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DEPARTMENT OF INFRASTRUCTURE ENGINEERING

**MEMORANDUM**

TO: James Kern, Town Manager

FROM: Jason L. Mammone, P.E., Director of Engineering

DATE: January 29, 2015

SUBJECT: Update of Engineering Department Projects and Activities

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The following is a brief update on some of the projects that the Engineering Department is currently working on and/or involved with:

- **Dedham Square Improvement Project** – *ongoing* – The Engineering Department has been serving as the Project Manager for the Town and coordinating all aspects of the project and public outreach for the project through various social medias (Facebook, Twitter, Flickr, YouTube and the Dedham Square Improvement Project website). Previously worked with our design consultant to finalize drawings and contract specifications for the project. Coordinated over 40 public hearings to solicit comments regarding the design of the project.

Construction of the square project was completed in November of 2013. The contractor is still under contract till October of 2015 performing the 24 month extended establishment item of the contract for the landscaping that was installed as part of the improvements. Since the end of construction, the BOS has approved the installation of an electronic vehicle (EV) charging station for the Keystone Parking Lot, Landscape Planters for throughout the Square and street furniture for throughout the Square. The Engineering Department had been busy over the winter and spring months working with various community groups to select the appropriate planters and furniture for the Square and overseeing the design and installation of the EV Station. The next few months will be spent balancing out the final payments and budgets so the remaining funds can be rescinded at the May Annual Town Meeting. It is anticipated that the overall budget will be under by approximately \$400,000.

- **Inflow and Infiltration Project** – *ongoing* – The Engineering Department has been working to reduce inflow and infiltration using an in-house approach to inspect, assess, design, and oversee improvements to the sanitary sewer system. Over the last eight years the Town has inspected 1,293,503 linear feet (245 miles) of sewer main, performed 4,333 manhole inspections, installed 109,542 linear feet (21 miles) of cured-in-place liners,

installed 2,818 feet of short liners, cementitiously lined 4,074 vertical feet of manholes, chemically root treated 189,081 linear feet (36 miles) of sewer main, and performed 47,569 linear feet (9 miles) of testing and sealing of joints. To date the project has cost approximately \$10.4 million and we estimate that we have conservatively removed 4.5 million gallons per day (MGD) of inflow & infiltration from the system. In addition, the Town's MWRA sewer assessments have remained stable and our sewer rates have remained unchanged since 2008 as a result of our decreasing flow share. Assuming a no change in flow share scenario, we estimate that Dedham has cumulatively saved \$6.2 million over the past eight years as a result of these efforts (See Chart 1). Also, recent MWRA rankings show that Dedham is now ranked 21<sup>st</sup> in inflow and infiltration per inch mile of pipe which is down significantly from the rank of 2<sup>nd</sup> in CY2003.

