Sacramento Regional County Sanitation District

Interceptor Sequencing Study

**Technical Memorandum 17
City of Folsom SOI Flow Generation**

June 2011

Sacramento Regional County Sanitation District

Interceptor Sequencing Study

**TECHNICAL MEMORANDUM
NO. 17**

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1.0 BACKGROUND

The 2010 Sacramento Regional County Sanitation District (SRCSD) Business Initiative (BI) was created to address the planning gap between the long range interceptor plans (Master Plan 2000 (MP2000) and Interceptor Sequencing Study (ISS)) and near term planning and implementation. The BI was tasked with creating a mid range plan to address development needs in two areas of the east county: East Rancho Cordova and City of Folsom's Sphere of Influence (SOI) south of Highway 50. The East Rancho Cordova Mid Range Plan was approved by the Project Authorization Committee (PAC) in January 2011. The ISS developed a new interceptor hydraulic model, flow generation criteria, and facility criteria. The intent of the updated hydraulic model and evaluation criteria was to establish methods to evaluate the performance of the existing system and consider revised design criteria for future interceptor projects.

2.0 PURPOSE

The purpose of this technical memorandum is to evaluate various different methods to predict build-out flows in the Folsom SOI area and recommend an approach to providing sewer service. Due to the relatively small size of the area, the approach to flow generation has a potential impact the ownership of the sewer facilities based on the 10 million gallons per day (MGD) threshold established by the Master Interagency Agreement (MIA).

3.0 STUDY AREA

The City of Folsom SOI area consists of approximately 3,565 acres of proposed master planned development located east of Prairie City Road and South of State Highway 50.

Figure 17.1 Folsom Sphere of Influence Area Map
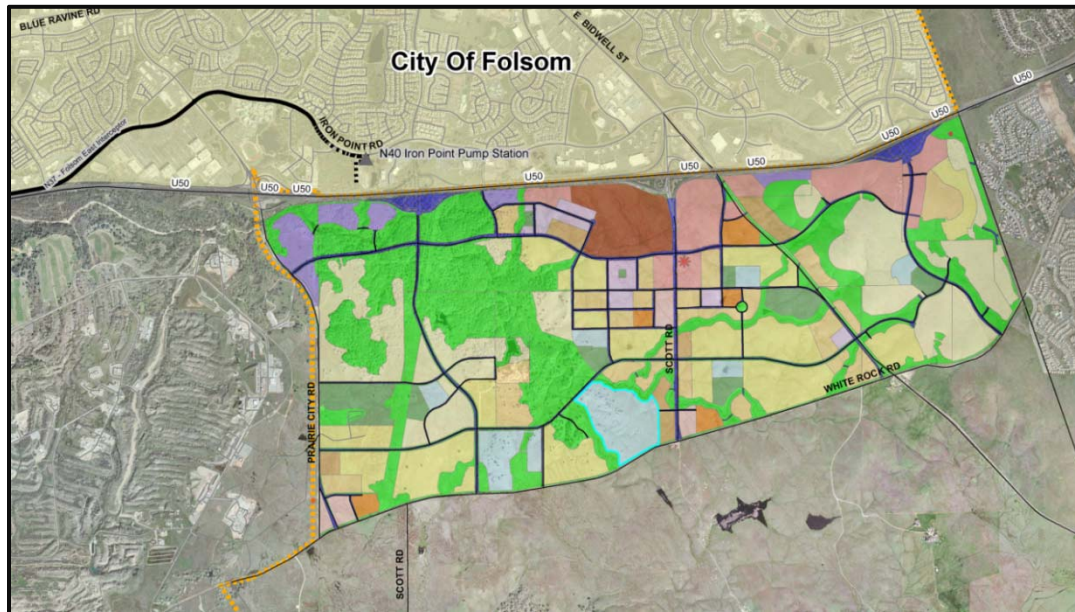
3.1 Folsom SOI Planning History

In 2001, the State Local Agency Formation Commission (LAFCo) designated the South of 50 area as part of Folsom's sphere of influence. The City of Folsom conducted a visioning process in 2005 to solicit public input on options for development of the South of Highway 50 Specific Plan Project. In 2008, the City of Folsom began development of a joint Environmental Impact Report (EIR) and Environmental Impact Statement (EIS) for the project. As part of the draft EIR/EIS, a study of wastewater infrastructure needs was completed in December 2008 (Appendix K of the DEIR). The study utilizes MP2000 and 2008 Sacramento Area Sewer District (SASD) flow generation standards to calculate flows in the Folsom Specific Plan Area.

