

Phasing Approaches Yield Fast Compliance and Big Savings for the Town of Middleborough for Nutrient Removal Upgrades

NEWEA Session 18

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Presented by:

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WRIGHT-PIERCE 
Engineering a Better Environment

Project Team

- Town Of Middleborough
 - Robert Nunes, Town Administrator
 - Charles Cristello, Former Town Administrator
 - Chris Peck, DPW Director
 - Todd Goldman, WPCF Superintendent
- Wright-Pierce
(Selected June 2013 to complete design)
- Environmental Partners Group , OPM



Presentation Overview

- Background
- Key Issues
 - Costs
 - Schedule - Funding/Design/Construction
 - Compliance
- Project Status



Background

- WPCF Last Upgrade in 1977 to 2.1 MGD
 - Equipment and Building Systems have reached end of life
 - EPA NPDES Permit limits for Nutrients
 - ◆ TN = 5 mg/L (New Limit)
(May 1st through October 31st)
 - ◆ TP = 0.15 mg/L (More Stringent)
(April 1st through October 31st)



Key Issue #1 - Costs

- Costs
 - WPCF Upgrade original estimate at \$30 million
 - Town targeted \$25 million or less
 - Largest Capital Project in Town's History



Addressing Cost - Part 1

- “Phased Approach” to Reduce Capital Cost
 - Need – meet needs for 20 years
 - Goal – Maximize use of existing infrastructure to reduce construction cost
 - Tools –
 - ◆ Revisit Flows and Loads
 - ◆ Process Modeling



Revisit Flows and Loads

- “Phased Approach” allows Town to save Capital Cost while maintaining WPCF permitted capacity of 2.1 MGD

Parameter	UNITS	Current 2007-2013	W-P Updated Interim Design	W-P Updated- Final Design
RAW INFLUENT FLOW				
Annual Average	MGD	1.1	1.6	2.1
Max. Month (Flow Based)	MGD	2.8	4.0	5.2
Peak Daily (Flow Based)	MGD	2.9	4.2	5.5
Peak Hourly	MGD	4.0	5.8	7.5



Process Modeling

- Results of “Phased Approach”:
 - Convert only 2 out of 4 Aeration Tanks to a 5-stage Bardenpho
 - Add a third Secondary Clarifier (Future Phase only)
 - Town saves Capital and O&M Costs



Addressing Budget Issues: Results

Construction Estimates	Cost
Original Construction Estimate	\$30 Million
Town Target	\$25 Million
Revised “Phased Approach”	\$23 Million
Low Bidder (Methuen Construction)	\$21.5 Million

Reduced Capital Costs by \$8.5 Million



Addressing Cost Part 2- Project Funding and Financing

- SRF 0% Loan Requirements
 1. Comprehensive Wastewater Management Plan (CWMP)
 2. Project Purpose
 - (Nutrient Removal)
 3. Smart Growth Control
 - “Flow Neutral” Land Use Controls
 4. Regional Water Resources Management
 5. Enforcement – No Permit Violations



Town Savings = \$5.25 Million



Key Issues : Cost Summary

Cost Source	Cost
Part 1: Capital Cost Savings	\$8.5 Million
Part 2: Project Funding and Financing through 0% Interest Loan	\$5.2 Million
Total Town Project Savings	\$13.7 Million



Key Issue #2 Schedule



- Comply with New NPDES Permit
- Meet Funding & Financing Milestones



Key Issue #2 - Schedule

Milestone	Permit Compliance (New Limits)	SRF Program Milestones	Completion Dates
CWMP		October 2014	Sept 2014
Design	May 2015	October 2014	October 2014 (16 months)
Construction Starts	May 2016	June 2015	June 2015
Construction Complete	May 2018		Final Completion August 2017

