

Report To

FRANK AND STEIN  
ARCHITECTS AND ENGINEERS, INC.

Upon

RESTORATION OF ERIE CANAL  
ROME, NEW YORK

*R P Fielding*  
August, 1966

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# METCALF & EDDY

E N G I N E E R S

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August 10, 1966

Frank and Stein  
Architects and Engineers, Inc.  
219 S. Grand Avenue  
Lansing, Michigan

Attention: Mr. Victor H. Hogg  
Special Projects Division

Gentlemen:

In accordance with our proposal for engineering services accepted by you on April 5, 1966, we present herewith a report covering our investigations, studies and recommendations with respect to the feasibility of restoring the original hydraulic condition of approximately a 3-1/2-mile section of the Erie Canal in the vicinity of Rome, New York, situated generally between Erie Boulevard and Seifert Road.

## SCOPE

The Historic Rome Development Authority contemplates the restoration of the above-described portion of the Erie Canal to its original operating level. In this report, the

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hydraulic and economic feasibilities of maintaining this level are discussed and recommendations are set forth for accomplishing this purpose.

#### DESCRIPTION

The portion of the Erie Canal in the study area presently conveys the flow from Wood Creek, as shown on Fig. 1. The headwaters of Wood Creek are north of the City of Rome in the vicinity of the Delta Reservoir. The creek flows 4.75 miles southerly to the City of Rome Corporation Line through wooded and swampy areas that are sparsely developed. These areas comprise approximately 5,410 acres, and the slope of the creek through them is relatively flat.

Beginning at the Corporation Line, the extent of development of the drainage area increases to Erie Boulevard, a distance of approximately 1.75 miles, within which the slope of the creek steepens markedly to its maximum at Erie Boulevard. In this reach through the city, an additional area of 770 acres contributes storm runoff.

Flowing west from the Erie Boulevard crossing, Wood Creek is presently routed through the canal bed, which is silted and partially clogged with debris. As shown on Fig. 1 and Fig. 2, about 3,200 ft. from the Erie Boulevard crossing of Wood Creek, the flow must pass through four 48-in. culverts under a New York Central Railroad embankment across the canal. The flow then continues in the canal for 8,300 ft. to a masonry

overflow weir which is 99 ft. in length and was originally used to establish the operating water level in the canal. Overflow from this weir is returned to the original bed of Wood Creek. A 10.5-ft. opening was provided in the weir for installation of wood sluice gates used to drain the canal. These gates have been removed and the present canal flow is routed through the opening to the creek. The remainder of the present canal ditch extends from this point past Seifert Road, approximately 7,500 ft. to the west. The canal and Wood Creek receive the flows from many storm drains in the study area. The City of Rome has over twenty-five such storm drains.

The drainage area south of the Erie Canal and north of the Barge Canal, between Seifert Road and the abandoned railroad spur which extended to the south, as shown on Fig. 1, is presently drained to Mud Creek. This creek flows northerly and westerly, and is conveyed under the canal to Wood Creek by a 12-ft. wide by 6-ft. high stone-arch culvert located about 900 ft. west of the existing overflow weir.

Flow in the canal from the weir west to Seifert Road is occasional and occurs only when the water level rises due to the increased runoff from the more intense storms.

#### CANAL IMPROVEMENTS

In accordance with your suggestion, contained in your letter dated 20 July 1966, it has been assumed that the canal operating level is to be restored to El. 430.0 with the tow-path and berm banks at El. 431.4 to 431.6.

Any restoration work involving the raising of the canal water to this level could create problems of flooding. The canal, with improvements, could accommodate only part of the stormwater runoff and flow from Wood Creek. The larger part of the flow should be diverted from the canal. Although all dry weather flow now passes through the existing weir opening, the condition of the canal presents restrictions to the flow of stormwater. The four 48-in. railroad culverts, which replaced a former bridge, are not adequate to convey a heavy storm flow under the railroad embankment and the water levels would rise in the canal and overflow the towpath from Wood Creek at Erie Boulevard west to the railroad culverts.