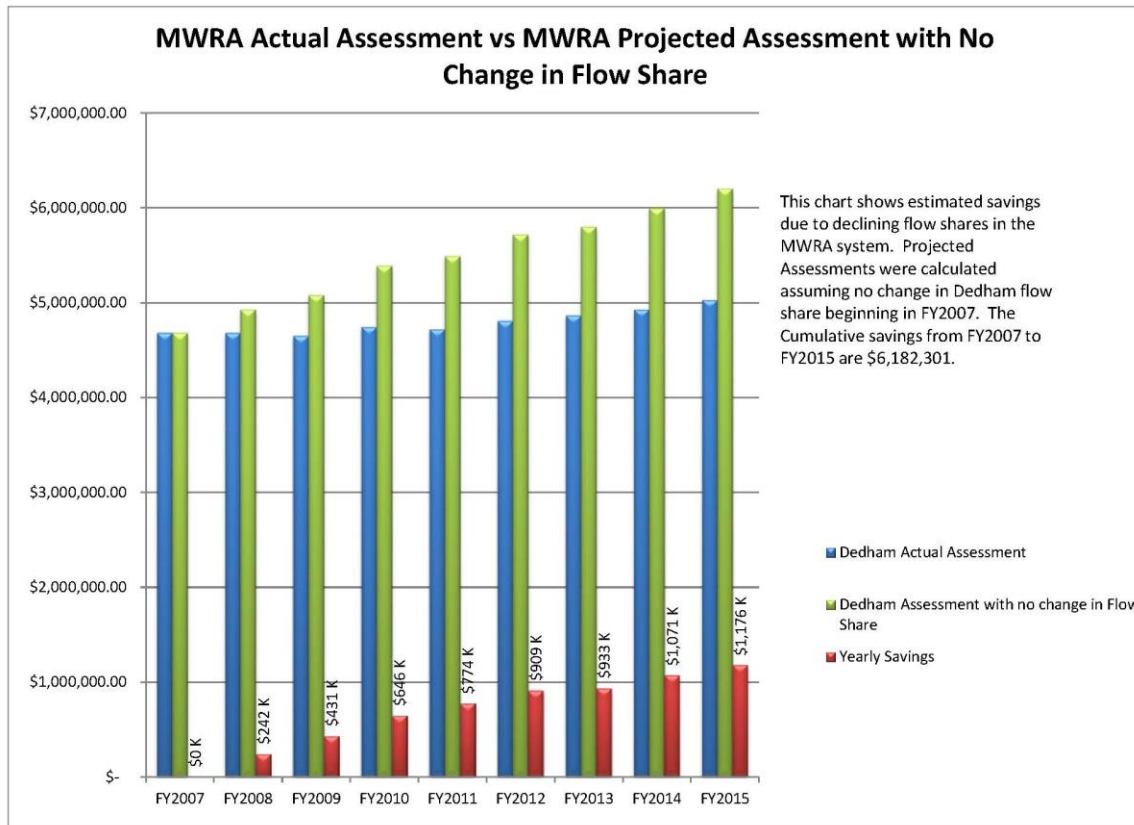


Chart 1

- **2014 I/I Inspection Project** – *completed* – This project involved the inspection of 117,615 linear feet (22 miles) of sewer mains and 489 sewer manholes. The project was completed in May.
- **2015 Sewer On-Call Services** – *ongoing* – The Engineering Department has recently awarded a new 3-year contract for on-call services. We are currently in the process of having Town Counsel review the contracts and are hopeful to issue a Notice To Proceed by the end of February. The plan and specifications for this contract were generated using in-house personnel. This contract includes services utilized by both the Engineering

Department and Department of Public Works consisting of; 24 hour emergency cleaning, hourly rate for cleaning and inspection, wet weather sewer and manhole inspection, on-call sewer repair, and chemical root treatment.

- **2014 Private Building Inspections** – *ongoing* – The Engineering Department, in conjunction with Weston & Sampson performed a Town-wide voluntary house-to-house inspection program to identify prohibited connections to the Town's sewer system. Prohibited connections to the sewer system consist of sump pumps, floor drains, driveway drains, roof leaders and other prohibited sources of inflow that may be connected to the sewer system. These prohibited connections are sending clean water to the MWRA's Deer Island treatment facility at the expense of the taxpayers. The program will take place over 2 years. The intent of the project was to inspect buildings in precincts 4, 5 and 6 this year and the remaining precincts next year. Once the inspections have been completed the data will be compiled and a plan developed to best remove and reroute these prohibited connections to the proper sources. Unfortunately, due to the low percentage of owners participating in the voluntary inspections and the cost associated to perform the inspections, we have decided not to pursue inspecting the remaining precincts in 2015. It has been determined that making the inspections voluntary along with the promise of amnesty to fines and penalties that may have resulted from discovering prohibited connections was not enough to get owners to participate. In the future if the Town wishes to continue its reduction of inflow to the sewer system it is suggested that the inspections be mandatory.

Upon completion of visiting precincts 4, 5 and 6, we had approached 3,540 buildings, been allowed voluntary inspections on 1,460 (41%) buildings, not permitted to perform voluntary inspections on 209 (6%) buildings and had no answers and call-backs on 1,871 (53%) buildings. There have been 42 prohibited connections positively identified with an estimated 302,400 gallons per day of peak design inflow.

