FINAL
CSO CONCEPTUAL PLAN
AND SYSTEM MASTER PLAN

PART IV
INTERCEPTOR
STRATEGIES

December 1994

Massachusetts Water Resources Authority

Metcalf & Eddy
An Air & Water Technologies Company

ANDERSON-NICHOLS
Company, Inc.

PART IV

CHAPTER SEVENTEEN

INTERCEPTOR STRATEGY ALTERNATIVES

Interceptor strategies were developed in light of the objectives outlined in Chapter Fourteen. These included providing service for community system flows, reducing CSOs, and reducing peak flows to the Deer Island Treatment Plant. The primary function of an interceptor is to provide for the conveyance of sewage from community systems without detrimental back-up, and without flooding within the communities or the interceptor network. Interceptors that do not provide this function under design conditions are candidates for development of relief alternatives.

Interceptor strategies which accomplish the CSO reduction objective could include relief, storage, or transfer alternatives. These types of alternatives need to be assessed for their ability to meet this objective and their cost versus performance (benefit) compared to costs versus performance for CSO strategies which directly address CSOs.

The interceptor strategy objective of reducing peak flow to the treatment plant could most directly be addressed by storage strategies. Relief strategies could either be beneficial or detrimental in terms of this objective. For example, where relief is required for a specific interceptor, a relief or replacement conduit could be sized so that excess volume is available for storage. However, as discussed later, there were no locations identified where relief was required and an oversized replacement or parallel conduit economically constructed for storage. Interceptor relief may increase peak flows to the treatment plant if bottlenecks currently delay the timing of peak flows or result in overflows. Transfer alternatives could impact the timing of peak flow delivery to the treatment plant, potentially reducing peak flows.

Development of alternatives for each of the three major types of interceptor strategies (relief, storage and flow transfer) are presented in this chapter.

RELIEF STRATEGIES

The following paragraphs present the results of evaluations conducted on relief strategy alternatives. These include development of specific projects which would meet relief strategy objectives, evaluation of these projects, and summary of performance.

The primary objective of relief strategies was to provide an interceptor system that would properly serve the communities without detrimental back-up or overflows under the design criteria described in Chapter Fifteen. The objective of reducing CSOs was evaluated in areas where additional conduit capacity could sufficiently reduce the hydraulic grade line (HGL) so as to abate upstream CSOs and convey combined sewage to downstream facilities without exceeding the capacity of the downstream facilities. This objective was not applicable for most interceptor sections. One concern related to implementation of upstream relief strategies, or combinations of strategies, was the potential to increase downstream CSOs, create or exacerbate interceptor surcharging by rapid conveyance of upstream surcharge to downstream areas where the infrastructure could not convey the increased flow. Strategies to relieve interceptor sections included a system-wide assessment to identify interceptor surcharging or flooding downstream of potential interceptor relief projects to ensure that downstream problems would also be addressed.

Evaluation Approach

Any conduit that was surcharged under the baseline conditions defined in Section Two was evaluated for relief. The degree of surcharge, the conditions that caused the surcharge, and the potential detrimental impacts resulting from the surcharge were determining factors in prioritizing interceptor relief needs.

Priorities were established based on the degree of surcharging during the 1-year, 6-hour storm and peak flow conditions defined in Chapter Fourteen. The highest priority projects, designated as priority A, should proceed first. Relief of the second level priority projects, designated as priority B, should also proceed, but at a lower priority. Priority C projects have the lowest priority since, at least at this time, relief of these conduits would provide little or no benefit. Priority criteria have been established as defined below:

- **Priority A;** Conduits that surcharge to within six feet of the ground surface or contribute to sanitary sewer overflows (SSO).

- **Priority B;** Conduits that surcharge, but where the HGL is predicted to be six feet or more below the ground surface under design conditions should proceed at a second priority.

- **Priority C;** Conduits where surcharge is due to downstream limitations such as back-up from pumping stations or headworks, and where increasing conduit capacity would have little impact on the degree of surcharge, or simply move the locations of surcharge downstream, have the lowest priority for relief. These conduits were typically located in CSO areas, where CSOs provide relief of extreme hydraulic conditions and the surcharge predicted under design conditions was considered acceptable at this time.

Based on these considerations, a series of relief projects were developed. These are listed in Table 17-1 and shown on Figures 17-1 and 17-2.

Performance

Of the planned improvements, the performance of all of the Priority A and Priority B projects was satisfactory in that the model predicted that the designated interceptor improvements met the goals described above by eliminating the surcharging and flooding predicted under baseline conditions. The performance of projects designated "C" was generally predicted to be less satisfactory because these projects are subject to downstream hydraulic limitations. For these projects, providing interceptor relief produced marginal