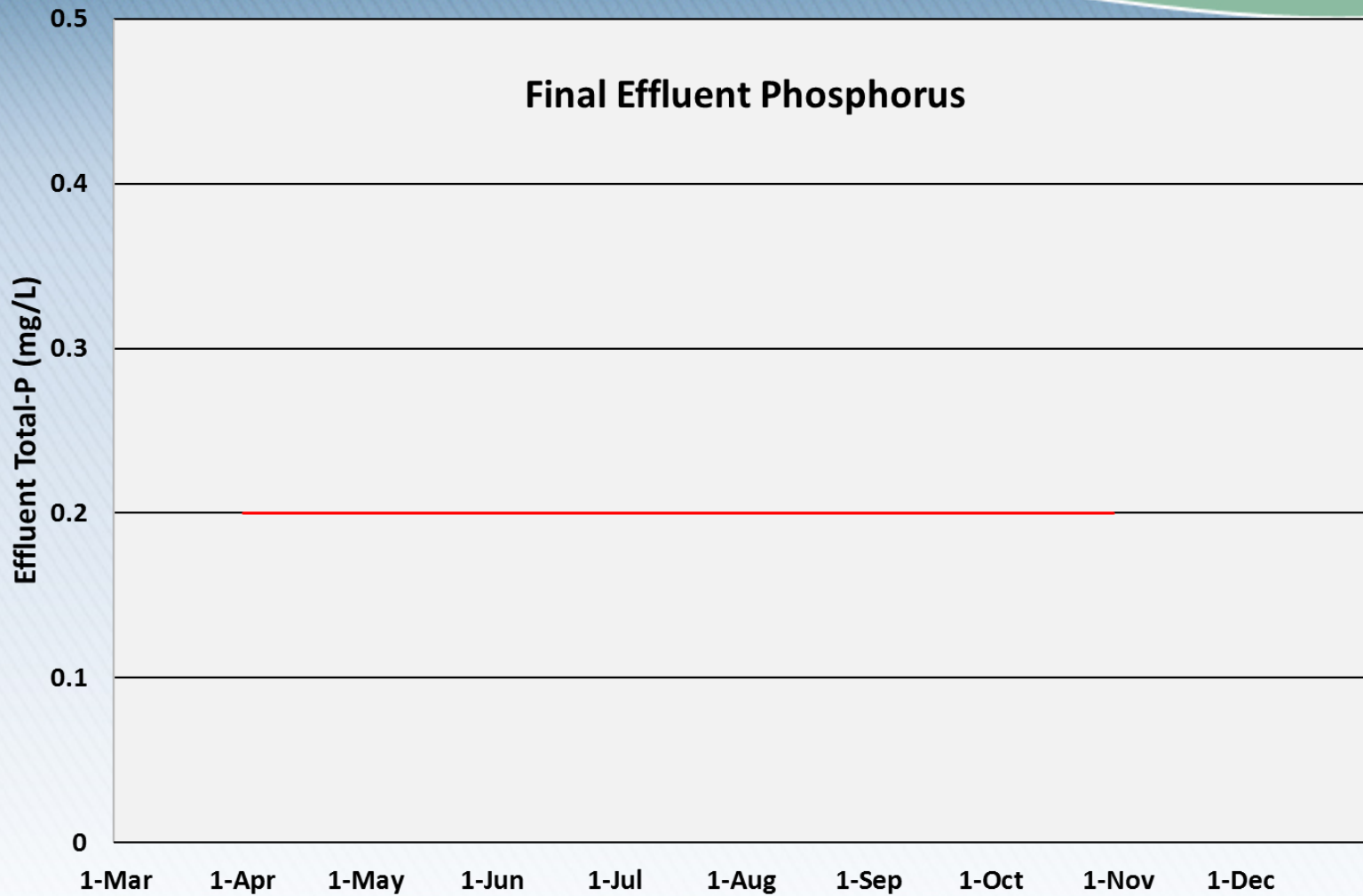


Key Issue #3 – Compliance During Construction

- WPCF Staff able to maintain compliance through construction
 - BOD 7 mg/L
 - TSS 7 mg/L
 - TP 0.2 mg/L
- Construction Sequence
 - New Tertiary Filters Constructed First Prior to Sand Filter demo



