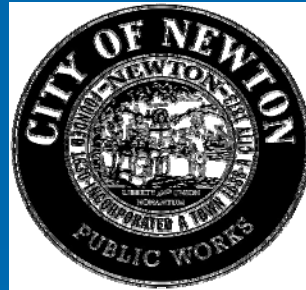


Crystal Lake Watershed: Monitoring and Improvements made by Public Works Dept.



Presented by

Maria Rose, CFM, Environmental Engineer

Crystal Lake Conservancy Annual Meeting – October 24, 2011

Drainage Channelization

City of Newton, Massachusetts

CHEESECAKE BROOK

LAUNDRY BROOK

HYDE BROOK

HAMMOND BROOK

CRYSTAL LAKE

COLD SPRING BROOK

SAW MILL BROOK

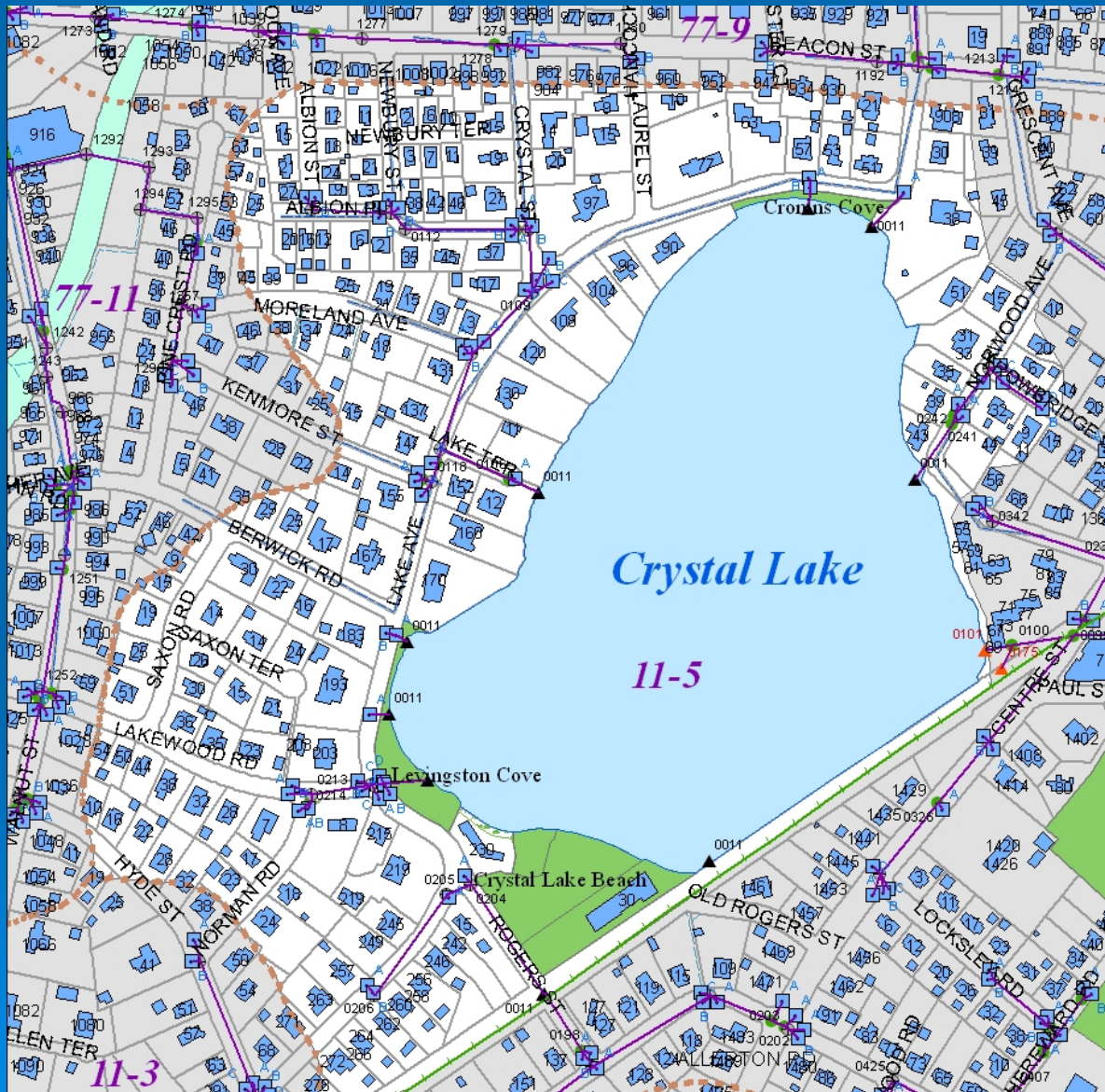
SOUTH MEADOW BROOK

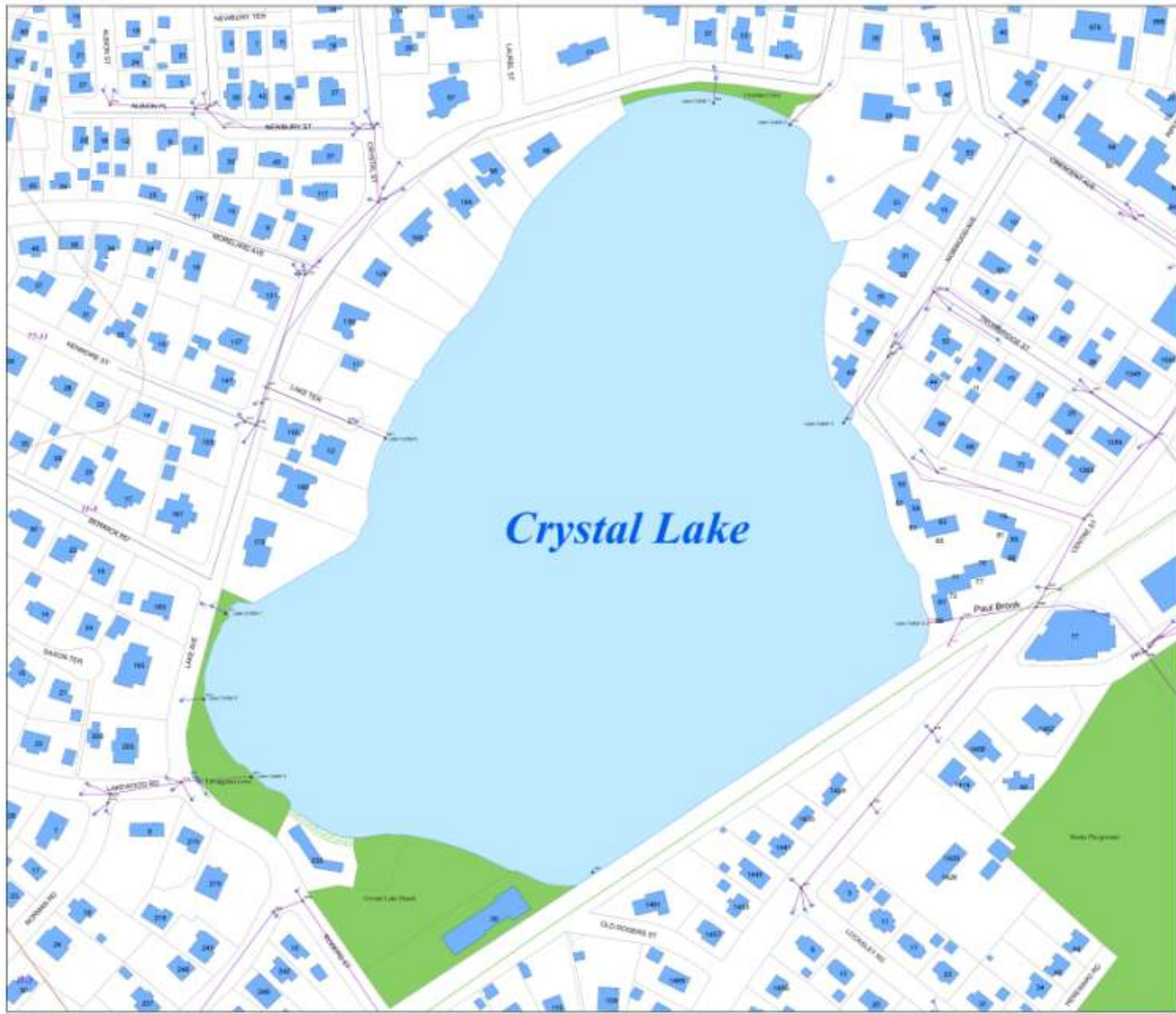
- Proposed Location of Channelization (from U.S.G.S)
- Dislocation of Dam
- Depth of Channelization (Intersection of a Channeling Line and a Flood Line with the lowest flood line elevation)
- 77-11 Channel Rating Floor Elevation (Scale)
- Shaded Areas: Flood Hazard
- Scale: 1" = 100'



