Medway's Integrated Water Resources Management Plan

IWRMP Update Workshop

IWRMP Task Force
Medway Town Hall
November 16, 2017

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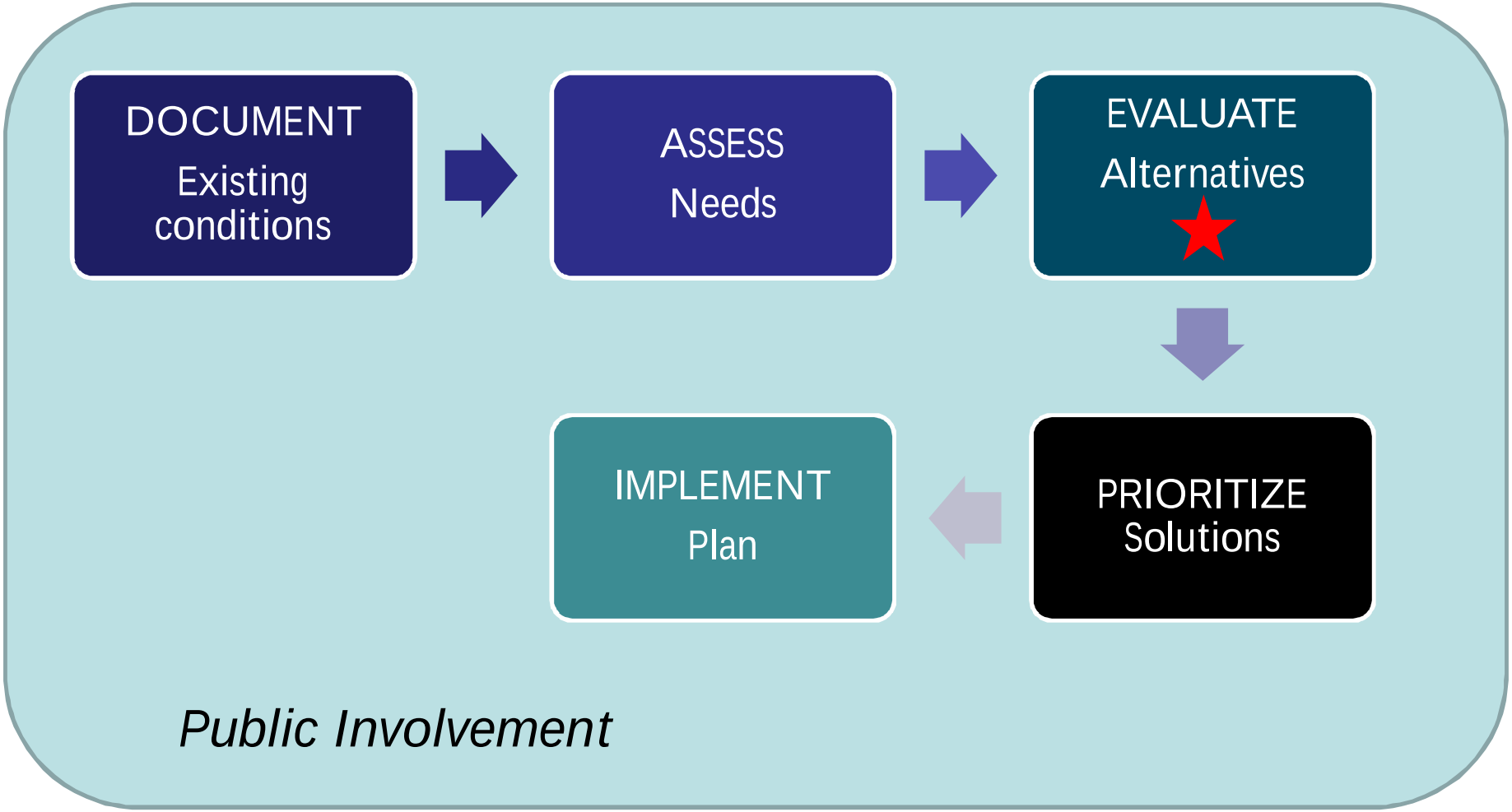
Agenda

1. Introductions, Meeting Objectives
2. Project Overview/Status
3. Integrated Systems Group Exercise
4. System Needs, Projections and Alternatives
    i. Drinking Water
    ii. Wastewater
    iii. Stormwater
5. Decision Model Development
6. Next Steps

Integrated Water Resources Planning Process



IWRMP Phase II

- ☑ Document Existing Conditions
- ☑ Identify Needs
- ☑ Identify Alternatives to Address Needs
- ❖ Evaluate Alternatives and Select Preferred Solutions
- ❑ Conceptual Design
- ❑ Develop IWRMP (in progress)
- ❑ Develop Implementation Schedule

Integrated Water Resources Systems

Water

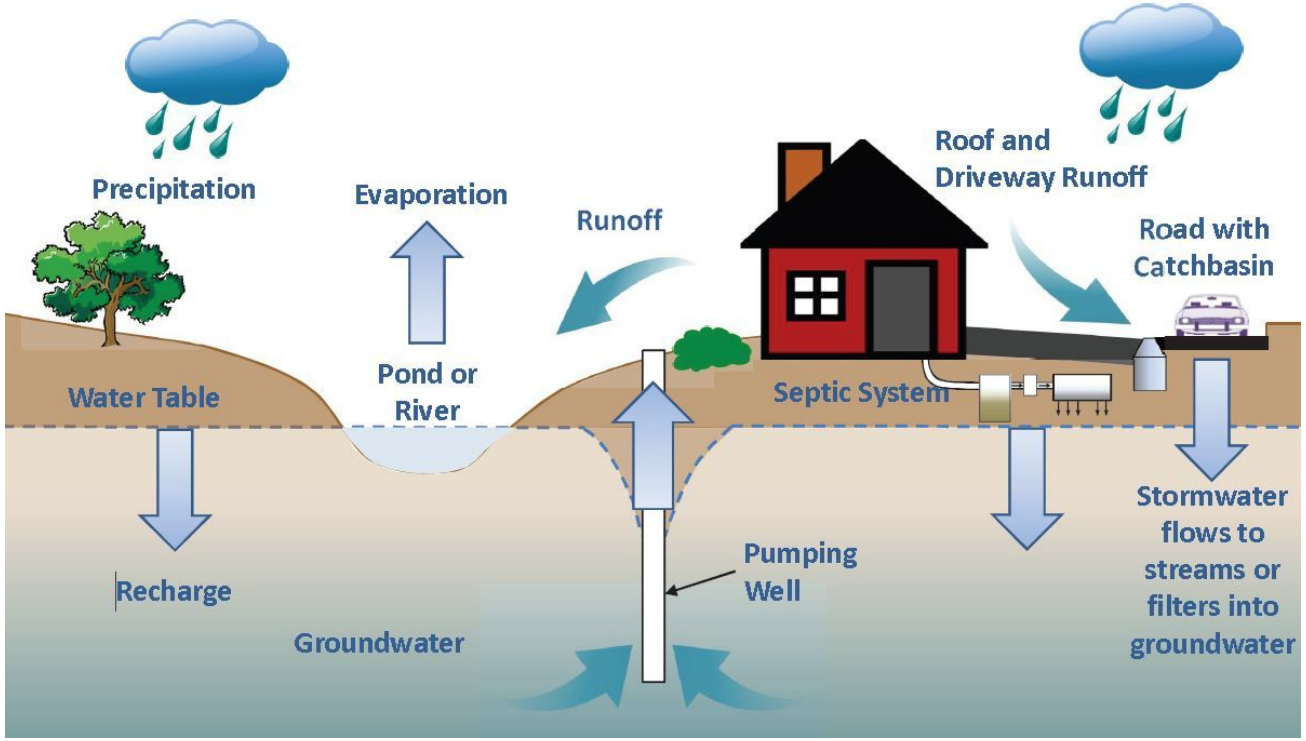
Stormwater

Wastewater

How do we integrate the analysis?

