

Power Line Relocation Study

PB Power Inc.

A Parsons Brinckerhoff Company



Power Line Relocation Study

Prepared for:

***Commonwealth Engineers &
Consultants, Inc.***

Regarding the

***Sakonnet River Bridge
FINAL EIS***



***Portsmouth & Tiverton
Newport County, Rhode Island***



November 13, 2002

Power Line Relocation Study

Sakonnet River Bridge Final Environmental Impact Statement

Prepared by PB Power, Inc., a subsidiary of Parsons Brinckerhoff Quade and Douglas, Inc.

December 16, 2002

PB Power, Inc. reviewed existing documentation and conducted a site visit to the Sakonnet River Bridge site to assess the feasibility of relocating the 115 kV transmission lines located to the north of the existing Sakonnet River Bridge. The following is a report describing the documentation and conditions reviewed a general assessment of the feasibility of relocation, a discussion of the requirements for transmission relocation relative to the bridge replacement alternatives, a brief description of the alternatives for transmission relocation, and indicative costs for selected transmission relocation alternatives. Environmental impacts, especially in the water, have not been assessed.

Documentation Review

The documentation reviewed included the following:

- Draft Environmental Impact Statement and Section 4(f) Statement, Volume 1 dated July, 2001
- Base Mapping with Narragansett Electric Transmission Towers, Tower Location Plan Nos. 1, 2, 3, 3A, 4, and 5, prepared by Commonwealth Engineers & Consultants, Inc.
- Tax Maps showing lots adjacent to Transmission Line Towers

General Assessment of Relocation Feasibility

Overall, it appears possible to relocate the transmission lines to the north of the existing alignment in an overhead configuration. Relocation will require placing a minimum of two new towers in the Sakonnet River directly, and also will require additional right-of-way (ROW) acquisition on the east bank of the river. A potential alignment for overhead transmission is shown on the attached tower location plan.

Since it appears possible to relocate the transmission lines in an overhead configuration, an underground/underwater configuration was not studied in detail due to significantly higher associated costs. Generally, if an underground river crossing alternative were to be considered, the route would be essentially the same as for the overhead alternative, with five ROW property acquisitions required. The potential cost impact of underground transmission is discussed in the Indicative Cost Estimate.

Effect of Bridge Construction Alternatives on Transmission Line Replacement

Five alternatives for bridge construction are presented in the Draft Environmental Impact Statement. Of the five alternatives, two have significant impact on the existing transmission lines; Alternative 3, New Bridge on Existing Alignment with Temporary Bridge, and Alternative 4, New Bridge on North Alignment. Each of these alternatives places either temporary (Alternative 3) or permanent (Alternative 4) roadways on the site of existing transmission towers. Either of these alternatives would require permanent relocation of the transmission line.

Since the existing transmission line lies north of the existing roadway and bridge at each side of the river, it is only feasible to relocate the transmission line to the north. The temporary or permanent roadway on the north alignment uses the route of the existing railroad right of way, which is currently used for location of transmission towers. Since there are no other similar land features in the river north of this right of way, tower foundations would have to be located in the river.

Description of transmission relocation and structures

It is generally feasible to relocate the transmission lines north of the new northern alignment for the bridge, or the temporary bridge, in an overhead configuration, maintaining a minimum horizontal clearance of 50 feet from the center of the transmission towers to any new bridge or highway structures. This is consistent with a nominal 100-foot right-of-way width for 115 kV transmission.

On the east (Tiverton) side of river, there appears to be sufficient open land to the north and west of the existing tower No. 38 where another river crossing terminal transmission tower could be placed. It may be necessary to obtain additional right of way from the railroad to locate this tower. The major difficulty on the east side of the river is that any new transmission line alignment north of the existing line would cross over existing buildings. The buildings are low, and do not present a clearance problem, but land taking would probably become an issue. A ROW approximately 100 feet wide is a typical width for a double circuit 115 kV transmission line. This would require acquiring approximately 25,000 square feet of property from the shoreline to the existing ROW boundary. The attached tower location plan shows the properties potentially affected by the new ROW.

On the west (Portsmouth) side of the river, it appears that there is sufficient existing right of way width north of the existing transmission line to locate a new pole north of existing transmission structure No. 42. The southern-most pole at existing transmission structure No. 42 would be removed and the lines shifted north. A new steel tower would be required at the shoreline north of existing transmission structure No. 41. This would serve as a new termination tower for the new river crossing. The attached plan shows the location of the new tower.