Map prepared by the City of Newton, Massachusetts, Planning and Development Department, 2011. The map is for informational purposes only and does not constitute a contract or warranty of any kind. The City of Newton is not responsible for any errors or omissions on this map. The user assumes all liability for any use of this map.

Drainage Areas to Crystal Lake





City of Newton - Crystal Lake

This map was prepared by the City of Newton, Massachusetts, and is intended to provide information only. It is not intended to be used as a legal document. The City of Newton is not responsible for any errors or omissions in this map.

City of Newton
 Planning and Development
 100 State Street
 Newton, MA 02459
 Phone: 617.552.3000
 Fax: 617.552.3001
 Website: www.cityofnewton.com



Legend

- | | | | |
|----------------|-----------------------|----------------------|------------------------------------|
| • Catch Basins | — Storm Drain Mains | — MBTA Transit Lines | ■ Open Space |
| • Manholes | — Easement Lines | — MBTA GREEN LINE | ■ Park or Recreation Area |
| • Water Cutoff | — Utility Lines | — | ■ Conservation Land |
| • Valve | — Drainage Basins | — | ■ Absolute or State Watershed Land |
| • Junction | ■ Surface Water | — | ■ Conservation Residues |
| • Pipe Size | ■ Building Outlines | — | |
| | ■ Property Boundaries | | |

Lake Outfalls



Outfall 1



Outfall 2



Outfall 3



Outfall 4 – no longer in use

Lake Outfalls



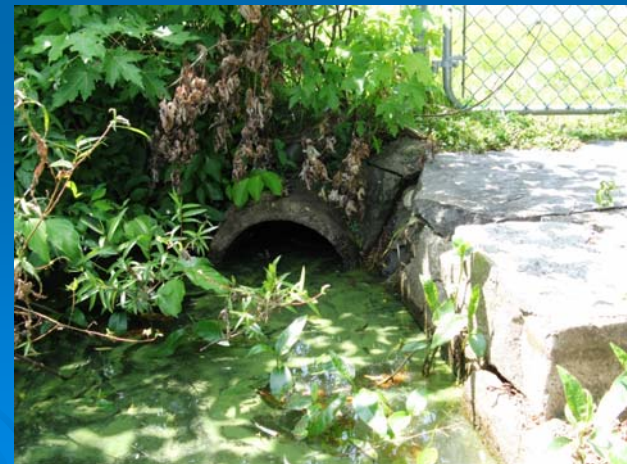
Outfall 5



Outfall 6



Outfall 7



Outfall 8

Lake Outfall Sampling

- Samples were collected on June 9, 2011 and September 29, 2011 from each outfall or next to it.
- Wet Weather conditions on both dates
- Analyzed for E.coli and Total Phosphorus at a MA certified lab
- Field testing of pH and Detergents

