014 | STP-101(16) | U2-22 |
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CUMBERLAND COUNTY

# DETAILED SPECIFICATIONS

**Scope of Work**
Project consists of the construction of a Water Distribution System Relocation Project to serve the Crab Orchard Utility District (COUD). The Relocation Project is being performed to accommodate the relocation and widening of Peavine Road, State Route 101. Field's Engineering Consultant Services, LLC and the Crab Orchard Utility District will coordinate with utility contractor pertaining to all work performed. The Crab Orchard Utility District can be contacted at (931) 484-6987 and Field's Engineering Consultant Services, LLC at (931) 456-6071. As detailed on the drawings, the relocation project will begin at Peavine Fire Tower Road and end at the intersection of Lakeview Drive.

**Easement & Rights-of-Way**
All work will be performed on properties owned by the State of Tennessee. However, Contractor is required to consult with Owner prior to any initiation of work in an area that is not located in the new Rights-of-Way of Peavine Road.

**Rip-Rap**
Where rip-rap (not shown on plans) is ordered by Engineer, it shall be considered as a separate/extra pay item.

**Connecting to Existing Water Appurtenances**
Contractor is responsible for properly tapping existing water mains to new main where applicable. This appurtenance is the property of the Crab Orchard Utility District.

Mr. M.C. Deck, Crab Orchard Utility District, Field Manager, shall be contacted prior to any work on any existing water appurtenance. Telephone Number: (931) 510-8723.

**Subsurface Conditions**
Engineer and/or Owner assume **NO** responsibility of subsurface conditions. Contractor shall be responsible for determining requirements for dewatering, rock excavation, unstable ground conditions, sheeting/shoring, etc. **NO** item pertaining to Contractor's misjudgment of subsurface conditions will be a separate/extra pay item. Contractor assumes **all** responsibility pertaining to subsurface conditions. **In no way will any unexpected subsurface conditions due to excessive rock, topsoil depth, or any other condition be considered an extra pay item**.

**Safety**
Contractor is solely responsible for complying with all prevailing local, state, and federal safety procedures. All work under this contract shall be done in strict compliance with the Occupational Safety and Health Act (OSHA) of 1970 (PL 91-596) and under Section 107 of the Work Hours and Safety Standards Act (PL 91-54).

Engineer and/or Owner assume **NO** responsibility as to assure that Contractor abides by said safety procedures.

**GENERAL**
The water system shall conform to the Rules of Tennessee Dept. of Environment and Conservation, Division of Water Supply, Minimum Design Criteria for Public Water Systems.

The water pipe shall be furnished and installed as illustrated in the details and drawings while maintaining not less than thirty six (36) inches of cover. All work is to be performed by an experienced worker. All materials and accessories are to be installed in accordance with the following specifications and by the manufacturer's recommendations.

The **CONTRACTOR** is to use top quality materials and shall practice proper storage, handling, and installation methods. The trench bottoms should be properly graded and bedded to provide proper, continuous support for the pipe except at the bell where holes should be dug to allow for bell.

**LOCATOR WIRE**
Locator wire shall be number twelve (#12) solid bare copper. Wire shall be buried continuously and four inches (4") below water main.

**LOCATOR TAPE**
Locator tape shall be approximately 3-inches wide with "WATER" or equal repetitively printed on entire length of tape. Tape shall be of a magnetic variety to allow for future locating with pertinent metal detection equipment. Tape shall be buried continuously twelve inches (12") above water main.

**HANDLING OF MATERIALS AND ACCESSORIES**
All materials shall be stored in a location where contamination or physical damage will not be possible. All materials must be delivered and unloaded by proper method as to not damage them in any way.

All equipment required to safely handle pipe and accessories shall be provided at the construction site when pipe laying is in progress. **All** pipe and joints **must** be properly inspected for defects and cleaned immediately before installation.

**POLYVINYL CHLORIDE PIPE FOR WATER MAINS**
Pipe for this project shall be of polyvinyl chloride variety colored WHITE. Pipe for the water mains shall be a variety of sizes and specifications as shown on the drawings. All pipe shall have push together elastomeric bell and joints designed so that pipe and fittings may be connected without the utilization of solvent cement or special equipment. All pipe shall be furnished in nominal lengths of 20 feet. Every length of pipe shall have size, class, and Manufacturer plainly marked on pipe. All pipe stored on site shall be per Manufacturer's instructions at all times prior to actual installation. **Varying classes of pipe are required for this project. Refer to drawings for exact amount, location, and class of pipe.**

**LATERALS**
All pipe used for laterals shall be Type K Copper. One (1) inch copper service tubing shall be utilized from mains to ¾" x ¾" x 1" tee for double taps. The pipe from the tee fitting to the meter box shall be ¾" copper service. Laterals shall be buried a minimum of thirty-six (36) inches below final grade.