The new river crossing would require a minimum of two towers to be built in the river in order to limit the span lengths to approximately 550 feet. This span length also allows for avoidance of the navigation channel, and limits the height of the terminal towers and the size of the towers and foundations. The requirement for construction in the river has a major impact on the cost of the transmission line relocation. The cost estimate uses a factor of two (2) to account for additional costs for the foundations in the river due to uncertainties in soil conditions, for example. The construction cost portion of the estimate also has a multiplier of 10, which is a standard industry multiplier and accounts for both the additional costs associated with working in the river and the short length of line.

The towers envisioned for the river crossing and termination towers would be single pole, tubular structures, with arms configured for double circuit, similar to the lattice steel structures currently in use. Foundations for these towers are typically caissons, approximately 5 – 7 feet in diameter and 25 – 50 feet deep. The diameter and depth are determined by the load and soil conditions.

Construction of the transmission line location would take approximately 5 months. Construction conditions in the river could extend this period.

Indicative Cost Estimate

The indicative cost estimate for the overhead alternative is presented on Attachment 1. The cost estimate considers both material and construction costs, and considers the effects of having to construct a relatively short section of line, and of having to work in the river. The effect of having to construct a relatively short line increases the construction cost because the fixed costs such as mobilization are not spread over a large project. A short line is considered less than 10 miles in length. The additional costs for working in the river are recognized, but are difficult to quantify accurately due to unknowns such as soil conditions. As a result, the cost for the steel tower foundations in the river is the most uncertain element of the estimate. Without comprehensive subsurface information, any costs for foundation work include uncertainty. Right of way, taxes, and permitting costs are not considered.

The estimated cost for the overhead alternative, exclusive of ROW and permitting costs, is approximately \$2,300,000.

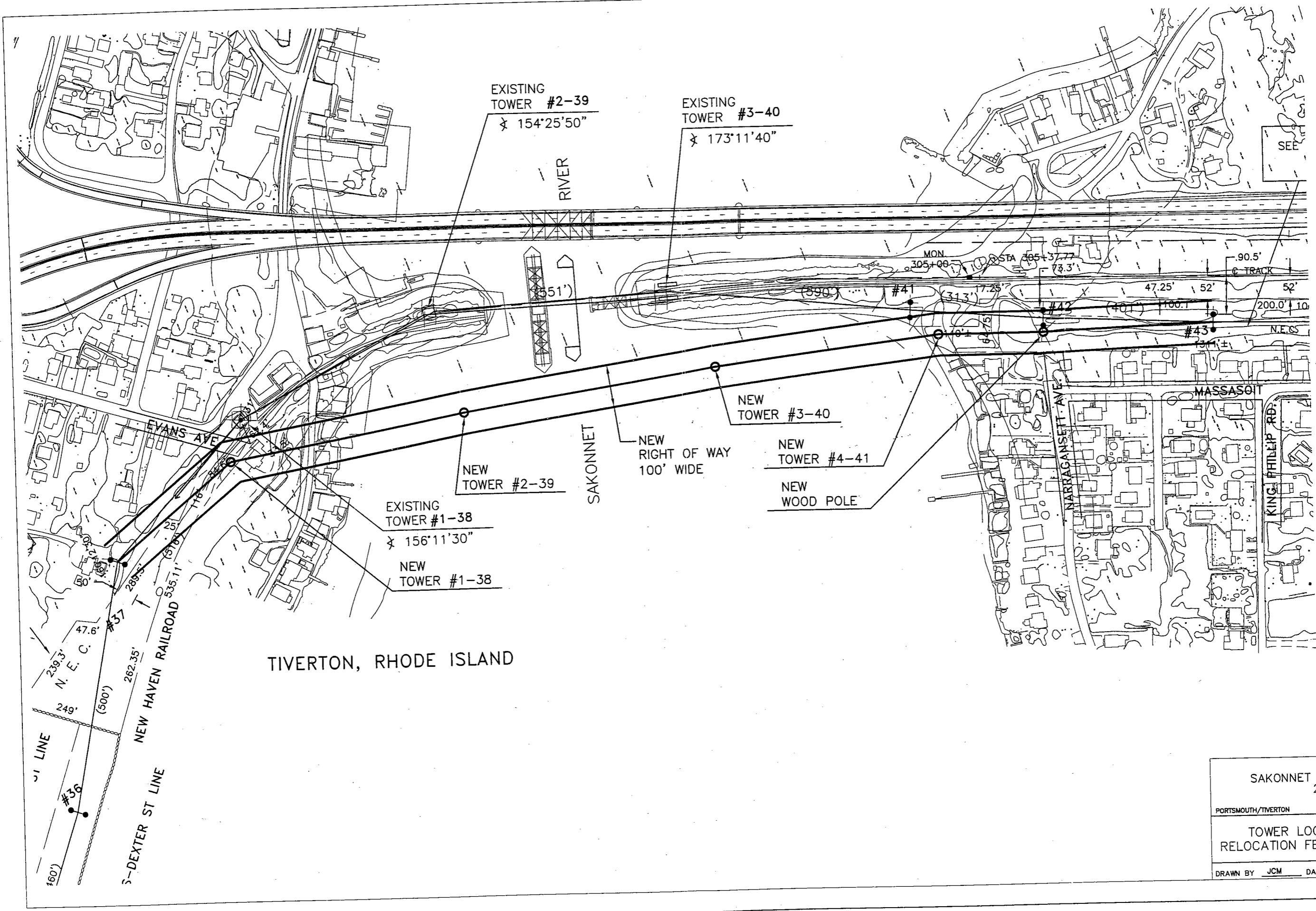
At 115 kV, the costs for underground construction are on the order of 10 times overhead construction. This would be applicable for land-based construction. Since the overhead construction has been increased due to the short line and river crossing, it is estimated that the underground multiplier would be approximately 5 for this project. This does not include additional costs for termination substations, if required by the utility. The estimated cost for the underground alternative is approximately \$11,500,000, exclusive of ROW and permitting costs.

