

LOUIS C. LAMBE

- Passaic Valley Sewerage Commission, 1988 Present (36+ Years)
- BS in Civil Engineering from NJIT
- Licensed Collection System Operator, C-4
- · Teacher of Advanced Wastewater Collection Systems
- · Civil Engineer / Wastewater Professional
- New Jersey Water Environment Association Senior Delegate
- Co-Author on two Operator Training Manuals

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WHY PVSC MEASURES FLOW?

- Accurate & Fair User Charge Billing
- Planning & Construction
- Infiltration & Inflow (I&I) Analysis
- Modelling Our Network
- Model Calibration

(1)

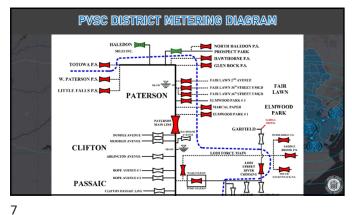
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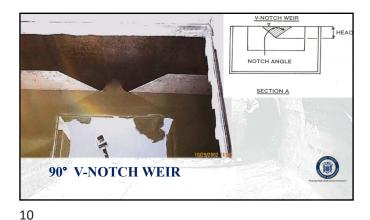
OUTLINE FOR DISCUSSION

- PVSC Flow Metering
- **Conversion to Paperless Recorders**
- Hydraulic Model vs Observed Flow
- Belleville Discovery
- East Orange Revelation
- Questions and Discussion

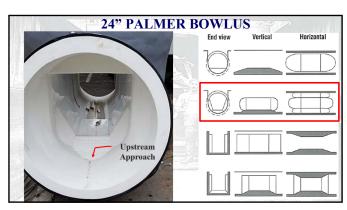








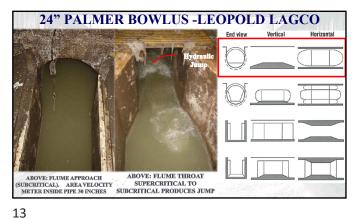
FLOW METERING Open Channel Flow Metering – water (fluid) that flows in channels, culverts, rivers, and streams, where the water is open to the atmosphere and has a free surface at the top. Closed Pipe Flow Metering - water (fluid) that flows in a closed pipe and under pressure.

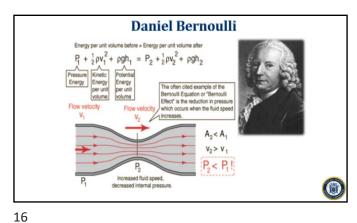


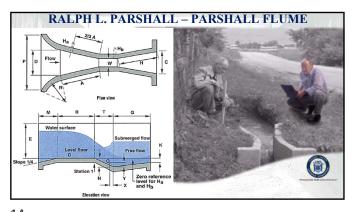
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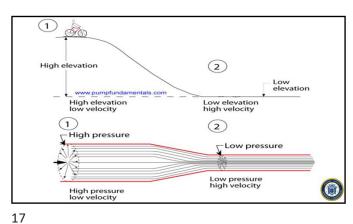
OPEN CHANNEL FLOW Weirs - A weir is essentially a dam built across an open channel over which the liquid flows, usually through some type of an opening or notch. Flumes - A flume is a specially shaped open channel flow section with an area and/or slope that is different from that of the channel. This results in an increased velocity and change in the level of the liquid flowing through the flume. The flow rate through the flume is a function of the liquid level at a distinct point. ● Area Velocity – (Q=VA) Flow rate is calculated by determining the mean flow velocity through a cross-section and multiplying this by wetted area at that point. This requires measurements of the mean velocity and the depth of flow.