Additional improvements and channels will be required to properly handle the storm runoff and to provide regulation of the water level.

#### DESIGN BASIS

The stormwater runoff from the drainage area and the resultant flow in the canal and Wood Creek were estimated on the basis of a storm which may be expected to be equalled or exceeded on the average of about once in 25 years for the Rome, New York area. The hydrologic data are based on the United States Weather Bureau records of rainfall.

The so-called rational formula  $Q = AIR$  has been used for estimating the rates of runoff. The factor I, relative imperviousness of the drainage area surface, has been estimated as equal to 0.26 for this drainage area. The time of

concentration of the peak rate of flow from the design storm was estimated as 208 minutes for the tributary drainage area at Erie Boulevard. Two values of R, average rainfall intensity in inches per hour for the estimated time of concentration, were obtained from the rainfall intensity - duration curves that were plotted from the rainfall data. The value of R for a 25-year frequency storm equals about 0.75 inches per hour, and for a 10-year frequency storm, 0.69 inches per hour. The design rates of flow are 1,200 cfs. (cubic feet per second) and 1,100 cfs. for the respective R values.

Studies have been made to determine the necessary improvements for a canal water level of El. 430.0.

Overflow weirs have been designed to control the water levels in both the restored canal and the feeder canal from Erie Boulevard to the railroad culverts.

The required channels have been designed for a maximum velocity of less than 4 fps. (feet per second) in order that the bed and banks would not be subject to objectionable scour at the design rates of flow.

All elevations in this report are referred to the City of Rome datum which is the old Erie Canal datum and is 0.96 ft. higher than United States Geological Survey datum.

The preliminary design of restoration work is based on replacement of the existing railroad culverts with a bridge

and thus provide for an unrestricted flow in the canal between Erie Boulevard and Seifert Road.

#### RECOMMENDED RESTORATION WORKS

The locations of the recommended works for restoring the canal operating level to El. 430.0 are shown on Fig. 2. Recommended construction includes an "east" weir near the line of South Charles Street, a restored "west" weir, an adjustable weir at Seifert Road, and a culvert along the route of a channel to be provided from the recommended 42-in. storm drain extension to a ditch to run south to Conservation Ditch. Conservation Ditch would be enlarged thence to Mud Creek.

The east weir would utilize the proposed boat landing and boat slip walls. The height of walls would vary in steps from El. 430.1 to El. 431.5 $\pm$ . The overflow portions would include a 200-ft. length of wall with its top at El. 430.1, 100 ft. of wall along the east side of the boat slip at El. 430.2 and 100 ft. along the west side of the slip at El. 430.3.

The area to the south and east of the slip and wall would be surfaced with riprap to reduce erosion and graded to drain to the ditch which would carry the overflow to Conservation Ditch.

It has been assumed that the sluice gates in the original 99-ft. long overflow weir would be replaced and the crest height of this west weir established at El. 430.0.

At Seifert Road, a 5-ft. long adjustable weir would be constructed to permit enough water to overflow to cause a continuous motion of the canal water and prevent it from becoming stagnant in the length between the recommended restored west weir and Seifert Road.

Under design conditions, the overflow from the recommended east weir would spill to a ditch having a trapezoidal cross-section with a bottom width of 20 ft., and a water depth of 7 ft. The side slopes of the ditch would be 1 vertical on 2 horizontal and its total width 48 ft. at the design water surface. This ditch would extend from near the end of the recommended 42-in. culvert west of the railroad, south to Conservation Ditch, which would be enlarged to the same dimensions.

Flows of the Conservation Ditch discharge into Mud Creek, which extends west to the existing 12-ft. wide by 6-ft. high stone-arch culvert, near which an 84-in. culvert is recommended. The ditch is presently 20-ft. to 30-ft. wide and about 4 ft. deep. Its channel must be widened and deepened to a section equivalent to the previously-mentioned trapezoidal cross-section.