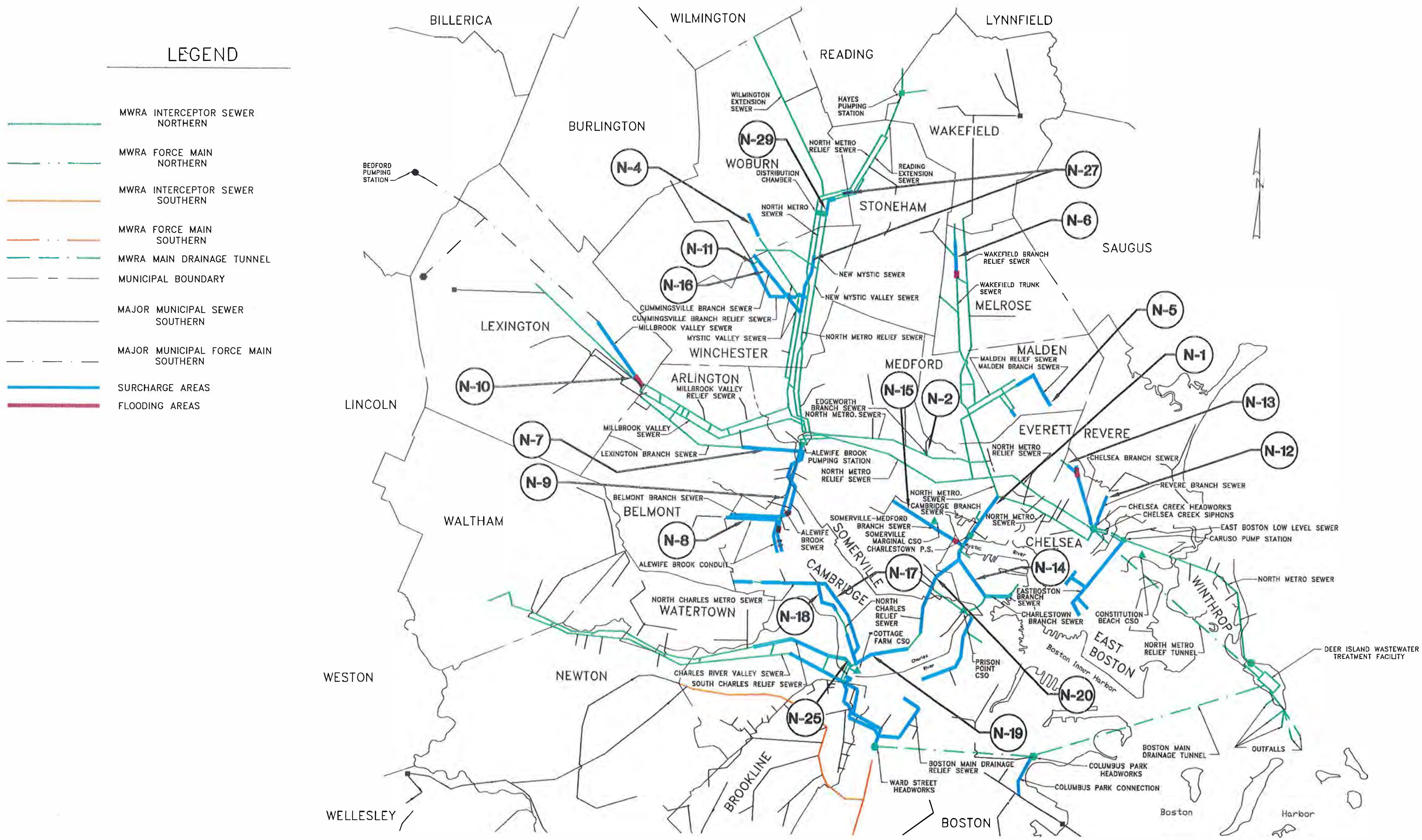

FIGURE 17-1.
NORTH SYSTEM INTERCEPTOR
RELIEF PROJECTS

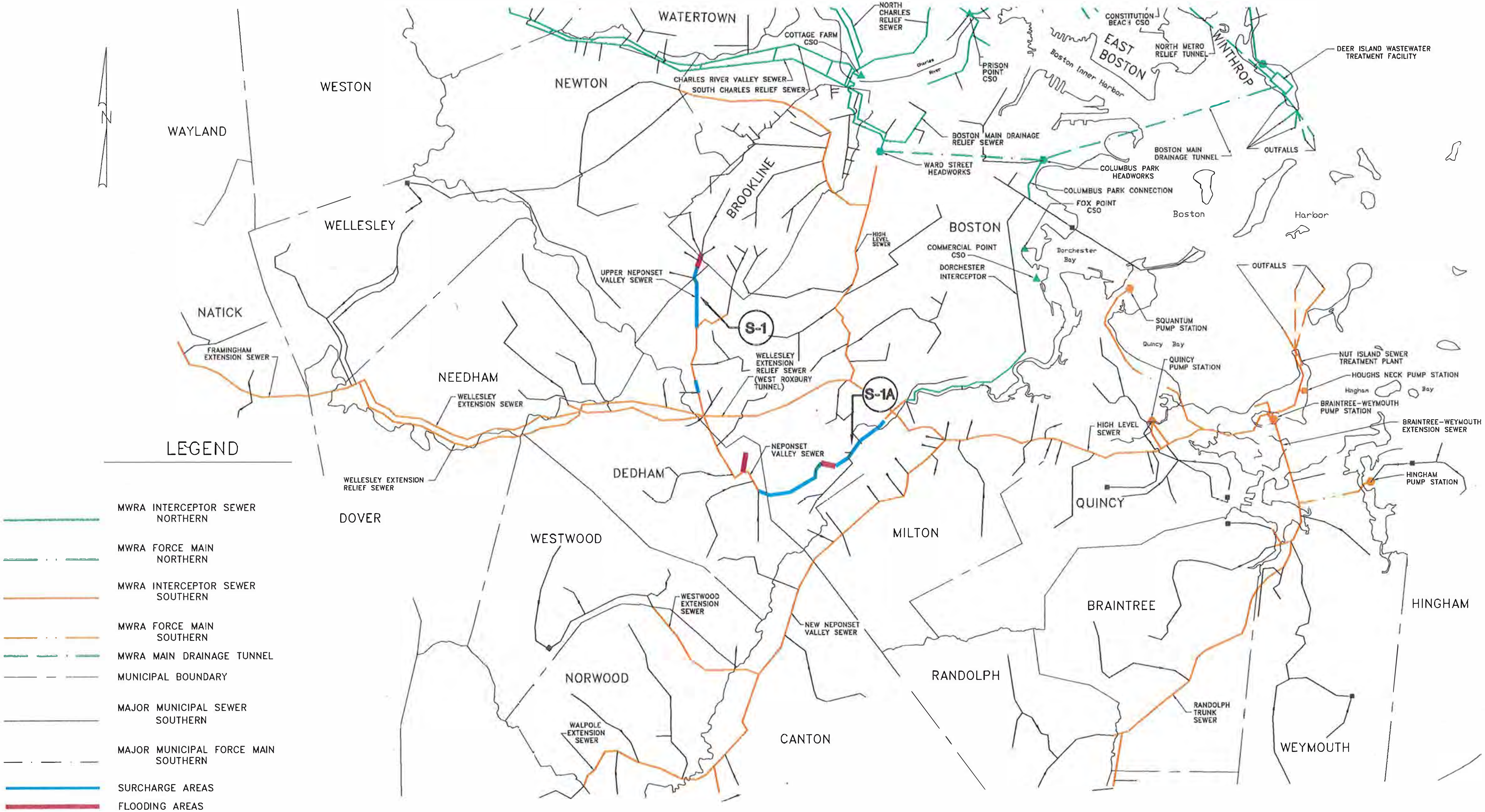

FIGURE 17-2.
SOUTH SYSTEM INTERCEPTOR RELIEF PROJECTS

TABLE 17-1. INTERCEPTOR RELIEF PROJECTS

Alt. No.[1]	Interceptor	Section No.	Cost (Dollars)	Priority of Relief[2]	Comments
N-1a	Cambridge Branch Sewer	23	5,100,000	B	
N-2	Edgeworth Branch Sewer	20A	620,000	B	
N-4	Mystic Valley Sewer	160	1,200,000	A	
N-5	Malden Branch Sewer	54-55, 66	1,200,000	B	
N-6b	Wakefield Trunk Sewer	49-50	5,610,000	A	Potential overflow, relief is required.
N-7	Lexington Branch Sewer	52-53	740,000	B	
N-8a	Alewife Brook Conduit	ABC	N/A	C	Downstream Pump Sta. is limiting (CSO)
N-9b	Alewife Brook Sewer	43	N/A	C	Downstream Pump Sta. is limiting (CSO)
N-10	Millbrook Valley Sewer	84 (siphon)	180,000	A	Potential overflow, relief is required.
N-11	Cummingsville Branch Relief Sewer	86	N/A	N/A	Model shows surcharge, but replacement of Cummingsville Branch Sewer is more effective.
N-12	Revere Branch Sewer	61	4,240,000	A	
N-13	Chelsea Branch Sewer	57	4,480,000	A	
N-14	Charlestown Branch Sewer	31	5,140,000	C	Backed up from Pump Sta. (CSO)
N-15	Somerville/Medford Branch Sewer	35	6,750,000	A	Backed up from Pump Sta.
N-16[3]	Cummingsville Branch Sewer	47	N/A	A	This replacement is to relieve Cummingsville Relief Sewer, Section 86. See N-11.