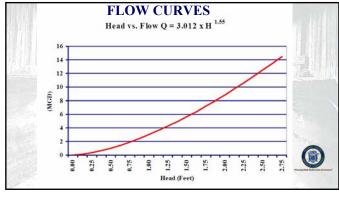










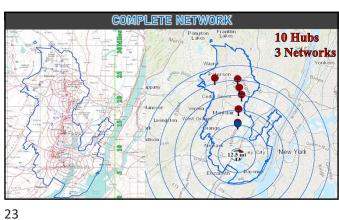


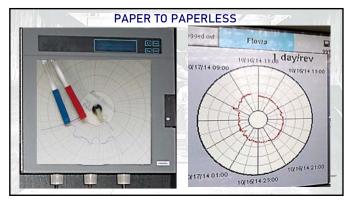


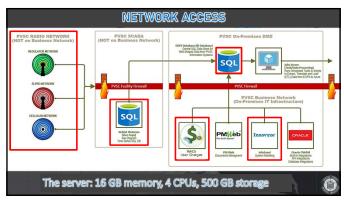


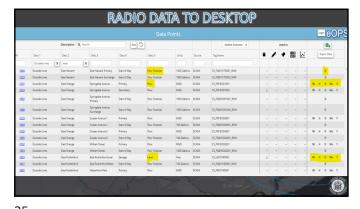


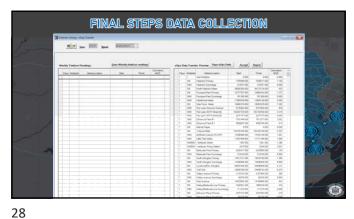






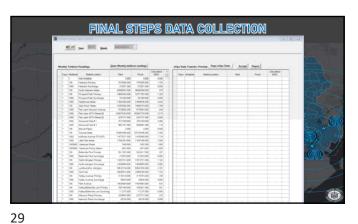




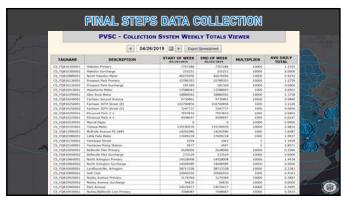


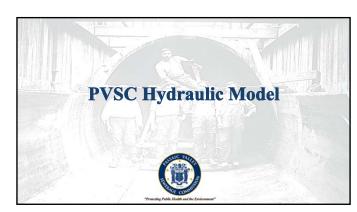
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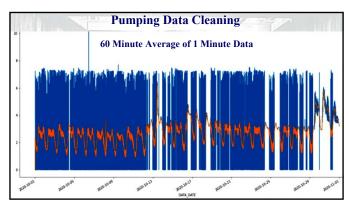
PVSC Hydraulic Model 10/15/2020 Kick Off Meeting with Innovyze Original Model Built for Long Term Control Plan (2015) Sites aggregated for simplicity (1 curve) disaggregated Adapt Model for specific purpose and diverge from LTCP Connect eOPS Data To ICM Live Model (SmartCover) First Results March of 2021

Passaic Chamber Second River South Kearny

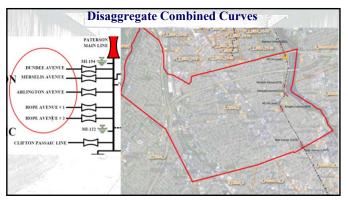
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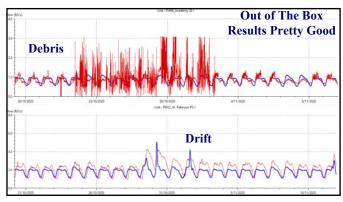
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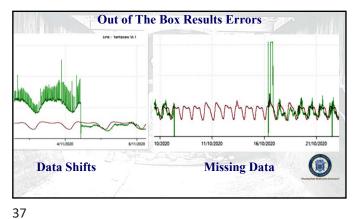
Diagram	meter1	meter 2	meter3	1		
SECOND RIVER	2014	2015	2016			
PASSAIC CHAMBER	2021	2022			1	
Fairlawn 36th St	2097	2098		THE	A A A A A A A A A A A A A A A A A A A	
SOUTH KEARNY P.S.	2024	2027				

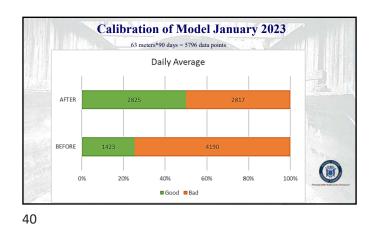


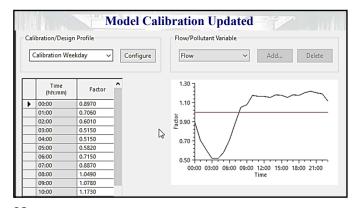
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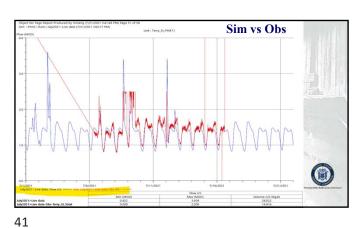