The enlarged Conservation Ditch would intercept the flows from a City of Rome storm drain at a location easterly of South Charles Street, if extended. This storm drain, which is 40 in. in size, would be abandoned from this point west to near the site of Fort Bull.

The 42-in. storm drain, which now empties into Wood Creek at Erie Boulevard, would be extended to discharge into an open ditch located along the south side of the canal from approximately opposite Clark Street to the railroad bridge abutment. Flow in this ditch from the 42-in. storm drain would be routed around the bridge abutment in a 42-in. culvert. Near the end of the culvert it would turn back through the canal berm and its outlet and would be into a ditch to extend toward the south. The 42-in. pipe would be laid in open cut through the canal berm at both ends of the bridge abutment. This work should be done before construction of the proposed bridge, which is to replace the four 48-in. culverts.

In addition, it would be necessary to raise the elevations of the towpaths on each side of the canal east of the proposed railroad bridge. This is required to contain the storm flows and to prevent washout of the towpaths.

The existing city storm drains at South Charles Street, South Doxtator Avenue, Clark Street, and at Erie Boulevard near Wood Creek, would be subject to surcharge to some extent at the restored level, although in all cases such surcharging would not materially affect their operation, provided that deposits are not permitted to accumulate at the outlet ends of these drains.

It is also recommended that some work be done in the Fort Bull area in connection with the restoration of the original Clinton's Ditch. The outlet for the twin 36-in.

culvert should be extended past the restored ditch to an open channel to run toward the south. Flows from this channel would discharge either into the existing 40-in. storm drain or to Mud Creek. The manholes of the existing culvert would be raised to towpath level. Water to help maintain the Clinton Ditch fresh and free of obstructions may be obtained by a pipe and valve arrangement through the berm of the restored wall at this location.

In order that the proposed channels, conduits and restored ditches and canal will be adequate to convey storm flows, it will be necessary that they be maintained free and clear of aquatic plants, weeds, hummocks, brush, trees, deposits, trash and other debris.

All the above works, if suitably maintained, will not only be of benefit to the restoration, but would result in materially less frequent and less extensive flooding. This is especially important in the vicinity of Wood Creek and Erie Boulevard, due to the removal of the four 48-in. culverts and the extension of the 42-in. city storm drain.

#### ESTIMATED COST OF RECOMMENDED WORKS

Estimates of the construction cost of the weirs, culverts, ditches, storm drain extension, and sanitary sewer work include allowances for overhead and profit and for

engineering and contingencies. Certain items of work essential to the canal restoration are not included. The costs of the west weir restoration and the railroad bridge, replacing the culverts, will be covered in the client's restoration work. The east weir would use the canal walls which are already planned for in the overall restoration work.

The estimates are listed in Table 1.

Table 1. Estimated Costs of Recommended Restoration Works

Item	Cost
East weir (grading and riprap not including walls)	\$ 17,000
West weir restoration	---
Seifert Road weir	500
Ditch excavation	40,000
84-in. culvert installation	22,000
42-in. storm drain extension	19,000
42-in. culvert at railroad abutment	12,000
42-in. drain outlet ditch	10,000
15-in. sanitary sewer relocation	3,000
40-in. storm drain headwall	400
36-in. twin culvert extension	13,000
36-in. twin culvert outlet ditch	4,500
Towpath fill	1,000
Subtotal	\$142,400
Engineering & Contingencies	<u>35,600</u>
Total	\$178,000

INTER OFFICE  
MEMORANDUM

#9

Project Historic Rome Development

Commission 6623 Date 12 August 1966  
Phone Call Date 8 August 1966

Telephone conversation between Robert A. Latham and Victor H. Hogg

Robert says that Rail Road culvert is located on 1920 Survey and may be used to drain 42" sewer. Existing culvert is round tube 54" in diameter invert elevations - bottom 421.59 feet, top 426.09 feet, water level of stagnant water about one foot above bottom. Clark feels that if sewer is in a culvert a 36 inch diameter tube could be laid inside existing culvert and, because of four foot fall, could carry load of 42 inch sewer.