4.0 MASTER PLAN 2000 FLOW GENERATION

Although the Folsom SOI area is outside the Urban Services Boundary (USB) delineated by approved local land use planning agencies, the SRCSD Board of directors made a finding of overriding consideration to include capacity for the Folsom SOI area in the MP2000 analysis due to the high cost of providing parallel facilities after the MP2000 projects were implemented.

4.1 Area and ESDs

MP2000 estimated the Folsom SOI area at 3,672 gross acres based on the petition City of Folsom filed with LAFCo to expand the City's sphere of influence in 2001.

MP2000 assumed that all area would build out at 6.0 ESD/gross acre minimum regardless of current or future land use planning information. This includes redevelopment (densification) of existing land uses that are currently less than 6 ESD/ac.

4.2   Wastewater Flow Estimates

Wastewater flows include three components: base wastewater flow (BWF), groundwater infiltration (GWI), and rainfall-dependant infiltration/inflow (RDI/I). Used the following criteria to generate design flows:

- BWF = 310 gpd/ESD (diurnal peaks based on rain gauge data)

- GWI = Included in BWF

- RDI/I = 0.6% - 1.8% based on location and limited flow meter and rain gauge data

4.3 Hy   draulic Modeling

MP2000 was the first planning document to build and implement a dynamic hydraulic model of the existing and future interceptor system to evaluate performance and expansion needs. The prior 1993/94 Sacramento Sewerage Expansion Study (SSES) used a static model with simplifying assumptions about the interceptor basins.

The total flow predicted by the MP2000 hydraulic model for the Folsom SOI area is 14.5 MGD.

5.0   ISS FLOW GENERATION

The ISS updated the interceptor hydraulic model and re-evaluated flow generation and facility criteria for existing and future interceptors. Unlike the MP2000, which evaluated the existing and future interceptor system with a single set of design criteria, the ISS team developed two different sets of criteria:

Realistic   Flow generation is based on historical experience, does not include factors of safety. Used to evaluate existing system and trigger studies to consider improvements and/or relief projects.

Conservative   Flow generation is based on assumptions that include identified factors of safety (primarily ESD density). Potentially used to size future facilities.

5.1   Area and ESDs

Rather than assuming a blanket minimum land use density of 6.0 ESDs per acre for future development, the ISS team developed two land use scenarios to be used for analysis of expansions to the interceptor system.

| Realistic Land Use Scenario | Land use densities based on 50th percentile of similar existing development density distributions within the SASD service area. |
| Conservative Land Use Scenario | Land use densities based on 85th percentile of similar existing development density distributions within the SASD service area. |

A common assumption between both land use scenarios is that existing connected parcels are assumed to not redevelop (densify) during the life of the pipe unless designated by a land use agency as a redevelopment area. One important assumption that differentiates the ISS method of ESD density distribution from the previous MP2000 effort is unsewered areas (roads, parks, open space, etc) are counted as zero ESDs whereas MP2000 assumed 6.0 ESDs per gross acre minimum. The ISS team reviewed current planning documents available for the various land use jurisdictions and produced a land use map that is used by the hydraulic model to generate flows from ESD density information. The conservative land use categories that were established varied from a low of less than 1 ESD/ac to a high of 8 or greater ESD/ac. For the Folsom SOI area, the Specific Plan was reviewed and the conservative ESD density is estimated at 4.1 ESD/ac. These values were obtained by equating the Folsom SOI specific plan land uses to similar land uses in SASD's service area and applying the 50th and 85th percentiles. The projected dwelling unit densities in the Folsom SOI specific plan were not used to develop ESD densities.

