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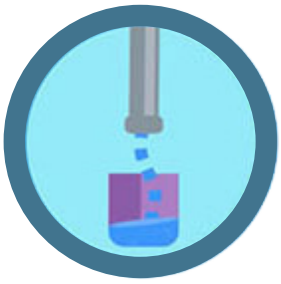
GLWA
Great Lakes Water Authority



2016 SEWER SHARES ASSESSMENT REPORT

Executive Summary

GLWA provides wholesale sewer services throughout Southeast Michigan. GLWA charges these customers according to their individual SHAREs of the system cost. These SHAREs were established through GLWA's customer outreach process in 2013. GLWA has updated the SHAREs for development of the FY 2018 and FY 2019 charges. This Executive Summary highlights the SHAREs updating process. A detailed report will also be available on the GLWA website.

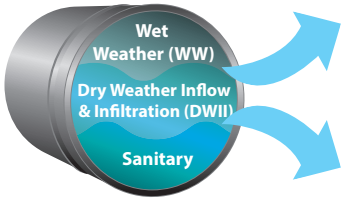
VISION STATEMENT: Through regional collaboration, GLWA strives to be the provider of choice dedicated to efficiently delivering the nation's best water and sewer services in partnership with our customers.

Challenges in Updating Current Shares

100% FIXED COST ALLOCATED BASED ON TWO COMPONENTS

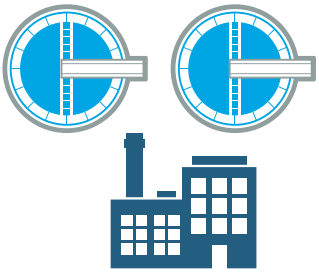
FY 2015 THROUGH FY 2017 SEWER CHARGES

1 CURRENT STRENGTH OF FLOW ALLOCATION



DETERMINE EACH CUSTOMER'S FLOW PROPORTIONS

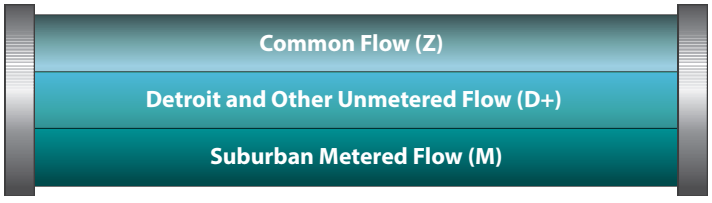
WASTEWATER POLLUTANTS
(Not allocated individually)



WET WEATHER AND DWII ARE CURRENTLY ALLOCATED AT 1/3 OF SANITARY STRENGTH OF FLOW

CHALLENGE: Determine more accurate strength-of-flow estimates, especially for Dry Weather Inflow and Infiltration (DWII).

2 CURRENT FLOW VOLUME ALLOCATION



CALCULATED USING HISTORICAL FLOW DATA IN METERED AREAS AND ESTIMATES IN AREAS WITHOUT MASTER METERS

CHALLENGE: Determine more accurate flows, especially for customers without master meters: Detroit, Highland Park, Hamtramck and portions of other cities.

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GLWA Sponsors Collaborative Effort to Update SHAREs