**METER BOXES AND YOKES**
Meter box shall be Carson Brooks Cat# MS1818B -18" Deep with cast iron reading lid or approved equal.

Copper setter shall be FMVBHH72-7W-41-33Q 5/8x3/4 dual check with quick set or approved equal.

**TAPPING SADDLES**
Ford bronze tapping saddles Model S70-603 or approved equal shall be utilized.

**INSTALLING FIRE HYDRANTS**
Fire hydrants will be M&H (129) traffic model type. Fire hydrants are to be re-set where they are presently located. The fire hydrant that is removed shall be inspected by the Owner/Engineer to assure that they are in proper working order. (See drawings for exact locations) If the fire hydrant in question is not in proper working order, Contractor is responsible for replacing the hydrant with a M&H (129) traffic model type or equivalent. Fire hydrants are to have two (2) two and one-half (2 ½) inch outlets and one (1) six (6) inch outlet to fit large fire department hose.

The lateral between the water main and hydrant shall have a six (6) inch M.J. Gate Valve. The valve box shall be cast iron. Concrete shall have horizontal and vertical bearing areas of no less than three (3) square feet. At least six (6) cubic feet of crushed stone is to be used around the hydrant for drainage.

Hydrants are to be set where final grade will be immediately below the breakable flange or at the indicated bury level. Hydrants must have an undamaged enamel coating and the oil reservoirs must be filled.

**THRUST BLOCKS AND RESTRAINTS**
Thrust blocks must be 2,500 psi poured in place concrete. The thrust blocks must be installed at all points of unbalanced pressure where pipe could pull apart. Thrust blocks shall conform to the details as shown on drawings.

When downward bends cannot be avoided the fitting shall be held in place by one of the following:

1. Steel rods and clamps which extend for two pipe lengths to each side of bend.
2. Steel rods which are anchored at least eighteen (18) inches in solid rock.
3. Poured concrete under pipe of sufficient volume to counteract unbalanced force with steel clamp anchored to concrete.
4. An approved locked flexible joint extending two (2) pipe lengths on each side.

Rods and bolts used shall be at least one-half (1/2) inch diameter and straps or clamps must be at least one-quarter (1/4) inch thick. All steel restraints shall be coated with coal tar epoxy and concrete shall be Class B.

**VALVE AND VALVE BOX**
Valve and valve box details shall be as illustrated on drawings.

The valve box shall be centered over the valve operating nut and installed vertically. Box shall be tall enough to extend to final grade while adjustable upper section is midway between upper and lower limits. Backfill shall be properly tamped around the upper section to prevent future settlement.

Valve box shall have 18" x 18" concrete surround with reinforcing steel as shown in details. All valve boxes in paved streets shall have a 6' x 6' concrete surround with reinforcing steel.

**BLOW-OFF HYDRANT VALVE**
Blow-off hydrant valve shall be #77 Mainguard two (2) inch post hydrant or approved equal. It shall have a two and one-half (2 1/2) inch nozzle cap with chain and shall be located at least twenty-four (24) inches above the ground line. Blow-off valve shall be installed as per drawings.

**SEPARATION FROM SEWER LINES**
Water and sewer lines must be separated at least ten (10) feet horizontally and eighteen (18) inches vertically from bottom of water main to top of sewer main as per drawings.

When water mains and sewer mains must cross, they must cross in a perpendicular fashion.

**TESTING AND DISINFECTION**

**GENERAL**

Subsequent to the completion of the construction work of the relocation project, all water lines shall be tested and disinfected. In the case that the pressure or leakage test is unsatisfactory, or bacteriological tests indicate that the disinfection process is incomplete, corrective measures shall be taken and the tests repeated until satisfactory results are obtained.

**LEAKAGE AND PRESSURE TESTS**
Polyvinyl chloride pipe shall be tested in accordance with ISO 2531. Testing for this project shall be performed as follows:

All constructed water lines shall be subjected to a hydrostatic pressure of 200 psi for a period of two (2) hours. Any defective work that is identified during the hydrostatic test shall be replaced and the pressure test repeated.