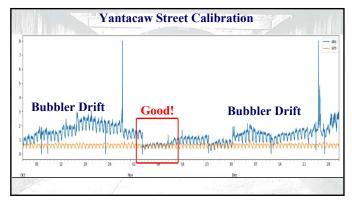




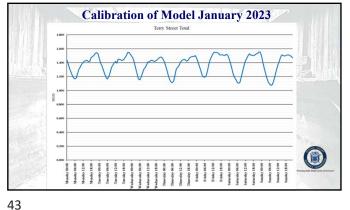








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Monday 0	90:50 vehicles 00:51	220.948	1,5859	0.136999	1.09600	9,554013	0.126900	0.198433	2.40044	0.735772	2.657924	0.200000	1.602740	2.29909
	00:00 NRMAN 00:00	252.695	0.599015	61000	1.73654	0.54223	0.121480	0.190829	2.349422	0.707974	1.879966	0.000000	0.00000	2.39907
Monday I	4:00 Nonday 01:00	200.545	8.540067	0.007621	7.407929	0.327509	0.136575	0.183123	2.254929	0.679137	1.899579	0.000000	0.61376	2,119796
Months 0	00 00 MANAGE 00 00	197.644	2.527000	0.006400	1.191790	0.317796	0.113087	0.177672	2.187654	0.878790	1.80218	0.000000	0.791399	2.05596
Monday (6 00 Nonday 06 00	196.322	0.530830	9.00057a	1.113334	6303676	0.111798	0.175586	2.16(756	0.893057	1.830891	0.000000	0.59603	2.032300
Monday 0	00 TO WINNESS 07:00	196297	0.527600	0.004533	1,354994	0.308112	0.113230	0.177898	2.190200	0.89832	1.84873	0.300000	0.2940.57	2,65975
	00:00 Monday 00:00	209 125	0.557056	0.110353	7.806333	0.335025	0.119133	0.187902	2,512162	0.696354	1,947579	0.200000	9.627294	2,173600
Monday 0	00:00 MANASH 00:00	219.292	0.594138	0.115718	7,917009	0.552148	0.125145	0.194953	2.404572	0.730208	2.642264	0.000000	9.657729	2,279073
	00:00 Wonday 10:00	224.838	0.598933	0.119644	1,177984	8,363053	0.128515	0.201913	2.48585	0.748675	2.093909	8.500000	0.674060	230692
	1100 SKINSON LL 00	291.304	0.613601	0.121950	1.405400	0,571115	0.13294	0.207549	2,5359.69	0.768239	2.13256	0.300000	0.893135	2,40201
	12:00 Monthly 12:00	294.608	1.0364	0.125799	1.5399	0.876742	0.134399	0.210686	2,99903	0.781206	2.184995	0.000000	6.703664	2,438456
	2000 Wondey 12:00	238,964	0.636545	8.126000	1.895453	0.303743	0.136590	0.234800	2,640085	0.795120	2.225488	0.000000	8.756797	2,4676
Mondey 3	4:00 Monthly 14:00	299.331	0.697516	0.00000	1.794719	0.384327	0.136799	0.234928	2,64628	0.794931	2.22885	0.000000	0.71769	2,48755
	\$ 00 Wordey 13:00	240,277	0.640035	0.126793	1.759108	0.385645	0.157339	0.215777	2,656561	0.800083	2,257690	0.000000	0.730007	2,8033
	1600 MONTH 1600	297.284	1.6206	4325212	1.69000	0,90009	0.135029	0.213090	2,625495	0.790118	2,209039	0.000000	6711693	2,4607
	27:00 Micheley (27:00	297.684	0.615962	6.121528	E 852891	0.382985	0.135972	0.213929	2.600129	0.792127	221549	0.300000	0.713491	1,420
	2011 yeshesir 0015	398.545	0.657793	9.131909	1,91254	0.596553	0.145130	0.221764	2.750291	0.522293	2,299777	0.200000	0.740003	2,50007
	29 00 NROMEN 19 00	249 800	0.004877	6331712	9.07039	0.400621	0.142610	0.224152	2.759694	0.831134	2,534544	0.000000	0.74969	2,394013
	10:00 NAD-MBy 20:00	252,260	8,670,956	0.133134	9,374858	0.405089	0.144389	0.226139	2,799074	0.039984	2,549292	0.000000	0.75809	2,621952
	11:00 Manday 25:00	256.813	0.664002	0.335917	9,540057	0.412399	0.146791	0.230621	2,839409	0.835143	2,395589	0.000000	8.770064	2.689250