- **2014 Inflow Investigations** – *ongoing* - In the Summer of 2013, the Engineering Department, in conjunction with Weston & Sampson, performed a second round of smoke testing on approximately 40% of the Town's sewer system to identify direct (i.e. catch basins) and indirect (i.e. cracks in adjacent storm and sewer pipes) sources of inflow. The identified direct inflow sources, that were municipally related (located within the Town's Right-of-Way), were removed by the Department of Public Works and the indirect sources were handled through our sewer lining contract. A third round of smoke testing is currently being performed on the remainder of the Town's sewer system. The data collected from the final round of smoke testing will be compiled and analyzed over the winter. To date the Town has removed over 500,000 gallons per day of I/I from the system through our smoke testing efforts.
- **Private Ways** – *ongoing* – The Town By-laws for acceptance of private ways as public ways was recently updated at the 2014 Annual Town Meeting. The Engineering Department has been working with the private ways subcommittee to develop a policy/standard by which the residents of a private way would have to adhere to in order to become a public way and also includes the construction standards/specifications by which a private way must be reconstructed.
- **Colburn Street Dam** – *ongoing* – After decades of ownership disputes concerning the Colburn Street dam between the State and the Town, it was finally determined that the Colburn Street Dam is owned by the Town. There have been a few Phase 1 Dam inspections/evaluations performed on the 100+ year old dam that indicate that although the dam is in fair condition, it is in need of maintenance. The Engineering Department has received a proposal from our consultants to conduct Phase 2 Dam inspection/analysis.

The funding for the Phase 2 study is being considered as an FY2016 capital request. This study would include geotechnical, land surveying, conceptual design and cost estimating services. A hydraulic/breach analysis will also be conducted as part of the study to determine the actual hazard level of the dam. If the dam's hazard level can be lowered and classified as "low" it would save the Town money in the long term, since the maintenance and inspection requirements on a "low" hazard dam are less than a "significant" hazard dam which the dam is currently classified as.

- **Transportation Improvement Project (TIP)** – In the winter of 2013/2014 the Engineering Department presented to the BOS four potential projects that could be considered a viable project for funding through the MPO TIP. The BOS selected moving forward with the sidewalk/corridor improvements for Bussey Street and Rustcraft Road/Elm Street. The Engineering Department hired BETA Group as the design consultants for the project. To date, we have collected survey and traffic data and are in the process of compiling the information. As part of the improvements, a Kiss and Ride was proposed for the Rustcraft Road/Elm Street improvements to be located on the State's property at the Dedham Corporate Center Commuter Rail Station. The Engineering Department along with the Interim Town Manager, DPW, BOS and our State Representative met with the State's Secretary of Transportation, MassDOT & the MBTA to discuss the proposed project to get their support and an easement to construct the Kiss and Ride. The State was so impressed with what the Kiss and Ride could do for MBTA ridership and improved safety for commuters that they constructed the Kiss and Ride using their available funding. We will continue to work with our consultants to have 25% design plans ready for submission to MassDOT in the Spring of 2015.
- **2014 Violet Avenue Drainage Study** – *ongoing* – At the request of the Town Administrator, based upon the continued and ongoing concerns of the residents of Violet Avenue, the Engineering Department, along with Weston & Sampson began the evaluation of the existing drainage system that runs through some of the properties of Violet Avenue and Kiely Road. The drainage system currently overflows from a drainage structure located in the backyard of a resident on Violet Avenue during high intensity rain events which creates flooding problems to several properties within the immediate area.
- **Sewer Fats, Oils, and Grease (FOG) Issues** – *ongoing* – As part of our overall inspection program the Engineering Department also has an aggressive FOG program to help eliminate back-ups and maintenance issues related to excessive grease in the sanitary sewer system. The Engineering Department has implemented a biological dosing program at key locations to help digest grease at known trouble spots. In addition, the Town has installed two Smartcover level alarms to alert personnel to potential blockages before sewer overflows can occur.
  - **Legacy Place** – *ongoing* – The Engineering Department, in conjunction with the DPW and Health Department, has been monitoring the grease traps at Legacy Place. These grease traps have been improperly maintained to date and have been causing multiple problems at our Rustcraft Road Pump Station. We have been sampling the grease traps monthly over the past few months to establish a trend in grease accumulation. Our preliminary information has indicated that a majority of the grease traps cannot be properly maintained following the current protocol by the Board of Health and were in need of more frequent cleaning. This preliminary information was presented to the Board of Health and they have mandated these establishments to take on a more stringent grease trap cleaning schedule in an effort to reduce the Town's maintenance of the pump station and increase its efficiency. Our department will continue to monitor the grease traps over the next several months to determine if the establishments are complying with the Board of Health's cleaning schedule.

