



Town of Madawaska, ME

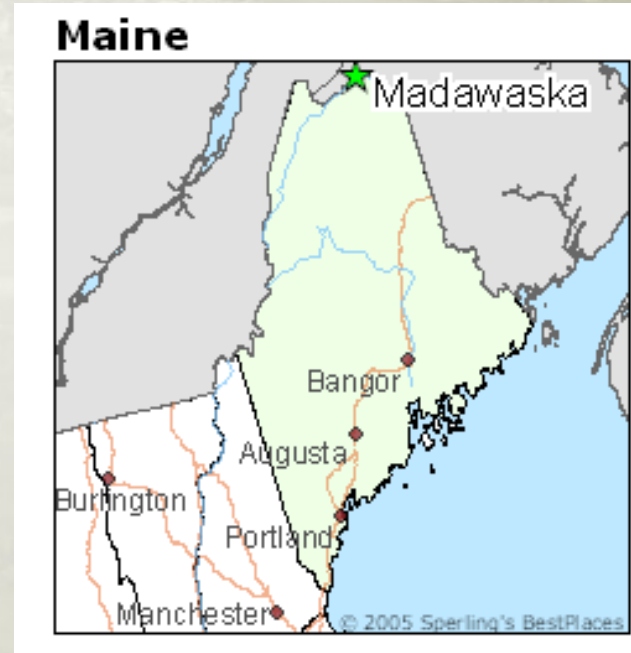
CSO Success – Overcoming Funding & Design Challenges





Town of Madawaska - Introduction

- Madawaska is in rural Aroostook County, Maine
- Northeastern Most Point In U.S.
- Population: 4,035 per the 2010 census
- Borders Edmundston, NB, Canada
Busy Point-of-Entry to the U.S.
- WWTF Outfall Discharges to the
 - St. John River
(Border between U.S. & Canada)





Summary of Overall System

- **Sanitary Collection System - About 20 Miles of Sewer (105,600 LF)**
 - Sizes Range 6 Inches to 24 Inches
- **WWTF – Originally Constructed late 1970s**
 - Last Major Upgrade in 1998
 - High Rate Activated Sludge Process – Design ADF of 0.6 MGD
 - Peak Hour Flows of 2.5 to 2.8 MGD – Average Flows of 0.25 MGD (PF = 11.2)
- **Collection System Pumping Stations – 3 Total**
 - Main P.S., - Transports All Flow to WWTF
 - Fraser P.S. – Transports 2/3 of Flow to Main Interceptor
 - St. David P.S. – Smaller Pump Station
 - Serves Approximately 120 Connections
- **Two Original Licensed CSOs**
 - CSO #1 – Near the Main P.S.
 - CSO #2 - Near the Fraser P.S.





Problem

- **Madawaska given a NPDES waste discharge license/MEPDES permit/WDL requiring the mitigation of CSO discharge events on or before 12/31/2014**
- **Three Main Problems Leading To CSO Events**
 - **Cause #1:** Sewer Pipe & Manhole Deficiencies
 - **Cause #2:** Cross Connections (Floor Drains, Roof Drains & Sump Pumps)
 - **Cause #3:** Mechanical Equipment Deficiencies (Pump Clogging, Communications & Lack of Standby Power)
- **Vitrified clay and asbestos concrete pipe installed in early 1900s**
- **Pipe & Structure integrity generally poor**
- **I/I rate approximately 26,000 GPD/in-mile**



Problem Compounded By Weather

- #1: Spring Rains
- #2: High Volume of Snow Melt
 - Typical Average Snowfall
 - 112 Inches Per Year
- Increased I/I & CSOs
- Example: Monthly average flow for April 2009 was 1.55 MGD
- Typical Dry Weather Flow = 0.25 MGD
 - 6 Times More Flow For Single Month
 - Caused by Snow Melt & Spring Rainy Season





Holistic vs End of Pipe Approach

- Holistic approach for the Town – Not Just End of Pipe Solution
 - Targeted repair of high priority areas
 - TV inspections and smoke & dye testing allowed prioritization of areas.