	12:00 Workley 22:00	258.943	0.68763	0.138942	9.408000	0.815804	0.149010	0.232142	2.862907	0.882241	2,411530	0.000000	9.776680	2.89140
	19:00 Michaely 20:00	254.282	0.002008	0.135237	9,321236	0.401547	0.146481	0.230150	2.833538	0.333377	2,586744	0.300000	0.769673	2,6675
	00:00 Tuesday 00:00	245.437	0.613729	0.129904	1,63884	0,394330	0.140278	0.221994	2,723429	0.817261	2.285566	0.199900	0.756086	2.5500
	1900 Tuesday 00:00	290,534	9.602647	0.125226	1.493503	0.375000	0.133479	0.208133	2,583903	0.777598	2,11692	0.000000	0.790404	2,42716
	12:00 Tuesday 02:00	236,541	5,603448	81185G	1,2990	0,362799	0,029488	0.201442	2,594729	0.754947	2,1975	8,500000	0.6963	2,0540
	10:00 Tyesday 00:00	257,953	0.780479	0.014999	1,925646	0,349900	0.124335	0.199892	2.499299	0.725809	2.029999	0.300000	0.603305	2,26400
	14:00 Tuesday 00:00	207.204	0.555949	0.009940	7,596362	0,02798	0.118474	0.184078	226940	0.688963	1.929794	0.00000	0.623477	2,15905
	19:00 Tuesday 09:00	199.296	0.530807	0.000133	7,24890	0,00076	0.113898	0.17885	2202379	0.863291	1,85507	0.000000	6,91103	2,07009
	N 00 Tuesday 06:00	195370	8,539416	0,000094	1,11903	0,313755	6.113671	0.375450	2.160063	0.698933	1,819400	0.000000	0.90979	2,000
	17:00 Tuesday 07:00	200,841	0.535042	0.00990	1,005527	0,322550	633400	0.190393	2,220796	0.000334	1,879613	0.000000	0.80347	2,08770
	96:00 Tvestey 08:00	250.429	0.590505	0.113896	7,855169	0,0789	6.120219	0.188964	2,526469	0.700663	1,959000	0.00000	8.65116	2,18765
	99 30 Tyesday 09:30	225 449	0.9904	0.138035	1.0592	0,309099	0.127894	0.200876	2,473117	0.744829	200154	0.00000	0.670000	232499
	10:00 Tuesday 30:00	228.351	0.60756	0.12099	1,290101	0.386571 0.3757/5	0.130409	0.204888	2,522521	0.799708	2.124768	0.00000	1.654000 0.701803	
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			140364	0.12538 0.12923	1.69007	0.55628	8.193122	0.203591	2.52564	0.79084	221345	0.00000	0.712382 0.699250	
	13:30 Tyesday 13:50	299.334	8.603004 8.660480	0.129/25	1,17090	4,39000	0.139256	0.204564	2,57900	0.776906	2.011188	2.00000	1.0900	1,050
	14:00 Tuesday 14:00 15:00 Tuesday 13:00	245 572	1.64535	0.12829	LOSS	0.38003	0.138697	0.217854	2.662534	0.80999	2.28730	0.00000	0.729000	2.53942
	15:00 Tuesday 15:00 16:00 Tuesday 36:00	342,923	0.64030 0.64030	812/278	1,77360	0.009013	0.13786	0.231984	2,662534	0.00199	2.259042	0.00000	8.773404	2.52110
														2,919
	17:90 Tuesday 17:90	240,084	0.639523	0.129999	1.792112	0.302536	0.157229	0.215604	2,63403	0.799643	1,205899	0.00000	0.720090	
	18:00 Tuesday 18:00	241.859	0.664250	6.127926	1.79606	0.300306	0.030344	0.227198	2.614015	0.805222	2,252438	0.500000	0.72503	2,51383
	19:00 Tuesday 19:00	266,536	0.656125	0.129978	8,908792 9,142098	0.395544	0.140791	6.221201	2.72090	0.830197	2,249699	0.00000	0.798763 0.753887	2,90033
Vestey 2	10:00 Tuesday 20:00									0.836972				



