
Kent County Water Authority Distribution Storage Tank Hydraulic Evaluation

Technical Memorandum No. 2B Existing Water Storage Facilities March 2007

1.0 Purpose and Scope

This project relates to utilizing the updated computerized hydraulic model of the Kent County Water Authority (Authority) water system to complete a detailed hydraulic study and evaluation of the entire supply and distribution system in regards to distribution storage for the next twenty (20) year planning period. This evaluation is intended to consider system demand for both existing and the projected planning period and an evaluation of the ability of the water system infrastructure distribution storage components to effectively meet these demands.

The project has been divided into various sub tasks and each of which will be further detailed in a specific technical memorandum. The purpose of this technical memorandum is to establish the set points for the base and overflow elevations of the Authority's existing storage tanks. This information was gathered through a field survey of the existing water storage facilities within the Authority's water system. The following are the specific efforts associated with this task.

1. Verification of the base and overflow elevations of the existing storage facilities by a registered professional surveyor in the State of Rhode Island.
2. Set bounds at each of the tank sites to identify and benchmark a site elevation, as needed at each tank site.
3. Establish horizontal and vertical controls for the bounds (RISPC – NAD83) (NAVD 88).
4. Locate tanks (RISPC – NAD83) and take measurements necessary for height determination at base and overflow elevations.
5. Install benchmark bounds at each tank site where granite bound property markers do not exist.

2.0 Professional Field Survey

A field survey of the Authority's water storage facilities was conducted by Chas H. Sells, Inc. of Nashua, NH between July 28, 2006 and August 3, 2006. Surveys were conducted at the following eight (8) storage facilities:

- Technology Park Tank
- Carrs Pond Tank
- Frenchtown Road Tank
- Crompton Tank (Setian Lane)
- Wakefield Street Tank
- West Street Tank

- Seven Mile Tank #1 (Fiskeville Reservoir #1)
- Seven Mile Tank #2 (Fiskeville Reservoir #2)

Surveys were not performed at the existing tank sites of the Read School House Road Tank and the Tiogue Tank due to the fact that the Read School House Road Tank is scheduled to be replaced with a tank of higher elevation and the Tiogue Tank will be removed from service and eventually demolished. The Tiogue Tank Gradient will be reserviced from the existing 500 foot High Service Gradient.

2.1 Results of Field Surveys

Following are the results of the field surveys for each of the eight (8) existing storage facilities that were surveyed. Refer to Plates 1 through 7, which graphically depict each of the tanks and elevations.

Technology Park Tank – High Service Pressure Gradient

Location: Hopkins Hill Road / West Greenwich, RI
 Type of Tank: Elevated tank (Spheroid style)
 Total Volume: 1,500,000 gallons
 Overall Height: 150 feet
 Bowl Height: 50 feet
 Bowl Diameter: 75.25 feet
 Overflow Elevation: 500.69 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Ground Elevation: 350.14 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Material: Steel
 Constructed: 1988
 Description: Single fill and draw pipe to base of tank bowl
 SBDH Elevation: 348.97 feet; coordinates N: 209,518.160 E: 310,952.987

Carrs Pond Road Tank – High Service Pressure Gradient

Location: Carrs Pond Road / West Greenwich, RI
 Type of Tank: Standpipe
 Total Volume: 3,000,000 gallons
 Height: 82 feet
 Diameter: 80 feet
 Overflow Elevation: 500.1 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Ground Elevations: 418.84 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Material: Concrete
 Constructed: September 2001
 Description: Single fill and draw pipe at base of tank
 SBDH Elevation: 418.84 feet; coordinates N: 204,464.210 E: 314,552.616

Frenchtown Road Tank – Low Service Gradient

Location: Intersection of Frenchtown Road and High Hawk Drive / East Greenwich, RI
 Type of Tank: Reservoir
 Total Volume: 1,500,000 gallons
 Height: 50 feet
 Diameter: 73 feet
 Overflow Elevation: 334.03 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Ground Elevation: 284.40 feet (based on site survey by Chas H. Sells, Inc. August 2006)
 Material: Concrete
 Constructed: 1977

Description: Single fill and draw pipe at base of tank
SBDH Elevation: 284.40 feet; coordinates N: 197,569.716 E: 322,449.601

Crompton (Setian Lane) Tank – Low Service Gradient

Location: Off Setian Lane at Flanders Drive / West Warwick, RI
Type of Tank: Reservoir
Total Volume: 3,000,000 gallons
Height: 20 feet
Diameter: 160 feet
Overflow Elevation: 334.6 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Ground Elevation: 315.55 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Material: Steel
Constructed: 1968
Description: Single fill and draw pipe at base of tank
SBDH Elevation: 314.50 feet; coordinates N: 215,781.419 E: 323,265.804

Wakefield Street Tank – Low Service Gradient

Location: End of Carrie Ann Drive / West Warwick, RI
Type of Tank: Reservoir
Total Volume: 2,000,000 gallons
Height: 70 feet
Diameter: 70 feet
Overflow Elevation: 333.7 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Ground Elevation: 265.45 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Material: Concrete
Constructed: 1990
Description: Single fill and draw pipe at base of tank
SBDH Elevation: 265.46 feet; coordinates N: 234,147.304 E: 326,048.941

West Street Tank (currently out of service) – Low Service Gradient

Location: West Street / West Warwick, RI
Type of Tank: Reservoir
Total Volume: 1,000,000 gallons
Height: 50 feet
Diameter: 58 feet
Overflow Elevation: 331.5 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Ground Elevation: 281.07 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Material: Steel
Constructed: 1956
Description: Single fill and draw pipe at base of tank
DH Elevation: 282.42 feet; coordinates N: 227,766.369 E: 319,522.701

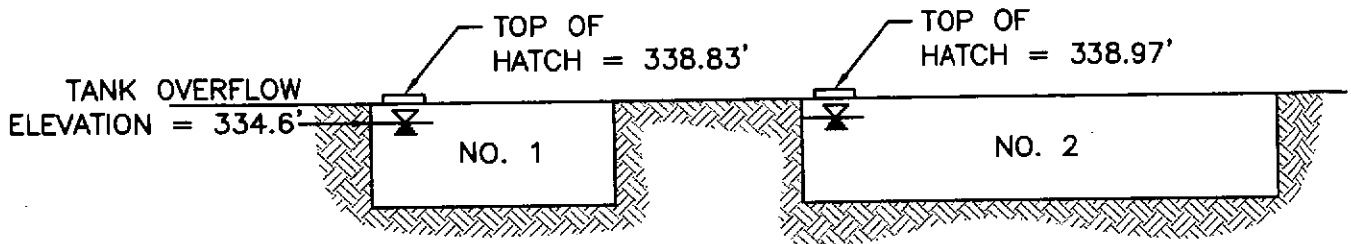
Seven Mile Tank No. 1 and No. 2 (Fiskeville Reservoirs) – Low Service Gradient

Location: Adjacent to Seven Mile Road near Spring Lake Reservoir No.1 / Cranston, RI
Type of Tank: Reservoir
Total Volume: 1,500,000 gallons (combined)
Square Area: 80 square feet
Height: 11 feet
Overflow Elevation: 334.6 feet (based on site survey by Chas H. Sells, Inc. August 2006)
Top of Hatch Elevation: 338.83 feet Tank No. 1, 338.97 feet Tank No. 2 (based on site survey by Chas H. Sells, Inc. August 2006)

Material: Reinforced Concrete
Constructed: 1944 & 1960
Description: Single fill and draw pipe at base of tanks
SBDH Elevation: 337.33 feet; coordinates N: 242,978.169 E: 314,061.229

The attached drawings titled *KCWA Tank Study*, *Tank Photos* and *KCWA Water Tank Survey* depict the results of the field surveys and include limited site plans which depict the location of reference bounds. In addition to the reference bound, a second benchmark was provided at each site which usually consisted of a chiseled "X" in the tank foundation.

PLATE 1



TOTAL VOLUME = 1,500,000 GALLONS (COMBINED)
SQUARE AREA = 80 SQUARE FEET
HEIGHT = 11 FEET
MATERIAL = REINFORCED CONCRETE
CONSTRUCTED = 1944 & 1960

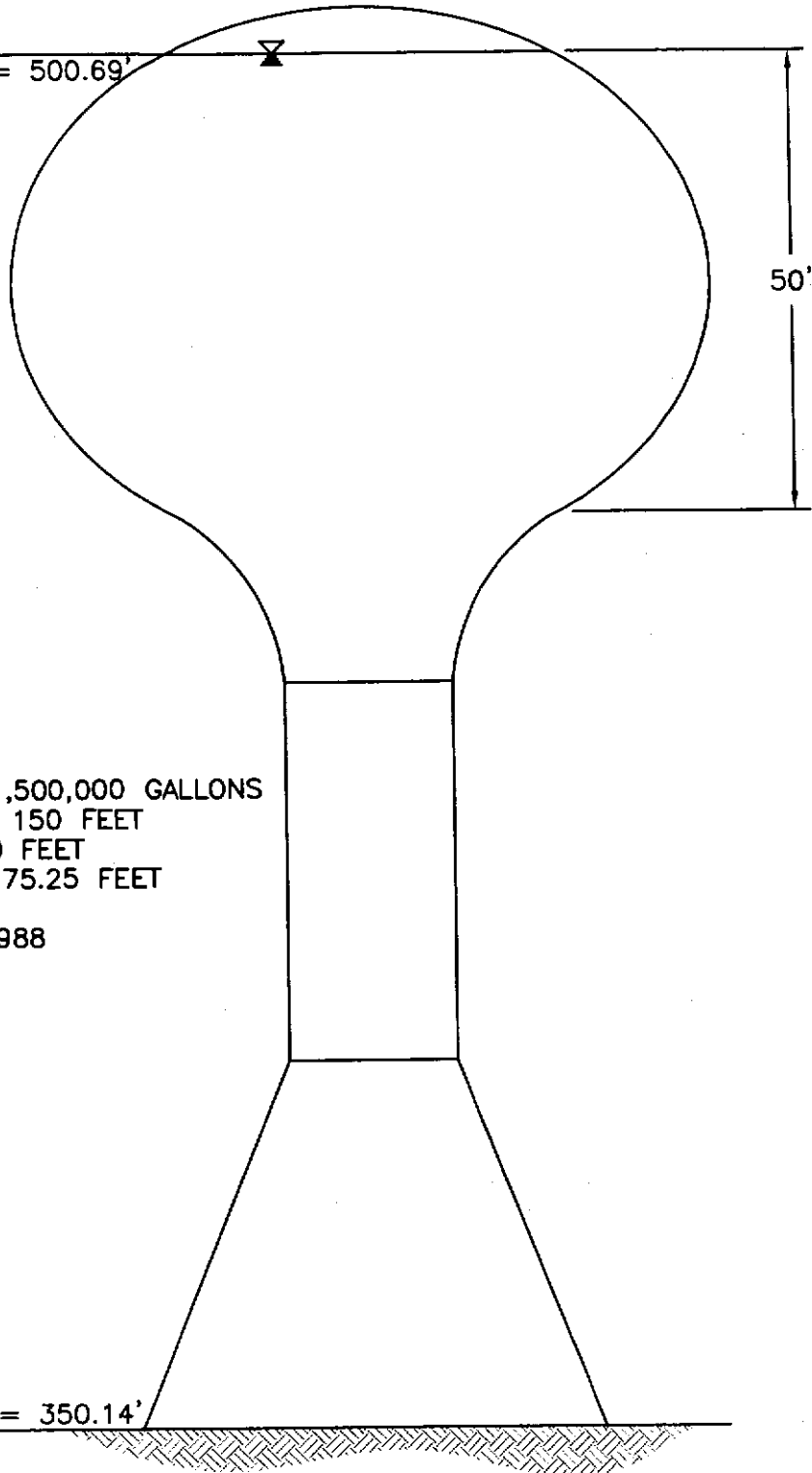
SCHEMATIC – FISKEVILLE UNDERGROUND
RESERVOIRS (NO. 1&2)