Attachment 1
Rhode Island Department of Transportation
Sakonnet River Bridge Rehabilitation or Replacement
Overhead Transmission Cost Estimate

Item	Quantity	Per-Unit	\$/Unit	Cost	Category Cost
Steel, Double Circuit Steel Pole Angle, 115 kV, extra height	2	20000	1.5	\$ 60,000.00	
Steel, Double Circuit Steel Pole Deadend, 115 kV, extra height	2	20000	1.5	\$ 60,000.00	
Poles, Wood, 60 ft. Class 1	1	1500	1	\$ 1,500.00	
Foundation, Double Circuit Steel Pole Angle (1)	2	20000	2	\$ 80,000.00	
Foundation, Double Circuit Steel Pole Tap (2)	2	20000	1	\$ 40,000.00	\$ 241,500.00
Insulators, Suspension, 115 kV, Sets	54	1	1000	\$ 54,000.00	
Line Hardware	1	1	10000	\$ 10,000.00	\$ 64,000.00
Conductor, 795 kCMIL, ACSR	15600	1.5	1	\$ 23,400.00	
Conductor, Shield, 3/8" EHS Galvanized Steel	5200	1	1	\$ 5,200.00	
Guy Wire, 7/16" EHS Galvanized Steel	500	1	1	\$ 500.00	
Conductor, No. 6 Solid Copperweld	200	2	1	\$ 400.00	
Connectors and Fittings	1	1	20000	\$ 20,000.00	\$ 49,500.00
Anchor, Screw Type, Triple Helix	3	500	1	\$ 1,500.00	\$ 1,500.00
				\$ 356,500.00	\$ 356,500.00
Construction (3),(4)				\$ 1,782,500.00	
Engineering @ 6 %				\$ 128,340.00	
Contingency				0	
TOTAL COST				\$ 2,267,340.00	

Basis of Estimate:

- (1) Pole costs increased by 50% for additional height
- (2) Foundations increased by factor of 2 for river work
- (3) Construction = 0.5X material cost, modified by (4) below
- (4) Construction cost increased by factor of 10 for short line/river crossing



TIVERTON, RHODE ISLAND

SAKONNET RIVER BRIDGE 250	
PORTSMOUTH/TIVERTON	RHODE ISLAND
TOWER LOCATION PLAN RELOCATION FEASIBILITY STUDY	
DRAWN BY JCM	DATE 11/7/02 SCALE 1"=100'