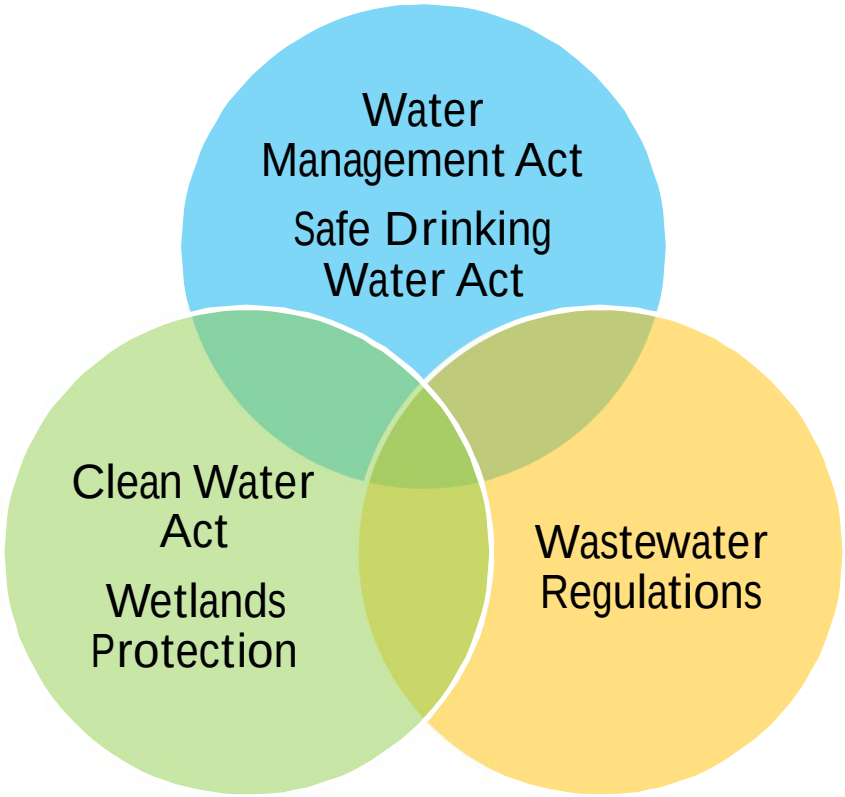
- Develop Decision Model
  - Simulate interactions between systems
  - Provide quantitative assessment of alternatives
  - Determine which alternatives will be most effective
  - Allow for focused design effort on selected alternatives

Why Integrated Water Resources Planning?



Water resources and infrastructure are all interconnected !

Regulatory Context & Integrated Planning



Water resources and infrastructure regulations overlap

Medway's Water Resources Challenges

Water bans in effect as drought continues

Medway: State executive OKs Exelon expansion Milford Daily News
With **Medway** unable to provide the average of 95,000 gallons of **water** the plant will need per day, Exelon has been in talks with neighboring Millis to ...

Storm water permit, and huge expense, may be incoming

WATER SUPPLY & DEMAND ASSESSMENT IN RELATION TO EXELON POWER 'WEST MEDWAY II' PROJECT

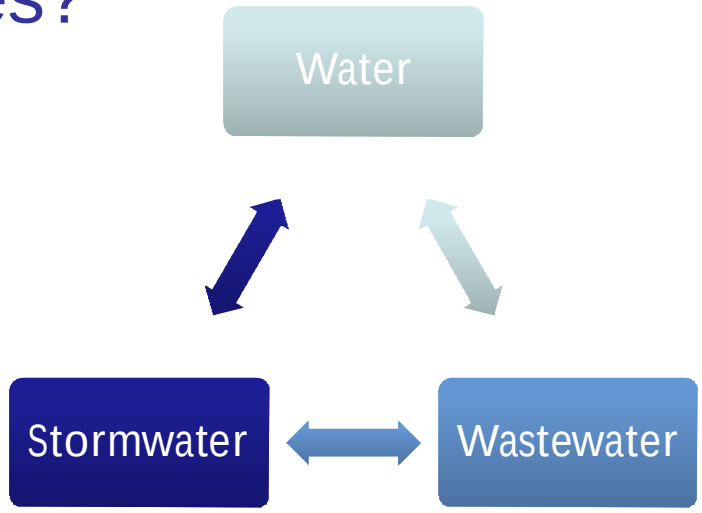
Water: a costly commodity in MetroWest

Like Bellingham, Medway's water is pumped out of the ground, which brings naturally occurring high levels of iron and manganese.

Medway crews repond to three water main breaks

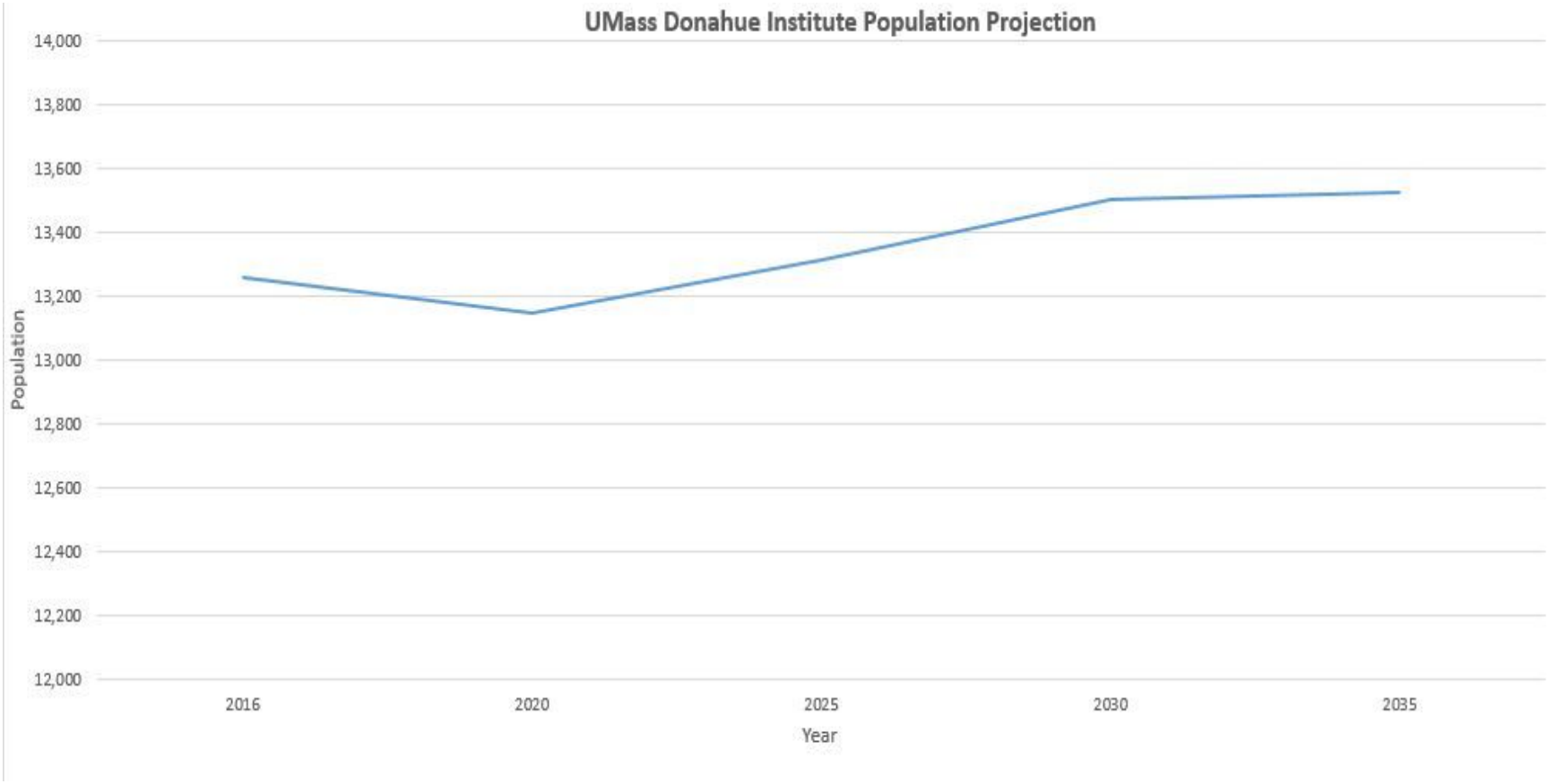
Group Exercise

- What do these systems mean to you?
- How do they interact?
- What are the drivers for managing them?
- Who are the stakeholders?
- What are the funding sources?