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

SEPT. 2006

PLATE 2

TANK
OVERFLOW
ELEVATION = 500.69'



TOTAL VOLUME = 1,500,000 GALLONS
OVERALL HEIGHT = 150 FEET
BOWL HEIGHT = 50 FEET
BOWL DIAMETER = 75.25 FEET
MATERIAL = STEEL
CONSTRUCTED = 1988

GROUND
ELEVATION = 350.14'

SCHEMATIC — TECHNOLOGY PARK ELEVATED TANK

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

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342 Park Avenue, Woonsocket, RI 02895

PLATE 3

TANK
OVERFLOW
ELEVATION = 334.6'

GROUND
ELEVATION =
315.55'

20'

TOTAL VOLUME = 3,000,000 GALLONS
HEIGHT = 20 FEET
DIAMETER = 160 FEET
MATERIAL = STEEL
CONSTRUCTED = 1968

SCHEMATIC - CROMPTON (SETIAN LANE) TANK

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

SEPT. 2006

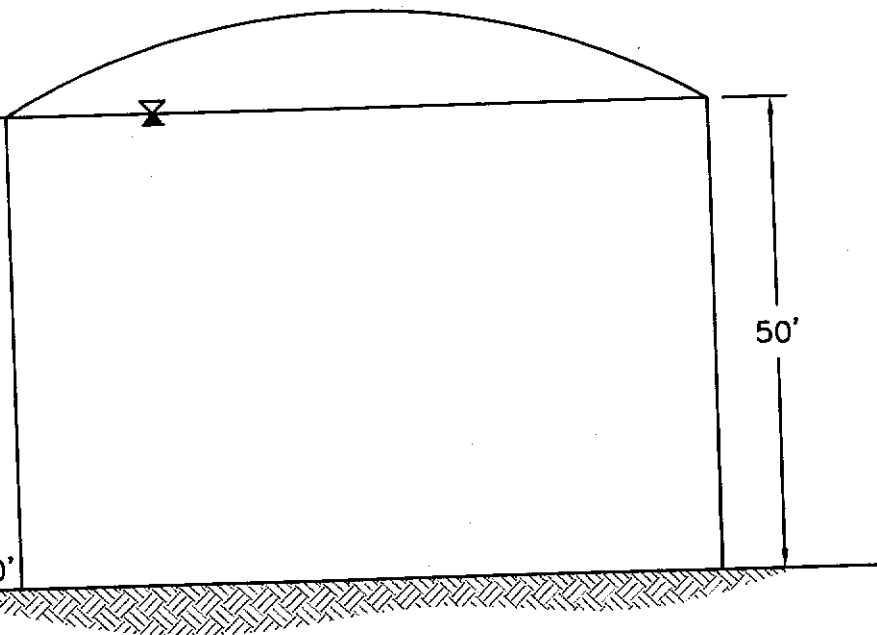
Civil
& Environmental
Engineering Partners, Inc.

342 Park Avenue, Woonsocket, RI 02895

PLATE 4

TANK
OVERFLOW
ELEVATION = 334.03'

GROUND
ELEVATION = 284.40'



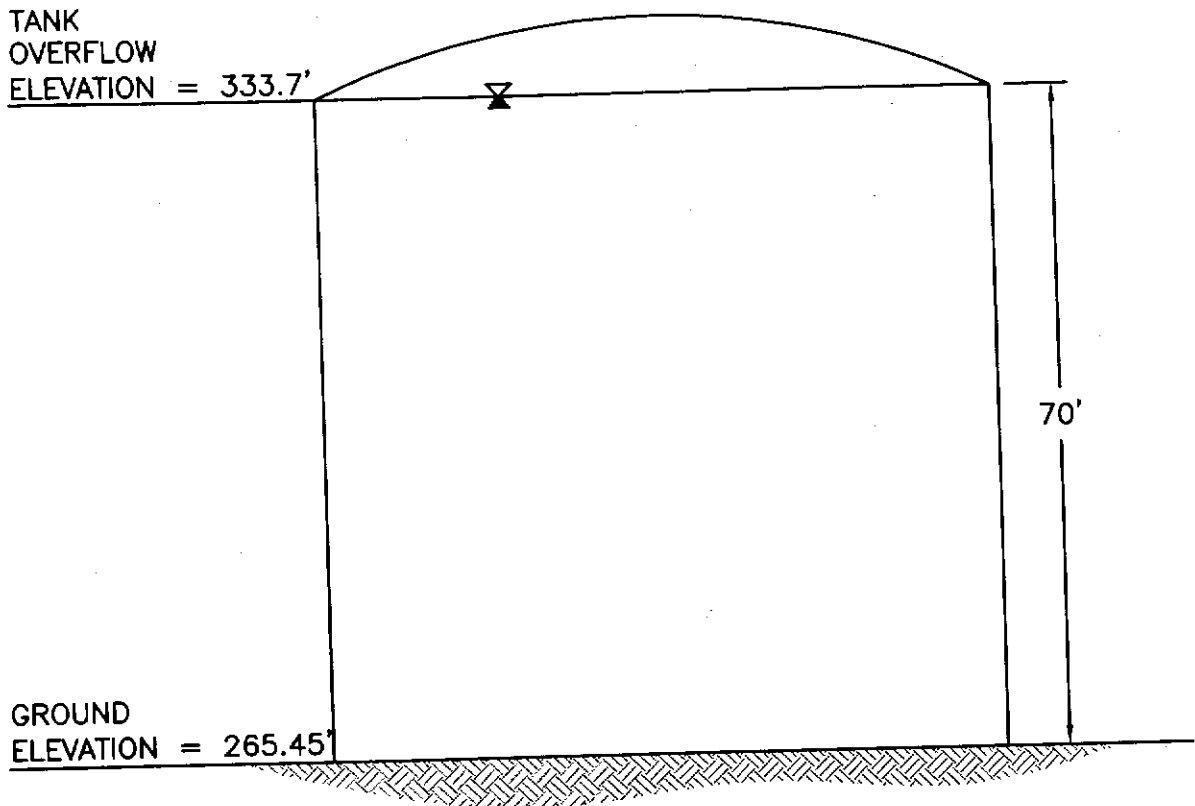
TOTAL VOLUME = 1,500,000 GALLONS
HEIGHT = 50 FEET
DIAMETER = 73 FEET
MATERIAL = CONCRETE
CONSTRUCTED = 1977

SCHEMATIC - FRENCHTOWN ROAD TANK

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

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PLATE 5



TOTAL VOLUME = 2,000,000 GALLONS
HEIGHT = 70 FEET
DIAMETER = 78 FEET
MATERIAL = CONCRETE
CONSTRUCTED = 1990

SCHEMATIC - WAKEFIELD STREET TANK

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

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342 Park Avenue, Woonsocket, RI 02895

PLATE 6

TANK
OVERFLOW
ELEVATION = 500.1'

GROUND
ELEVATION = 418.84'

82'

TOTAL VOLUME = 3,000,000 GALLONS
HEIGHT = 82 FEET
DIAMETER = 80 FEET
MATERIAL = CONCRETE
CONSTRUCTED = SEPTEMBER 2001

SCHEMATIC - CARRS POND ROAD TANK

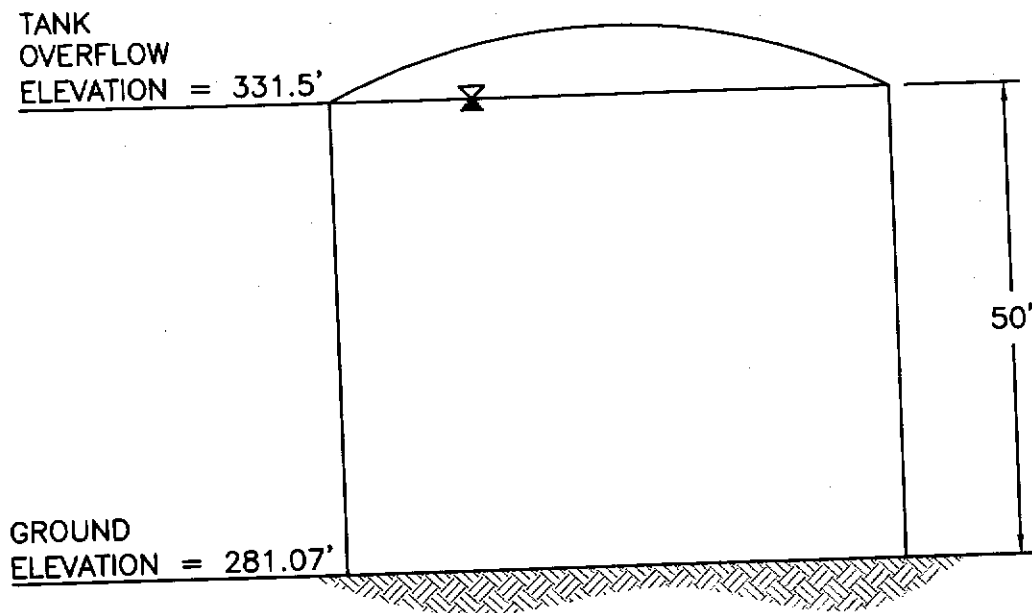
NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

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& Environmental
Engineering Partners, Inc.