TABLE 17-1 (Continued). INTERCEPTOR RELIEF PROJECTS

Alt. No.[1]	Interceptor	Section No.	Cost (Dollars)	Priority of Relief[2]	Comments
N-17	North Charles Metro Sewer	29	9,300,000	C	
N-18a	North Charles Relief Sewer	207B/204	6,970,000	C	Back up from Ward St. to H.W.
N-19	North Charles Relief Sewer	209	2,100,000	C	
N-20A	Cambridge Branch Sewer (Upper Section)	26	7,410,000	C	Back up from Charlestown Pump Sta.
		26		C	
		27		C	
N-25	South Charles Relief Sewer	5	2,820,000	C	
N-27a	North Metro Sewer	44	2,790,000	B	
N-29a	Reading Extension Sewer	72	340,000	A	
S-1[3]	Upper Neponset Valley Sewer	30	N/A	A	
S-1a	Neponset Valley Sewer	19	12,100,000	A	

1. The alternative number (Alt. No.) refers to the potential relief project location map (Figure 4-1 and Figure 4-2).
2. Priority of Relief is defined as follows:
   A = Potential for sanitary sewer overflows or there is less than 6 ft. from hydraulic gradient to ground surface.
   B = Non-CSO area; no sanitary sewer overflows occur, there is greater than 6 ft. from hydraulic gradient to ground surface.
   C = CSO area; downstream choke point contributes to surcharging.
3. These projects are under development by MWRA and the costs are not included here.

beneficial results. For example, it was determined that the combined capacity of Alewife Brook Branch Sewer and the Alewife Brook Conduit was limited by the downstream pumping station. In order to model conduit improvements that would be required, it was assumed that the existing pumping station had unlimited capacity. A number of iterations providing relief were modeled, and although surcharge was generally reduced slightly, the flow conveyed from this CSO area more than doubled. In spite of the modeled interceptor relief improvements, surcharge and CSO discharges were still present. It appears that as long as the area is served by combined sewers, CSOs under extreme hydraulic conditions are necessary and appropriate to ensure that adequate sewage conveyance is provided to the communities tributary to these interceptors.

The upstream section of the Cambridge Branch Sewer and the Charlestown Branch Sewer present a similar situation to the Alewife Brook Branch Sewer and Alewife Brook Conduit. Relief of these conduits was modeled both with and without an unrestricted discharge from the Charlestown Pumping Station, and although surcharge was substantially reduced, the increase in flow necessary to accomplish the surcharge reduction was 1.6 times greater than baseline condition flows. Increasing the Charlestown Pump Station discharge by this amount would only move the problem downstream and exceed the capacity of the Chelsea Creek Headworks. CSOs upstream of the Charlestown Pump Station ensure that adequate service is provided to local communities under extreme hydraulic conditions.

Downstream Impacts. All of the Priority A and B projects for both the North and South systems were analyzed collectively using the hydraulic system model to evaluate the downstream impacts of these projects. This determined whether relieving upstream surcharge and flooding would result in the initiation or exacerbation of downstream surcharge, flooding, CSOs or increased flows to Deer Island. The results of this analysis indicated no impacts on surcharge downstream and only minor increases in HGL, CSOs, and system-wide flows.

An alternative to interceptor relief was evaluated for the Neponset Valley Sewer. As indicated in Figure 15-2 and Table 15-4, the downstream reach of the Neponset Valley Sewer experiences surcharging and flooding during the 1-year, 6-hour storm under future planned conditions. The Upper Neponset Valley Sewer is tributary to the Neponset Valley Sewer through a junction with the West Roxbury Tunnel. At this connection, the Upper Neponset Valley Sewer literally passes through the West Roxbury Tunnel. Where the Upper Neponset Valley Sewer passes through the tunnel, the top of the sewer has been cut away to create a side-outlet weir. Flow can pass over this weir from the Upper Neponset Valley Sewer into the West Roxbury Tunnel.

An alternative to interceptor relief evaluated for the Neponset Valley Sewer was to direct all flow from the Upper Neponset Valley Sewer into the West Roxbury Tunnel and block the downstream connection to the Neponset Valley Sewer. The result of reducing flow into the Neponset Valley Sewer was that the number of surcharged nodes and duration of surcharging in the Neponset Valley Sewer was reduced, but surcharging was not eliminated. Over 120 minutes of surcharging remained, although flooding was eliminated at one of the two nodes for which flooding was predicted under future planned conditions. Due to the extent of surcharging remaining in the Neponset Valley Sewer with the complete diversion of flow from the Upper Neponset Valley Sewer into the West Roxbury Tunnel, this diversion is not recommended. Instead, relief of the Neponset Valley Sewer is recommended.

The Priority C interceptor relief projects generally resulted in increased surcharge at some locations downstream. This had a relatively minor impact on CSO volumes; generally downstream CSOs increased slightly while upstream CSOs decreased slightly. As described above, the Priority C relief projects were often not effective at eliminating surcharge in interceptors that are impacted by combined sewer system flows and/or downstream restrictions caused by headworks facilities and pumping stations. Because CSOs relieve the hydraulic gradient under extreme conditions, relief did not appear warranted to ensure the provision of adequate community service. Since the Priority C relief projects had minimal impacts on CSO volumes, relief did not appear warranted in terms of CSO control.

STORAGE STRATEGIES

The objective of in-system storage was to detain a sufficient volume of sewage during peak flow conditions so as to:

- significantly reduce volume of CSO in downstream areas, or
- significantly reduce peak flow to the Deer Island treatment plant

Potential in-system storage projects were evaluated in both the North and South Systems. With one exception, however, the North System interceptors had very little excess capacity and many were surcharged. This limited the investigation of in-system storage in the North System to the North Metropolitan Trunk Sewer from downstream of the East Boston (Caruso) Pump Station to the Winthrop Terminal facilities at Deer Island.

Many sections of interceptors in the South System were identified as having excess capacity under baseline hydraulic conditions as presented in Chapter Fifteen. Table 17-2 lists MWRA interceptor sections evaluated for storage with a basic description of the storage control device, approximate length of the storage "wedge" created in the interceptor, and a location description. These projects are shown in Figure 17-3 and Figure 17-4.

Evaluation Approach

Baseline interceptor hydraulics (presented in Chapter Fifteen) were reviewed to identify conduits that had excess capacity under design conditions. For conduits that had excess capacity, the d/D value was noted to determine the pipe cross-sectional area potentially available for flow storage. In addition, the length and slope of conduits with excess capacity were reviewed to determine the length potentially available for flow storage. Long, relatively flat conduits presented the greatest potential for storage without unacceptable surcharging at the upstream end. In some instances, multiple control devices (inflatable weirs) were considered to utilize pipe volume for storage without causing excessive