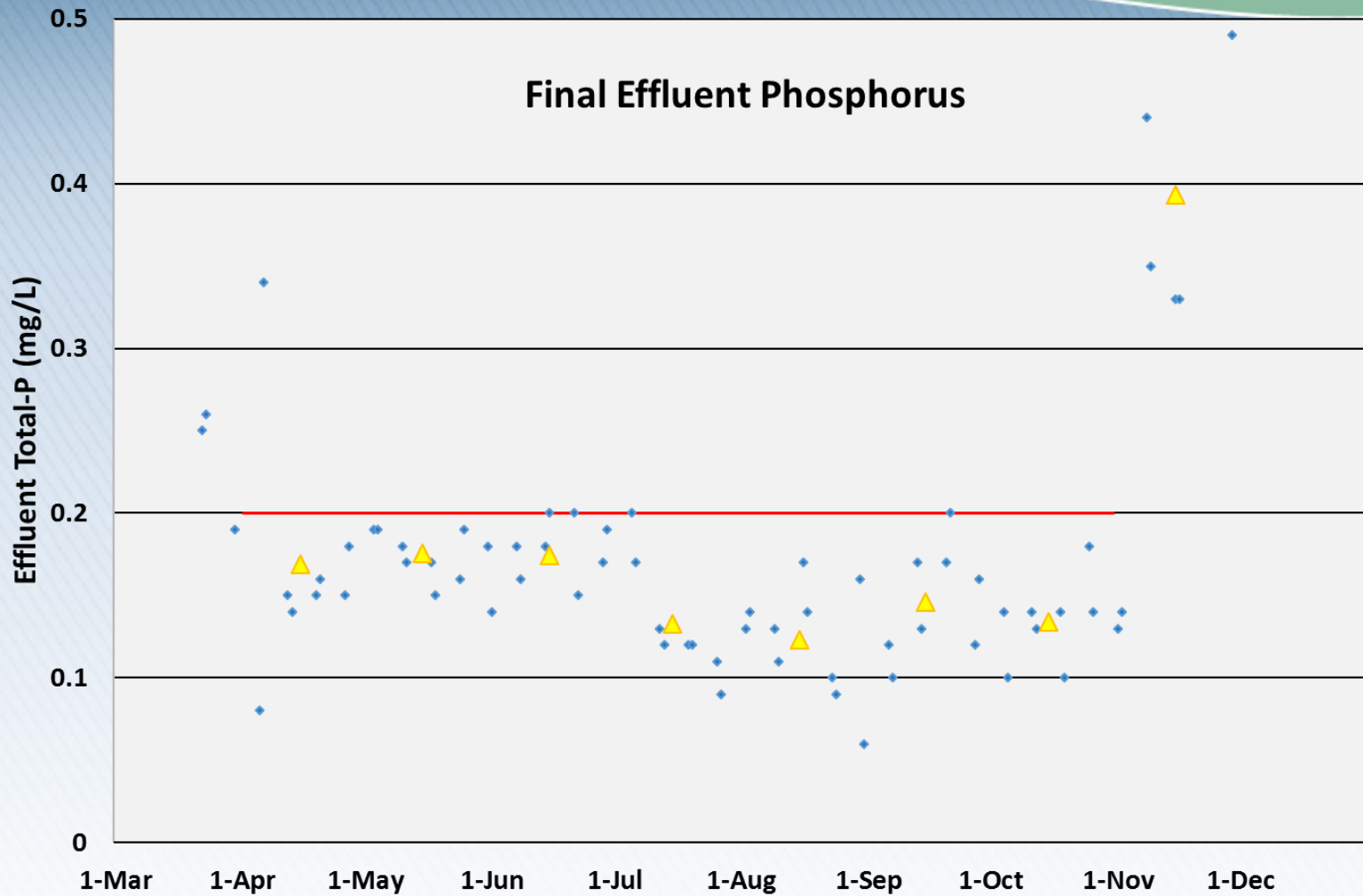
Plant Data



— CURRENT PERMIT



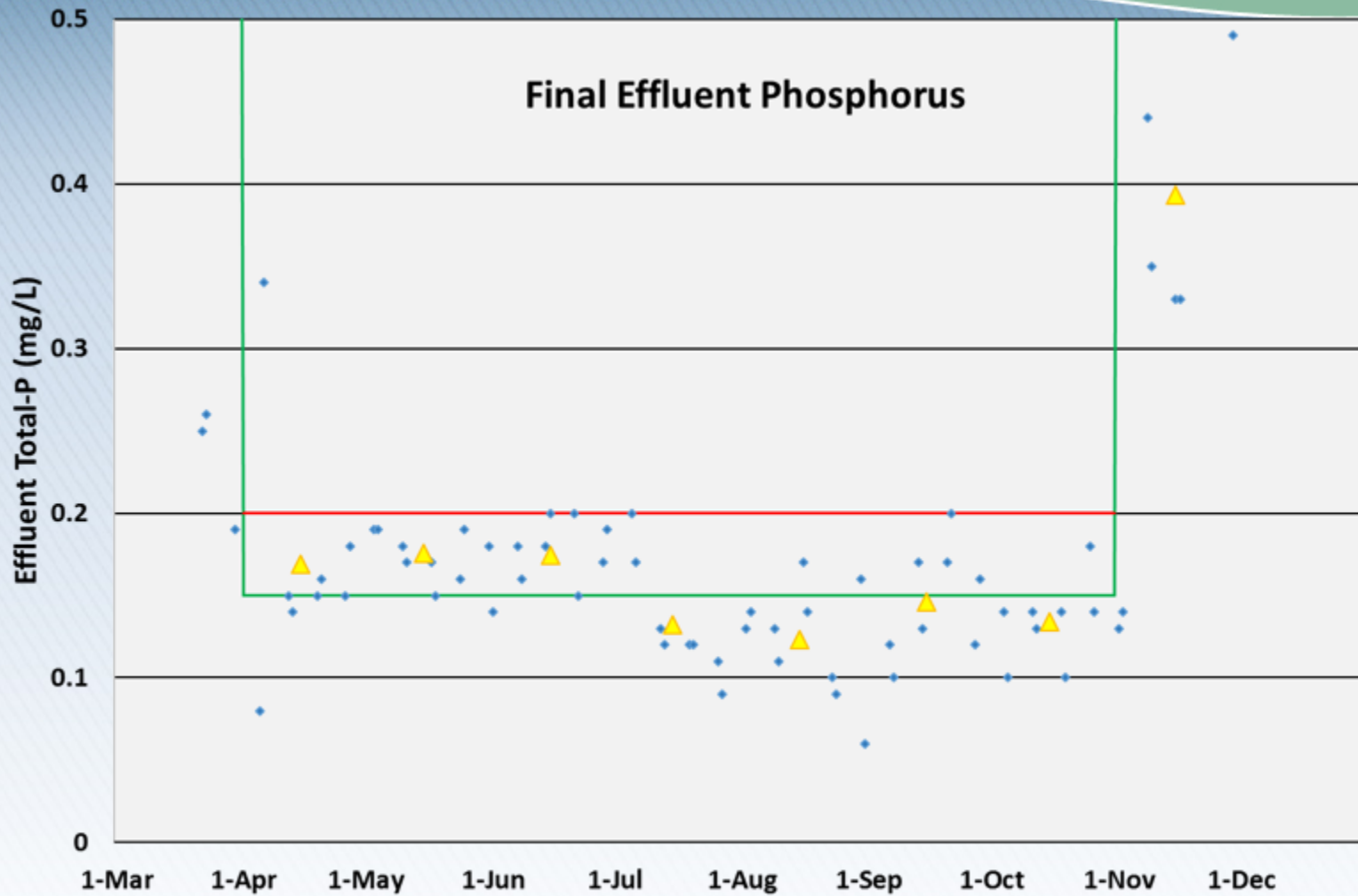
Plant Data



— CURRENT PERMIT ◆ TOTAL-P DAILY VALUE ▲ MONTHLY AVERAGE



Plant Data



— CURRENT PERMIT — FUTURE PERMIT • TOTAL-P DAILY VALUE ▲ MONTHLY AVERAGE



Project Status

- Project Overview
- Construction Challenges
- Looking Forward



Project Overview

- WPCF Improvements:
 - Mechanical Fine Screen
 - Aerated Grit & Grit Pumps
 - Primary Clarifiers
 - Aeration Tanks – (5-Stage Bardenpho)
 - Supplemental Carbon
 - Secondary Clarifiers
 - Tertiary Treatment (Disk Filters)



Project Overview

- WPCF Improvements:
 - Disinfection (Chlorination & Dechlorination)
 - Sludge Dewatering and Sludge Pumps
 - Leachate Receiving Station