142 Park Avenue, Whitefield, NH 03790

PLATE 7

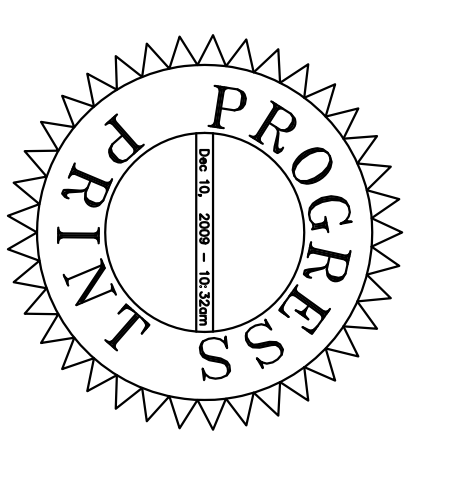
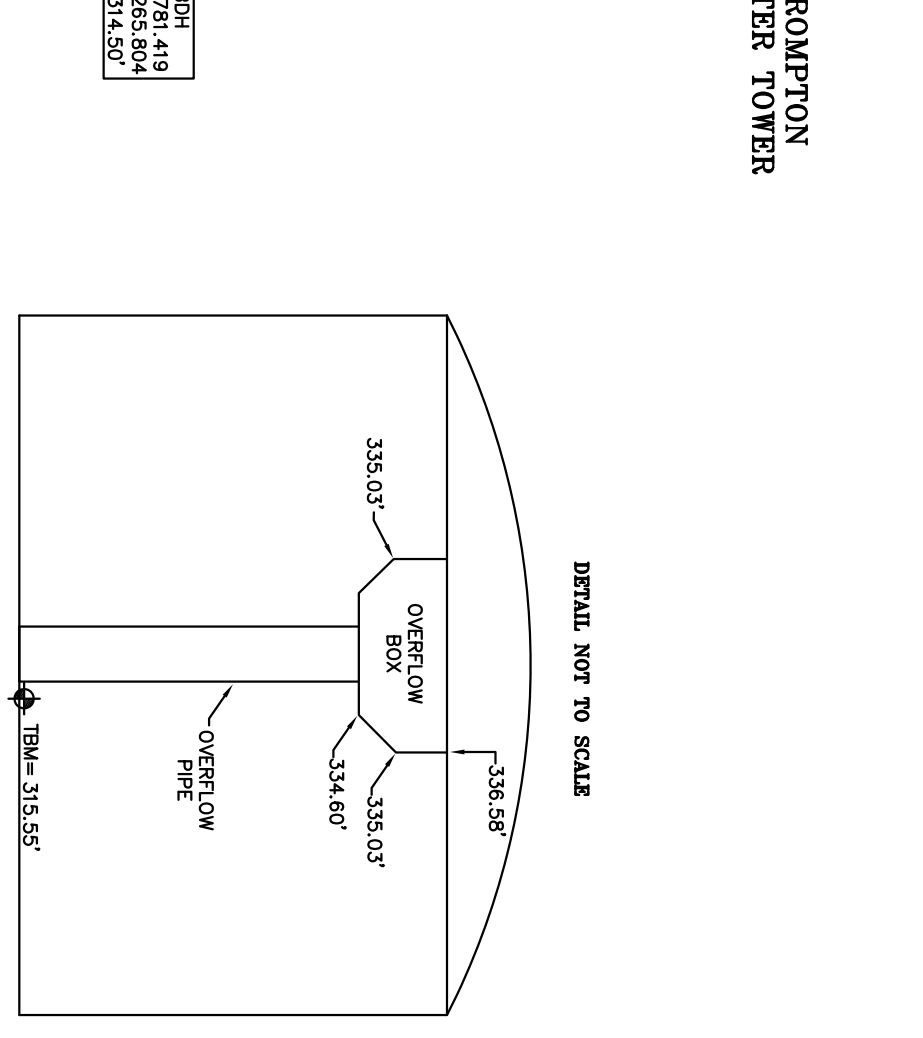
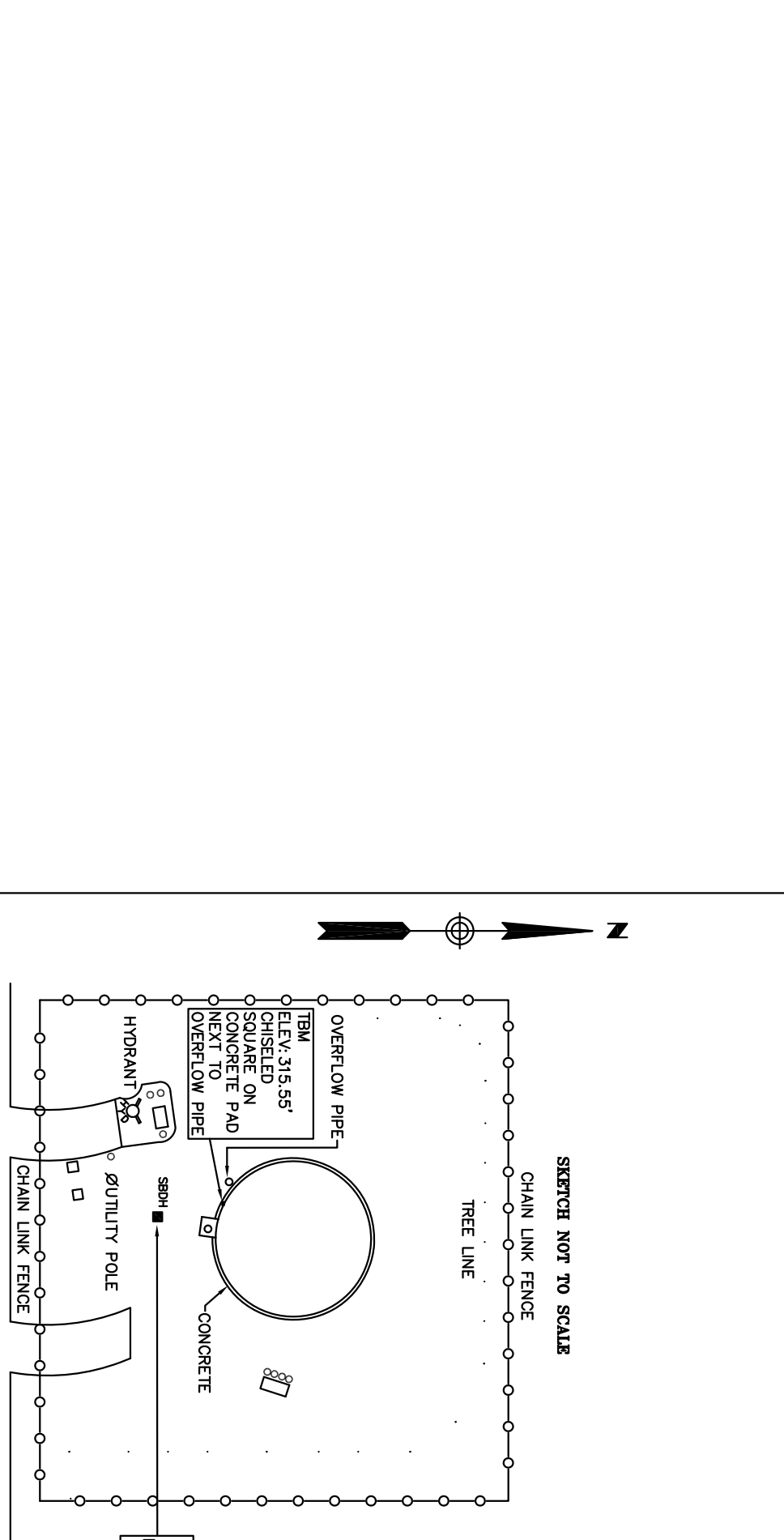
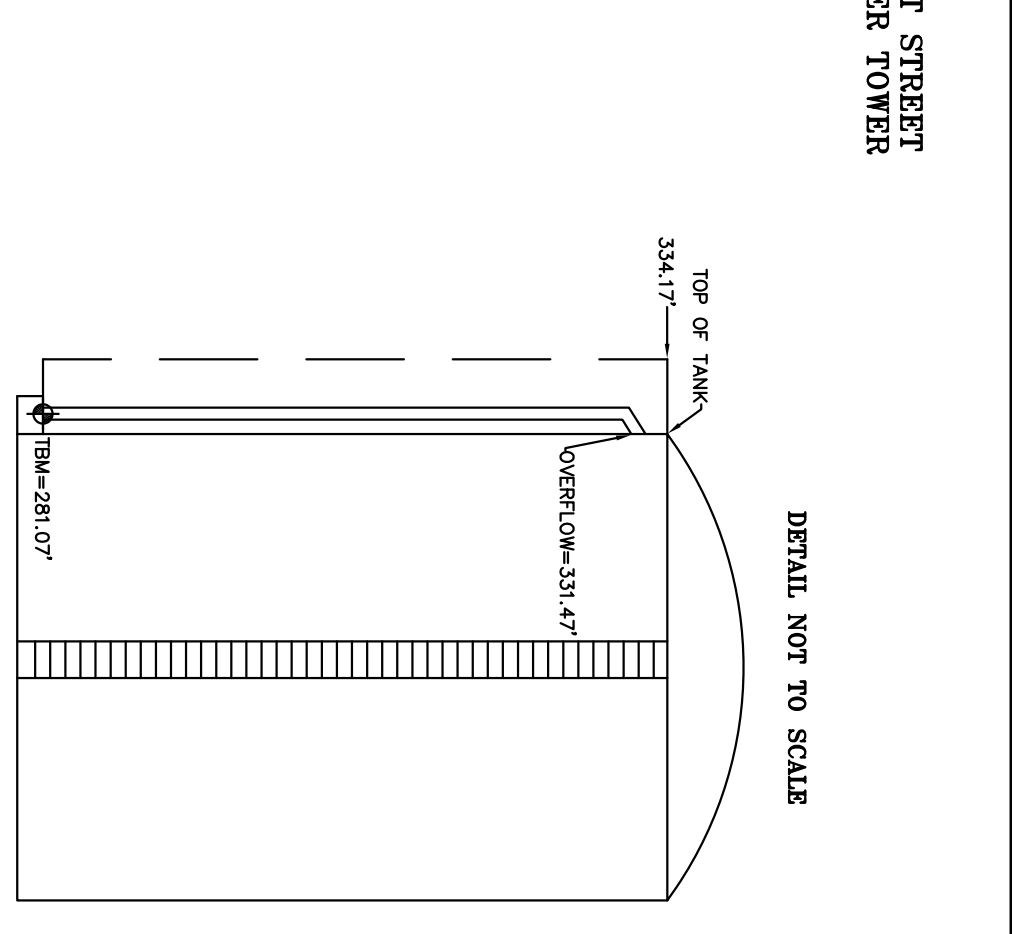
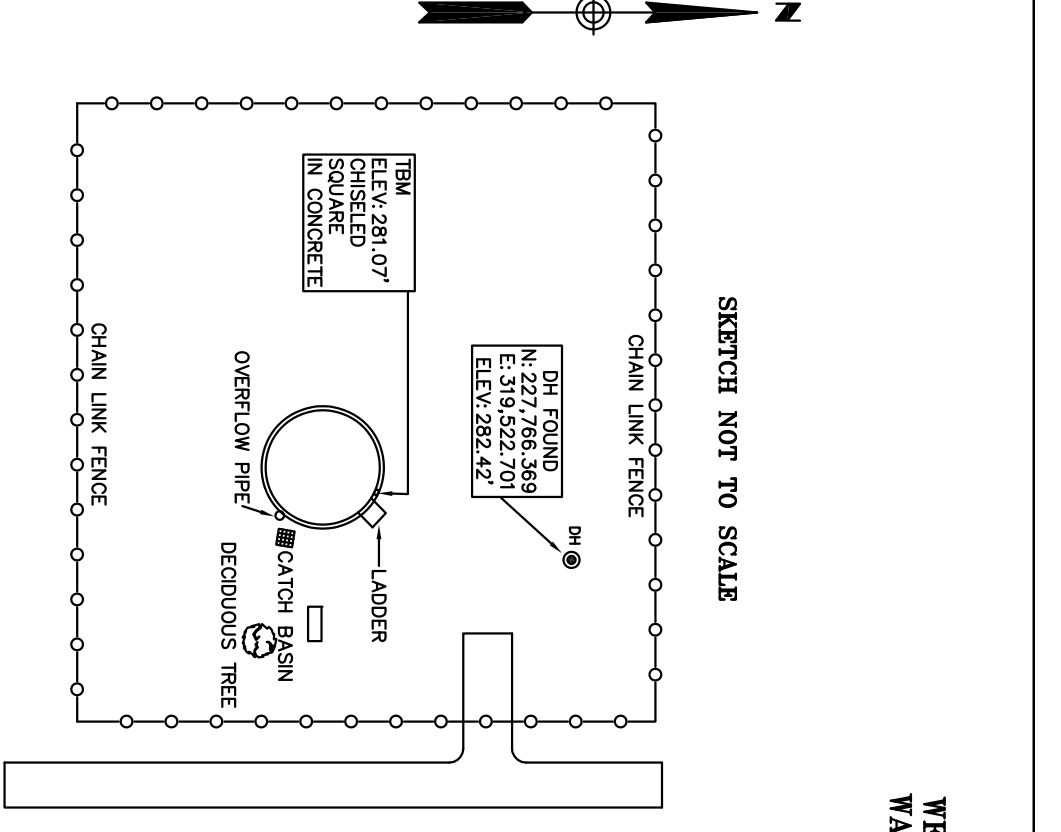