CMOM REMINDER

CMOM = "Capacity Assurance, Management, Operations, & Maintenance"

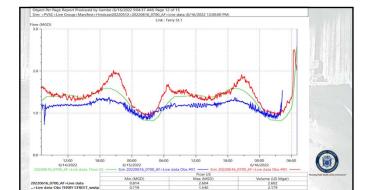
~ is a flexible, dynamic framework for municipalities to identify and incorporate widely accepted wastewater industry practices to:

- 1. Better manage, operate, and maintain collection systems
- 2. Investigate capacity constrained areas of your system
- 3. Respond to sanitary sewer overflow (SSO) events
- 4. Proactively prevent sanitary sewer overflows

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SYSTEM CAPACITY EVALUATION

The system operator should have a program in place to:

- 1. Periodically evaluate the capacity of the sewer system in both wet and dry weather flow
- 2. Ensure the capacity is maintained as it was designed.
- 3. Identify the location of wet weather related SSOs, surcharged lines, basement backups, and any other areas of known capacity limitations

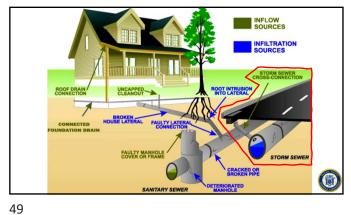
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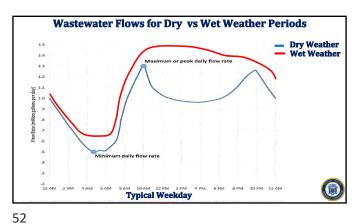
SYSTEM CAPACITY EVALUATION

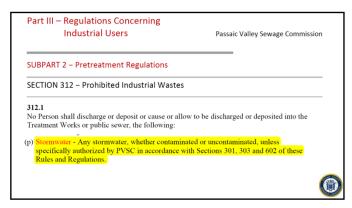
System Operator should have a program to evaluate the capacity of the sewer system in both wet and dry weather flow:

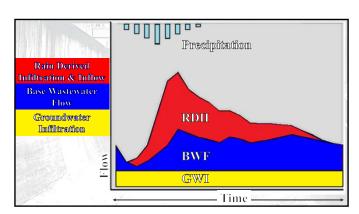
- 1. Water vs Wastewater Relationship
- 2. Dry vs Wet Weather Flow Comparison
- 3. Observed Flow vs Modeled Flow