Invert elevations

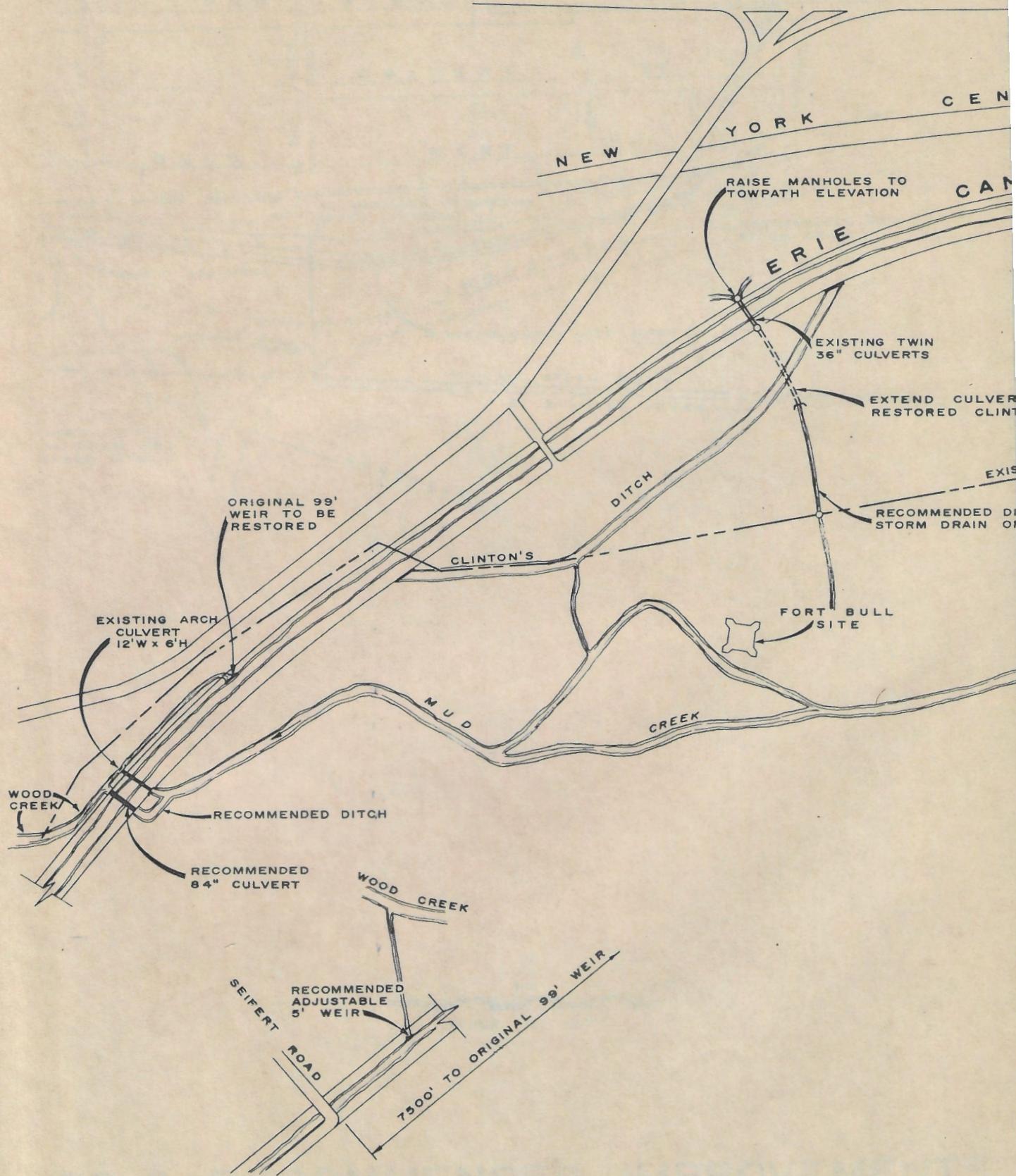
54" Rail Road culvert 421.59"