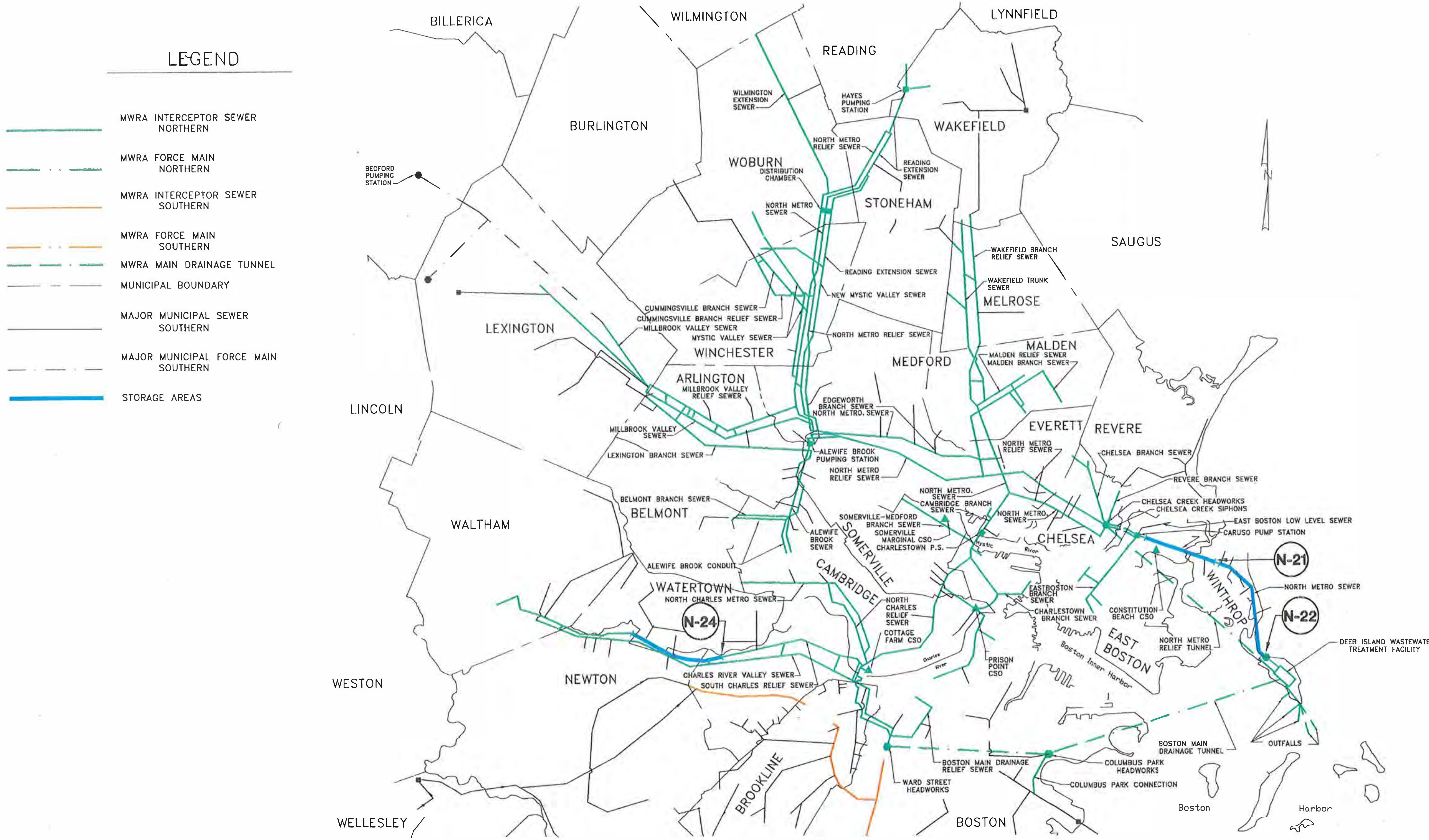

FIGURE 17-3.
NORTH SYSTEM STORAGE PROJECTS

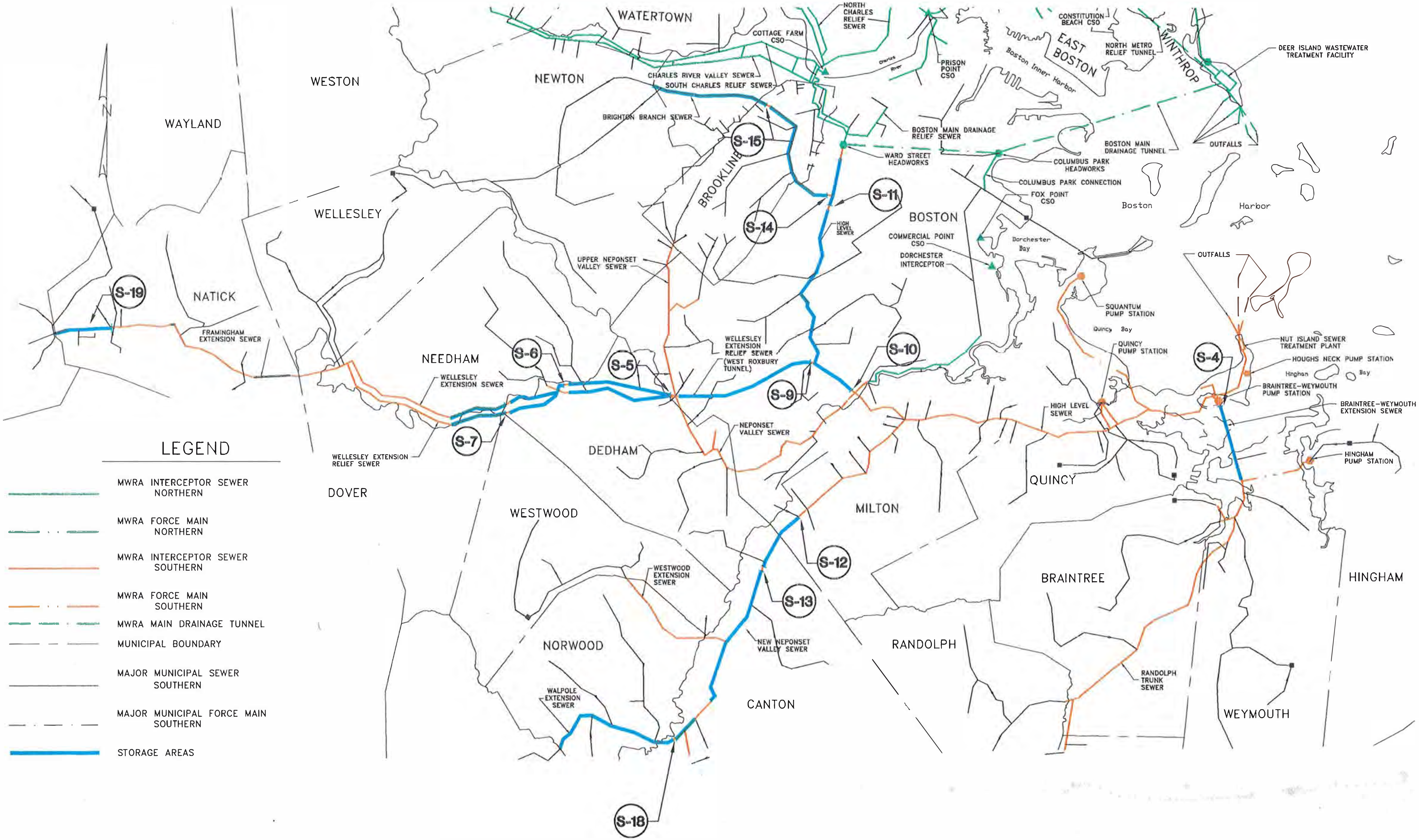

FIGURE 17-4.
SOUTH SYSTEM STORAGE PROJECTS

TABLE 17-2. INTERCEPTOR STORAGE PROJECTS

Interceptor Designation	Alt. No.[1]	Section No.	Improvement Description	Effective Length of Storage (ft.)	Location
North Metropolitan Trunk Sewer to Winthrop Terminal	N-21	3-6	Provide 21 ft. weir in 9 ft. dia. sewer.	7,000	N-21 and N-22 are between the East Boston (Caruso) Pump Station and Winthrop Terminal Headworks.
North Metropolitan Trunk Sewer to Winthrop Terminal	N-22	6-9	Provide 21 ft. weir in 9 ft. dia. sewer.	8,000	N-21 and N-22 are between the East Boston (Caruso) Pump Station and Winthrop Terminal Headworks.
South Charles Relief Sewer	N-24	3&4	Provide 9 ft. weir in 6 ft. dia. sewer.	8,000	Near Brook St. in Brighton
Braintree Weymouth	S-4	622	Provide 7 ft. weir in 60 in. dia. sewer	8,000	Near inlet of Braintree Weymouth Pump Station
Wellesley Extension Relief Sewer	S-5	638	Provide 12 ft. weir in 72 in. dia. sewer	10,000	West of Intersection at Upper Neponset Valley Sewer
Wellesley Extension Relief Sewer	S-6	638	Provide 12 ft. weir in 60 in. dia. sewer.	5,000	Just upstream of Route 128, near Needham - Dedham town line
Wellesley Extension Relief Sewer	S-7	629	Provide 10 ft. weir in 54 in. dia. sewer.	5,000	Near Westwood town line
WERS - West Roxbury Tunnel	S-9	637	Provide 12 ft. weir in 7 ft. dia. sewer.	13,000	Near tie-in to High Level Sewer
High Level Sewer	S-10	566	Provide 14 ft. side overflow weir in 10 ft. dia. sewer.	15,000	Just upstream of Neponset Valley Sewer
High Level Sewer	S-11	572	Provide 16 ft. weir in 9 ft. dia. sewer.	4,000	Just downstream of Brighton Branch connection