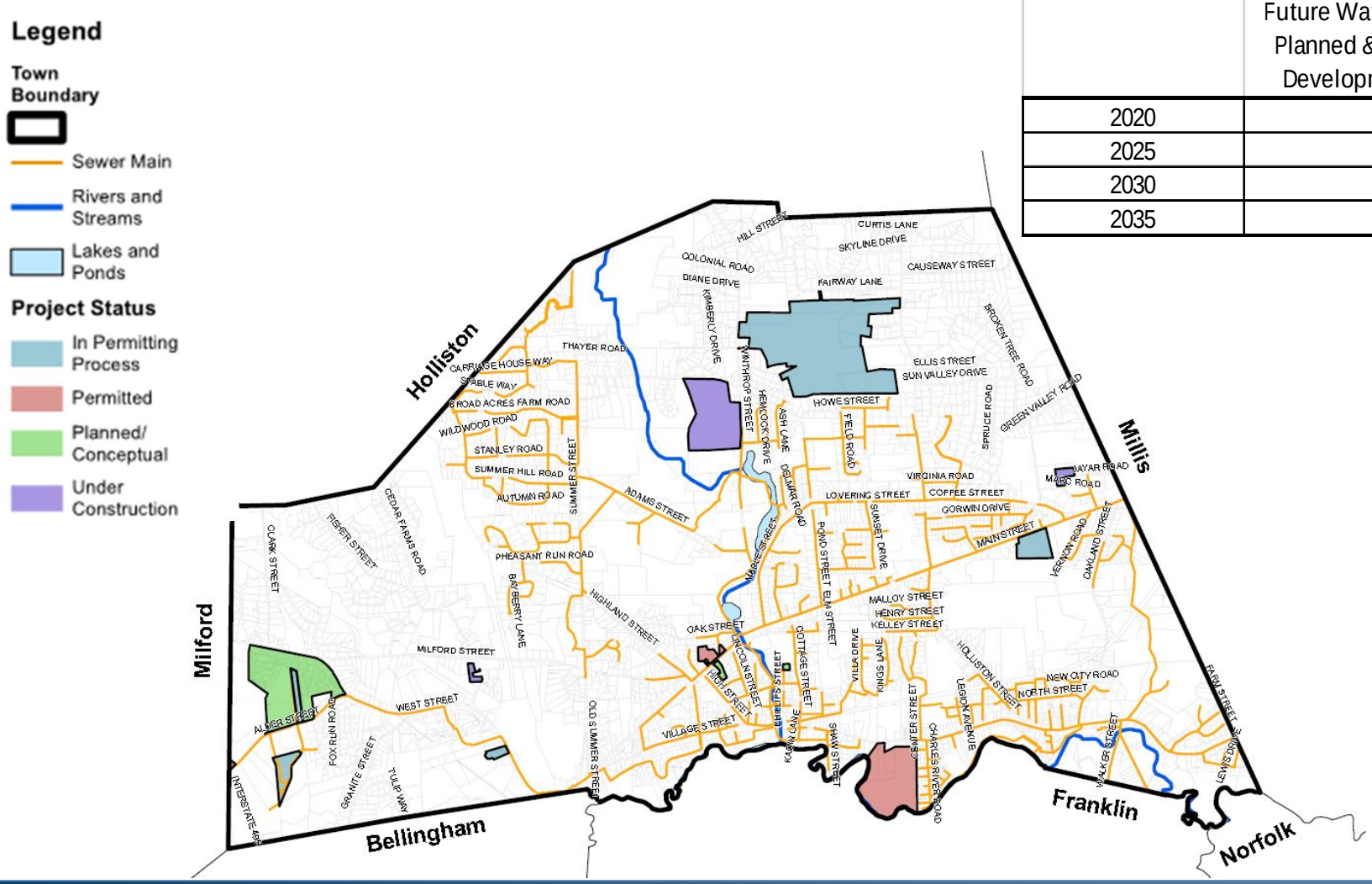
System Needs, Projections and Alternatives

Population Growth



- 1.26% Growth from 2020 to 2025
- 1.48% Growth from 2025 to 2030

Upcoming Development Projects



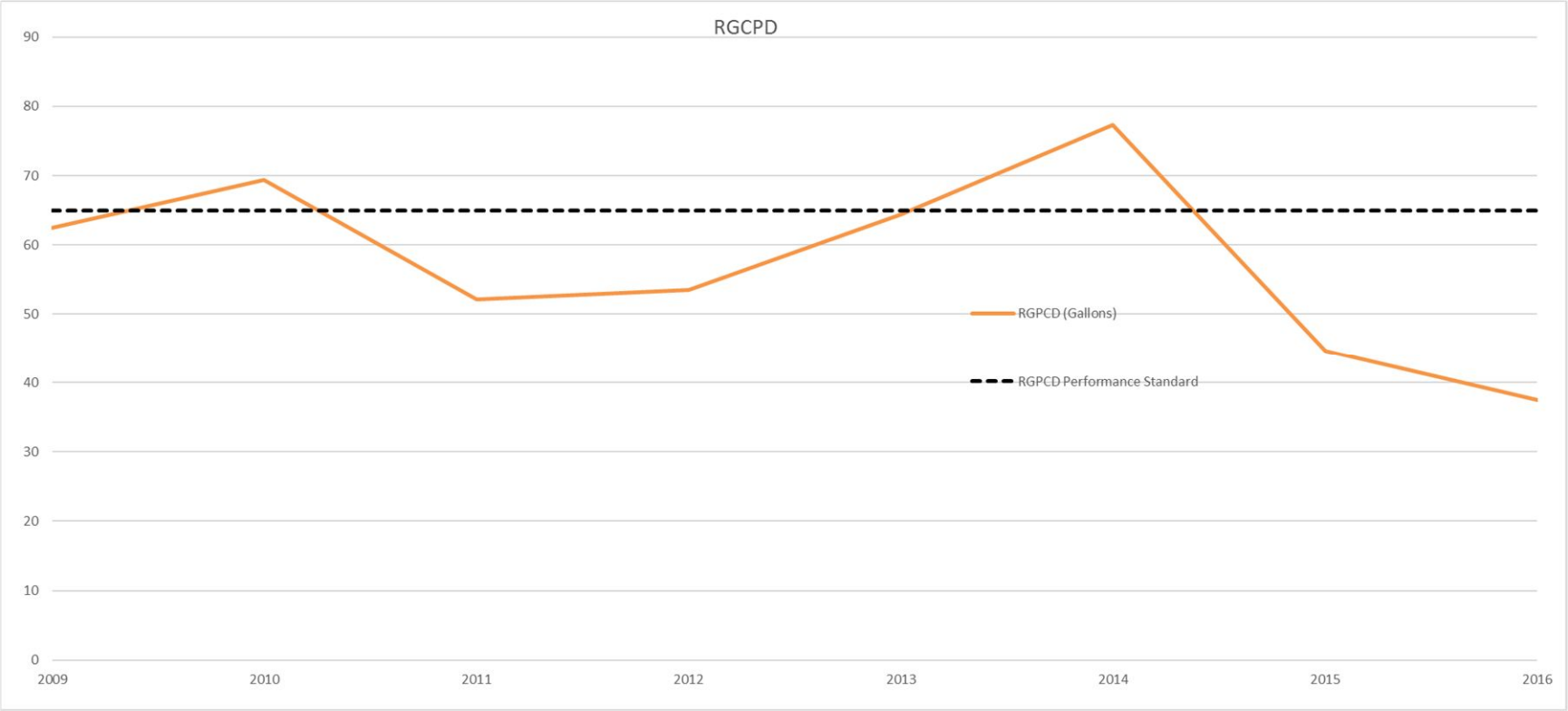
	Future Water Demand, Planned & Permitted Development (gpd)
2020	84,700
2025	185,900
2030	197,600
2035	251,700