- **Pavement Management** – *ongoing* – The Engineering Department, in conjunction with the Department of Public Works, has continued the pavement management program which began in 2007. Through eight years of the program, the Town completed \$16.5 million worth of repairs and maintenance to 69 miles of roads and 20 miles of sidewalks. During this time the pavement condition index has risen from 70 to 83. A new 3-year road program has been generated and is to be considered for approval by the BOS in February 2015.
- **Pump Station Operation** – *ongoing* – The Engineering Department, in conjunction with the DPW, oversees the operation of the three sanitary sewer pumping stations, including the weekly maintenance, routine and emergency repairs, and upgrades of various components. The Engineering Department and DPW monitors alarms at all stations 24 hours a day and responds as needed.
- **Traffic Calming** – *ongoing* – In 2012, The Board of Selectmen approved the traffic calming policy created by the Engineering Department. The Engineering Department will continue to work with the Board of Selectmen and the Town Manager to refine and revise the policy, as needed, in order to give clear guidance to residents wishing to implement traffic calming strategies in their neighborhoods through the submission of Traffic Calming Request Forms to the Transportation Advisory Committee (TAC). The Engineering Department sits as an ex-officio member of the TAC responsible for general oversight of the committee and performing preliminary investigations consisting of traffic counts, intersection turning movement counts, and speed surveys using in-house equipment and labor.
- **Gonzalez Field Accessible Parking Design** – *completed* – As requested by the Parks & Recreation Department, the Engineering Department designed a parking area on the south side of Gonzalez Field for 2 accessible parking spaces. All aspects of the design work were performed in-house. The Engineering Department was also responsible for the permitting which included a Minor Site Plan review with the Planning Board and Request for Determination of Applicability with the Conservation Commission and MassDEP. Construction of the parking area was completed in the summer of 2014 by the DPW with oversight by the Engineering Department.
- **Highland Street Sidewalk Design** – *complete* – As requested in 2011, the Engineering Department completed the preliminary design and cost estimate (not including land takings) for a new sidewalk on Highland Street in areas where no sidewalk currently exists. The Engineering Department worked with SMC Mapping Consultants to identify the roadway property lines. Several permanent land takings have been identified as necessary for proper installation of new sidewalks. This project is waiting for future capital funding.
- **Violet Avenue at Pine Street Intersection Realignment** – *completed* – The Engineering Department in conjunction with the DPW, identified this intersection as a safety concern for pedestrians and motorists based upon public input from local residents and a crash study performed by the Engineering Department for the intersection. This intersection is currently used by the Schools as a drop-off/pick-up location. There are no sidewalks existing on Violet Avenue, making it dangerous for students who wait for the bus. The redesign of the intersection consisted of creating a well-defined "T" intersection that forces motorists to approach the intersection in more of a perpendicular fashion. By making the intersection geometry perpendicular, the intent is to make the motorist have to come to a stop in order to make the right or left hand turning movement onto Pine Street. Also, by making a proper "T" intersection, we were able to generate useable space off the roadway for the construction of asphalt sidewalks with granite curbing and accessible ramps within the area of the immediate intersection creating a safer location for students

getting on and off the bus. Construction was completed this month by the DPW's asphalt paving & resurfacing contractor.