INVOLVEMENT

29
TEAM MEMBERS

50+
MEETINGS

1,200+
MEETING HOURS

Involvement occurred from February to December 2016

The WRRF is also referred to as a wastewater treatment plant

INVESTMENT

$500,000
REGIONAL SAMPLING

$250,000
MANAGEMENT, ENGINEERING AND FINANCIAL CONSULTING

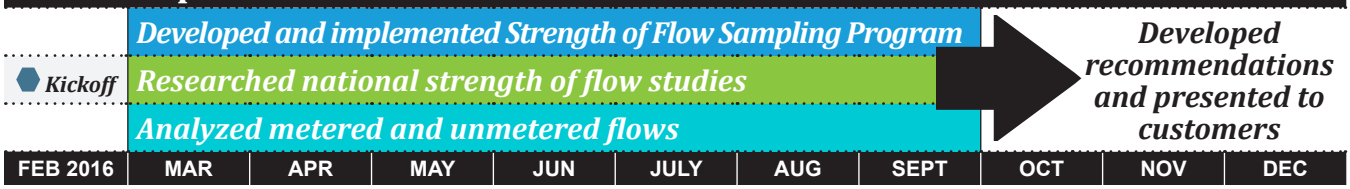
$100,000
IN STAFF RESOURCES

SEWER SHARES UPDATE TEAM

Fred Barnes, Macomb Co.
Elizabeth Barrera, Wayne Co.
Phil Brink, CDM Smith
Alicia Burnham, GLWA
Raphael Chirolla, Oakland Co. WRC
Carrie Cox, Oakland Co. WRC
Bart Foster, The Foster Group
Anil Gosine, DWSD
Marcus Hudson, DWSD
Charles Humphriss, OHM
Craig Hupp, R.C. Hupp Law
Mark Jacobs, Dykema
Tom Jennings, Benesch
George Karmo, Benesch
Vyto Kaunelis, OHM
Bruce Manning, Macomb Co.
Tim Minor, Applied Science
Palencia Mobley, DWSD
Mini Panicker, GLWA
Eric Rothstein, GRG
Phil Sanzica, Oakland Co. WRC
Biren Saparia, GLWA
Maria Sedki, FTCH
Chandan Sood, GLWA
Elmeka Steele, Wayne Co.
Jon Wheatley, GLWA
Madison Ziems, GLWA

Champion: Suzanne Coffey, GLWA Chief Planning Officer
PM/Facilitator: Charlie Fleetham, GLWA Customer Outreach

SHAREs Update Timeline



Updated Strength of Flow Allocation

CHALLENGE: Determine more accurate strength-of-flow estimates, especially for DWII.

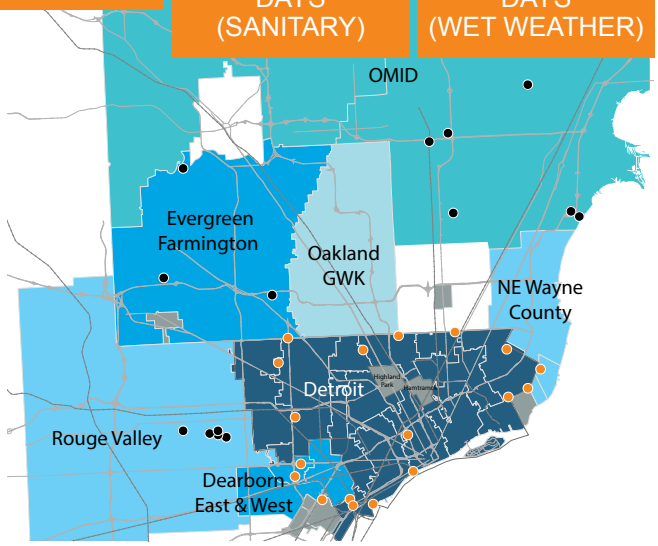
SYSTEM SAMPLING PROGRAM REPRESENTATIVE OF SERVICE AREA

Sanitary and Wet Weather Flow Sampling
(March 21 – September 6, 2016)

18 LOCATIONS

50 DRY WEATHER DAYS (SANITARY)

14 WET WEATHER DAYS (WET WEATHER)

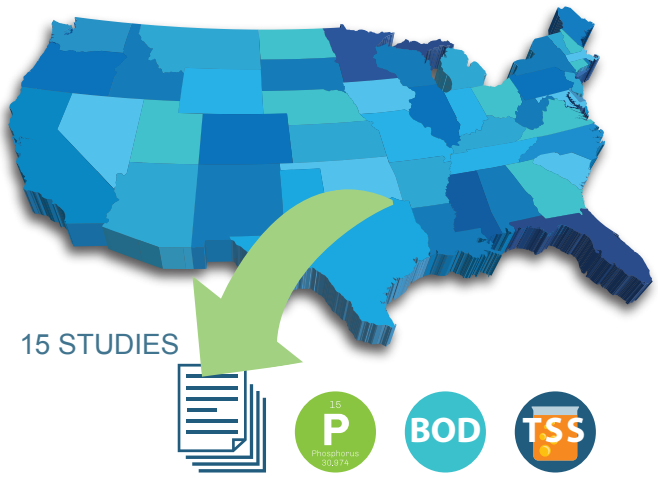


DWII Sampling
(June 2 - August 2, 2016)

14 LOCATIONS

4 NIGHT TIME FLOW DAYS (DWII)

NATIONAL RESEARCH OF MEDIAN/ AVERAGE VALUES



New Estimates of Strength of Flow Ratios

PARAMETER	SAN	DWII	WW
BOD	100%	2.4%	5.3%
TSS	100%	2.1%	39%
Phosphorus	100%	4%	2.5%
FOG	100%	0%	40%

OUTCOMES

- Developed three reasonable strength of flow ratios alternatives.
- Determined all three strength alternatives had similar impact on SHAREs.
- Determined sampling data did not provide consistent strength estimates for wet weather flows.
- Significantly reduced previous DWII and wet weather flow strengths except for wet weather TSS and FOG.
- Customers with higher sanitary component will see a relative increase in SHAREs and customers with higher DWII will see a relative decrease all else being equal.
- Cost to customers for DWII is still substantial; therefore maintaining significant incentive for reduction.