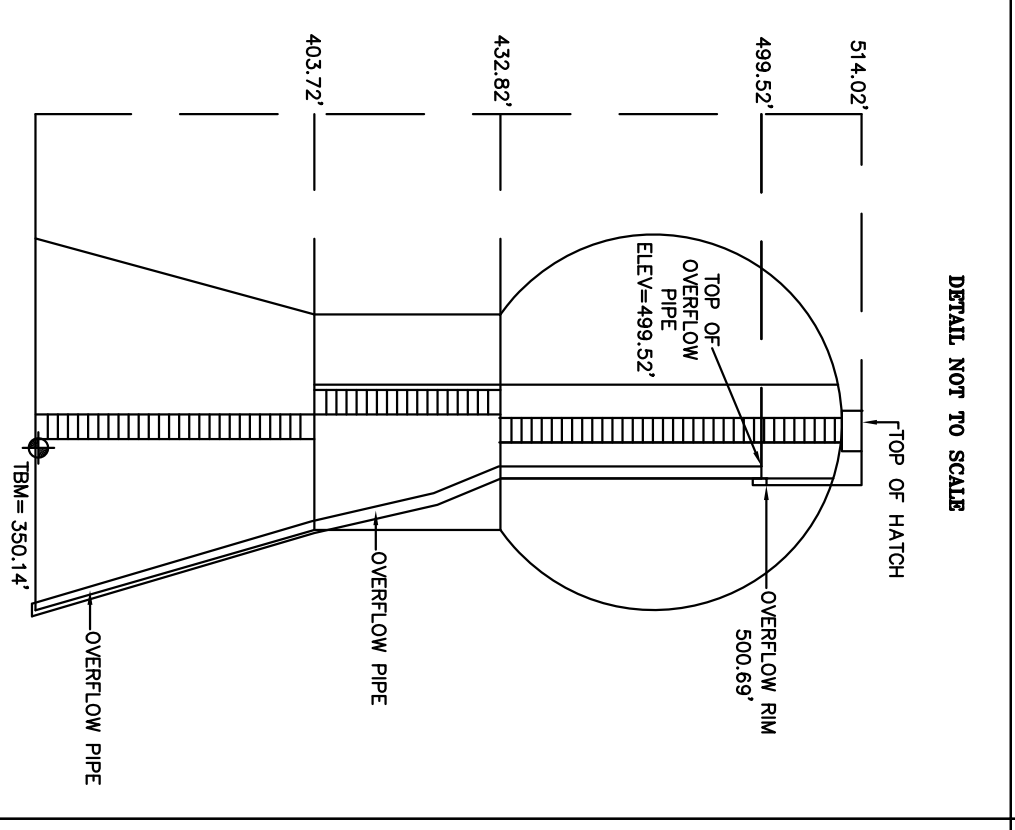
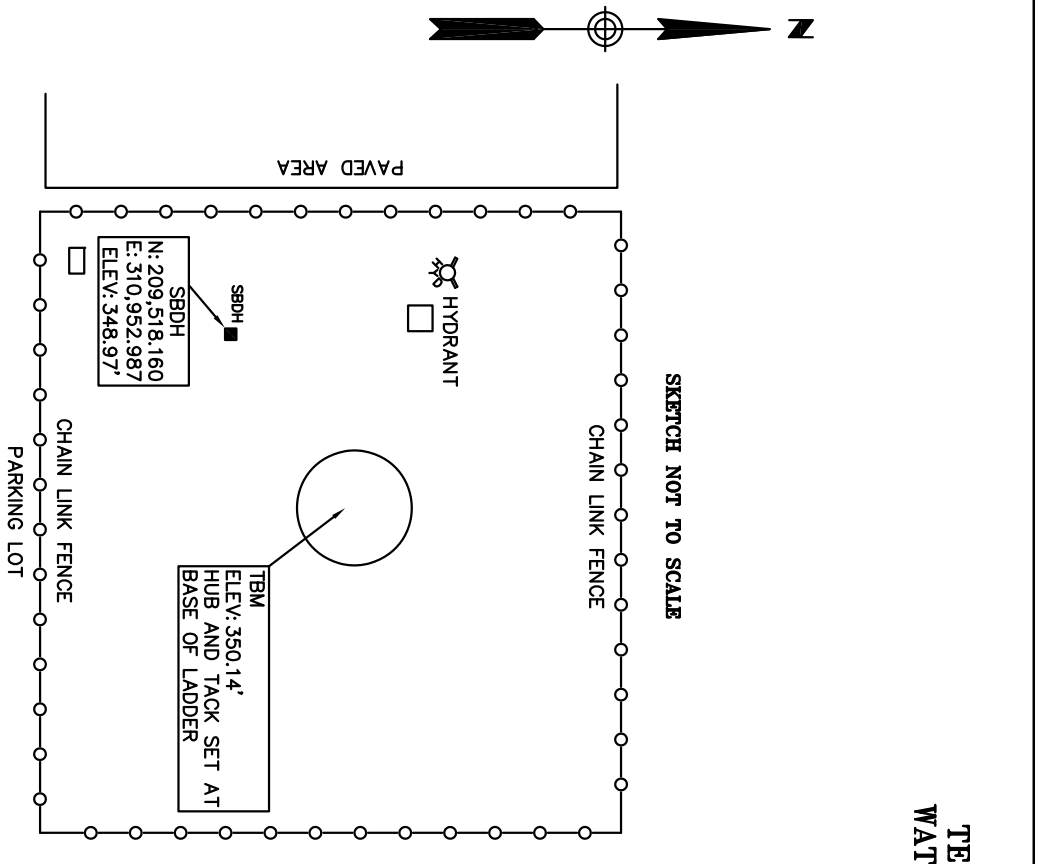
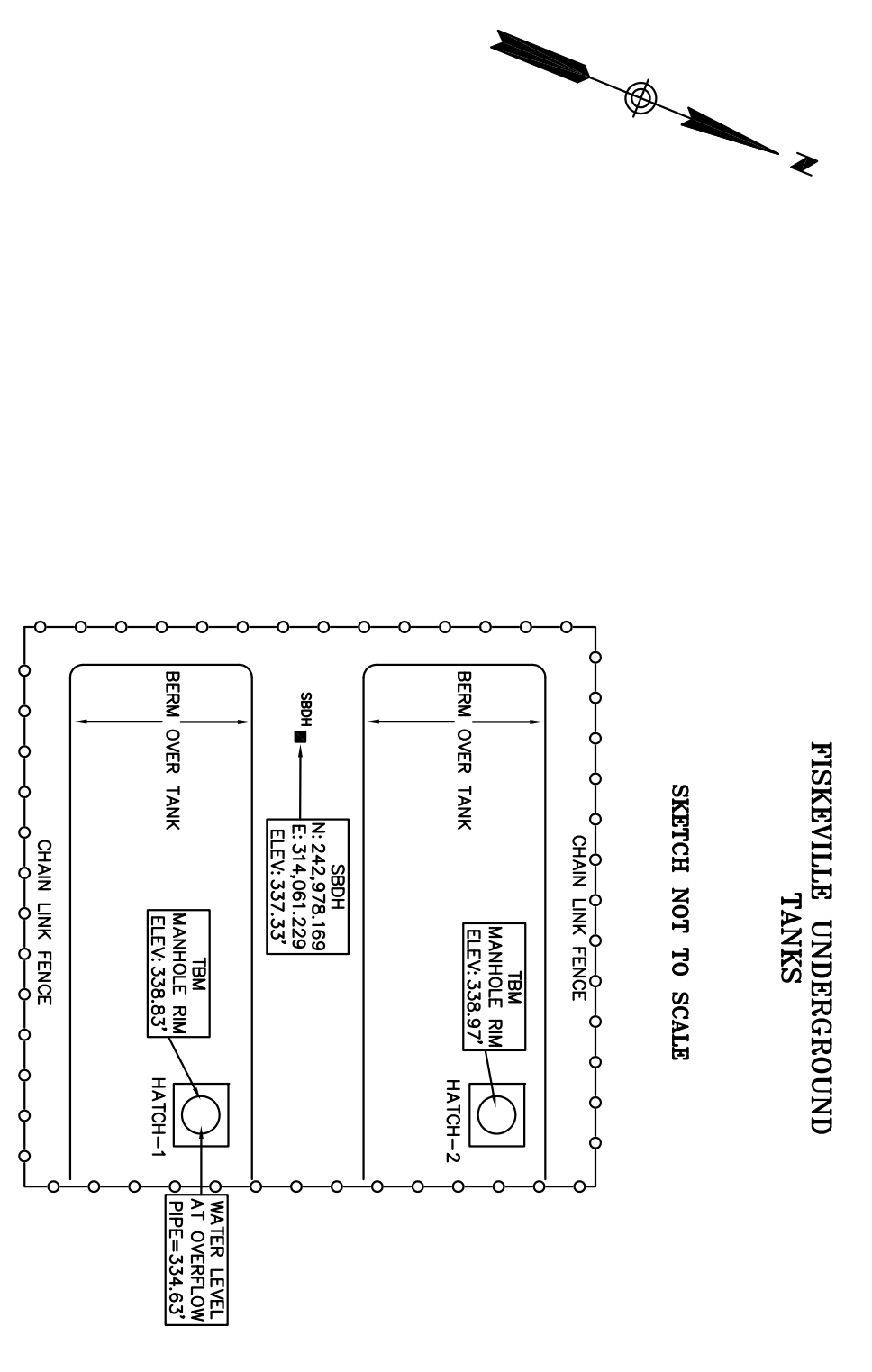
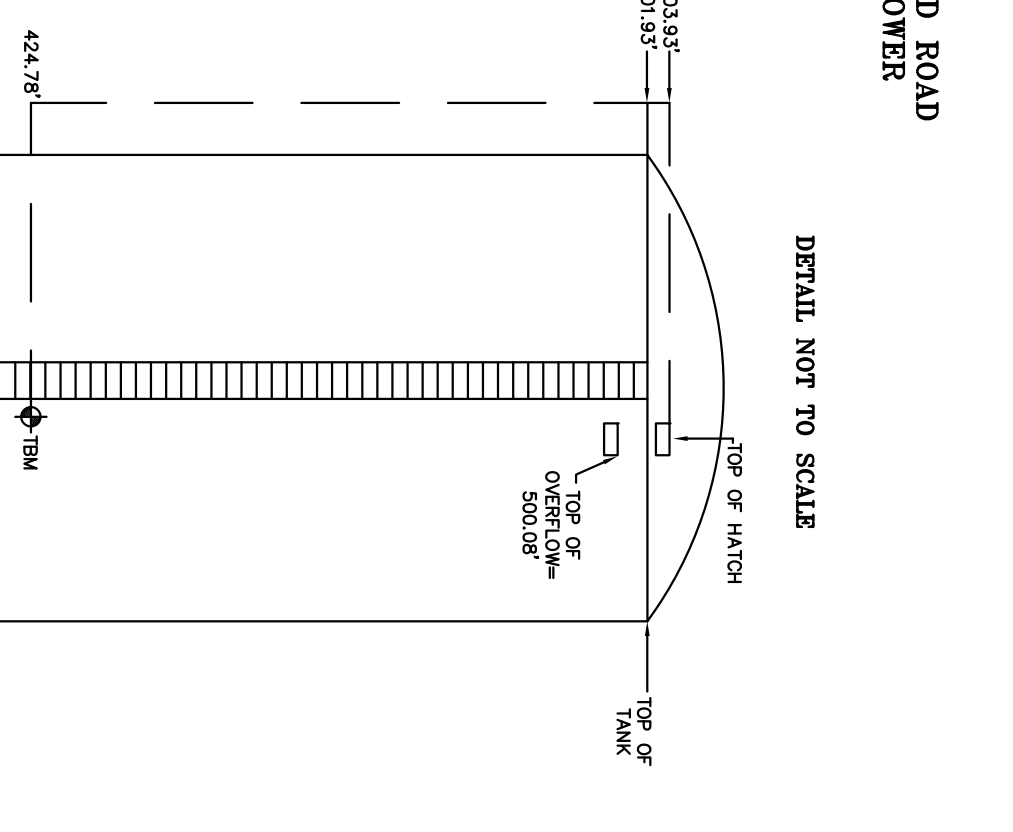
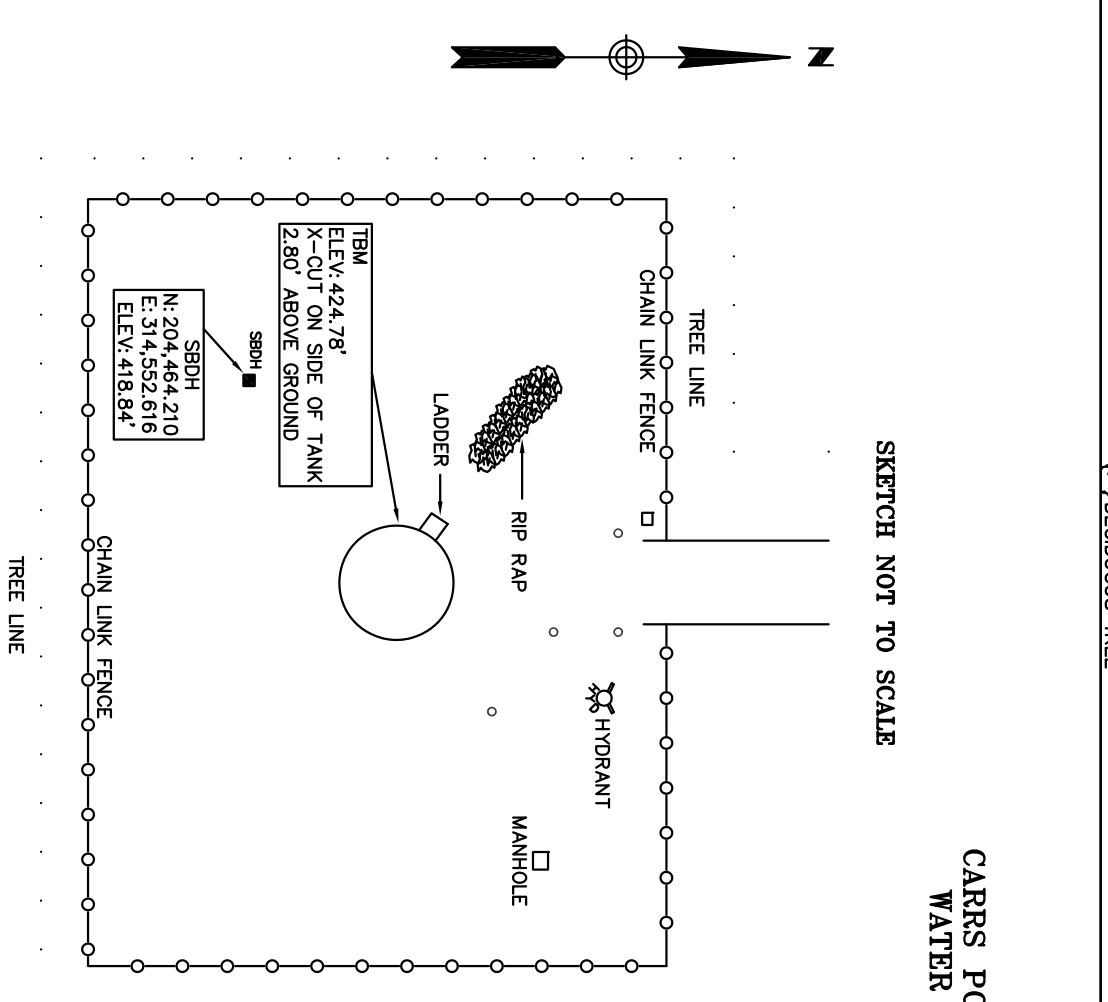