TABLE 17-2 (Continued). INTERCEPTOR STORAGE PROJECTS

Interceptor Designation	Alt. No.[1]	Section No.	Improvement Description	Effective Length of Storage (ft.)	Location
New Neponset Valley Sewer	S-12	610	Provide 5 ft. weir in 6 ft. dia. sewer.	5,000	Milton/Canton town line
New Neponset Valley Sewer	S-13	612	Provide 5 ft. weir in 5 ft. dia. sewer	13,000	Downstream of tie-in at Westwood Extension Sewer
Brighton Branch Sewer	S-14	580	Provide 9 ft. weir in 7 ft. dia. sewer.	12,000	Near tie-in at High Level Sewer
Brighton Branch Sewer	S-15	585	Provide 6 ft. weir in 6 ft. dia. sewer.	10,000	Northwest of Alt. No. S-14 near Brookline town line
Walpole Extension Sewer	S-18	617	Provide 5 ft. weir in 4 ft. dia. sewer.	15,000	West of Intersection at Stoughton Extension Sewer
Framingham Extension Sewer Rehab	S-19	634	Provide 4 ft. weir in 4 ft. dia. sewer.	7,000	Downstream of Framingham Pumping Station

1. The alternative number (Alt. No.) refers to the potential storage project location map (Figures 4-3 and 4-4).

surcharging. It was also noted that conduits that are constructed at elevations considerably lower than tributary community sewers would be more suited to controlled surcharging in connection with in-system storage. Profiles were developed to indicate conduit slopes and the hydraulic gradient under baseline hydraulic conditions. An evaluation of these profiles and the data described above lead to the selection of interceptors that were evaluated for potential in-system storage.

In order for a storage alternative to be considered viable, it would have to accomplish one or more of the following:

- Achieve a cost-effective reduction in CSO volume (i.e., the cost of the storage alternative plus the cost of the reduced volume CSO control alternative would have to be less than the cost of the CSO control alternative without the reduction achieved by the storage alternative).
- Cost-effectively improve the performance of a CSO control alternative.
- Cost-effectively reduce secondary treatment capacity requirements at the Deer Island treatment plant.

The potential in-system storage projects presented in Table 17-2 were identified and evaluated based on the above approach.

Performance of North System Storage Alternatives

The only interceptor in the North System that is large, has a flat slope, is quite long, and has excess capacity under baseline hydraulic conditions is the North Metropolitan Trunk Sewer from the East Boston (Caruso) Pump Station to the Winthrop Terminal Headworks at Deer Island. For this interceptor, two weir control structures were simulated to store sewage in virtually the whole length from Winthrop Terminal facilities to the Caruso pump station. Under design conditions (one-year, six-hour storm, peak sanitary flow, peak infiltration) the two weir control structures, identified as N-21 and N-22, would result in a reduction in peak flow to the Deer Island treatment plant of 23 mgd. In-system storage was also considered on the South Charles Relief Sewer in conjunction with a transfer alternative. This transfer alternative is discussed later in this chapter.

Performance of South System Storage Alternatives

The performance of South System in-system storage alternatives was assessed using the EXTRAN hydraulic model with all of the storage alternatives included in the simulation. The South System interceptor relief projects presented earlier were also included to incorporate the potential increase in peak flow as a result of relieving the Upper Neponset Valley Sewer and the Neponset Valley Sewer. This simulation predicted a peak flow reduction at the downstream end of the High Level Sewer (at meter NI-1) of approximately 14 mgd. The peak flow was also delayed by approximately 9½ hours.

Summary of Storage Alternatives

A review of the interceptor network indicated that significant in-system storage potential existed only in the South System or downstream of CSOs in the North System (in the North Metropolitan Trunk Sewer from East Boston to Winthrop). Assuming the peak flow reductions were coincident, the maximum cumulative reduction in peak flow to the Deer Island treatment plant predicted would be 37 mgd. The potential benefit of this in-system storage did not reduce CSO volumes, and was therefore limited to reducing peak flows to Deer Island. The available storage volume was not great enough to reduce peak flows sufficiently to effect capital savings by the elimination of a significant portion of a secondary battery at the treatment plant (⅓ of a secondary treatment battery has a capacity of approximately 90 mgd). Also, since the in-system storage capacity evaluated was based on the baseline condition of a 1-year, 6-hour storm, for greater storm events, less storage capacity would be available. If treatment plant capacity was reduced based on the system's storage capability during a 1-year, 6-hour storm and a larger storm occurred, the treatment plant capacity would be exceeded, and NPDES permit violations could result. For these reasons, in-system storage alternatives were not recommended.

TRANSFER STRATEGIES

The following paragraphs present the results of evaluations conducted on flow transfer strategy alternatives. Transfer strategy objectives, evaluation approach, and the flow transfer alternatives evaluated are presented below.

Under the baseline hydraulic condition, the objective of the flow transfer alternatives was to reduce downstream CSOs by transferring flow from a hydraulically overloaded portion of the system to a portion of the system with excess capacity. By intercepting and transferring flow upstream of active CSOs, the flow transfer alternatives were intended to reduce the peak flow and hydraulic gradients at downstream CSO regulators, thereby reducing or eliminating the CSO volume to be handled by CSO strategies.

Evaluation Approach

Transfer strategy alternatives were evaluated based on whether the alternative could cost-effectively reduce CSO control needs. In order for a transfer alternative to be cost-effective, the cost of the transfer alternative plus the cost of the accompanying CSO control alternative would have to be less than the cost of a CSO control alternative sized to function without the transfer alternative. In addition to cost, non-monetary factors were also considered.

Potential Transfer Alternatives Evaluated

Two potential flow transfer projects were identified and evaluated. These projects are shown in Figure 17-5. Both would transfer flow during wet weather conditions from the North System to the South System, upstream of the Ward Street Headworks. The objective of these flow transfers was to cost-effectively reduce CSO control needs at CSOs in the vicinity of the Ward Street Headworks and at the Cottage Farm CSO facility in particular.

Ward Street to High Level Sewer. The EXTRAN model indicated that the High Level Sewer, which is tributary to Nut Island in the South System, could accept about 50 mgd of additional flow under baseline hydraulic conditions (1-year, 6-hour storm, with peak sanitary and infiltration flow) without detrimental impacts such as surcharging or flooding. Under baseline hydraulic conditions, the Ward Street Headworks 256 mgd capacity is exceeded and the headworks is choked, which contributes to CSOs in the vicinity of the headworks, and at the Cottage Farm CSO facility in particular. A pumped flow transfer from the approximate location of the demolished Ward Street pumping station in the North System to the High Level Sewer in the South System was evaluated.

The former Ward Street Pump Station was demolished in the late 1960s, with the brick and stone rubble being buried as fill, and much of the structure being demolished to within a few feet of final grade and then buried in place. The site is now a parking facility for the Massachusetts College of Art. These factors impacted alternative costs as well as non-monetary impacts of this potential flow transfer project.