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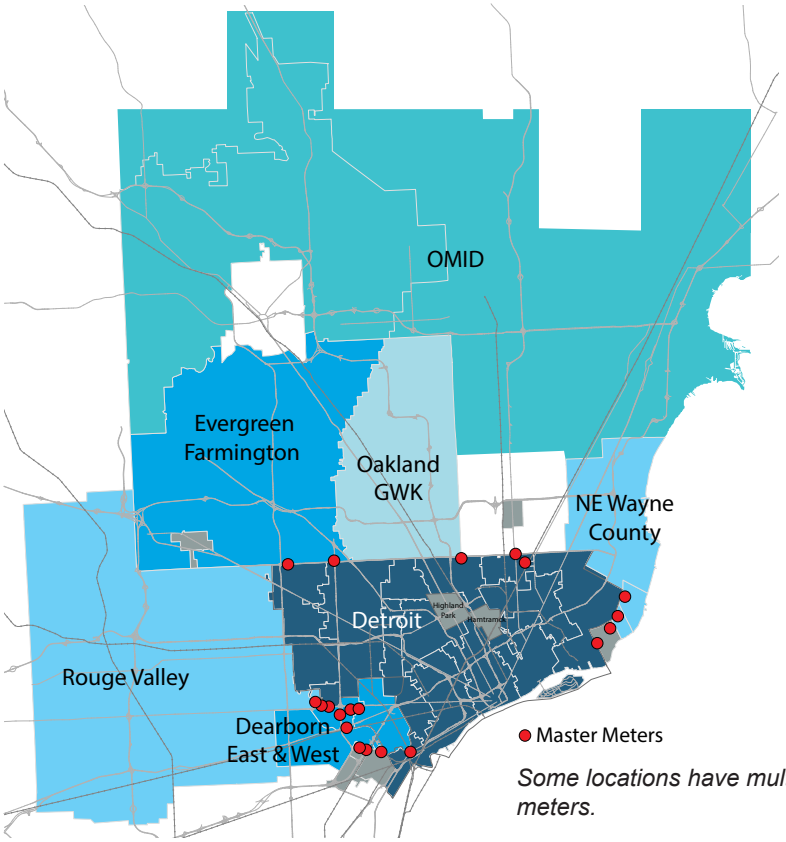
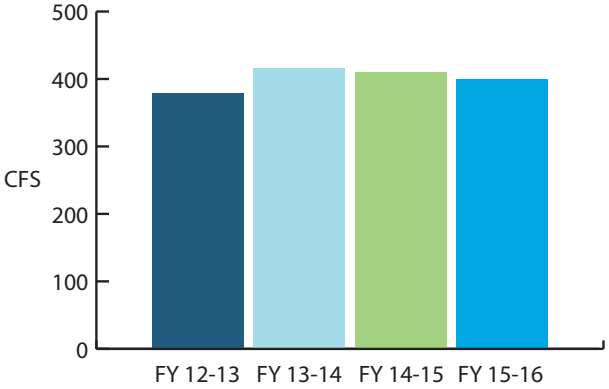
Updated Master Metered Flows