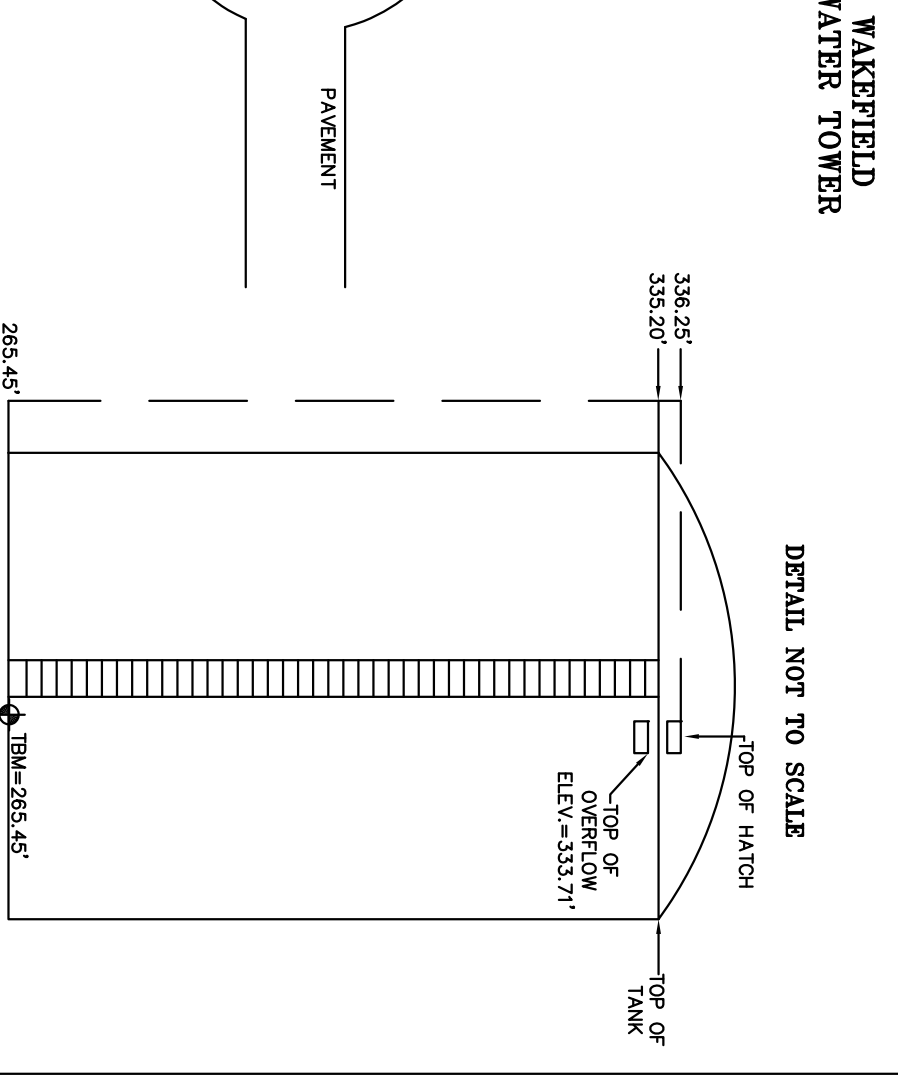
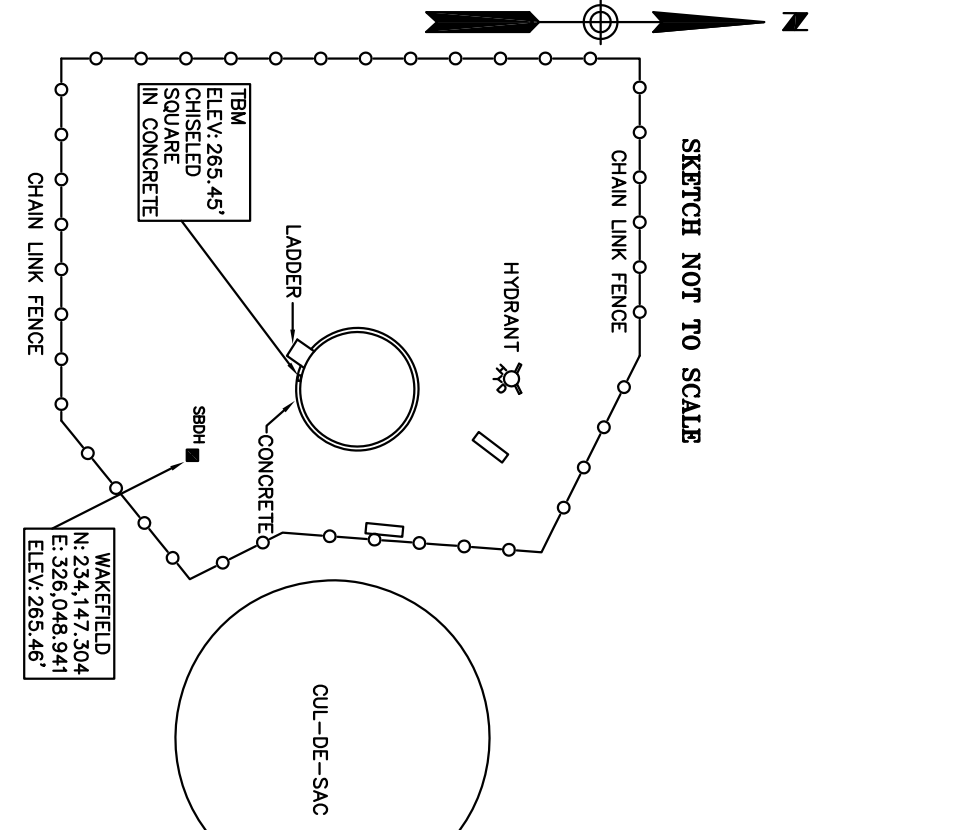
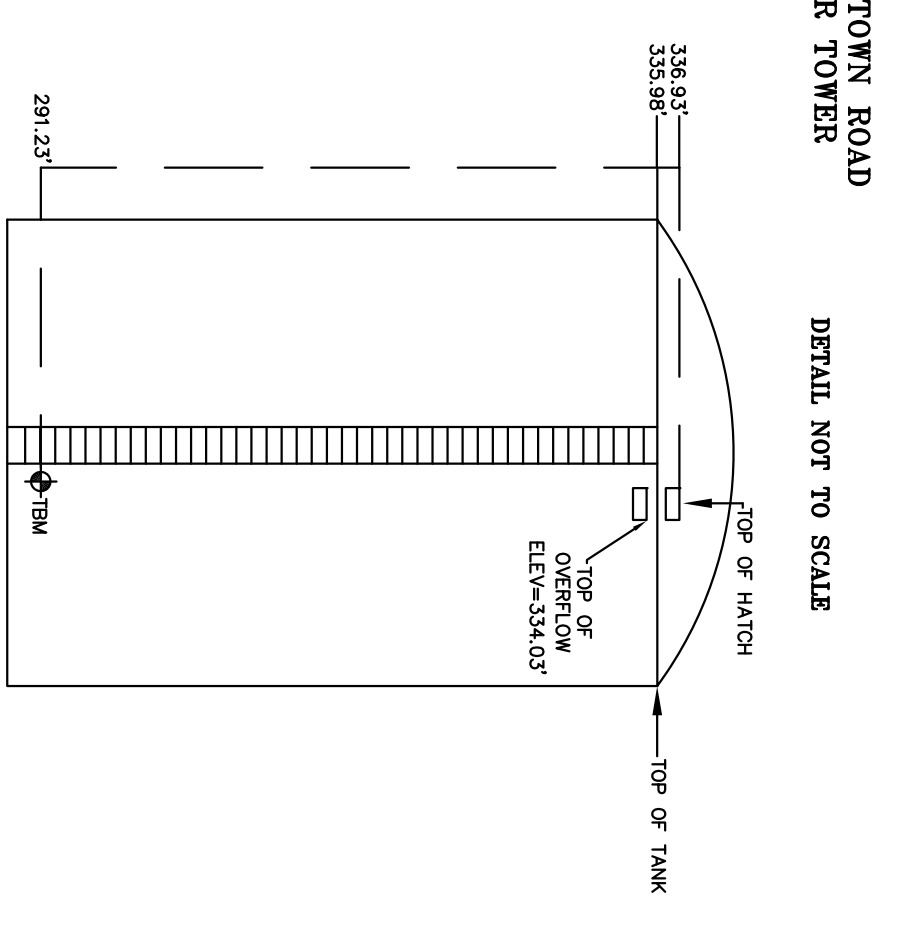
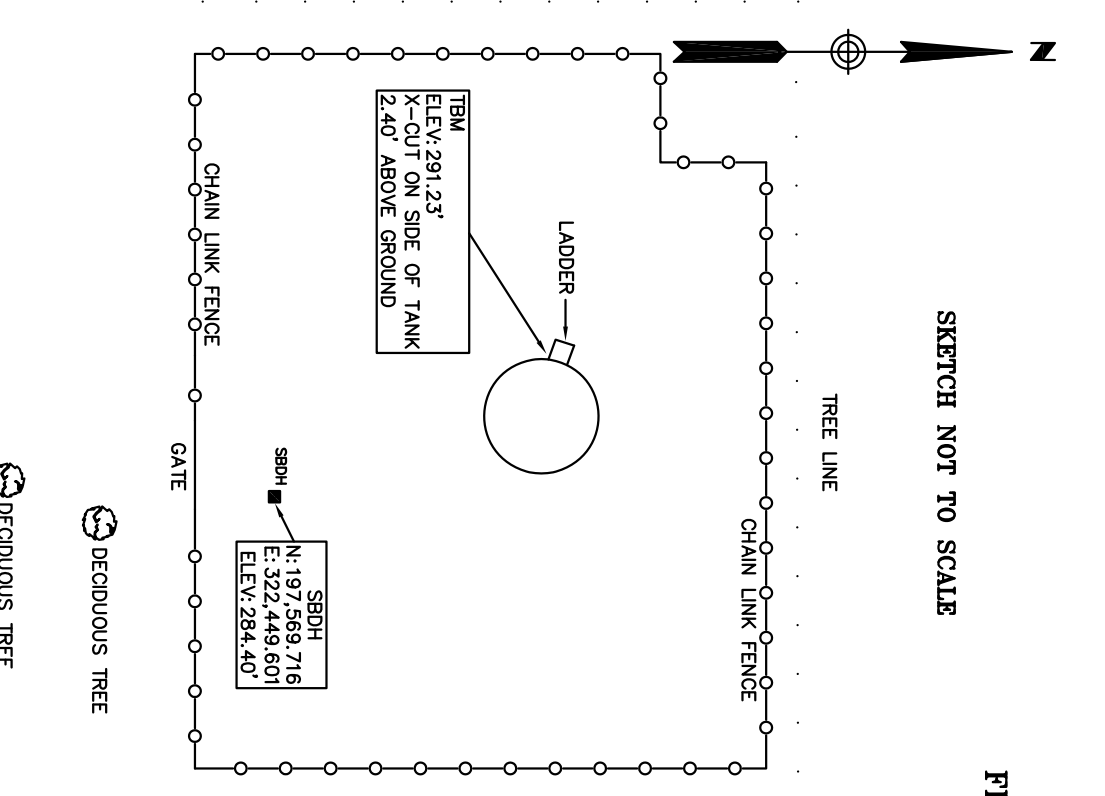
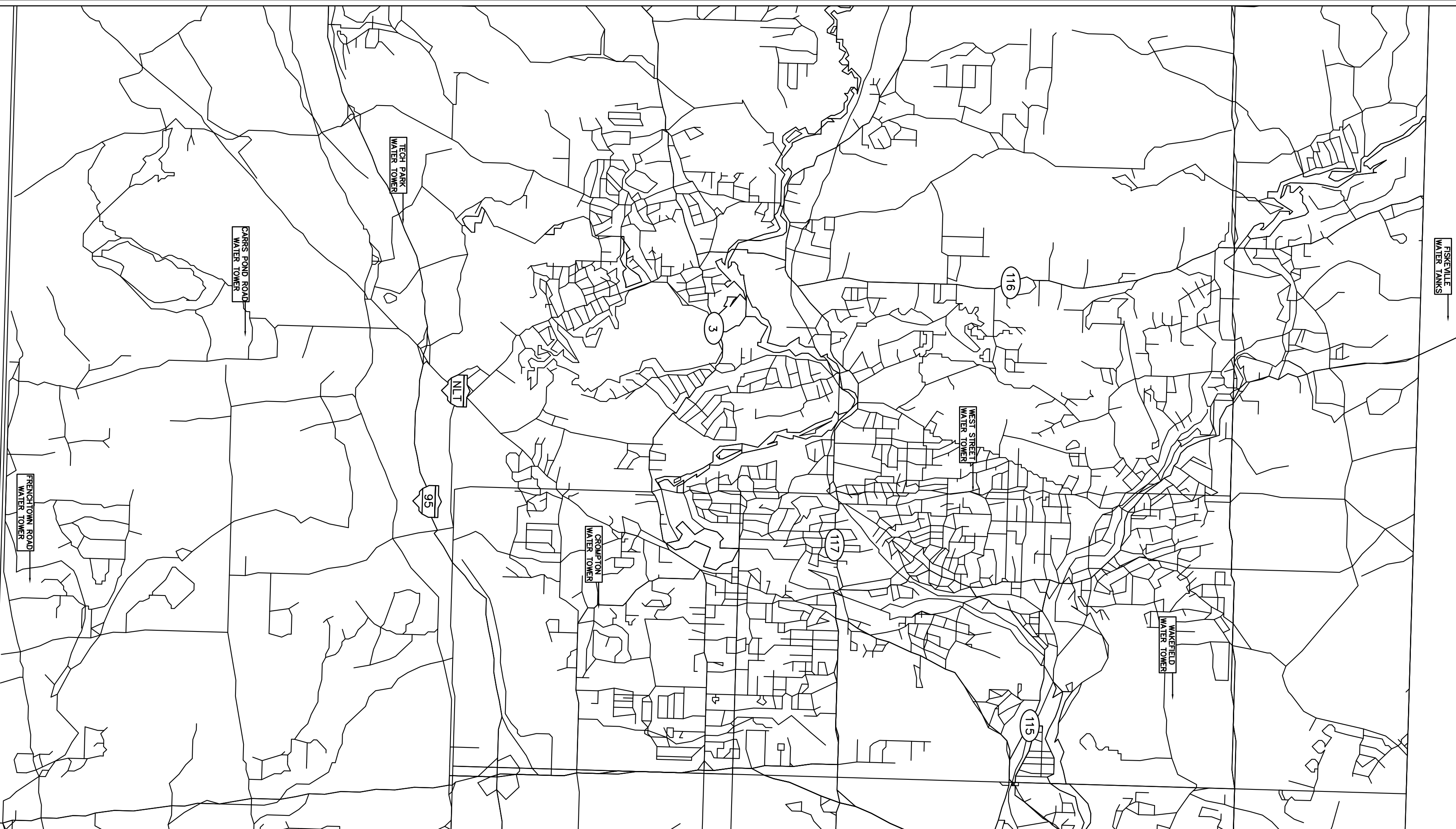
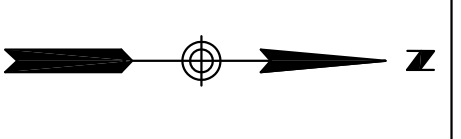