The cost for a 50 mgd wet weather flow transfer pumping station at this site was estimated at $20,000,000. Sliplining one of the two existing 48 in. force mains was estimated at $500,000 for a total estimated capital cost of $20.5 million.

South Charles Relief Sewer to Brighton Branch Sewer. The EXTRAN model indicated that the Brighton Branch Sewer, which is tributary to the High Level Sewer in the South System, could accept approximately 18 mgd additional flow without detrimental impacts. This determined the maximum capacity of a pumped flow transfer from the South Charles Relief Sewer, upstream of CSOs in the North System, to the Brighton Branch Sewer in the South System. Because this transfer alternative and the Ward Street transfer previously described both would convey flow to the High Level Sewer, the cumulative impact of both transfers was assessed. It was determined that the Brighton Branch Sewer transfer and the Ward Street transfer could not operate at maximum capacities simultaneously under baseline hydraulic conditions without causing surcharging in the High Level Sewer. If both flow transfer alternatives were recommended, appropriate controls would be provided to prevent hydraulically overloading the High Level Sewer.

A potential location for the 18 mgd wet weather flow transfer pumping station would be on MDC park land between Nonantum Road and the Charles River. A 30-in. force main approximately 4,300 ft. long would follow Brooks Street and other residential streets to the Brighton Branch Sewer at Washington Street. The cost of the pumping station would be approximately $8,000,000 and the force main approximately $600,000, for a total estimated capital cost of $8.6 million. Non-monetary factors would include impacts on residential areas, some disturbance of park lands, traffic impacts on Brooks Street and Nonantum Road, and work in proximity to wetlands.

Performance of Transfer Alternatives

The results of the EXTRAN model simulations indicate that the flow transfer alternatives do not significantly reduce downstream CSO volumes. In addition, the cost of the transfer alternatives is relatively high versus the cost of recommended CSO controls, and the cost of transfer alternatives would not significantly reduce the cost of CSO control or improve the performance of the recommended CSO controls. Based on these findings, neither flow transfer alternative is recommended at this time. If higher levels of CSO control are recommended in the future, these transfer alternatives should be reconsidered.

PART IV

CHAPTER EIGHTEEN

RECOMMENDED INTERCEPTOR IMPROVEMENTS

As discussed in Chapter Seventeen, a series of interceptor relief strategies are recommended for the SMP. There were no in-system storage or flow transfer strategies identified that cost-effectively met the goals and performance objectives for the alternatives identified and evaluated. Recommended interceptor relief projects were divided into three levels of priority for implementation, with the lowest level (Priority C) subject to further evaluation and not recommended for implementation at this time. The recommended Priority A and Priority B interceptor relief projects developed as part of the SMP are presented in this chapter.

PRIORITY A PROJECTS

The Priority A projects address interceptors that surcharge to within six feet of the ground surface under baseline hydraulic conditions. These projects are listed in Table 18-1, which includes a brief project description, construction impacts, community impacts, and environmental impacts. The locations of the Priority A projects are shown on Figure 18-1 and Figure 18-2.

Priority A projects should be given a high priority for implementation because surcharging was predicted to be within 6 feet or less of the ground surface under baseline hydraulic conditions. Back-up of flow into community systems and possible overflows may result under extreme storm conditions, and was predicted to result under baseline hydraulic conditions for some interceptor segments.

PRIORITY B PROJECTS

The Priority B projects address interceptors that surcharge under baseline hydraulic conditions, but to a lesser degree than the Priority A projects. These projects are listed in