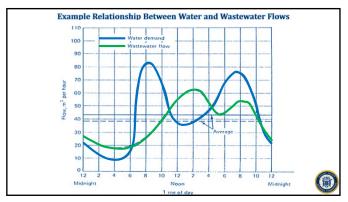


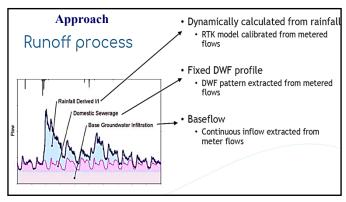


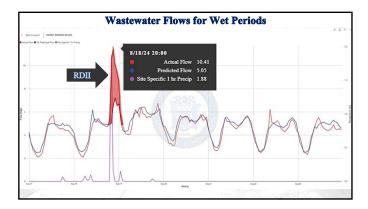


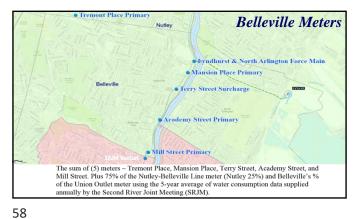




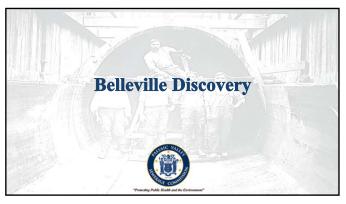


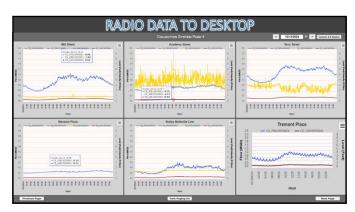




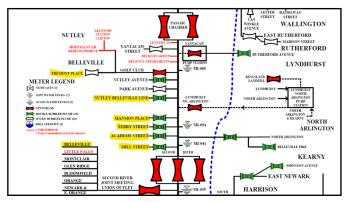


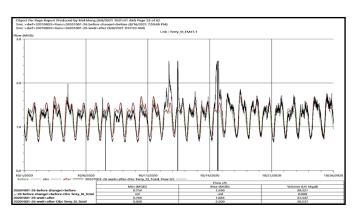
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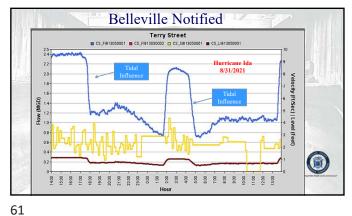


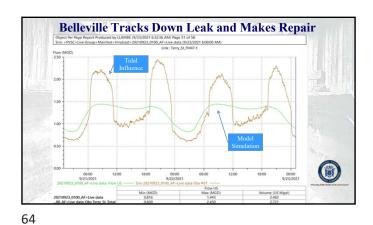


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Problem Is Back Notified Belleville

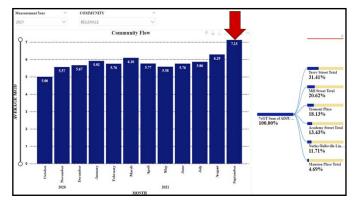
The graph below is your actual flow pattern compared to the model simulation for the last two days. Green is simulated data and the brown is observed data. Everything above the green line is extraneous flow which is costing Belleville money. At peak, there is about a 1 MGD delta. Over the coarse of 6 hours per tide or 12 hours per day this equates to about ½ a million gallons per day being charged to Belleville. In dollars, this could cost you approximately \$5,200 per week over what you would normally be billed.

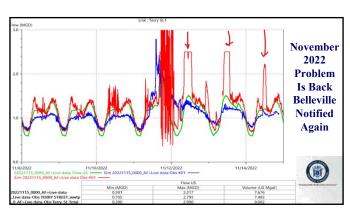


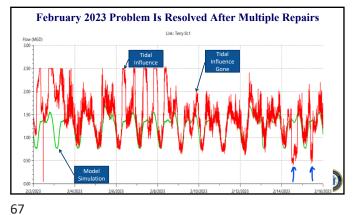
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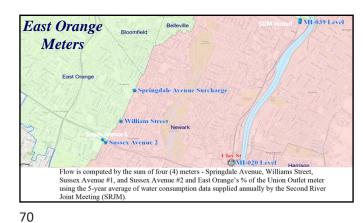
Problem Is Back Notified Belleville - November 2022 Tom, Terry Street has started spiking with the high tide again. It started after the recent heavy rain. Please check the local storm outfalls for a gate stuck open. This might stop the intrusion. PVSC still expects you to deliminate this cross connection once you locate it. As you are aware, Belleville is paying for this intrusion of extraneous flow because it is going through the meter and into our system. I remind you of our Rules and Regulations against extraneous flow. Thanks in advance for your attention to this ongoing problem. Louie 312.1 No Person shall discharge or deposit or cause or allow to be discharged or deposited into the Treatment Works or public sewer, the following: (p) Stormwater - Any stormwater, whether contaminated or uncontaminated, unless ecifically authorized by PVSC in accordance with Sections 301, 303 and 602 of these