STABILIZED SUBURBAN FLOWS FY 2013-2016



REVIEWED 4 YEARS OF MASTER METER FLOW DATA AND CONSIDERED SYSTEM CHANGES

SANITARY FLOW EQUALS 90% OF WHOLESALE WINTER WATER SALES

ANALYZED 1,461 DAYS OF DAILY FLOW DATA TO IDENTIFY WET AND DRY DAYS AND CALCULATE DWII

ESTIMATED VOLUME OF NON-REVENUE WATER THAT BECOMES I&I

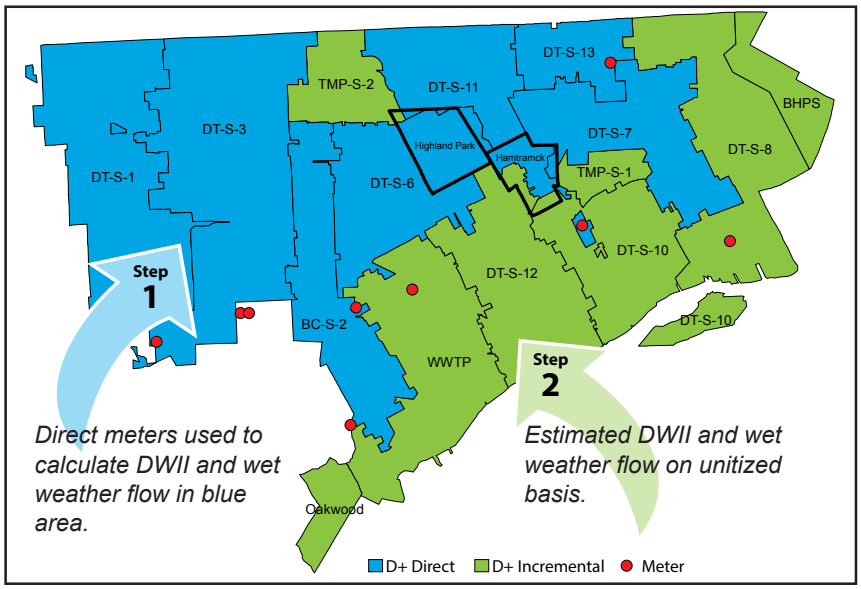
ANALYZED REASONS FOR CHANGE IN CUSTOMERS' HISTORIC FLOWS

OUTCOMES

- Validated suburban flow data.
- Refined difference between dry and wet day flows.
- Demonstrated consistency of flows over 4-year period.
- Developed customer 4-year averages for use in SHAREs calculation.
- Increased confidence of metered flows used in other charge calculations enabling more accurate estimation of Common and Detroit flows.

Updated Flows in Areas Without Master Meters (D+ Areas)

CHALLENGE: Determine more accurate flows, especially for customers without master meters: Detroit, Highland Park, Hamtramck and portions of other cities.



D+ includes Detroit, Highland Park, Hamtramck and portions of other cities.

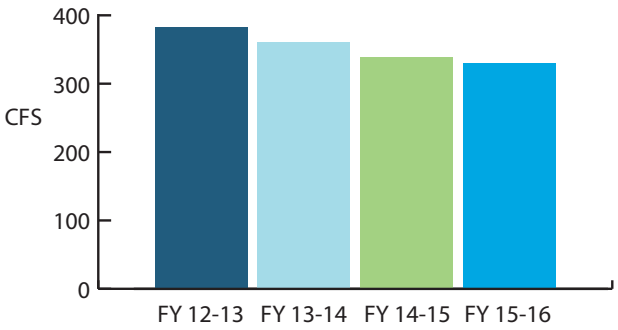
REVIEWED 4 YEARS OF D+ DIRECT SYSTEM METER DATA

CONDUCTED FIELD INVESTIGATIONS IN D+ INCREMENTAL

SANITARY FLOW EQUALS 95% OF RETAIL WINTER WATER SALES

ANALYZED 1,461 DAYS OF DAILY FLOW DATA TO IDENTIFY WET AND DRY DAYS AND CALCULATE DWII

BETTER FLOW ESTIMATES FOR CUSTOMERS WITHOUT MASTER METERS FY 2013-2016



DEVELOPED UNITS OF FLOW BASED ON D+ DIRECT TO ESTIMATE FLOWS IN D+ INCREMENTAL

CALIBRATED WRRF FLOW METERS AND PUMP CURVES

OUTCOMES

- Calculated D+ flows based on data rather than subtracting from total flows.
- Improved flow estimates for 2/3 of D+ total flows using local meter data (D+ Direct).
- Developed estimation process, based on D+ Direct data, to use for remaining 1/3 of flow (D+ Incremental) where local meter data is not available.
- Improved flow calculation for total Water Resource Recovery Facility (WRRF) flow.
- Developed more accurate estimate of Common Flow through flow balancing and better estimation of all other flows.

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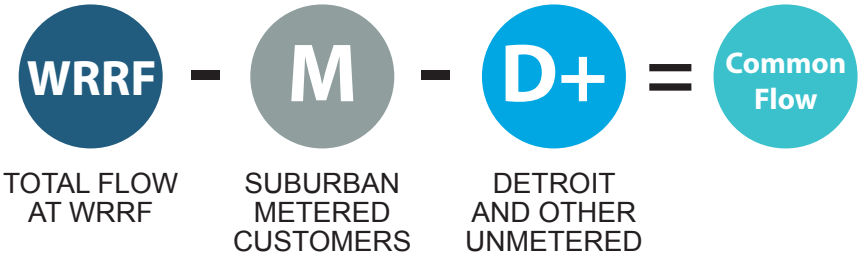
ANALYZED UPDATED WRRF FLOWS AND DEDUCTED RECYCLED WATER

ASSIGNED REMAINING FLOW TO COMMON FLOW

DEVELOPED A BASIS FOR REVISED COMMON FLOW CALCULATION:



Note: In the FY 2015-2017 SHAREs calculation, D+ was derived from a Common Flow estimate, otherwise known as the Z flow.