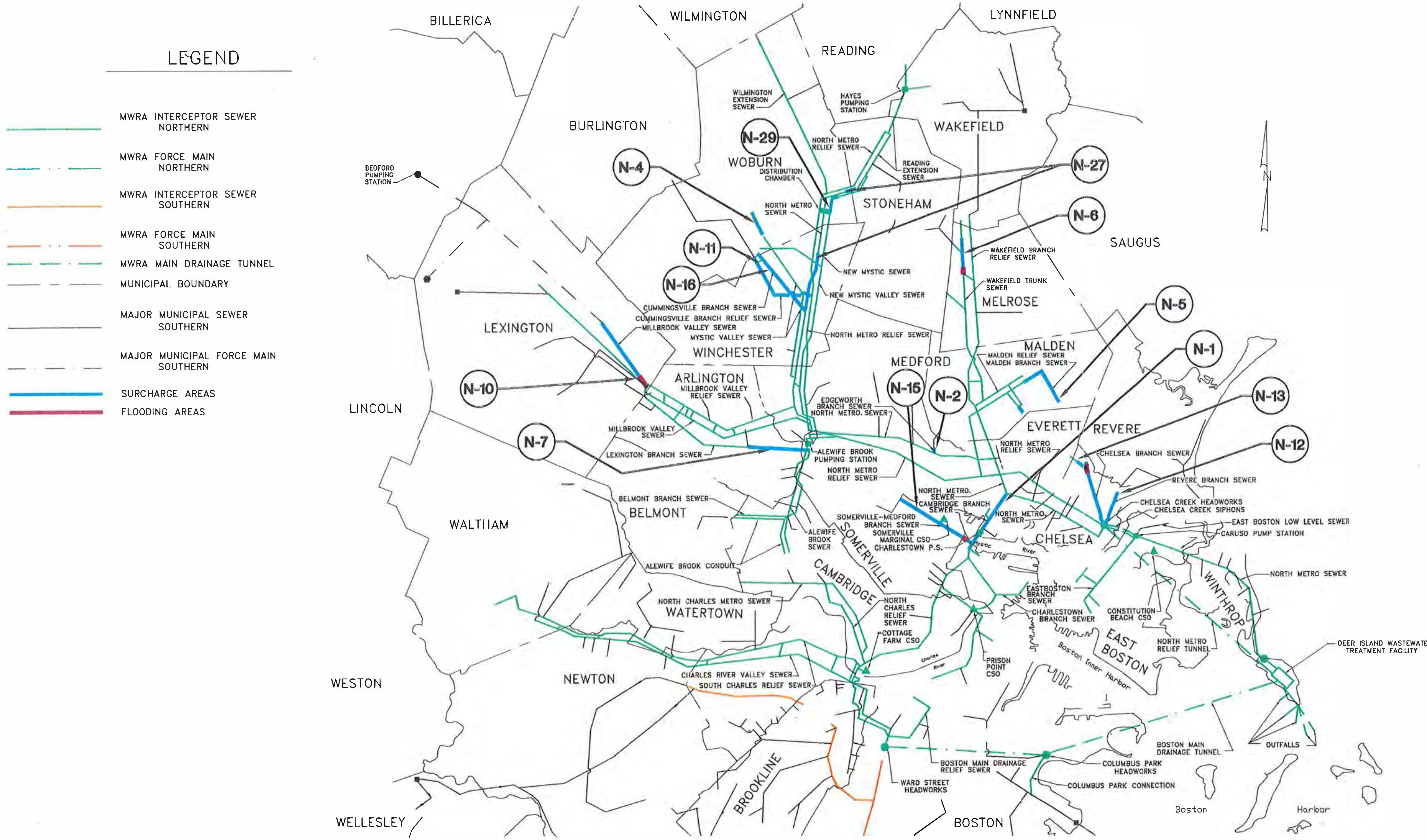

FIGURE 18-1.
RECOMMENDED NORTH SYSTEM
INTERCEPTOR RELIEF PROJECTS

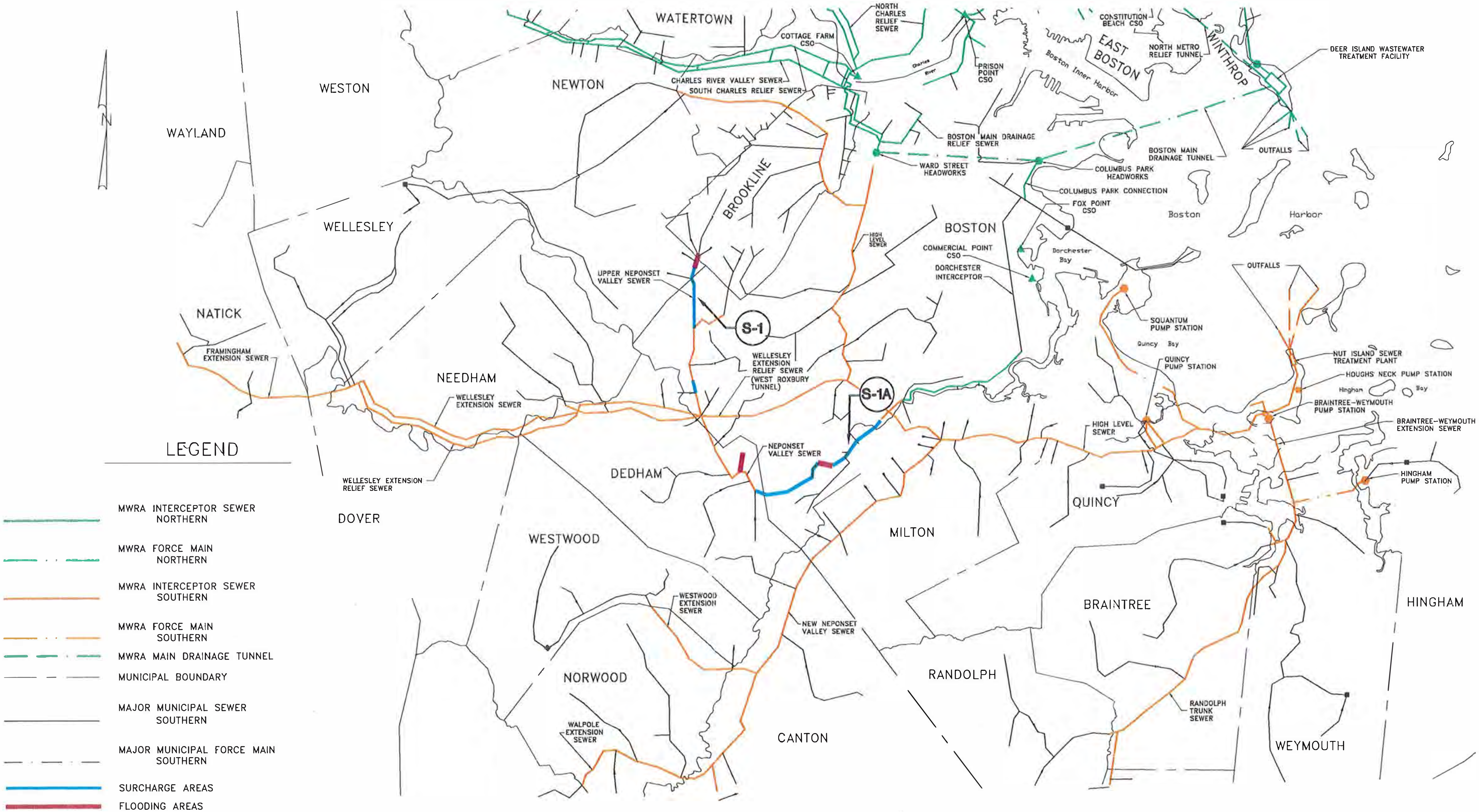

FIGURE 18-2.
RECOMMENDED SOUTH SYSTEM INTERCEPTOR RELIEF PROJECTS

TABLE 18-1. PRIORITY A INTERCEPTOR RELIEF PROJECTS

Interceptor Designation	Alt. No.	Capital Cost ($ million)	Improvement Description	Construction Impacts	Community Impacts	Environmental Impacts
Mystic Valley Sewer Section 160	N-4	1.2	Replace 4,250 ft. of existing 1.25 ft. dia. sewer with new 2 ft. dia. sewer. (Upper end of Mystic Valley Sewer into Woburn.)	5 ft. to 11 ft. deep excavation along abandoned RR right of way. Fairly level route, sufficient construction room.	Moderate traffic disruptions at intersections. Noise impact in residential area.	Noise and dust from construction. Some work adjacent to wetlands.
Wakefield Trunk Sewer Sections 49, 50	N-6b	5.6	Replace 11,886 ft. of existing 1 ft., 1.25 ft and 1.5 ft. dia. sewer with new 2 ft. dia. sewer. (Through Melrose Center to Wakefield line.)	10 ft. to 20 ft. deep excavation in dense residential and downtown areas. Potential poor soils particularly on Tremont St. and significant dewatering required. Very narrow crossing under RR bridge and low clearance. Close to buildings in Melrose Center.	Narrow streets - major disruption to residents, businesses and city services (DPW and City Hall). Adjacent to High School fields.	Adjacent to wetlands (Ell Pond), culvert crossing, and noise/dust from construction.
Millbrook Valley Sewer Section 84	N-10	0.2	Replace existing 110 ft. siphons (one 12 in. dia. and two 21 in. dia.) with two 24 in. dia. siphons under Mill Brook near Arlington Reservoir.	Stream diversion and significant dewatering required. Somewhat difficult access for heavy equipment.	Some impact on adjacent residential areas from equipment accessing the site.	Mill Brook stream crossing and noise from construction. Wetland mitigation required.
Revere Branch Sewer Sections 61 & 62	N-12	4.2	Install 3,112 ft. of 4.5 ft. dia. relief sewer parallel to existing 4 ft. dia. sewer. Install 3,500 ft. of 4 ft. dia. sewer parallel to existing 4 ft. dia. sewer. (Sewer extends from Chelsea Screen House along Eastern Ave. and Crescent Ave., essentially to Mill Creek.)	25 ft. deep excavation with RR crossing and parallel to RR tracks. Possible soil contamination from surrounding oil tanks. Approximately 1,300 ft. of existing sewer along Crescent Ave. was constructed as a tunnel.	Industrial traffic (Eastern Ave.) must be maintained. Active commuter rail parallels Crescent Ave. and crosses sewer at Eastern Ave.	Near wetland (Chelsea Creek). Noise and dust from construction. Disposal of contaminated soil could be an issue.