Holistic vs End of Pipe Approach

10-year proposed schedule of 8 different phases

- Initial phases were in the Fraser Pump Station collection area
 - Targeted to reduce I/I pumped from this area of Town to the Main Pump Station
- Following phases focused on the Main Pump Station collection area
 - Goal: Maximize the amount of extraneous flow removed early on in the implementation
- Targeted Focus with high- and medium-priority areas





Project Funding

Town was able to secure several funding packages to implement the necessary solutions

- USDA Rural Development (RD)
 - \$1.98 Million Loan
 - \$4.72 Million Grant
- Economic Development Administration (EDA)
 - \$2.0 Million Grant
- Maine Department of Environmental Protection (MDEP)
 - \$1.0 Million Loan w/ \$300k in Principle Forgiveness
- Significant funding awards allowed the community to accomplish the work in a few years rather than over a prolonged period and leverage the Town's share.

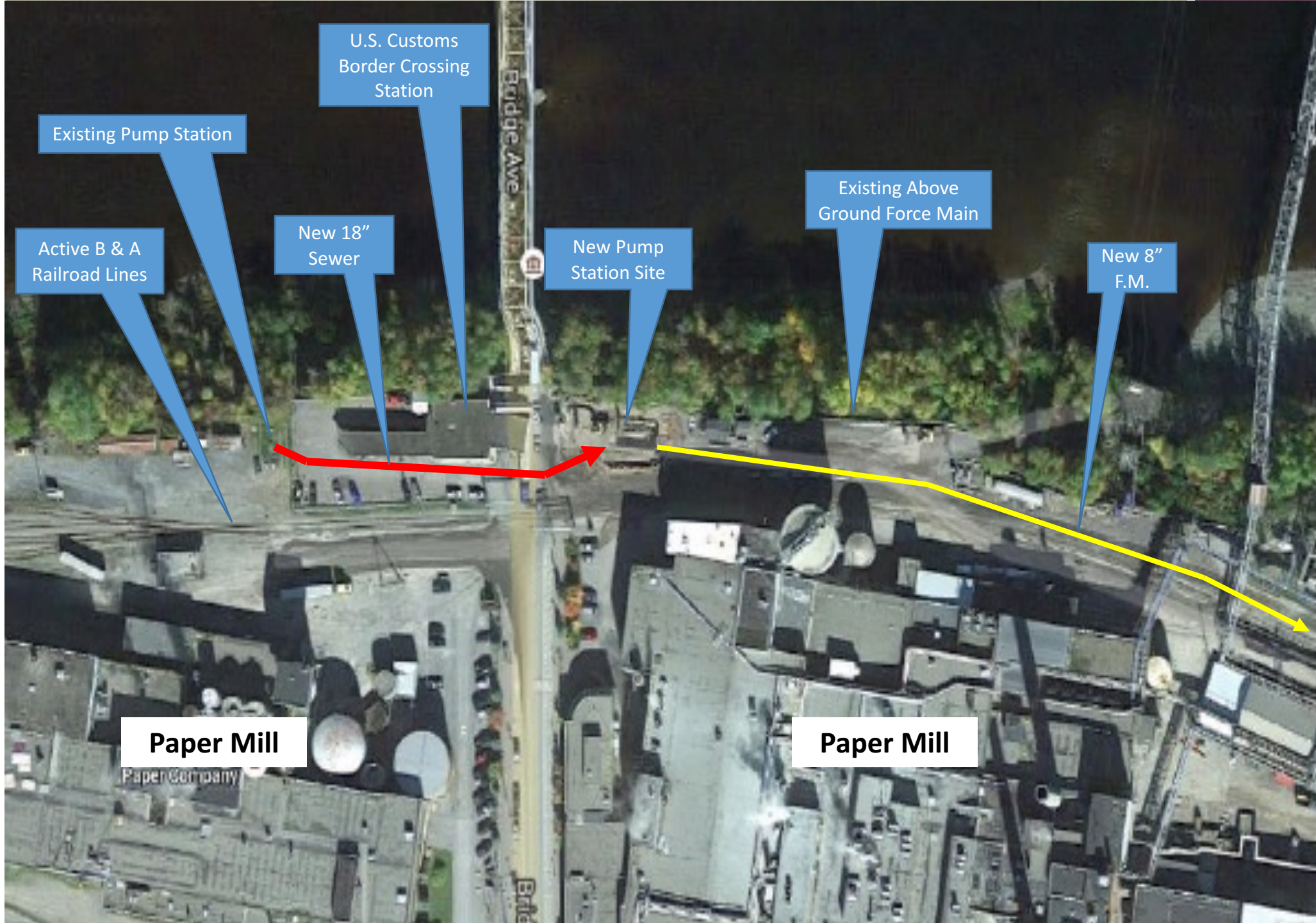




Mechanical Upgrades

- Improvements to two pump stations (Fraser P.S. & Main P.S.)
- Three Main Areas of Focus
 - Pump Clogging, Communications, & Standby Power
- Fraser P.S.
 - Relocation due to Federal Government Border Crossing
 - Pump Clogging: 2 to 3 Times Per Week & Lead/Lag Configuration
 - No Dedicated Standby Power – Large Station 2/3 of Flow
 - Poor Communications – Lack of High Level Alarming or Faults Lead to CSOs
 - Interference with Canadian Signals
 - Fraser Upgrades – Most Challenging Aspects Of Entire Project







Fraser Pump Station Mechanical Upgrades

- New Pump Technology - In order to reduce mechanical failures, clogging, and repairs (Submersible Chopper)
- Prior to the recent upgrades the old station experienced weekly pump clogging, which led to many of the previous CSO events





Fraser Pump Station Mechanical Upgrades

- Dedicated Standby Power - Including dedicated standby power
- Communications: A new dedicated licensed radio communications system to transmit alarms and status back to the staff
 - Radio path study US FCC & Canadian FCC 220 Mhz band for more reliable signal





Main P.S. Mechanical Upgrades

- New higher capacity pumps
- Electrical System Upgrades – Previous VFDs did not allow pumps to run full speed leading to CSOs
- New communications & control systems





Main P.S. Upgrades

- Adjustment of CSO monitoring equipment to avoid false readings due to storm water
- New dedicated generator to accommodate station