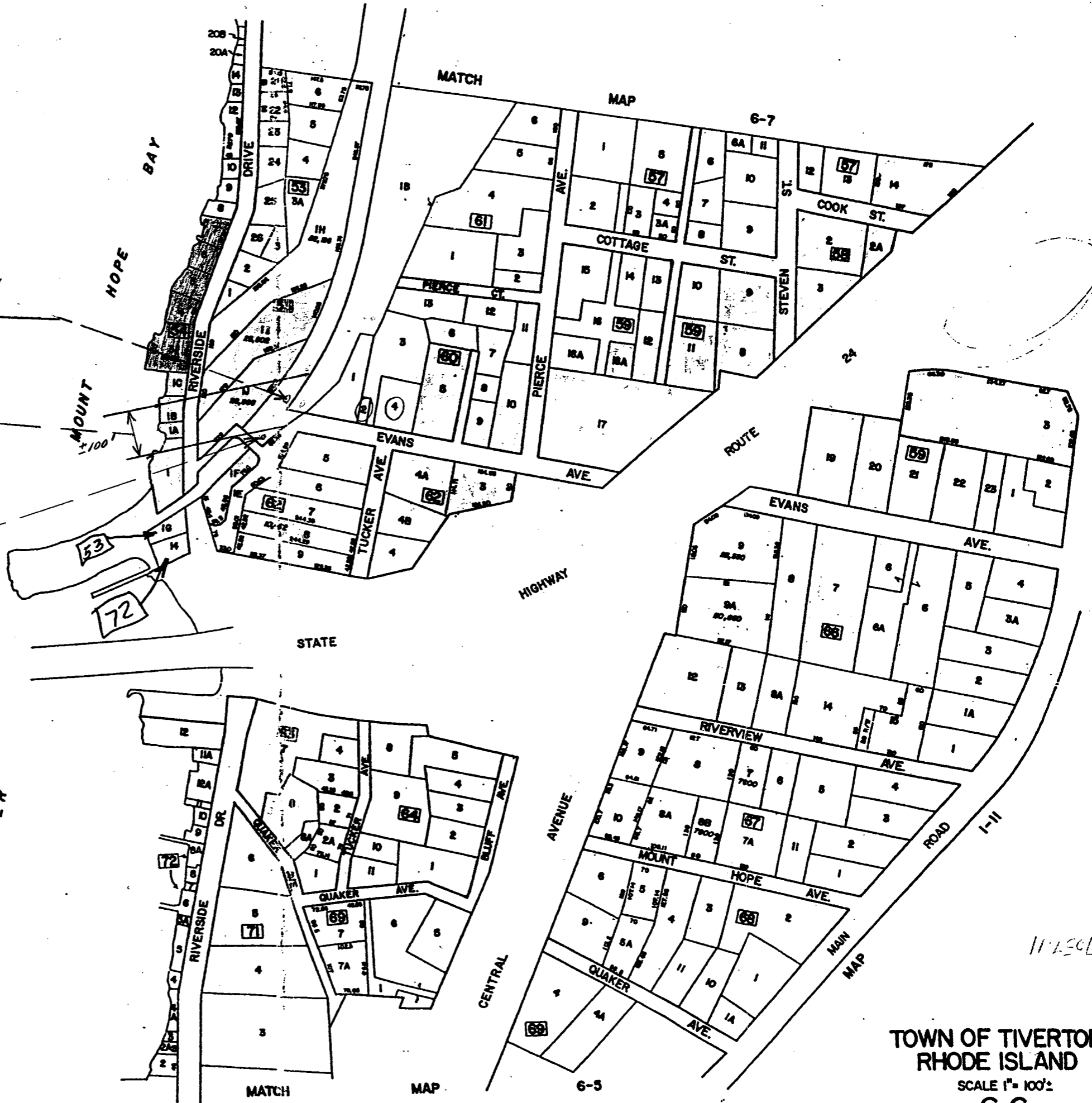


APPROX. LOCATION
NEW TOWER #1-38

APPROX. LOCATION
NEW RIGHT-OF-WAY

APPROX. LOCATION
EXISTING TOWER #1-38

SAKONNET RIVER



2-29

TOWN OF TIVERTON,
RHODE ISLAND
SCALE 1" = 100'
6-6

11/25/66