- **Striar Property – ongoing** – The Engineering Department assisted the Manor Fields Scoping Committee with the development of the RFP for the design of recreational facilities at the Striar Property. We also sit as an ex-officio member to the committee to review and answer questions concerning engineering aspects of the design. We have provided limited surveying services to the consultant as a means to reduce costs associated with the design. The Town's consultants are currently fine tuning the 100% design plans and specifications for submission.
- **Needham Street Bridge – ongoing** – The Engineering Department in conjunction with DPW had been working with MassDOT as they established their 100% design plans. MassDOT advertised the project in November 2014 with a bid opening scheduled in April 2015. Construction is anticipated to start in the summer of 2015. The Engineering Department was responsible for acquiring all the right-of-way easements for the project. Prior to this the Engineering Department and the DPW had to take emergency steps to repair a hole in the bridge deck and develop a temporary shoring plan to allow the bridge to remain open.
- **Geographic Information System (GIS) Administration – ongoing** - The Engineering Department, led by its GIS Manager, manages the administration of the GIS for the Town. The role of the GIS Division within the Engineering Department is to respond directly to the various needs of the Town's various departments, as they relate to GIS. The responsibilities of the GIS Division include database administration, software application development, generating reports, creating maps and updating the Town's geospatial data. Below is a listing of some of the projects that the GIS division has been involved with:
  - **Department Outreach – ongoing** – The GIS Division conducted informational sessions over the course of several months. Sessions were held with individual and small groups of departments to better focus the discussion.
  - **Public Web/Mobile GIS – ongoing** – The GIS Division continues to publish mapping content through the Town of Dedham Maps Online application. Information is available as downloadable PDF files, web maps, and applications.
  - **Work Order/Asset Management for Public Works – ongoing** – Worked with Public Works department to implement an integrated work order and asset management solution. The software solution, Cartegraph, allows Public Works staff to track service requests and work orders to their completion. The asset management will allow the Public Works department to track maintenance history on specific items (e.g. signs, stormwater infrastructure). The asset management capability will assist the Public Works department in tracking federally mandated maintenance on public infrastructure.
  - **Citizen Access Service Requests – complete** - The GIS Division implemented YourGov by Cartegraph for the Public Works department. The YourGov solution has both a web and mobile application. Both applications integrate directly into the Public Works existing work order management system, allowing staff to access all service requests in a single location.
  - **Cemetery – complete** - The web application for the Brookdale Cemetery was redesigned for better support on various tablet and mobile devices. This allows the Cemetery Division to access burial record information from the field. The same application was repackaged for the Village Cemetery.

- **Infrastructure Engineering Operations** – *ongoing* – The Engineering Department uses an iPad to conduct stormwater outfall inspections in the field. Development is underway to expand this process to maintaining traffic signs.
  - **Web GIS for Town staff** – *ongoing* – The GIS division has been implementing cloud and web based GIS technology called ArcGIS Online. This technology provides GIS capabilities to departments and staff that do not otherwise have GIS. These tools allow sharing and collaboration of information between departments. The GIS Division has held multiple training opportunities throughout the year. In the fall, the GIS Division released its first “What’s New in GIS” newsletter to direct Town staff straight to newly available GIS services. The GIS Division continues to develop new content on ArcGIS Online to enhance the Town’s GIS.
  - **Police** – *ongoing* - Automated mapping of incident information from police database. The process provides the police with a secured web map of incident data updated every six hours. The data is also made available to other GIS users for mapping of accident or other relevant police incident information.
  - **State/Regional Collaboration** – *ongoing* –
    - **MassGIS** – *complete* - Worked with MassGIS staff to provide updated standardized structure data for Dedham to the state. Dedham is the only municipality to provide such an update. Also, worked with Applied Geographics to provide the state with standardized parcel data. Standardized parcel and structure information are critical data layers for creating statewide address information to support E911 services.
    - **MassOrtho** – *ongoing* - The Massachusetts Orthoimagery Consortium (MassOrtho) is a consortium of Massachusetts municipalities organized to share the costs of orthoimagery acquisition. MassOrtho is working with the U.S. Geological Survey (USGS) to streamline the procurement process and provide quality control over the project. The funding agreement is to be finalized in December 2013 for a March/April 2014 imagery collection. Dedham should realize a significant cost savings by participating in MassOrtho.
    - **USGS** - *ongoing* – Dedham has entered into a joint funding agreement with the USGS to collect LiDAR data as part of a larger collection. The LiDAR collection will provide Dedham with updated bare-earth ground elevations and surface model. Data collection is underway with delivery scheduled for 2014.
- **Storm Drainage Improvements/Inspections** – *ongoing* – The Engineering Department routinely responds to complaints and flooding issues throughout Town. As part of our evaluations of drain lines we have cleaned and inspected approximately 17.8 miles of pipe. In addition we design improvements as needed. Over the past year the Town has installed 9 new deep sump catch basins.
  - **Neponset Valley Stormwater Collaborative** – *ongoing* - The Engineering Department sits as one of the representatives from Dedham as part of the regional stormwater collaborative with 14 other Neponset Valley Communities. This collaborative was formed through the Community Innovation Challenge Grant awarded to the MAPC and Neponset River Watershed Association. The collaborative is working together to prepare the communities for the challenges that are anticipated to arise from the new MS4 permit to be issued to the Commonwealth from the EPA.
  - **Sewer Billing Project** – *ongoing* – The Engineering Department has been working with the Collectors Office to identify properties which were likely on sewer but not receiving