June 9, 2011

Lake Outfall Sampling

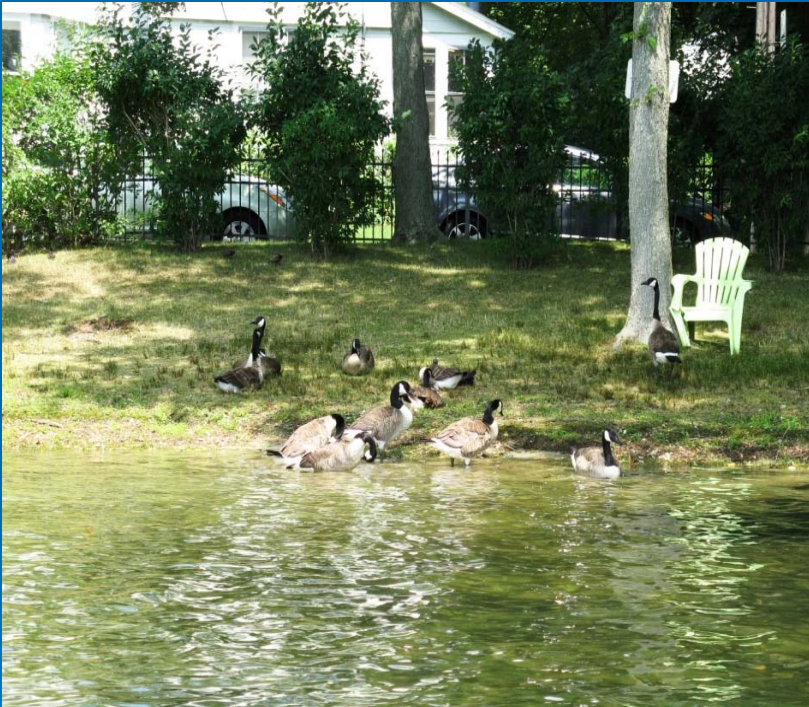
Collected directly from drain outfall pipes

Sample ID	Sample Location Description	E. Coli (CFU / 100 mL)	Total Phosphorus (mg/L)	Detergents (mg/L)	pH	Notes
Lake Outfall 1	20" by 24" Outfall in retaining wall across from 57 Lake Ave	24,000	0.73	0.0	7.4	Turbid sample (SW runoff also turbid). Three dead fish in vicinity; strong fish / bacteria odor.
Lake Outfall 2	Collected from the lake near the dock at Cronin's Cove and yard of 38 Lake Avenue. The outfall was not visible.	50	< 0.02		7.5	Clear, no odor. Small pool of orange-tinged water near shoreline.
Lake Outfall 3	Collected from the lake near record outfall close to 43 Norwood Ave. The outfall was not visible.	20	< 0.02		7.4	Clear, no odor
Crystal Lake Condos	Lake sample collected from behind the Crystal Lake Condos near the shoreline covered with geese feces.	150	< 0.02		7.2	Clear, no odor
Lake Outfall 5	PVC outfall near intersection of Lakewood Rd and Lake Ave.	54,000	0.47	0.4	6.5	Slightly turbid sample, another dead fish. Very strong bacteria odor, light-brown color.
Lake Outfall 6	Outfall through retaining wall. In front of 193 Lake Ave.	> 80,000	0.58	0.1	6.4	light-brown color, Slight odor.
Lake Outfall 7	8" Clay Outfall near intersection of Berwick Rd. and Lake Ave. Next to 170 Lake Ave.	50,000	0.55	0.0	6.5	Earthy smell. Light-brown color.
Lake Outfall 8	Sampled outfall beyond the end of Lake Terrace; behind #12. Invert BWL.	170	< 0.02		7.0	Clear, no odor

September 29th Preliminary Results

- Samples were clearer and less turbid in general – especially outfalls 1, 5, 6 and 7
 - Direct result of cleaning storm drains
- Less odor
- Phosphorus levels decreased
- E.Coli bacteria results vary, but still show moderate to high levels in direct outfall samples

Animals / Waste Factors



HERE'S THE
POOP ON STORMWATER
POLLUTION...