TOTAL VOLUME = 1,000,000 GALLONS
HEIGHT = 50 FEET
DIAMETER = 58 FEET
MATERIAL = STEEL
CONSTRUCTED = 1956

SCHEMATIC - WEST STREET TANK

NOTE: ELEVATIONS BASED ON SURVEY BY CHAS. H.
SELLS, INC., NASHUA, NH, AUGUST 2006

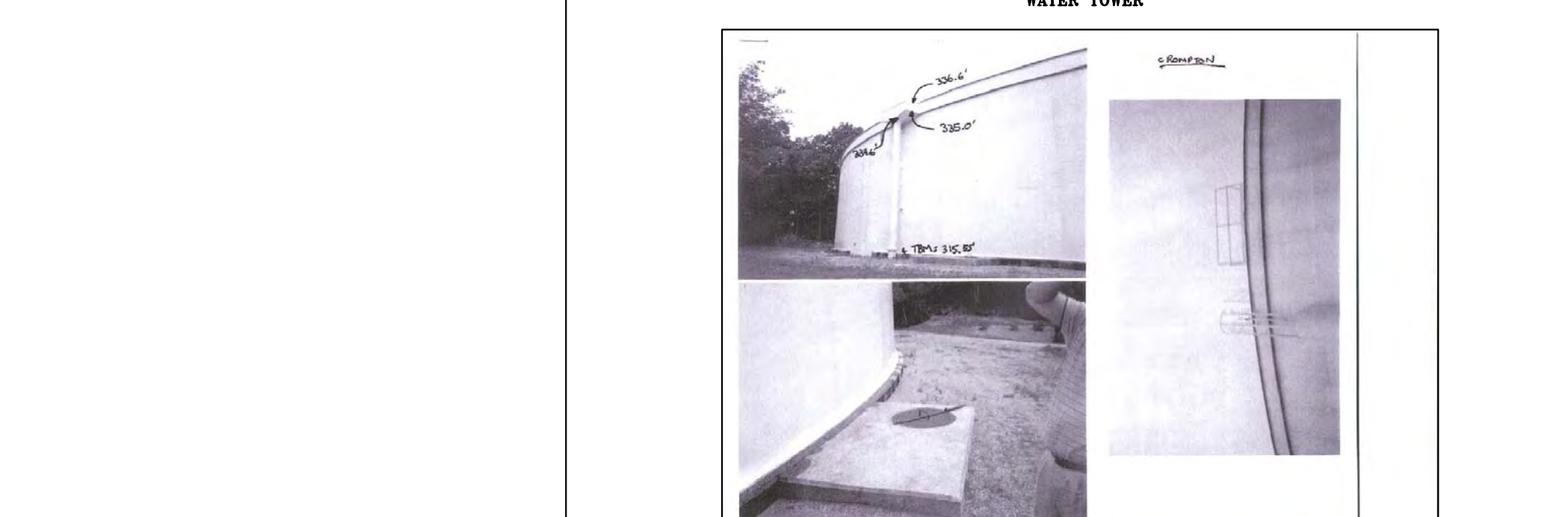