bills using billing data and GIS information. To date 156 properties have been added to the sewer billing system. Of the 156 properties, 24 are properties located in Westwood and 3 are properties located in Boston. We are currently utilizing our sewer TV inspection data and GIS to plot locations where active sewer connections are made to the Town's system to identify additional properties that are likely connected but not receiving bills.

- **Stormwater Illicit Discharge Detection** – *ongoing* – As part of the Town's NPDES Stormwater Phase II Permit, the Engineering Department conducts outfall inspections to screen for illicit discharges to the storm drainage systems. To date, 191 inspections have been completed.
- **Sewer Connection, Extension, and Repair Inspections** – *ongoing* - The Engineering Department reviews, issues, and inspects permits for the installation and satisfactory testing of sewer lines and manholes on a daily basis. We spend a great deal of time responding to questions from residents and builders and we provide them with locations of existing facilities from record plans or television inspections. Over the past year, the Department reviewed, issued and/or inspected 43 permits.
- **Subdivision and Site Plan Review** – *ongoing* - The Engineering Department reviews numerous site plans and subdivisions for consistency with Town regulations and acceptable design standards. We provide written comments to the respective boards on the adequacy of those plans and calculations.
- **Other notable completed projects:**
  - Washington Street Discontinuance (2013)
  - Municipal Building Inspections (2012)
  - Town Wide Inflow & Investigation & Rehabilitation Program (2012)
  - Lowder Street at Highland Street Intersection Realignment (2012)
  - Town-Wide Flow Monitoring Project (2011)
  - High/Lowder/Westfield Street Traffic Calming (2011)
  - Stormwater BMP Retrofit Grant (2012)
  - Lowder Street Culvert Replacement (2011)
  - Cedar Street Culvert Replacement (2011)
  - Colburn Street Reconstruction (2011)
  - Pacella Drive Illicit Discharge Removal (2010)
  - Traffic Regulations Update (2010)
  - East Street Reconstruction – Phase II (2009)
  - East Street Reconstruction – Lowe's Money (2009)
  - Condon Park Parking Lot Design (2009)
  - Bussey Street Culvert Abandonment (2009)
  - Maverick Street Wall Replacement (2009)
  - Zoar Avenue Sewer Replacement (2009)
  - Rustcraft Road Sewer Replacement (2009)
  - Gaffney Road Sewer Improvements (2009)
  - Brookdale Cemetery Expansion (2008)
  - Flanagan Place/Orphan Line Drainage (2008)
  - Bridge Inspections (2008)
  - Intersection Redesign, Greenlodge Street at Sprague Street (2008)
  - East Street and Washington Street Sewer Replacement (2007)
  - Street Opening Regulations Update (2006)
  - Sewer Regulations Update (2006)
  - Salt Shed (2006)



Cc: Board of Selectmen  
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