Average Water Use by Customer Type

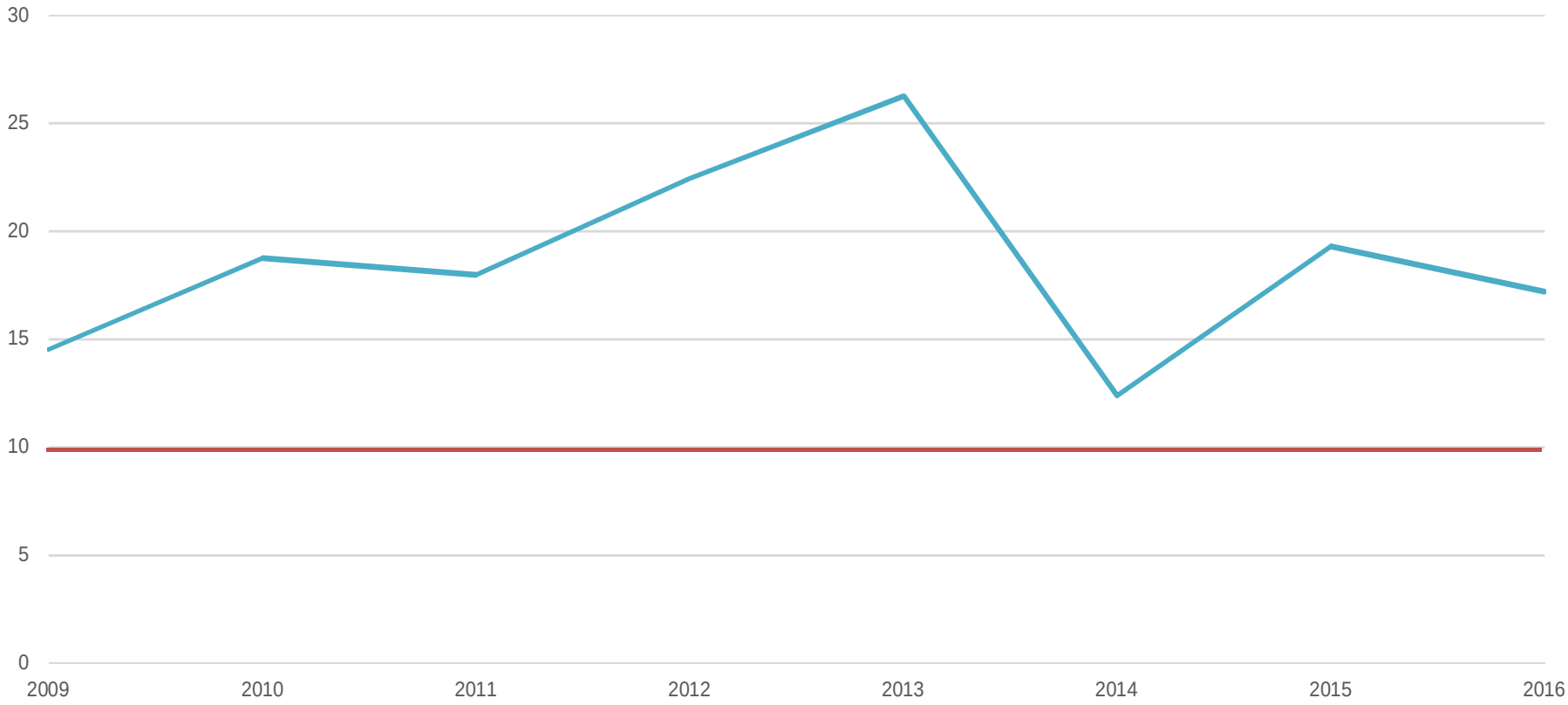
	Avg Annual Use (MG)	Percent of Townwide Use
Residential	215.846	87%
Residential Institutional	8.670	4%
Commercial Business	12.737	5%
Agricultural	0.337	0%
Industrial	5.991	2%
Municipal/Institutional/Non-Profits	3.331	1%
Other	0.525	0%
Total	247.436	100%

Source: ASR Data, 2009-2016

Residential Water Usage, Historic

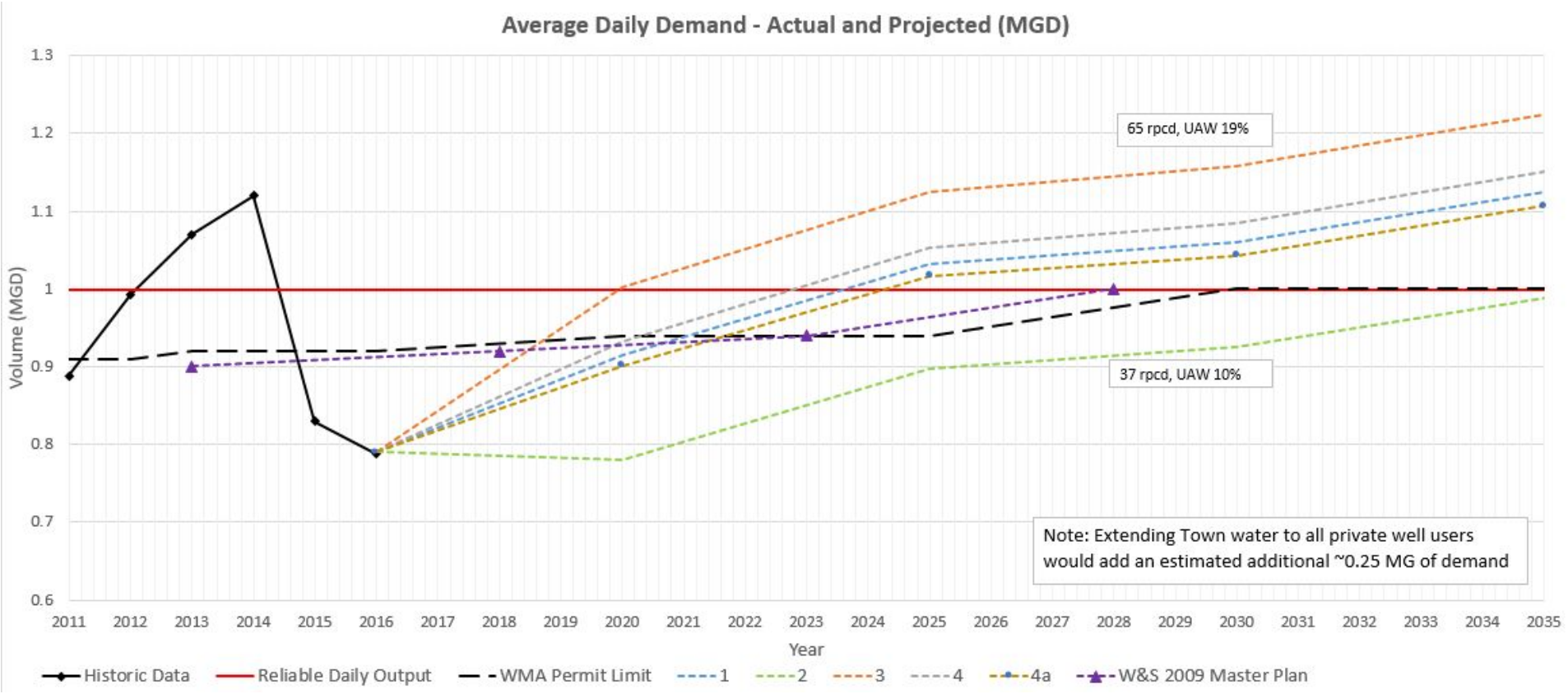


Unaccounted for Water (UAW, % of total)



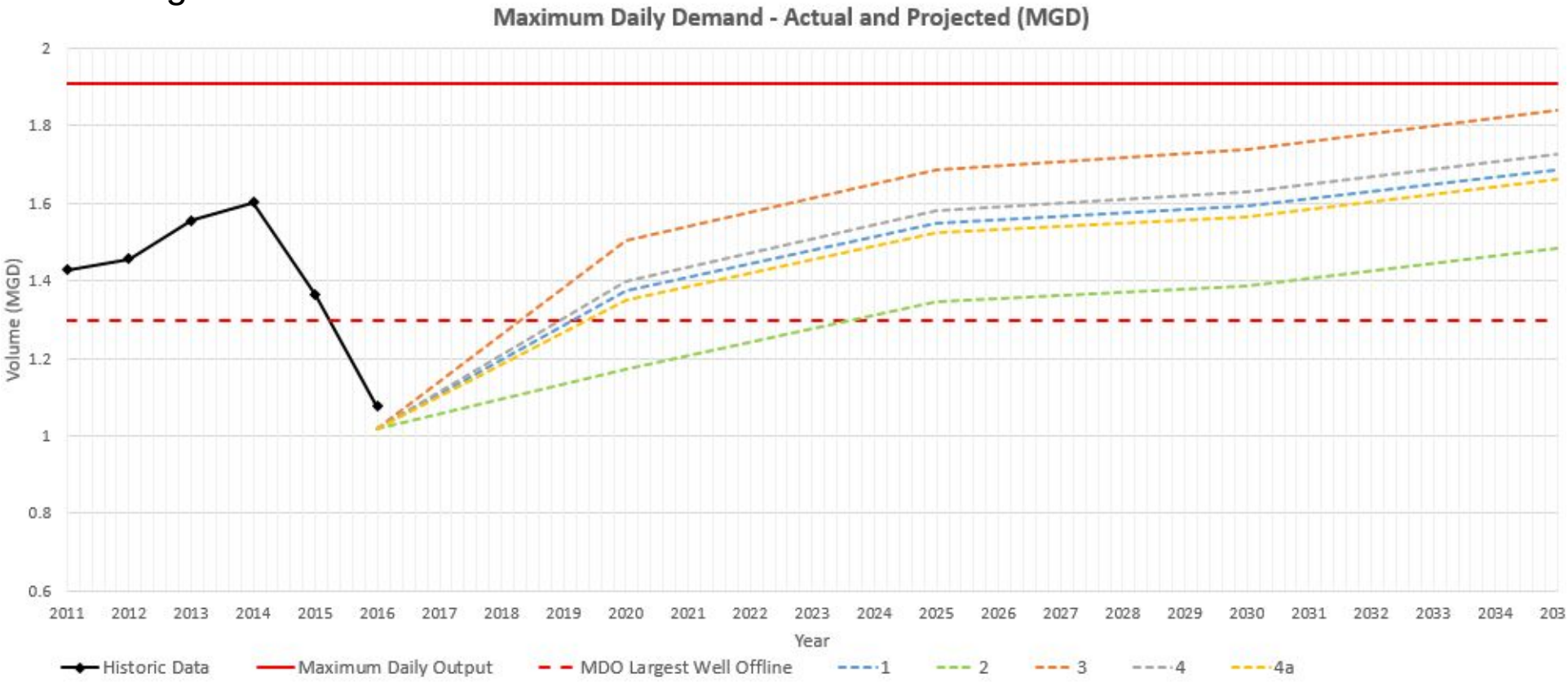
MassDEP requirement: 10% UAW

Drinking Water



Scenario	Description
1	Future residential water Use at current (2016) rate and UAW at current (2016) value
2	Future residential water use at current (2016) rate and UAW at 10%
3	Future residential water use at 65 gpcd and UAW 2011-2016 avg. value
4	Future residential water use at 65 GPCD and UAW at 10% (Umass Donahue Population)
4a	Future residential water use at 65 GPCD and UAW at 10% (MassDOT Population)