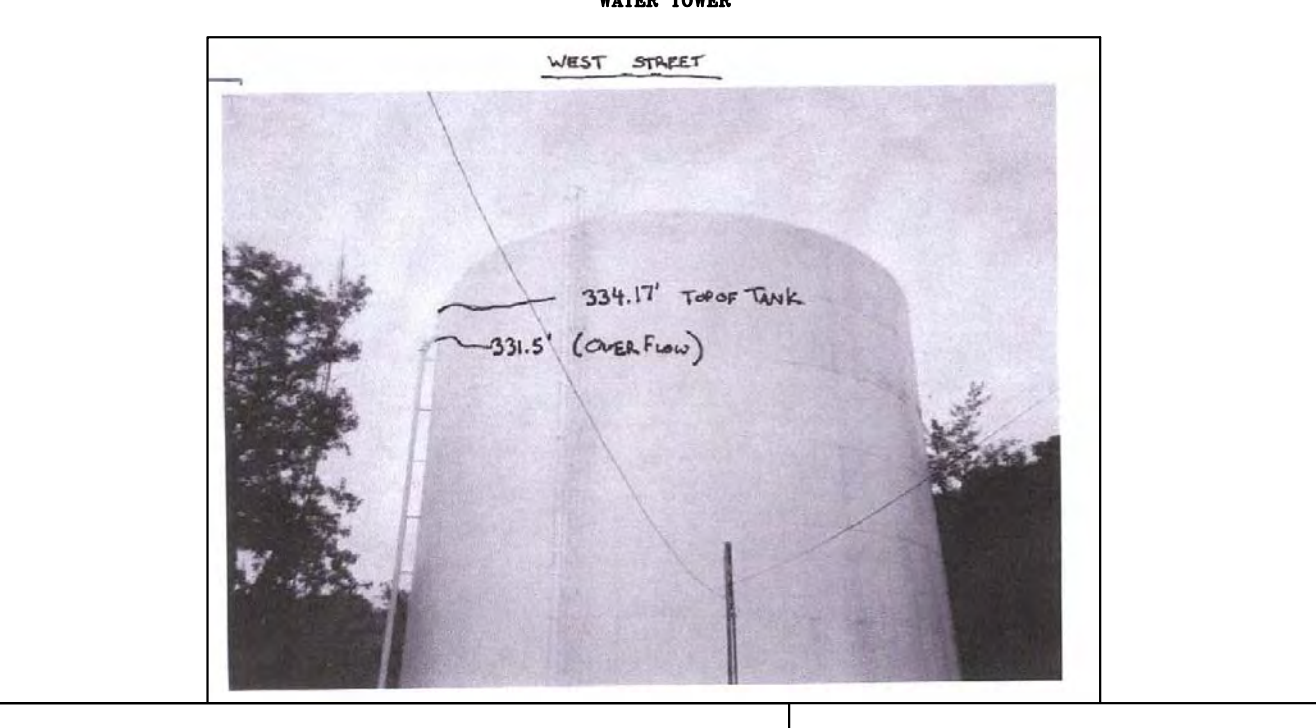
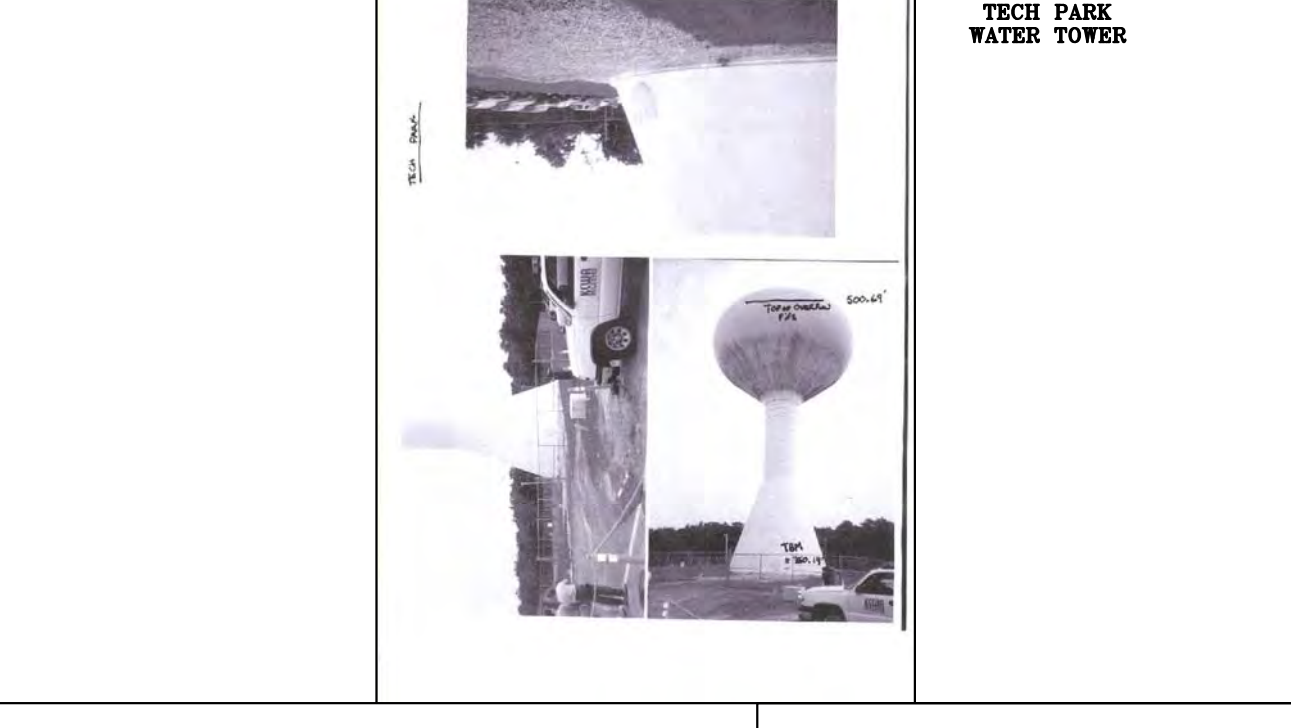
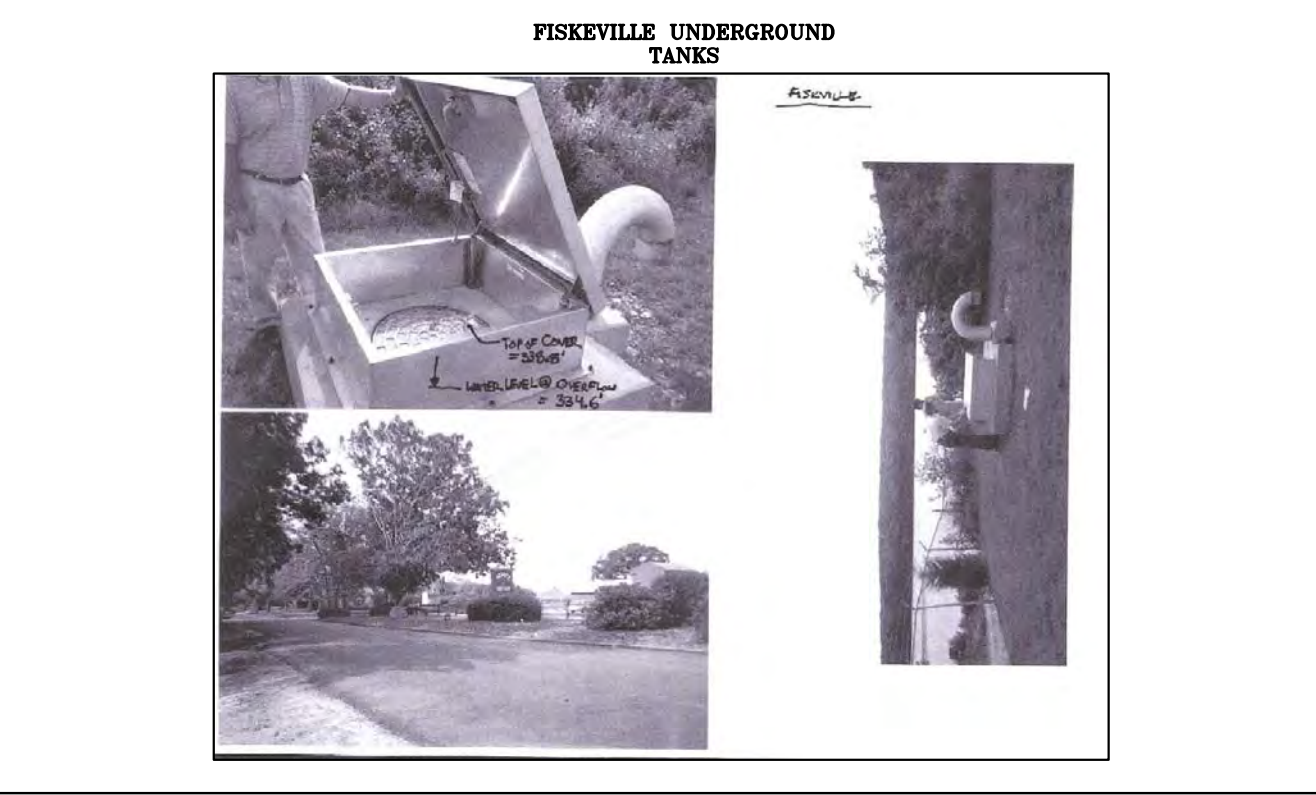
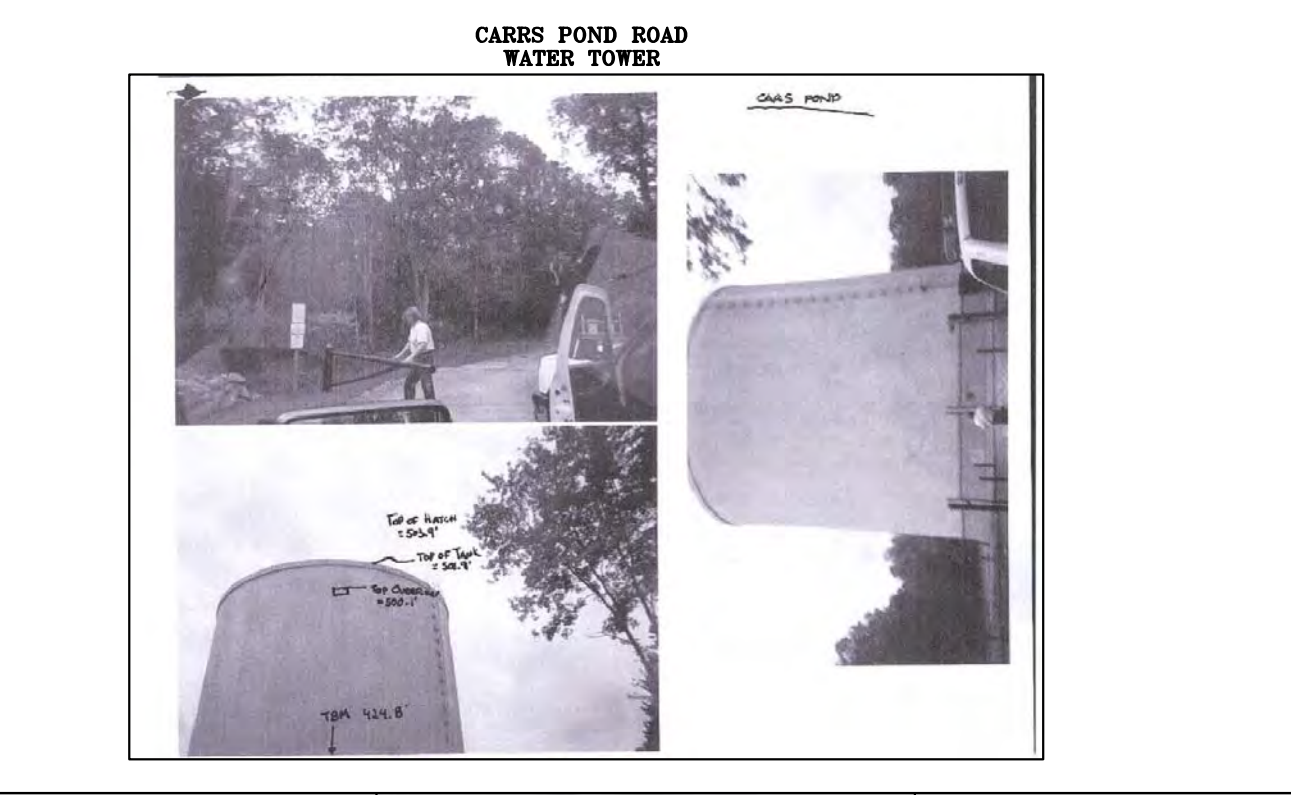
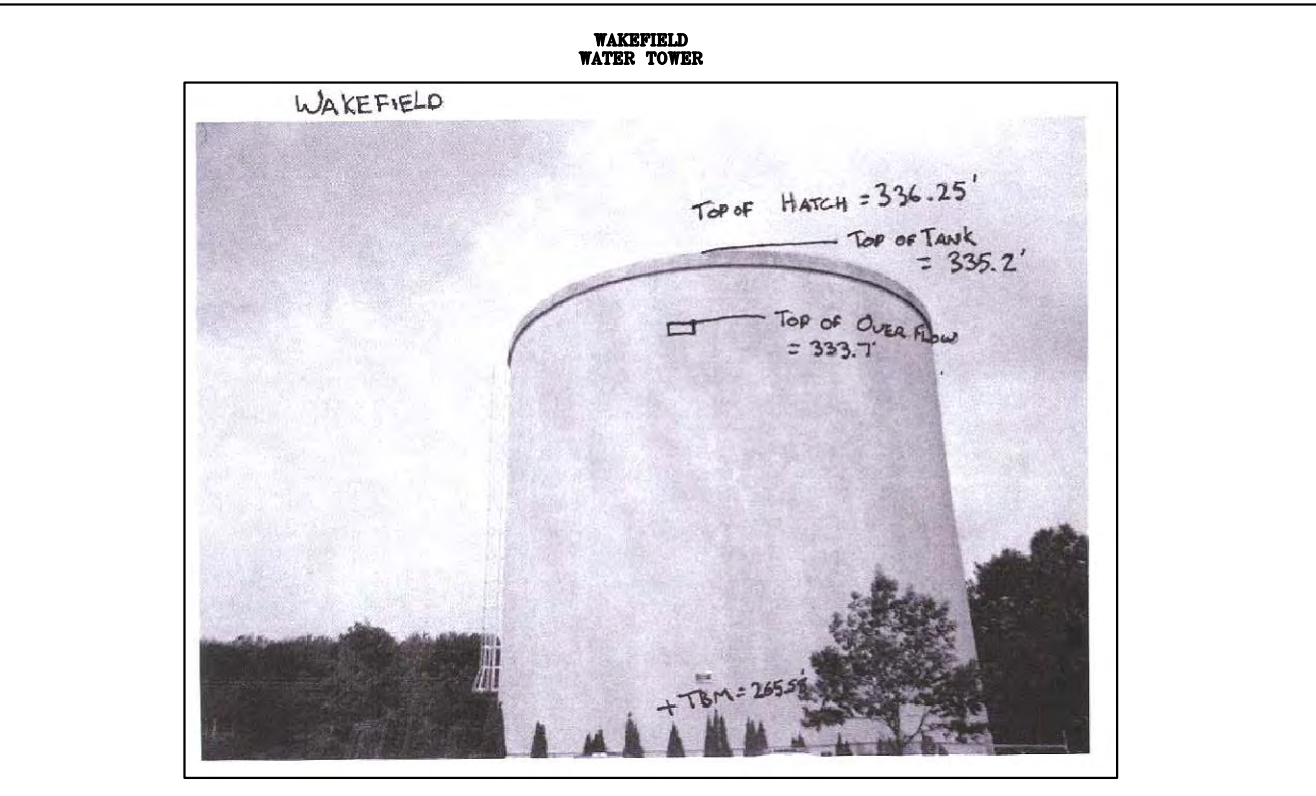
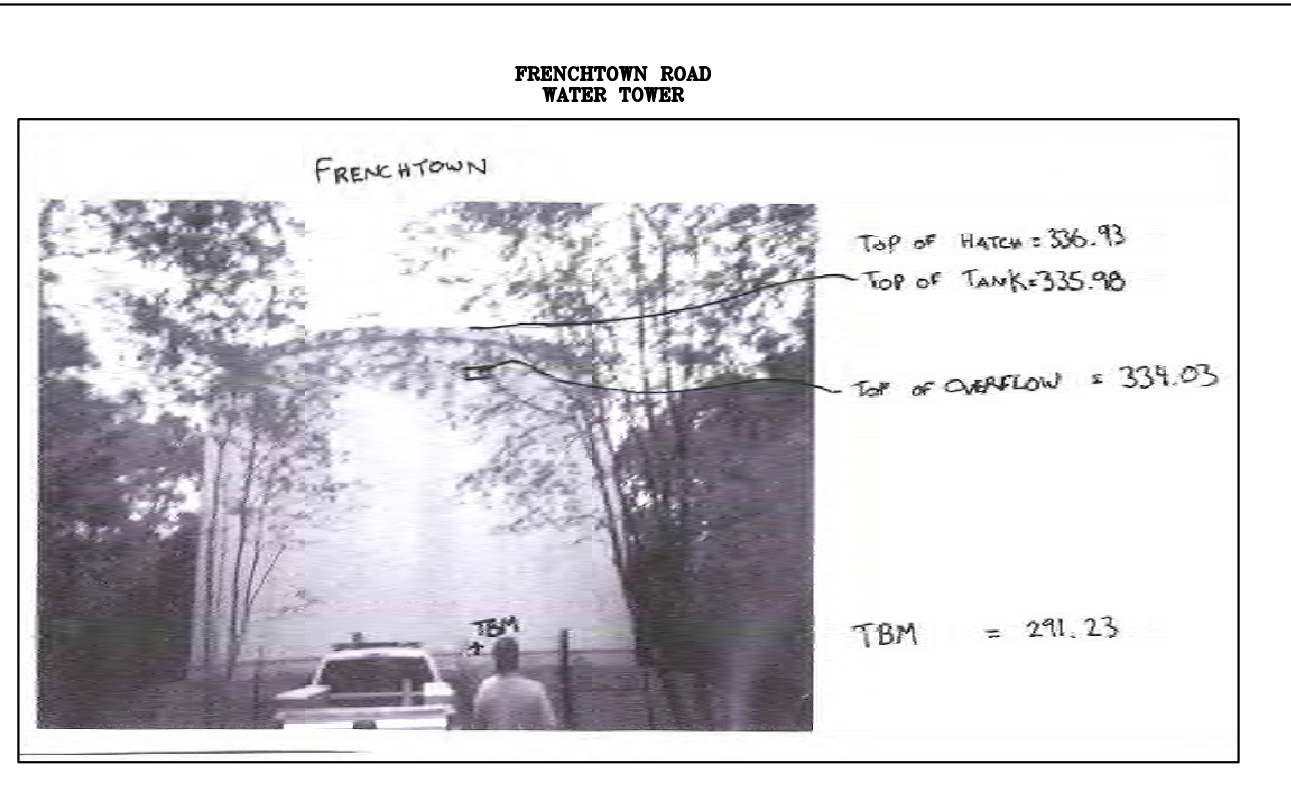
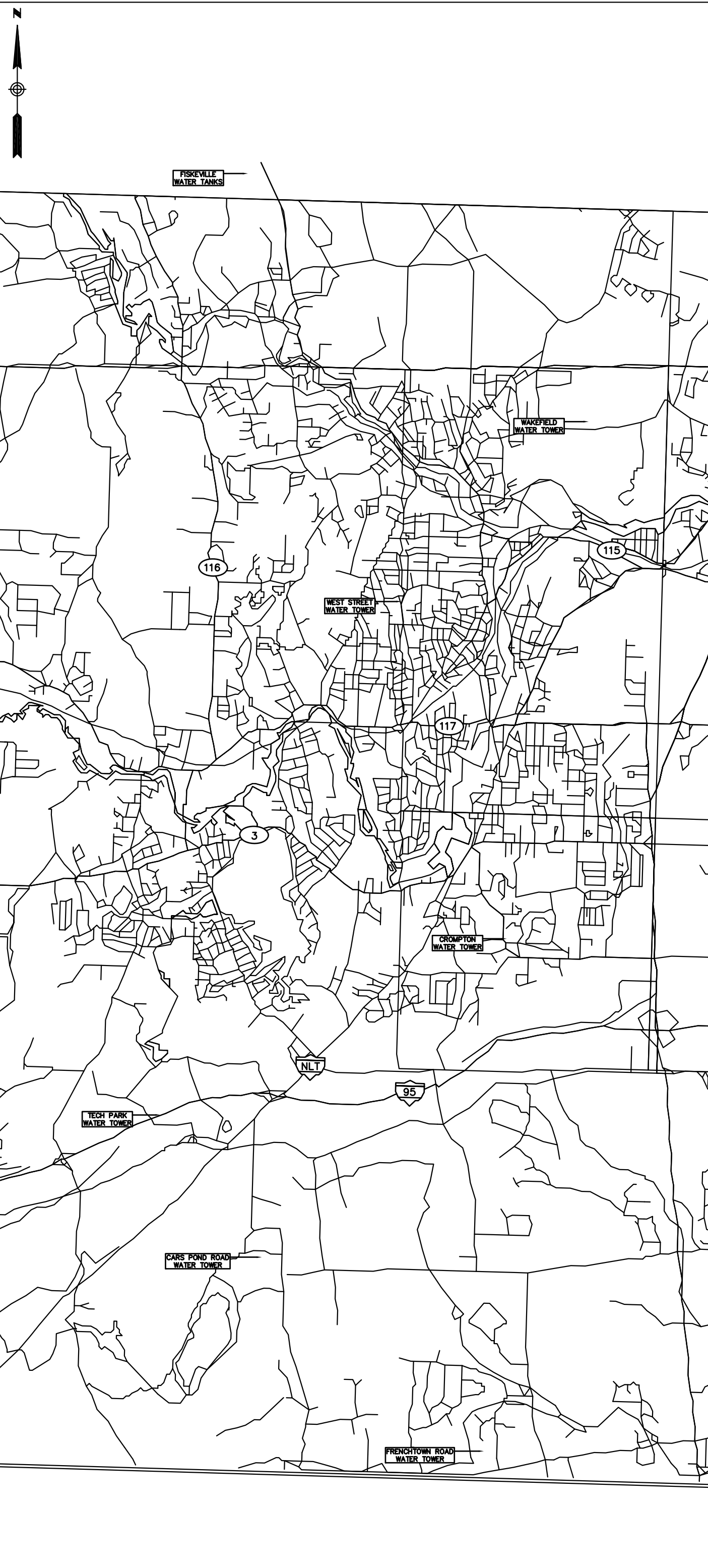
SEPT. 2006