The quantity of leakage under the aforementioned 200 psi shall not exceed 0.002 gallons per hour for each foot of water line being subjected to the pressure test. Should the quantity of the leakage exceed the aforementioned limit, the Contractor shall locate and repair the defective area until the leakage is within the allowable limits. The CONTRACTOR shall provide all labor, tools, equipment and materials for making the test. The CONTRACTOR shall provide the Crab Orchard Utility District with a pressure chart that indicates the integrity of the pressure test being within specified allowances.

**DISINFECTION**
All water lines installed shall be disinfected as follows:

The water lines installed shall first be flushed with potable water to remove debris, etc. from the lines. Subsequent to the flushing process being completed, the water line shall be disinfected prior to being placed in service with a solution of HTH with a minimum of 50 parts per million of available chlorine. The Crab Orchard Utility District will provide the required potable water at an expense of $5.75 per thousand gallons. The CONTRACTOR shall provide all suitable plugs, valves or caps, etc. for the pipe, injection pumps, pipe connections, chlorine and other equipment with all labor required to properly disinfect the water line. This project will require several disinfection processes and must be approved by the Owner/Engineer prior to initiation.

**NOTES:**
1. **Contractor is responsible for checking the chlorine residual, 1,200 ft - 1,500 ft from farthest reach of area tested hydrostatically.**
2. **Contractor is responsible for obtaining a TN State Approved Negative Bacteriological sample within 48 hours for any existing Crab Orchard Utility District water main break. All line breaks shall be reported immediately to Mr. M.C. Deck at the COUD.**
3. **In the event of a line break, contractor is responsible for immediate restoration of service to all customers.**

While the disinfectant is being applied to any section of the pipe, the water shall be allowed to escape all extremities to the section. The method of chlorine residual testing shall be the DPD color comparator method. The disinfectant shall be allowed to remain in the pipe for a period of at least 24 hours. Subsequent to the elapsing of the 24 hour period, the water line shall be flushed thoroughly until only the chlorine residual in the potable water remains. This process shall be documented by the CONTRACTOR and submitted to the COUD for review and approval.

Sample of the water shall then be taken by methods and personnel approved by the State of Tennessee Department of Environment and Conservation (TDEC) and shall be submitted to a TDEC approved bacteriological laboratory. Note: The Crab Orchard Utility District is a TDEC approved bacteriological testing laboratory. In any instance whereas bacteriological testing test positive for the presence of coliform organisms, the disinfection procedure shall be repeated until samples of satisfactory quality are obtained. Proof of these bacteriological tests shall be submitted to and approved by Mr. M.C. Deck at the Crab Orchard Utility District. Mr. Deck can be contacted at (931) 510-8723.

**SOIL AND EROSION CONTROL**
The General Contractor is responsible for the soil and erosion control for this project. However, utility Contractor is responsible to assure that these measures are in place prior to the initiation of any work. Utility Contractor is also responsible for two (2) weekly inspections of the soil and erosion control measures that affect the waterline relocation project. These inspections should be documented in writing and kept on file.

**INTERRUPTION OF WATER SERVICE**
Utility Contractor shall make all possible efforts to limit water service interruption to two (2) hours. All planned interruptions should be reported to the COUD twenty four hours prior to the water service being interrupted.

**BUY AMERICAN CLAUSE**
All material to be utilized on this project shall be manufactured in the United States of America.

**AS-BUILT DRAWINGS**
The CONTRACTOR shall be responsible for preparing 2 sets of "As-Built" drawings for the project. One set of the drawings shall be turned over to the Crab Orchard Utility District subsequent to the completion of the project and one set shall be submitted to Field's Engineering Consultant Services, LLC.

**NOTE 1:**
ALL KNOWN UTILITIES WERE FIELD LOCATED BY CRAB ORCHARD UTILITY DISTRICT (COUD). ENGINEER TAKES NO RESPONSIBILITY AS TO THE ACCURACY OF THE LOCATION OR ACTUAL QUANTITIES OF UTILITIES SHOWN.

**NOTE 2:**
CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS, LABOR AND EQUIPMENT TO PROPERLY DISINFECT WATER LINES PER TDEC REGULATIONS. CONTRACTOR SHALL WORK CLOSELY WITH COUD REPRESENTATIVES PERTAINING TO THE DISINFECTION OF ALL NEW WATER LINES.

COUD MAY BE CONTACTED AT 931-484-6987.

CRAB ORCHARD UTILITY DISTRICT
2089 EAST 1ST STREET
CROSSVILLE, TENNESSEE 38555

S.R. 101 (PEAVINE ROAD) WATERLINE RELOCATION

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET
CROSSVILLE, TENNESSEE 38555
(931) 456-6071

DETAILED SPECIFICATIONS