Drinking Water



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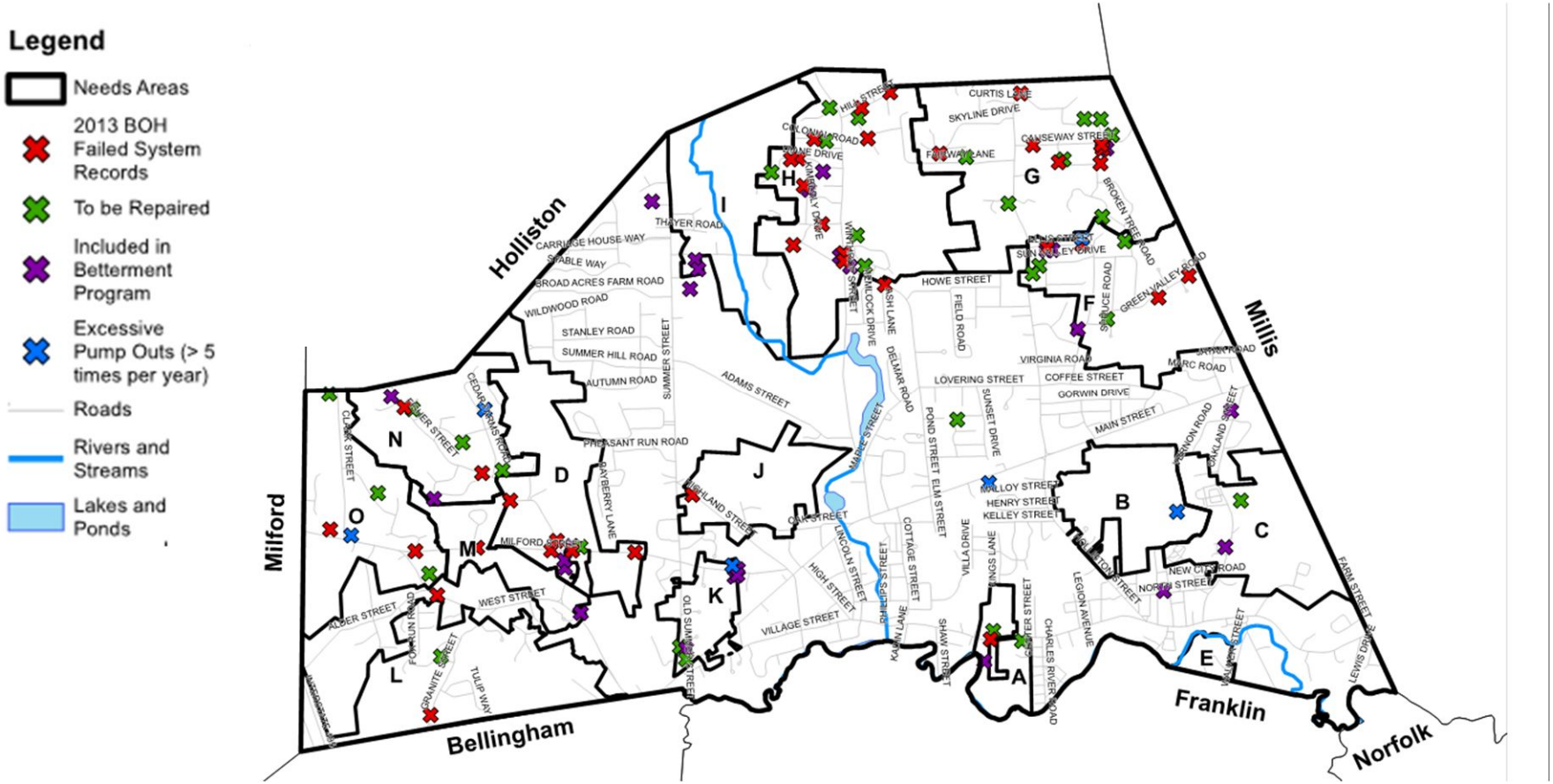
Groundwater Sources

	Avg Annual Pumping (MG)	Percent of Total Water Supply
Populatic/Water Street GP Well	154.640	44%
Oakland Street GP Well	24.680	7%
Village Street Replacement Well	111.926	32%
Industrial Park Road Well	58.290	17%
Total	349.535	100%