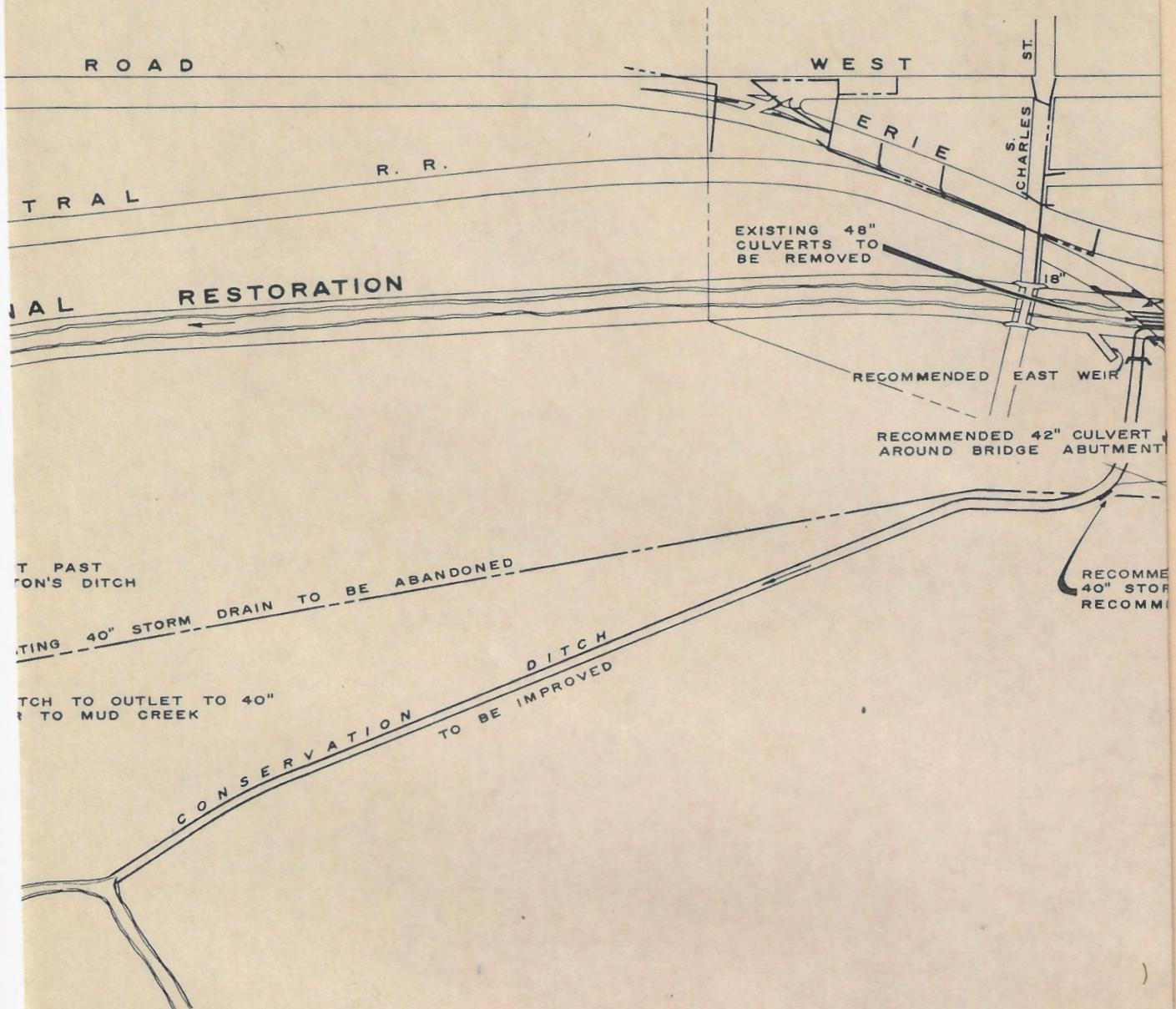
42" sewer at Erie Boulevard 424.5"