- Switch to Lead/Standby pump configuration instead of Lead/Lag





Sewer Infrastructure Upgrades

- Approximately 47,000 feet of sewer replacement to Date
 - Resulting in approximately 45% of the system upgraded since the Original CSO master plan was approved





Public outreach, community involvement, and new ordinance

- House to house inspection and education program
 - Oversight by Woodard & Curran engineers
 - Inspection by local engineering students
 - Data management by engineering interns
- Brochure and door hanger program
 - Successful in educating the public and the introduction of the fee assessment program





Public Outreach, Community Involvement & New Ordinance

Newly adopted ordinance, January 1, 2013

- Fees were assessed to any property that either refused inspection or kept an illegal connection to the sanitary system
- Fees were broken into two categories
- Inflow Fee: \$100/6 months
 - Assessed for any property either refusing inspection or those that had either a roof drain and/or sump pump connected to the sewer system
 - Assessed continually until the property owner demonstrated that there was no connection to the sewer system
- Floor Drain Fee: approximately \$25/year
- Assessed to any property with a floor drain that remained connected to the sewer system



Public Outreach, Community Involvement & New Ordinance

- The following table outlines the total fees assessed to properties within the Town:

TYPE OF FEE	# OF USERS
Inflow Fee	356
Floor-Drain Fee	347
No Fee Assessed	569



Inspection & Disconnection

- Focus on roof drain connections for large flat roofs on public and commercial buildings
- Roof Dye Program





Unique Aspects of Construction & Challenges

- US Customs Border crossing station in the project area
- The Fraser Pump Station is located in the Fraser Paper Company mill yard
- Connection of Live Sewer Systems
- Upgrades to Main P.S. while keeping facility online





How Did We Do?

- Multiple stakeholders came together to address an environmental compliance issue
- CSO Reductions To Date
 - 2011 to Present Day - **Only 1 CSO Event**
 - Previously Approximately 10 per year
 - 1 Lone Event – Due to Historical Flooding & Snow Melt - Spring 2014
- Infrastructure Rehabilitation To Date (~ 45% of Sewer System)
 - Two Pump Station Upgrades
- Public Outreach & Implementation Was Essential
- Solving CSO and sewer issues maximized economic growth and sustainability in Town



Questions?