5.2   Wastewater Flow Estimates

Wastewater flows include three components: base wastewater flow (BWF), groundwater infiltration (GWI), and rainfall-dependant infiltration/inflow (RDI/I). ISS developed the following criteria to generate design flows:

- BWF = 250 gpd/ESD (diurnal peaks based on model calibration of similar areas)

- GWI = Model calibration based on similar areas

- RDI/I = 0.6% realistic condition, 1.0% conservative condition

The model also has additional input settings for RDI/I flows that correspond to fast, medium, and slow peak flow response times. For expansion areas, the fast flow response is used for realistic and conservative flow scenarios unless more accurate information is available.

5.3 Hy   draulic Modeling

Rather than rely on a synthetic 10-year recurrence storm to develop RDI/I, a 10-year frequency system response was derived by analyzing the interceptor system flow response to various storms on record and performing a statistical regression analysis.

The ISS model was used to obtain PWWF for the Folsom SOI area using the consolidated land use map acreage, ESD density and the results for the conservative scenario is 9.2 MGD. See Appendix B for model results.

5.3.1   Equations to estimate model predicted flows

SASD Capacity Management provided a set of equations to predict realistic and conservative flows based on the output of the model using parameters developed with the ISS. The equations are applicable to sheds from 1mgd to 60mgd in size and assume fast RDI/I rates:

Equation 1: ADWF = (250 gpd/ESD)(# of ESD)(1 MG/10^6 G) +GWI

Equation 2: GWI = (GWI Factor)(# of Acres)/10^6

Equation 3: PDWF = (ADWF-GWI)(PF)+GWI

Equation 4: PF = 1.5831-0.004(ADWF)

Equation 5: RDI/I = (RDI/I Factor)(# Acres)/10^6

Equation 6: PWWF = PDWF+RDI/I

Where:
- ADWF(MGD): Average dry weather flow
- PDWF(MGD):Peak dry weather flow
- PWWF(MGD): Peak weather flow
- GWI(MGD): Ranges from 0 to 500 gpd per gross acre
    - 500 gpd/ac – Natomas, west of Main Drainage Canal
    - 200 gpd/ac – West of Union Pacific Railroad (UPRR)
    - 0 gpd/ac – East of UPRR
- PF: Dry weather flow peaking factor
- RDI/I(MGD): Rainfall-directed inflow and infiltration
    - 800 gpd/ac for realistic flow calculation
    - 1500 gpd/ac for conservative calculation
- # of Acres: Contributing(net) Acreage (gross acreage from the ISS CLU map)
- # of ESD: Contributing ESDs

More information on the derivation of the equations is located in Appendix C.

6.0   FOLSOM SOI SPECIFIC PLAN FLOW GENERATION

The current version of the Folsom SOI draft specific plan (June 2010) contains a proposed land use plan with a range of development densities for various proposed land uses:

Table 17.1 Folsom SOI Specific Plan Proposed Land Use, June 2010

Land Use	Acreage	%	Low Density (DU/AC)	High Density (DU/AC)	Low Density ESD	High Density ESD
Community Commercial	38.8	1%	6	6	233	233
General Commercial	212.9	6%	6	6	1278	1278
Office Park	89.2	3%	6	6	535	535
Multi-Family High Density	49.9	1%	20	30	748	1122
Multi-Family Low Density	266.7	7%	7	12	1400	2400
Multi-Family Medium Density	67.0	2%	12	20	603	1004
Mixed Use	59.1	2%	9	30	532	1773
Open Space	1053.6	30%	0	0	0	0
Parks	121.7	3%	0	0	0	0
Regional Commercial	110.8	3%	6	6	665	665
Public Quasi-Public	179.3	5%	6	6	1076	1076
Single Family	557.8	16%	1	4	558	2231
Single Family High Density	532.5	15%	4	7	2130	3728
Roads	226.1	6%	0	0	0	0
Totals	3,565	100%	-	-	**9,757**	**16,045**

*Multi-family units considered 0.75ESD

The specific plan estimates that densities are expected to be between 2.7 ESD/ac and 4.5 ESD/ac. Using these densities to calculate the PWWF using the model fit equations for the conservative flow scenario yields:

- Low Density – 9.2 MGD (using conservative flow generation criteria at 2.7 ESD/ac)
- High Density – 11.6 MGD (using conservative flow generation criteria at 4.5 ESD/ac)

6.1 El Dorado Irrigation District Service Area

Approximately 200 acres of the Folsom SOI area is within the existing EID service area. According to the Folsom Plan Area Specific Plan June 2010, the EID service area will be served by EID.