Source: ASR Data, 2009-2016

Septic System Failures

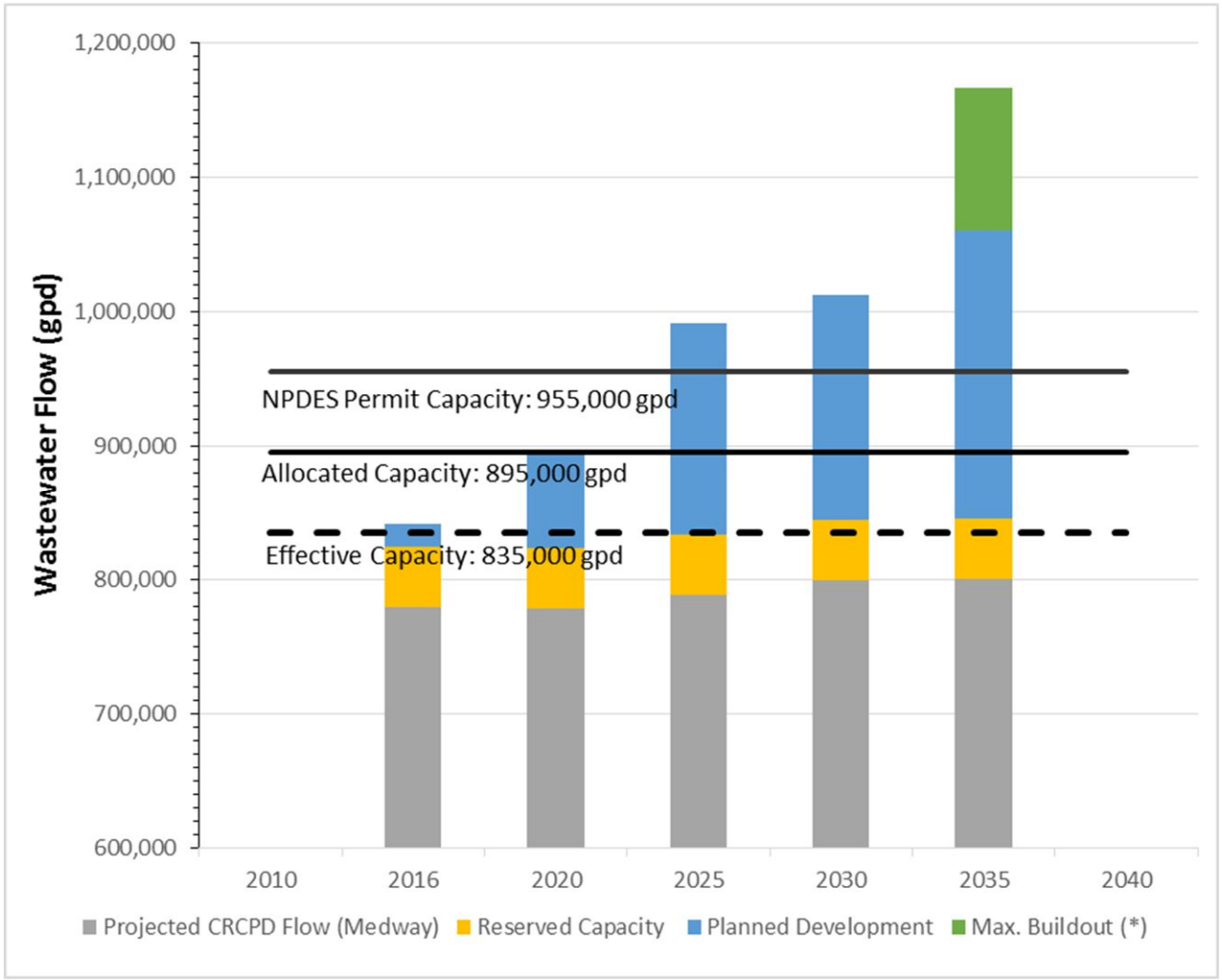


CRPCD Limits - Medway

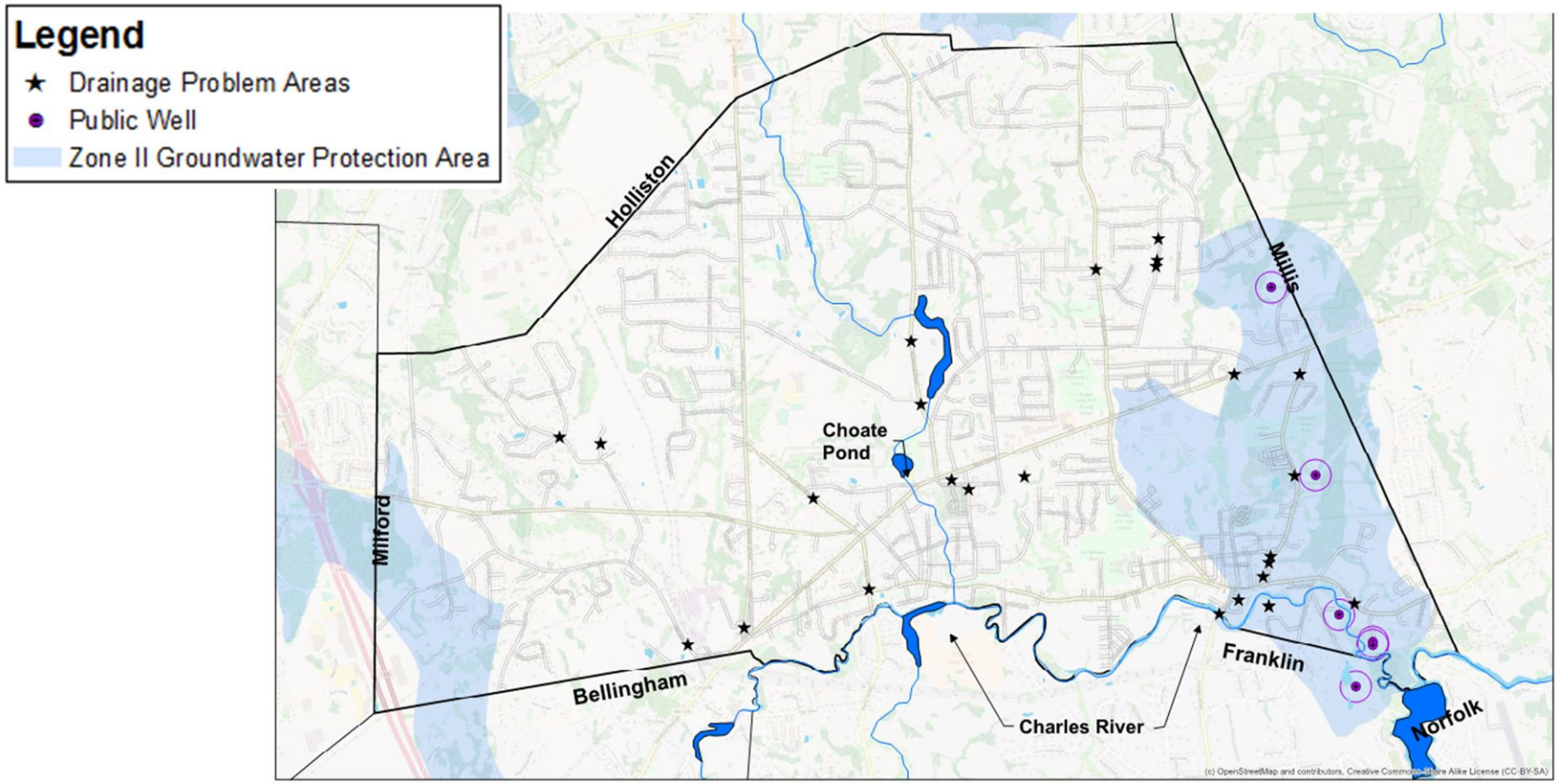
- Permit Capacity: 955,000 gpd
- Capacity Allocation: 895,000 gpd
- Effective Capacity: 835,000 gpd

Type of Flow	Current	2020	2025	2030	2035
Flow to CRPCD *(per Umass Donahue projections)*	779,000	778,600	788,300	799,400	800,800
Reserved Capacity *(Septic Users in Sewered Area)*	45,000	45,000	45,000	45,000	45,000
Known Development *(Source: Planning Department)*	17,000	72,000	158,000	168,000	214,000
Projected Flow	841,000	895,600	991,300	1,012,400	1,059,800