 - Septage Receiving Station
 - New Electrical Service and Standby Generator



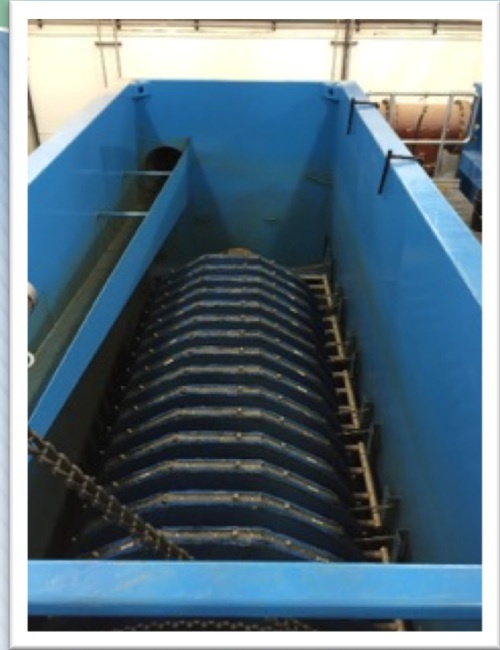
Construction Challenges

- Secondary Clarifier Failed (Plant had never been operated with one secondary)
- Electrical Failure of Main MCC Breaker
- Multiple Failures to Belt Filter Press



Project Status Looking Forward

- Tertiary Disk Filters –
Came On-Line March 2016
- Primary/ Secondary
Clarifiers – Came On-Line
June 2016



Project Status Looking Forward

- New Electrical Service
 - On-line in January 2017
- Headworks
 - On-line in Spring 2017
- Aeration Tanks
 - On-Line in Spring 2017
- Dewatering
 - On-Line in Summer 2017
- **Final Completion August 2017**



Construction



Construction



Questions / Discussion