Ongoing Task: Review Cost Allocation Based on Strength of Flow

CHALLENGE: Examine protocol for cost allocation between flow and strength, based on the 1979 Proposed Sewerage System Rates and Charges Study, to determine if still valid with changing operational protocols.

REVIEWED ALLOCATION IN CONTEXT OF CURRENT OPERATIONS

COSTS ALLOCATED IN CHARGES

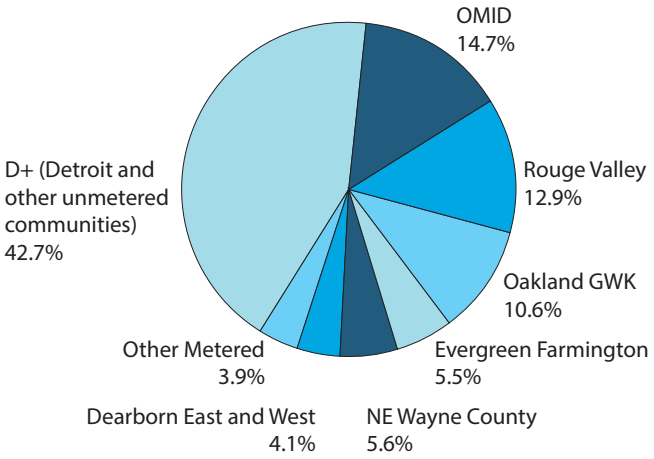
Strength of flow costs for liquid and solid trains dedicated to removing pollutants to meet permit requirements such as aeration, secondary clarification and sludge treatment and disposal including the new Biosolids Dryer Facility.

Flow volume costs for transporting and pumping flows as well as storing and treating peak flows at the WRRF.

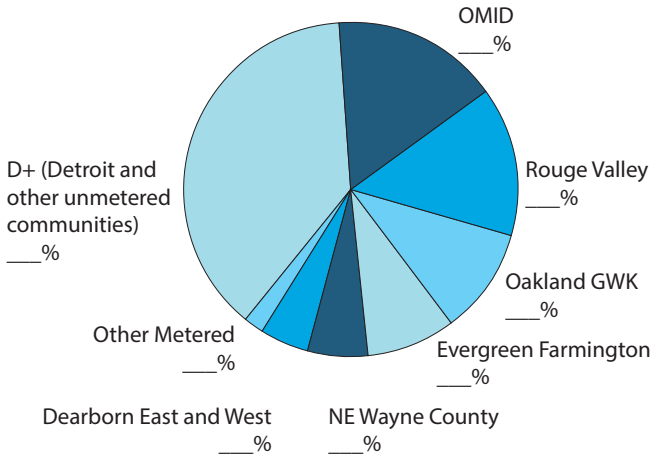
OUTCOMES

- Confirmed fundamentals of treatment process have remained consistent since application of strength of flow allocation.
- Concluded pollutant allocation of WRRF components remains a reasonable basis for the next SHAREs Period.
- Customers requested further review, e.g. collaborative cost of service study.

SHAREs Allocation Using Updated Method



Current SHAREs Period
FY 2015 through FY 2017



Next SHAREs Period
FY 2018 and FY 2019

SUMMARY OF UPDATED RESULTS

- A customer with a higher sanitary component of flow will see a relative increase in their SHARE, while **a customer with a higher percentage of DWII will see a relative decrease in their SHARE, all other things being equal.**
- SHAREs for Detroit and adjacent areas without master meters are based on validated, more accurate data. Based on current budget estimates, D+ SHAREs **decreased** from 42.7% to ___% and suburban SHAREs **increased** from 57.3% to ___%.
- Based on current budget estimates, the percentage of Common Flow in the system to be distributed across all SHAREs increased from 16.2% to ___% of the total flow into the WRRF.
- Comprehensive and collaborative review of the wastewater cost allocation methodology will be effective for 2 years – FY 2018 and FY 2019.

NEXT STEPS

- Continue sampling program on a selective basis.
- Continue analysis of the sources of common inflow and infiltration.
- Develop metering plan within the D+ Incremental area to improve estimates of D+ flow.
- Leverage GLWA Wastewater Master Plan project to get additional needed data.
- WRRF Cost of Service Study

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