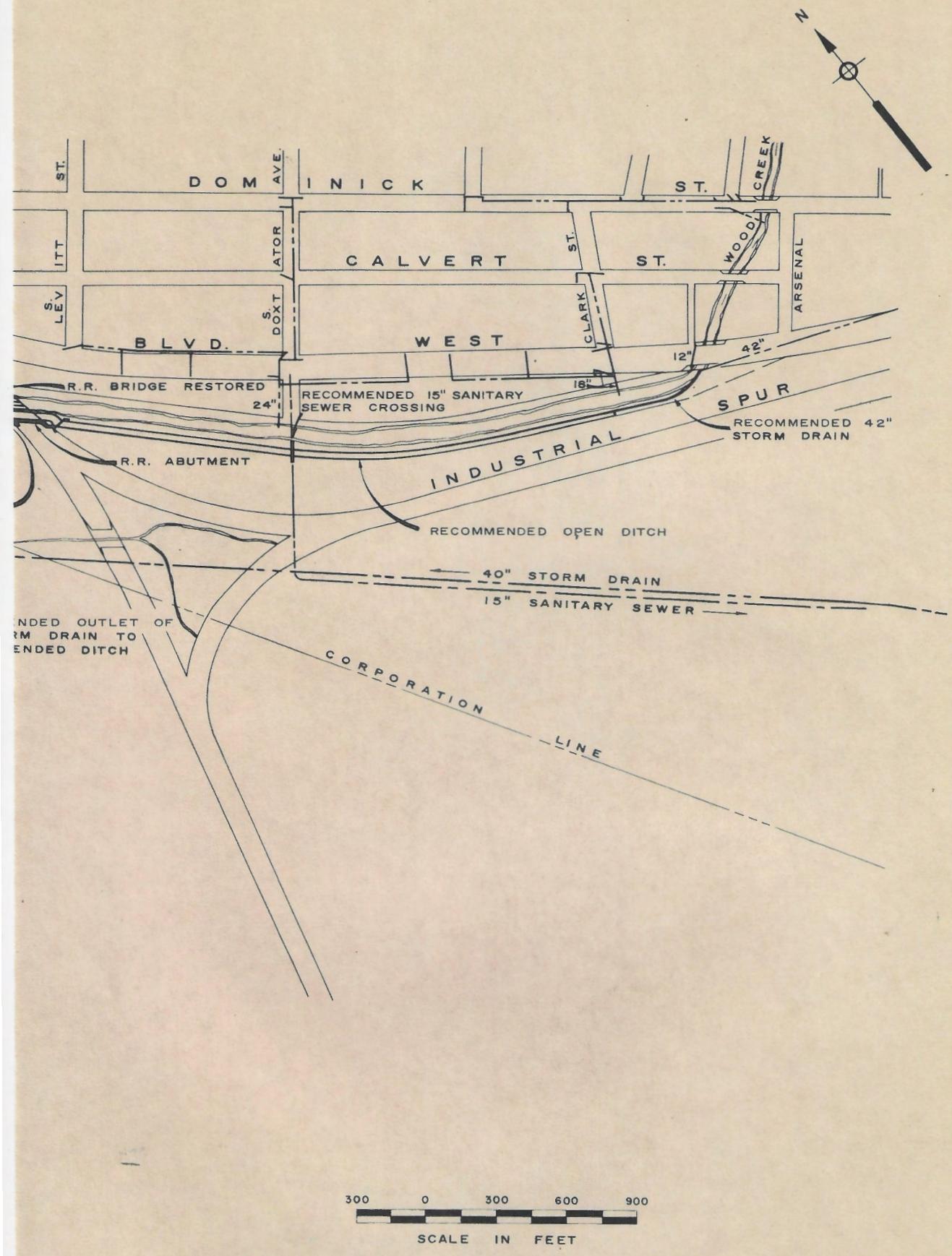
40" Birch outfall sewer near culvert 414"

ROME

TABERG







**FIG. 2 RECOMMENDED IMPROVEMENTS**