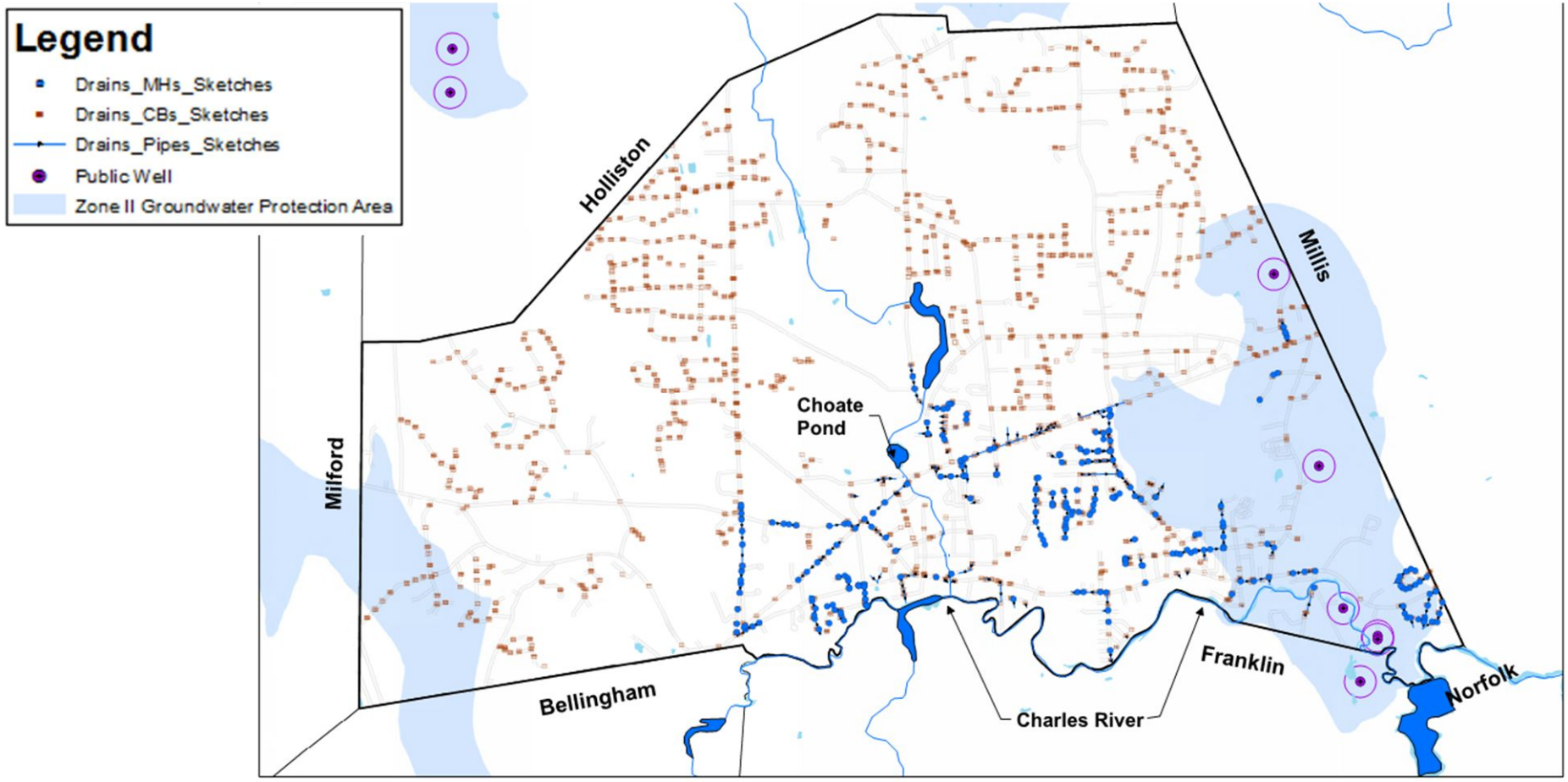
Wastewater Projections



Stormwater: Maintenance Areas



Stormwater: Mapping Needs



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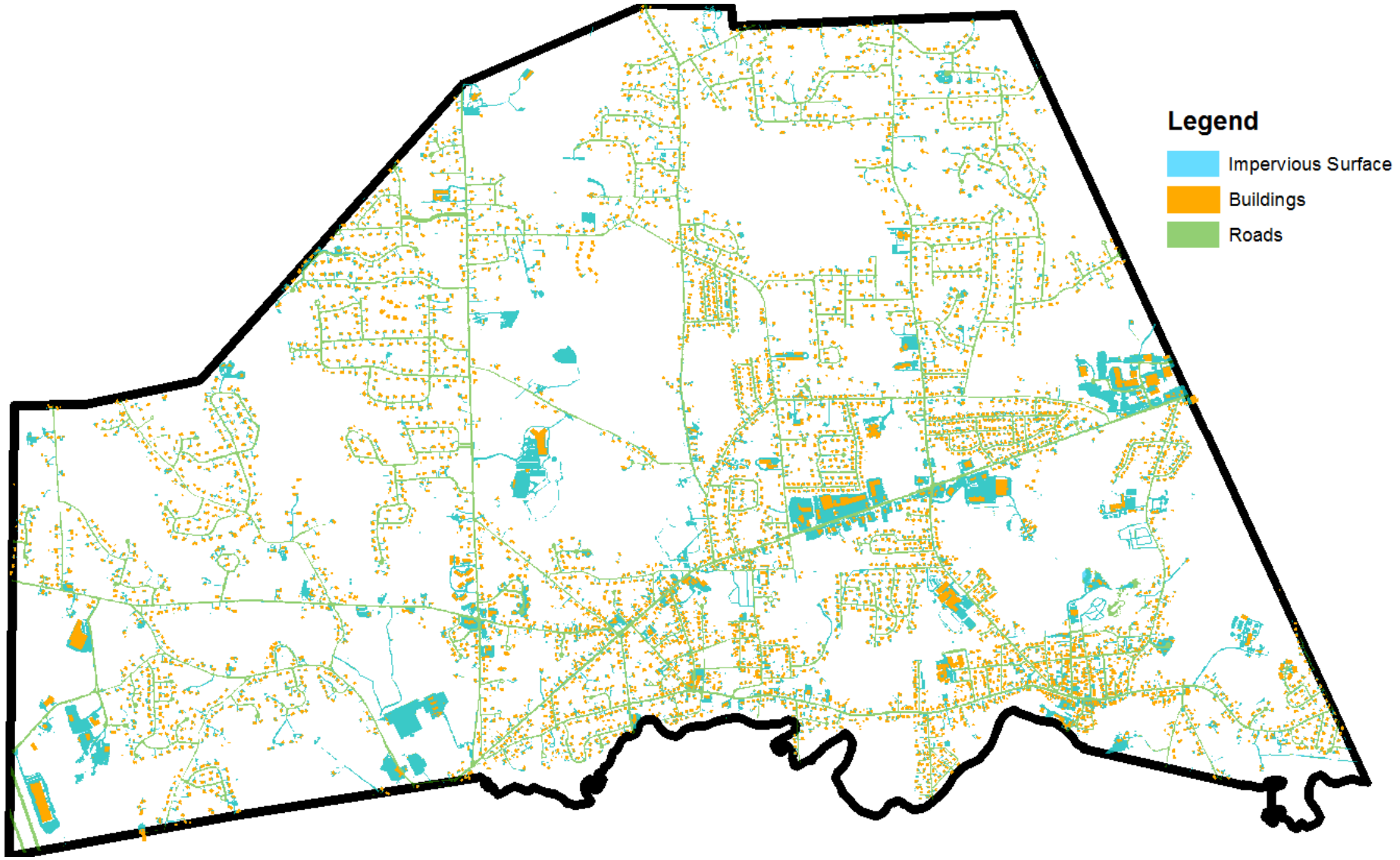

Stormwater: Runoff Impacts

- 10% of Town Area = Impervious Cover
- Average Annual Rainfall: 41.1”
- Runoff: ~3,120 MG/year

- Water Quality Discharges at Outfalls

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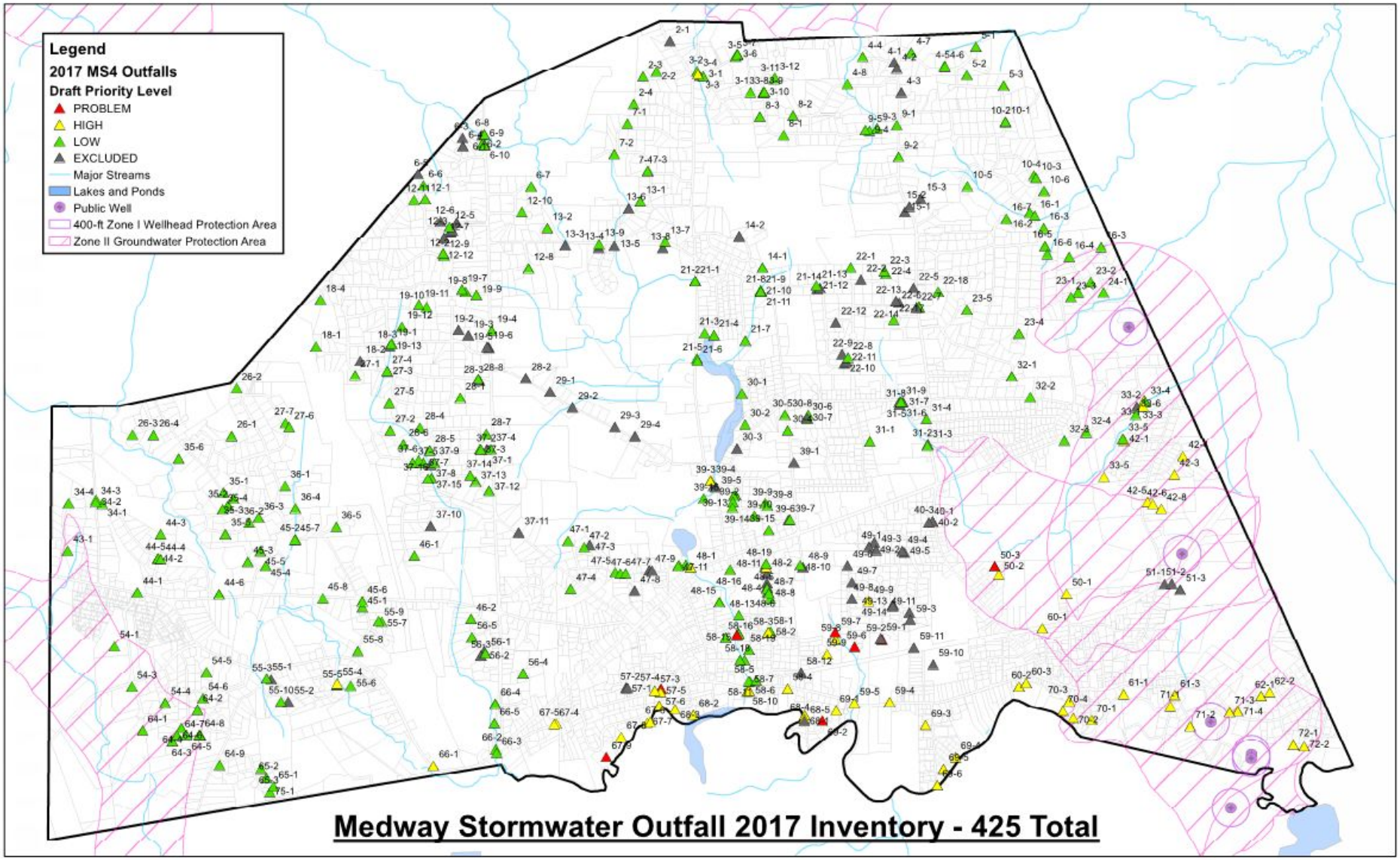


Medway Stormwater Outfall 2017 Inventory - 425 Total

Drinking Water

Needs	Solutions
Lack of well supply capacity	• annual well rehabilitation program to restore lost capacity; increase resiliency
Lack of well redundancy	• Satellite wells • Replacement wells / wellfield