Figure 17.2 EID Service Area
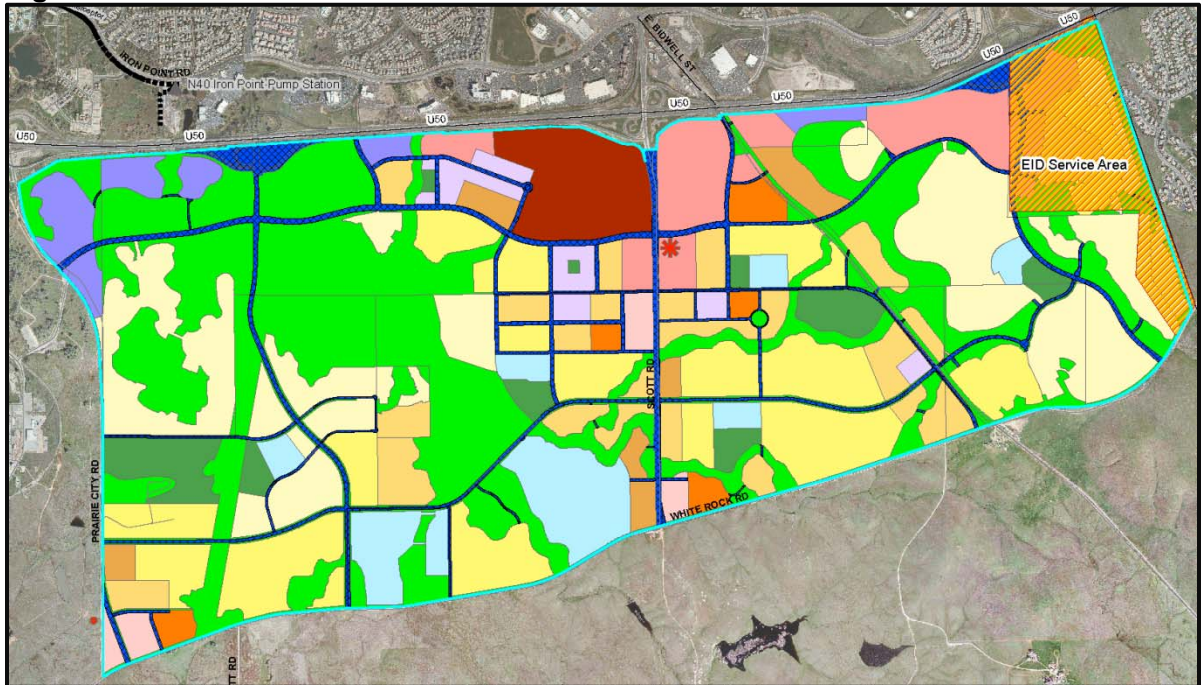
Using the land use densities from the specific plan to calculate PWWF using the model fit equations for the conservative flow scenario yields:

- Low Density – 0.5 MGD
- High Density – 0.6 MGD

6.2   City of Folsom Flow Generation

City of Folsom Design Procedure Manual dated May 22, 2003 contains flow generation criteria for the design of City of Folsom sewer infrastructure. Applying the standards to the proposed range of ESD densities proposed in the specific plan yields the following:

Table 17.2 City of Folsom Flow Generation Criteria Applied to SOI

Land Use	Average Flow (Low Density)	Average Flow (High Density)	Peaking Factor	Low Density PWWF	High Density PWWF
Community Commercial	0.06	0.06	3.5	0.22	0.22
General Commercial	0.34	0.34	2.6	0.89	0.89
Office Park	0.14	0.14	3.1	0.44	0.44
Multi-Family High Density	0.22	0.34	2.8	0.63	0.94
Multi-Family Low Density	0.42	0.72	2	0.84	1.44
Multi-Family Medium Density	0.18	0.30	2.6	0.47	0.78
Mixed Use	0.09	0.09	3.3	0.31	0.31
Open Space	0	0	-	0.00	0.00
Parks	0	0	-	0.00	0.00
Regional Commercial	0.18	0.18	3.1	0.55	0.55
Public Quasi-Public	1.72	1.72	2.3	3.96	3.96
Single Family	0.22	0.89	2.8	0.62	2.50
Single Family High Density	0.85	1.49	2.3	1.96	3.43
Roads	0	0	-	0.00	0.00
Totals	4.44	6.28	2.3	**10.21**	**14.44**