Please Scoop the Poop!

Here's why:

Pet waste can cause environmental and health problems if it isn't disposed of properly.

Stormwater, the runoff water after it rains, may wash pet waste off the ground into ponds, streams or coastal waters, either directly or via storm drains. Pet waste contains germs and nutrients that can be harmful to human health and to our waterways.



For more information, visit our community's website
or go to www.stormwatermatters.org.

Human Factors



Do not put anything down the storm drains!!!



Over-feeding
our lawns may also
green our rivers
and ponds!

Green Lawns Without Green Waters!

Applying more fertilizer than the label recommends or your soil needs won't improve your lawn, and instead the extra fertilizer may wash off into nearby waterways. Just as fertilizer helps plants grow on the land, it encourages algae and other aquatic plants to grow in water. Dense weeds and algae reduce oxygen in the water, which in turn harms fish and other aquatic life. "Green water" is also much less attractive for boating, swimming and other human uses.



For more information, visit our community's website
or go to www.stormwatermatters.org.

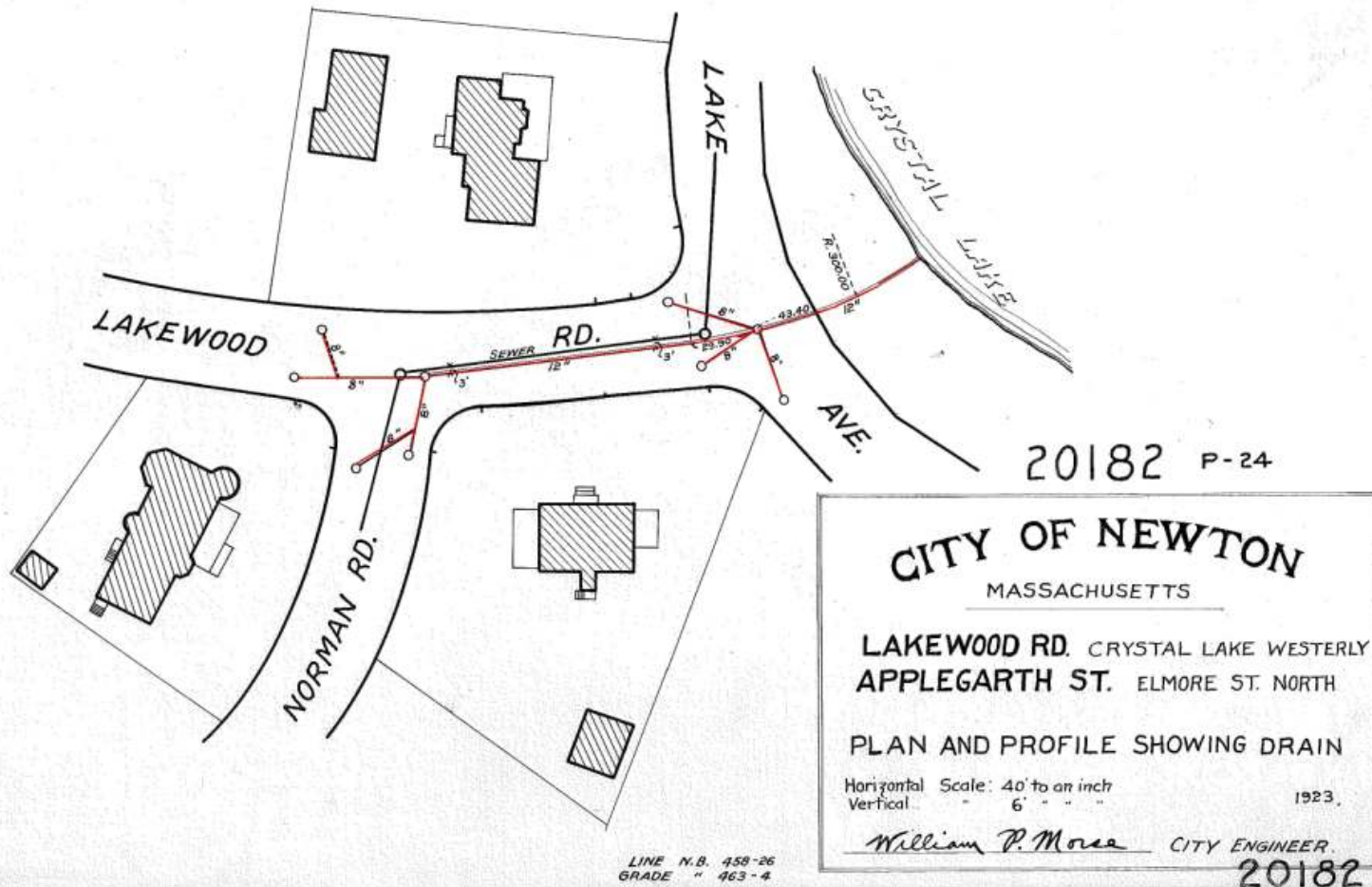
More Human Factors



Infrastructure Factors

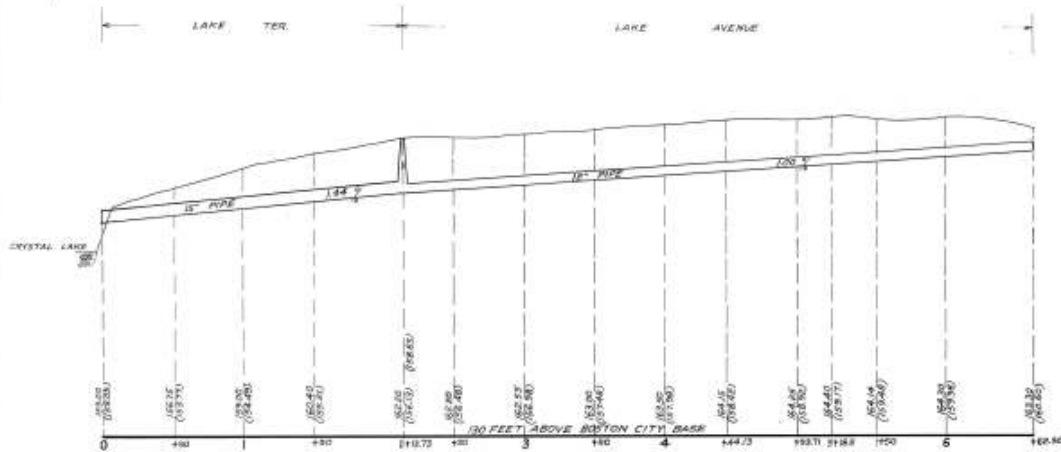
- Drains and sewers installed 80 to 120 years ago
 - Sewer joints break down over time
 - Laterals to mains can slip
 - Drains were designed with open joints
- Exfiltration from sewer
- Deep pipe runs = difficult repairs
- Underdrains