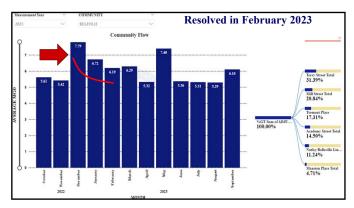
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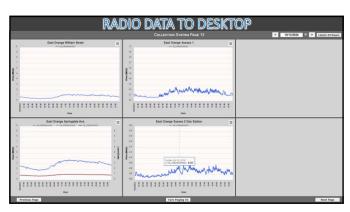




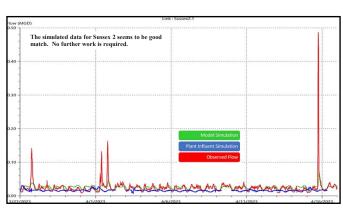




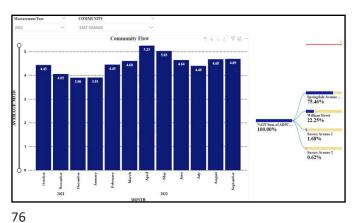




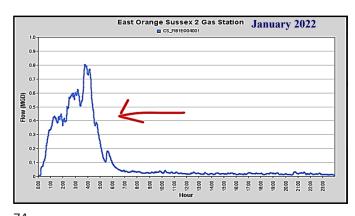




Subject: Date: Attachments:	East Orange Sussex 2 Flow Meter Tuesday, January 18, 2022 9:21:00 AM image003.png	January 2022
Tom,		
Good Mori	ning and Happy New Year. An in	teresting and unexpected thing
happened d	during this weekend's storm. The	flow through the Sussex 2 flow
meter went	from a flow rate of 10,000 gallor	is per day up to 800,000 gallons
per day du	ring the event. The Sussex 1 flow	meter did not show any sign of
surcharging	g during the same period which le	ads me to believe that there is
potentially	some cross connected catch basin	is in this small subarea that are
flowing the	rough your sanitary sewer. This a	area is supposed to be separated
_		conditions. Please investigate and
eliminate t	his source of storm flow from the	collection system. Please let me
know if yo	u have any questions regarding th	is matter.
Louie	• •	

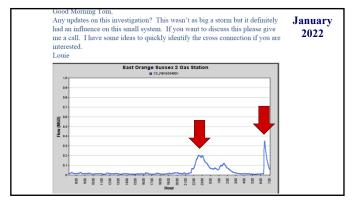


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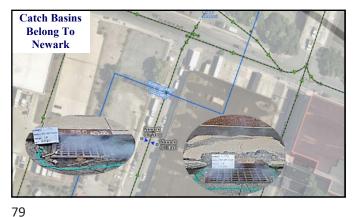


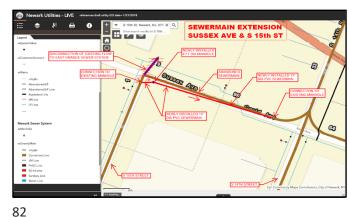


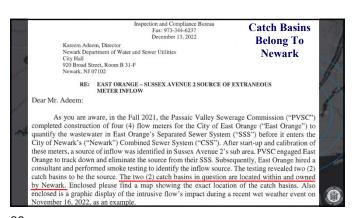
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The identified stormwater flow must be diverted to the nearest storm sewer for the following reasons:

- A stormwater connection to a sanitary sewer is prohibited by PVSC Rules & Regulations at Section 312.1(p)(enclosed);
- 2. As a result of the connection, East Orange is improperly being billed by PVSC for the runoff from this area; and
- 3. East Orange would be improperly paying Newark wheeling fees for flows that originate from a Newark catch basin.

In lieu of a more formal proceeding, PVSC is offering to host a meeting between East Orange and Newark representatives to discuss the issue and arrive at an amicable and expeditious solution. Please advise as to your availability in the upcoming weeks and a desired location (whether virtual or on location at the East Orange site) for this meeting. You may do so by contacting Mr. Louis Lambe at (973) 817-5816. We look forward to hearing from you.

Newark Agreed to do the work without a meeting and worked with PVSC to resolve the issue.