TABLE 18-1 (Continued). PRIORITY A INTERCEPTOR RELIEF PROJECTS

Interceptor Designation	Alt. No.	Capital Cost ($ million)	Improvement Description	Construction Impacts	Community Impacts	Environmental Impacts
Chelsea Branch Sewer Sections 11, 56 & 57	N-13	4.5	Replace 3,040 ft. of 2.08 x 3 ft. sewer and 1,175 ft. of 3.5 ft. dia. sewer with 4.5 ft. dia. sewer. Replace 1,500 ft. of 3.5 ft. dia. sewer with 4 ft. dia. sewer and 2,715 ft. of 2.75 ft. dia. sewer with 3.5 ft. dia. sewer. (Sewer extends along Eastern Avenue, Cabot St., under Northeast Expressway to Everett.)	12 ft. to 25 ft. deep excavation in residential and commercial areas, RR crossing and parallel to RR tracks. Adjacent to and through wetlands. Possible soil contamination. Significant support of structures and utilities required.	Significant disruption to both residential, commuter and industrial traffic. Same conditions in Eastern Ave. as Revere Branch Sewer.	Adjacent to and through wetlands. Noise and dust from construction activities. Disposal of contaminated soil could be an issue.
Somerville/Medford Branch Sewer Section 35	N-15	6.8	Replace 6,250 ft. of 32 in. x 28 in., 36 in. and 42 in. dia. sewer with new 48 in. sewer. Parallel 2,700 ft. of existing 40 in. x 48 in. sewer with new 54 in. dia. sewer. (This sewer extends from Sullivan Square area just west of I-93 along Mystic Ave. to Medford.)	19 ft. to 33 ft. deep excavation in dense residential/commercial area. Some jacking/tunneling may be required. Support of structures and utilities could be significant.	Significant traffic impacts. Mystic Ave. is a main traffic artery into Boston.	Noise and dust from construction activities. Probable contaminated soil in industrial areas.
Cummingsville Branch Sewer Section 47	N-16	N/A	Replace 4,500 ft. of existing 15 in., 18 in. and 20 in. dia. sewer with new 30 in. dia. sewer. Drop upstream invert to balance flow with Cummingsville Branch Relief Sewer. (The sewer extends along Sylvester Ave. onto Middlesex St. and through a wetland, onto Linden St. and Lake St.)	4 ft. to 12 ft. deep excavation in park lands, wetlands and residential areas. Extensive dewatering required.	Disruption to park land and wetlands. Disruption to community.	Construction through wetlands. Stream crossing required. Will disturb park land and require cutting of trees.
Reading Extension Sewer Section 72	N-29a	0.3	Replace 1,162 ft. of existing 1.67 ft. dia. sewer with new 2.5 ft. dia. sewer. (Existing sewer runs along river and crosses Hill St.)	Existing interceptor runs under Atlantic Gelatin Bldg. Construction is in commercial/industrial area. Interceptor runs along river.	Minor noise and dust from construction. Impact on Atlantic Gelatin may be significant.	Interceptor runs along river. May need to cut trees.

TABLE 18-1 (Continued). PRIORITY A INTERCEPTOR RELIEF PROJECTS

Interceptor Designation	Alt. No.	Capital Cost ($ million)	Improvement Description	Construction Impacts	Community Impacts	Environmental Impacts
Upper Neponset Valley Sewer Section 28, 29 and 30	S-1	N/A	Replace 17,500 ft. of existing 15 in. thru 45 in. x 46 in. sewer with new 30 in. to 42 in. sewer. (Existing Sewer runs through Baker St. Cemetery, crosses Baker St.; St. Joseph Cemetery, MBTA Commuter Rail tracks and continues along the Charles River).	5 ft. to 25 ft. deep excavation, interceptor crosses two large cemeteries and MBTA Commuter Rail tracks. Part of route lies in park land and along Charles River.	Disruption to park land and cemeteries. Most of route is remote from housing.	Crosses wetlands and cemeteries. Possible need to cut trees.
Upper Neponset Valley Sewer and Neponset Valley Sewer Section 15-21	S-1a with S-1	12.1	Replace 17,300 ft of existing 48 in. x 50 in. thru 54 in. x 56 in. with new 54 in., 60 in. and 66 in. dia. sewer, including S-1 improvements. (Neponset Valley Sewer runs along River St. to Business St. crosses RR tracks, parallels Neponset River back onto River St.).	12 ft. to 27 ft. deep excavation. Four RR crossings. Route parallels brook and passes by pond . Route crosses cemetery, residential/commercial area.	Noise and dust from construction. Disruption to cemetery and traffic.	Crosses wetlands and parallels brook. Trees may have to be cut. Route crosses cemetery.
TOTAL ESTIMATED CAPITAL COST		$34.9				

Table 18-2 and are shown on Figure 18-1 and Figure 18-2. Table 18-2 includes a brief project description, construction impacts, community impacts, and environmental impacts for each Priority B project.

Existing interceptors for which Priority B projects are recommended do not meet the MWRA's criterion that interceptors should be capable of handling flow under baseline hydraulic conditions without surcharging, and on this basis, these interceptors require relief. Because the degree of surcharging is such that the hydraulic gradient is more than six feet below the ground surface, relief of these interceptors should proceed but at a lower priority than the Priority A projects.

RELATION TO SEWERAGE DIVISION PLANNING

As stated in Chapter Fourteen, the MWRA is in the process of facilities planning on two projects which have been identified in this chapter as Priority A interceptor relief projects. These are the Cummingsville Branch Sewer and Relief Sewer Project and the Upper Neponset Valley Sewer Project. The results of interceptor relief alternatives development under the system master planning program should be incorporated into these on-going facilities plans as appropriate.

TABLE 18-2. PRIORITY B INTERCEPTOR RELIEF PROJECTS

Interceptor Designation	Alt. No.	Capital Cost ($ million)	Improvement Description and Route	Construction Impacts	Community Impacts	Environmental Impacts
Cambridge Branch Sewer Section 23, 24, & 25	N-1a	5.1	Install 4,935 ft. of 6 ft. dia. relief sewer parallel to existing 6.76 ft. diameter sewer. (Interceptor branches out from North Metropolitan Sewer, extends along Broadway (Route 99) to Charlestown Pump Station).	20 ft. to 35 ft. deep excavation in industrial (Sec. 24 & 25) and residential (Sec. 23) areas.	Sec. 24 & 25 are in main traffic artery (Rt. 99). Sec. 23 is narrow residential street.	Near wetlands (Sec. 25). Noise and dust from construction.
Edgeworth Branch Sewer Section 20A	N-2b	0.6	Replace 1,530 ft. of existing 2 ft. dia. sewer with new 3 ft. dia. sewer. (Sewer branches off North Metropolitan Sewer west of the Malden River).	10 ft. to 15 ft. deep excavation in industrial area with RR crossing.	Industrial traffic must be maintained. No thru traffic in area.	Noise and dust from construction. Possible contaminated material.
Malden Branch Sewer Sections 65 & 66	N-5	1.2	Replace 2,630 ft. of existing 1.5 ft. dia. sewer with new 2 ft. dia. sewer. (Existing sewer runs along Broadway between Taylor and Salem St.).	10 ft. to 20 ft. deep excavating in dense residential area. Support of utilities could be significant.	Significant traffic impact to residents.	Noise and dust from construction.
Lexington Branch Sewer Section 52	N-7	0.7	Replace 2,200 ft. of existing 1.5 ft. dia. sewer with 2 ft. dia. sewer. (Sewer runs along Lewis Ave onto Franklin to Hamlet to Mystic Valley Parkway to Decatur St.).	12 ft. to 17 ft. deep excavation in residential and commercial areas. Moderate rush hour traffic impacts on the Mystic Valley Parkway.	Commuter and residential traffic impacts. Heavy rush hour traffic on Mystic Valley Parkway.	Adjacent to Mystic River. Noise and dust from construction activities. May need to remove or protect large oak trees on residential lawns.
North Metropolitan Trunk Sewer Sections 44, 45, & 46	N-27a	2.8	Replace 2,300 ft. of existing 1.25 ft. dia. sewer with new 2 ft. dia. sewer. Replace 4,384 ft. of existing 2.46 ft. dia. sewer with new 3.5 ft. dia. sewer.	8 ft. to 17 ft. deep excavation in residential and commercial areas, Route along RR right of way and river.	Significant traffic impact to residential and commercial establishments.	Noise and dust from construction activities. Route follows river and crosses wetlands. Some tree cutting may be required.
TOTAL ESTIMATED CAPITAL COST		10.4				