Drainage Infrastructure



17200
P-24

17200
P-24



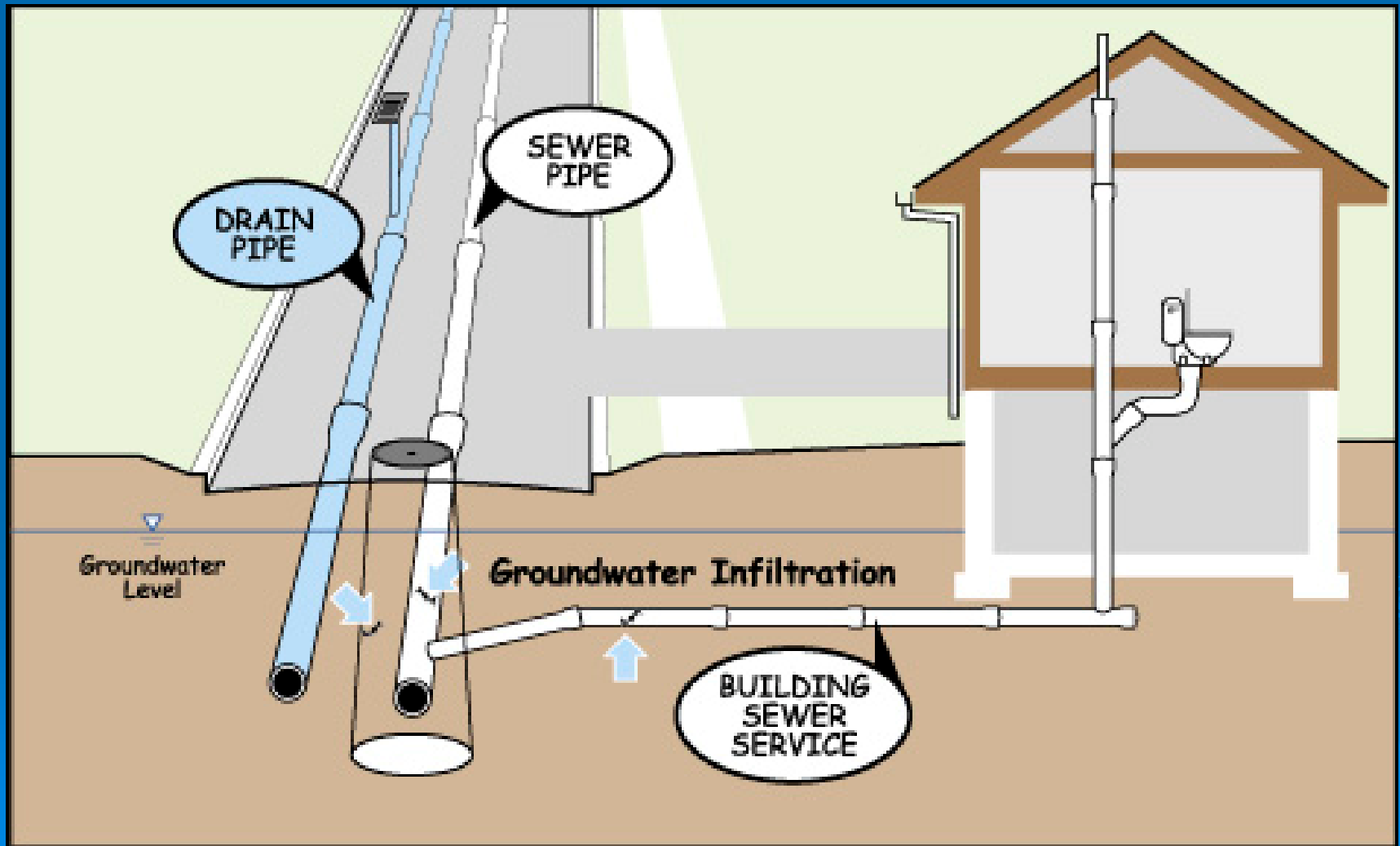
17200
P-24

17200
P-24

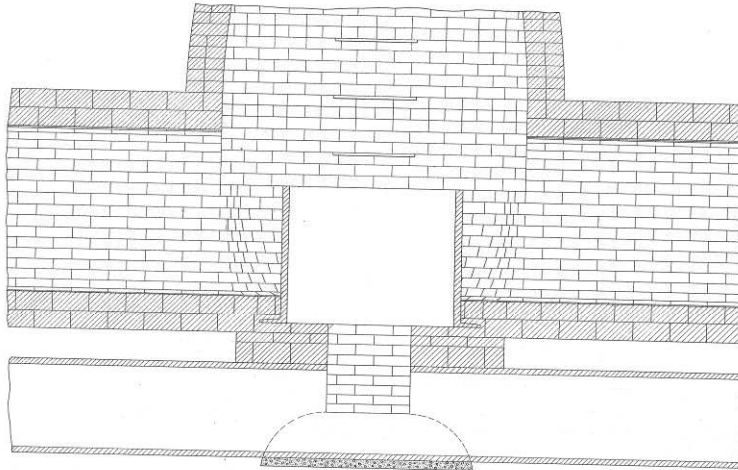
CITY OF NEWTON
 MASSACHUSETTS
LAKE TER. AND LAKE AVE.
 CRYSTAL LAKE TO LAKE AVE. AND
 LAKE TER. TO CRYSTAL ST.
PLAN AND PROFILE OF DRAIN
 Horizontal Scale: 40' to an inch
 Vertical: 6' - - -
 Sept. 27, 1898
 ALBERT F. NOYES CITY ENGINEER.

U.S. 224-1-10
W.A. 23-1-10

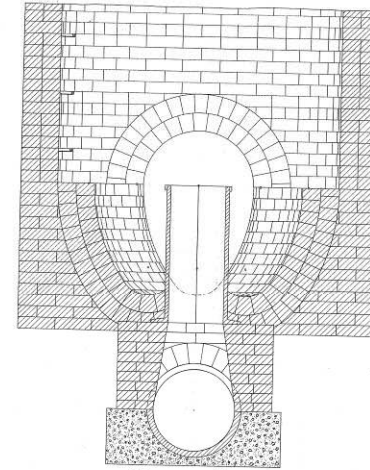
Infiltration Sources



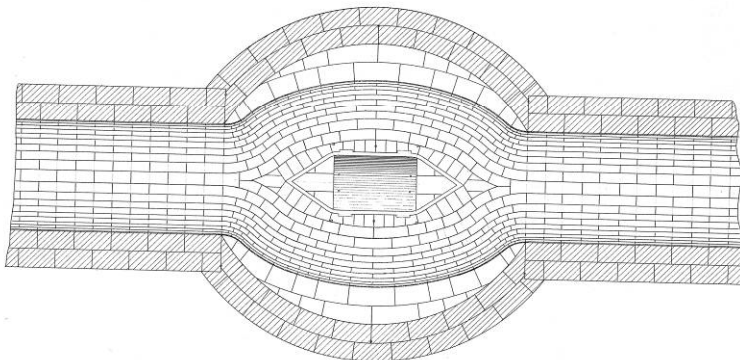
Underdrains



Sectional Elevation



Cross section



Sectional Plan

Newton Scientific System

Details of Manhole

— 1 ft. to one inch —

— Albert E. Hayes —

— City Engineer —

— 1908 —

CITY OF NEWTON
FILED IN OFFICE OF THE CITY CLERK
AND DEPOSITED IN OFFICE OF THE CITY
ENGINEER.
CITY CLERK.

Routine Maintenance work



Cleaning drain manholes
& catch basins



Street sweeping

Specialized Maintenance

- CCTV of drains and sewer pipes
- Jet Cleaning of drain lines
- Testing and sealing of joints (sewer)
- Slip lining of defective pipes
- Replace damaged sections
- Dye & smoke testing to find illicit connections

Bath house Parking Lot Existing Conditions








Bath house Parking Lot Existing Conditions



A cleaner Lake and Watershed
begins with each of us...



Please help prevent pollutants from getting into stormwater:

-  Don't litter.
-  Never throw, pour, or sweep anything into storm drains.
-  Recycle paper, plastic, cans and bottles.
-  Participate in a neighborhood cleanup day.
-  Get involved in water protection issues in your community.

We all need clean water for drinking, swimming, fishing, boating, and protecting wildlife.



For more information, visit our community's website
or go to www.stormwatermatters.org.