NOTES
 1. THIS PLAN WAS PREPARED FROM AN ACQUA ON THE BASIS OF THE SURVEY DATA PROVIDED BY CHAS. H. SELLS, INC. BETWEEN JULY 28, 2006 TO AUGUST 3, 2006.
 2. THE HORIZONTAL DATUM SHOWN HEREON REFERENCES RHODE ISLAND STATE PLANE SYSTEM - NA83.
 3. THE VERTICAL DATUM SHOWN HEREON REFERENCES NAVD83.

KCWA WATER TANK SURVEY
 KENT COUNTY, RHODE ISLAND
 PREPARED FOR
 C&E ENGINEERING PARTNERS, INC.
CHAS. H. SELLS, INC.
 145 MAIN DOWNSTATE RD, SUITES 100 & 105
 WASHINGTON STATE, BOSTON, MASSACHUSETTS
 CONSULTING ENGINEERS, ARCHITECTS & PHOTOGRAMMETRISTS

Drawn By	LVI	Date	
Surveyed By	MIS & MCS	AUGUST 16, 2006	Job No. 063033
Checked By	DH		Scale
Book No.	N-213		1 OF 1



NOTES

1. THIS PLAN WAS PREPARED FROM AN ACTUAL ON THE GROUND FIELD SURVEY CONDUCTED BY CHAS. H. BELLA, INC. BETWEEN JULY 26, 2006 TO AUGUST 3, 2006.
2. THE HORIZONTAL DATUM SHOWN HEREON REFERENCES RHODE ISLAND STATE PLANE SYSTEM - NAD83.
3. THE VERTICAL DATUM SHOWN HEREON REFERENCES NAVD83.

REVISIONS:	
APPROVED:	
KENT COUNTY WATER ASSOCIATION KENT COUNTY DESIGNED BY: DATE: 09/20/06 CHECKED BY: DATE: 09/20/06 DRAWN BY: DATE: 09/20/06 PROJECT NO.: J0612 DWG. NO.:	