Unlikely to meet max daily demand with largest source offline
 	
Within 2-5 years, may be unable to meet average day demand
	• Emergency purchase agreement with Millis
	• Alternative water sources
	  • New supply well
	  • Stormwater capture
	  • Wastewater Reuse

Drinking Water

Needs	Solutions
Future supply deficit projected	Continue / enhance demand management • Conservation education/outreach • Fixture retrofits • Rebates • Water ban
New regulatory constraints (WMA) • Offsets required for higher withdrawal authorization	Consult with DEP on new WMA Permit application; identify credits
Iron & manganese levels requiring treatment	Construct treatment facility
Un-accounted for water (UAW) >10%	• Meter testing / replacement program • Continue Annual Leak detection • Water main replacement as recommended in 2010 Master Plan

Wastewater

Needs	Alternatives
Data Gaps (flow metering)	• Permanent meter to confirm flow to CRPCD
CRPCD discharge limits	• Sewer moratorium • Infiltration/Inflow (I/I) Removal o Flow Metering* o Illicit Connections o Private Inflow Sources o CCTV Inspection o Manhole Sealing o Cured in Place Pipelining (CIPP)
Support Planned Buildout	• Sewer Extensions • I/I Removal • Increase discharge limit at CRPCD

Wastewater

Needs	Solutions
Septic systems failures • Physical limitations- High groundwater, extensive wetlands; poorly drained soils. • Protect Water Supply Sources	• Decentralized Treatment System • Sewer Extensions • Septic Needs Support Funds
Ongoing Maintenance • Fats, Oils, Grease (FOG) • Root Removal • System Condition Assessment • Pump Station Operation	• Support DPS Operations • CCTV Inspection of full system
Public Education	• FOG • Illicit Connections • Private Inflow Sources

Stormwater

Needs	Solutions
Localized Flooding • Low Topography • Sedimentation • Blocked Catch Basins • Beaver Activity	• Implement Green Infrastructure • Address development standards • Support maintenance
Mapping of System • GIS mapping of drain system • Delineate Catchments	• Map Drain System in Problem and High Concern Catchments
Water Quality Monitoring at Outfalls • Dry Weather Flow • Water Quality Sampling	• Support DPS Operations • MS4 Funding

Stormwater

Needs	Solutions
Maintenance • Good Housekeeping • Catch Basin Cleaning • Street Sweeping	• Support DPS Operations • MS4 Funding
Public Education	• Ongoing education programs
Water Quality Improvements	• 6 Minimum Controls • BMPs

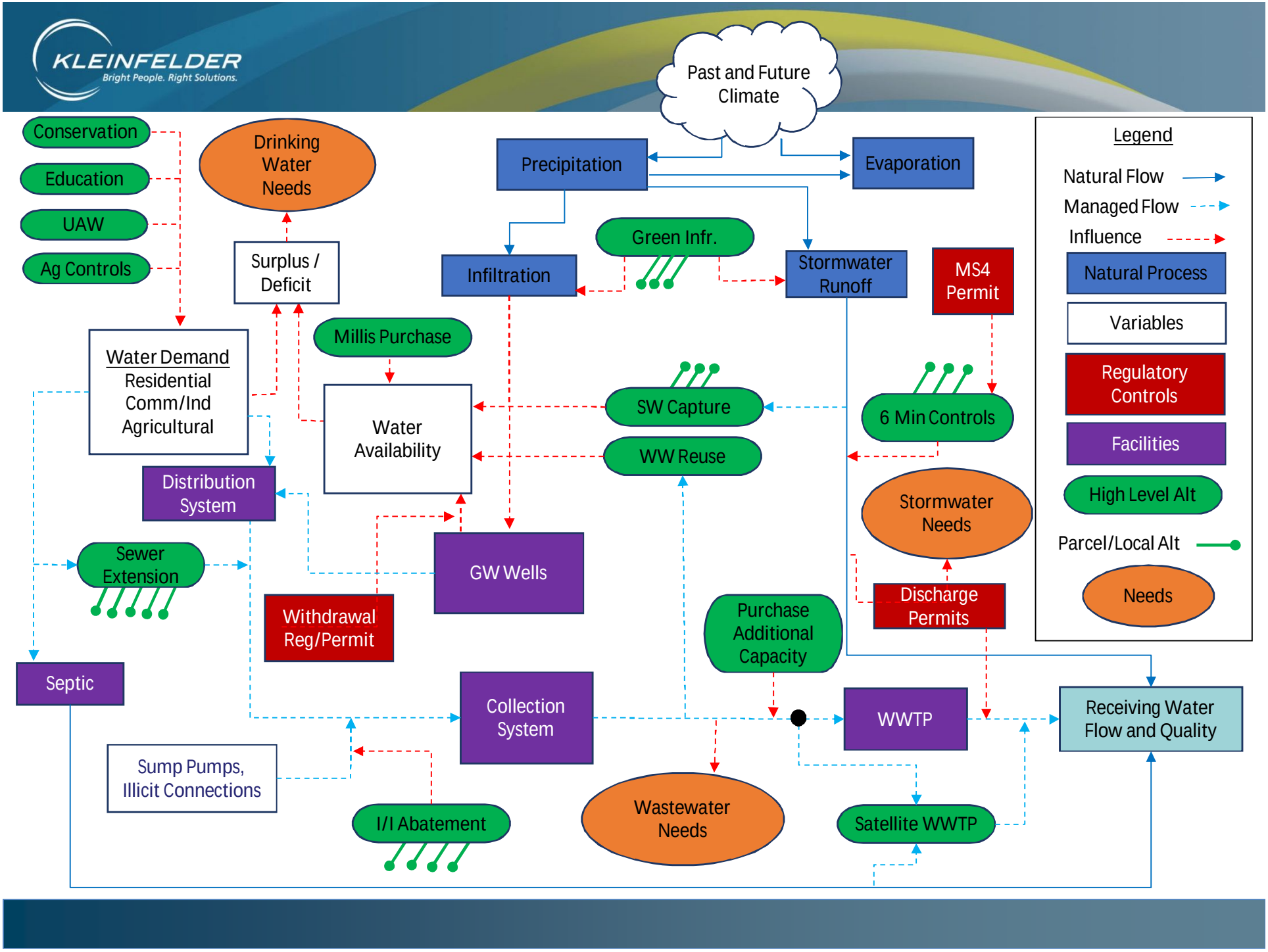
Decision Model Development

- How do we decide which alternatives will be best for the Town?
  - Technically feasible
  - Cost effective
  - Acceptable
  - Multi-benefit solutions

Decision Model

- Simulate dynamic interactions between systems:
  - Rainfall ↓, Groundwater ↓
  - Impervious Cover ↑, Runoff ↑
  - Population ↑, Water Demand ↑, Wastewater ↑
  - Limits: permits, water availability, capacity
  - Tradeoffs: resources, quality

- Goal: quantify the tradeoffs and sensitivities as a guide for decision making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Past and Future Climate
Conservation
Education
UAW
Ag Controls
Drinking Water Needs
Surplus / Deficit
Precipitation
Evaporation
Green Infr.
Infiltration
Stormwater Runoff
MS4 Permit
Millis Purchase
Water Demand
Residential
Comm/Ind
Agricultural
Water Availability
SW Capture
WW Reuse
6 Min Controls
Distribution System
Stormwater Needs
Sewer Extension
GW Wells
Withdrawal Reg/Permit
Discharge Permits
Purchase Additional Capacity
Septic
Collection System
WWTP
Receiving Water Flow and Quality
Sump Pumps, Illicit Connections
I/I Abatement
Wastewater Needs
Satellite WWTP
Legend
Natural Flow
Managed Flow
Influence
Natural Process
Variables
Regulatory Controls
Facilities
High Level Alt
Parcel/Local Alt
Needs

Model Inputs

- Historical and Projected:
  - Water demands
  - Wastewater flow
  - Precipitation
  - Management options
    - UAW identification
    - I/I removal
    - Treatment

Alternatives

- These are your decisions….
  - Which ones would be preferred?
  - Which would not be preferred?
  - What might be missing?

Next Steps Summary

Next Steps

- Run Decision Model (Nov-Dec)
  - Identify preferred alternatives for further development
  - Workshop in January
- Conceptual Design of Alternatives (Jan-Feb)
  - Evaluate Costs
- Draft Implementation Plan (Feb-Mar)
  - Review implementation schedule and costs
  - Workshop and Public Meeting in April
- Complete Draft IWRMP (April)

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Integrated Water Resources Management Plan

Thank you for your time!