7.0   SUMMARY OF RESULTS

Table 17.3 contains the results for the various methods to predict build out flows in the Folsom SOI area:

Table 17.3 Summary of Flow Generation Methods

Source	Gross Area (Acres)	ESD Density (Gross AC)	Total ESD	PWWF (MGD)	EID Service Area PWWF (MGD)	Total without EID
MP2000	3,672	6.0	22,035	14.5	Not Modeled	Not Modeled
ISS CLU map, Model output, conservative ESD and flow generation	3,329	4.1	13,690	9.2	Not Modeled	Not Modeled
ISS CLU Map acreage, ISS CLU map conservative ESD density, ISS model equations conservative flow generation	3,329	4.1	13,649	10.7	0.6	10.1
Specific Plan acreage, Specific plan low density ESD, ISS model equations and conservative flow generation	3,565	2.7	9,757	9.2	0.5	8.7
Specific Plan acreage, Specific plan high density ESD, ISS model equations and conservative flow generation	3565	4.5	16,045	11.6	0.6	11.0
Specific Plan acreage, Specific plan low density, Folsom Flow Equations	3,565	2.7	9,757	10.2	Not Modeled	Not Modeled
Specific Plan acreage, Specific plan high density, Folsom Flow Equations	3,565	4.5	16,045	14.4	Not Modeled	Not Modeled

8.0 DISCUSSION

Flow monitoring in the interceptor system has grown over time and enough data has been gathered to confirm that the flows predicted by MP2000 and previous master plans indicate that the assumptions are overly conservative and may result in over-investment in un-used capacity. The ISS evaluated each component of flow generation criteria has produced a better understanding of the nature of each component so that SRCSD can modify the base criteria as risk tolerance or other information changes.

MP2000 flow generation assumptions predicted that the Folsom SOI area should be designed for 14.5 MGD PWWF and included recommended future facilities to convey that flow to SRWTP.

ISS flow generation assumptions predict a range of 9.2-11.6 MGD depending on the method of calculation and the ESD density assumptions.

Sacramento Regional Wastewater Management Program Master Interagency Agreement (MIA) defines an interceptor sewer as "Any sanitary sewer designed to carry a peak wet weather flow of 10 MGD or greater from new development". The MIA does not explicitly define the flow generation criteria used to generate peak wet weather flows, nor does it define which flow generation criteria should be used in the event that SRCSD and a contributing agency flow generation assumptions to not yield the same design flows.

The Folsom SOI area is still very early in the development process and the details of development timing, phasing, and ultimate ESD densities are going to change in the coming years as the development moves forward.

9.0 RECOMMENDATIONS

It is recommended that the ISS carry forward the facilities identified in MP2000 to serve the Folsom SOI area but acknowledge that this issue should be re-visited in the next SRCSD Interceptor System Master Plan Update.

Initial service to the first phases of development will rely on City owned infrastructure until sufficient flow has been established to justify the construction and proper operation of a SRCSD sized facility.

APPENDIX A

Flow Calculations

Appendix A Flow Calculations

	Acreage	%	MP2000 (6ESD/gross AC)	ISS Consolidated Land Use Map Realistic BO (2.8ESD/net AC)	Conservative BO (4.1ESD/net AC)	EID Service Area	Folsom Specific Plan Low Density (DU/AC)	High Density (DU/AC)	Low Density ESD	Density ESD	EID Service Area Acerage	Density ESD	Density ESD	Folsom Sewer Design Standards Flow Factor (gpd/ESD)	Low Density Average Flow	Peaking Factor	PWWF	High Density Averag e Flow	Peaking Factor	PWWF
Community Commercial	38.8	1%	-	-	-	-	6	6	233	233	0	0	0	-	0.06	3.5	0.22	0.06	3.5	0.22
General Commercial	212.9	6%	-	-	-	-	6	6	1278	1278	35	207	207	-	0.34	2.6	0.89	0.34	2.6	0.89
Office Park	89.2	3%	-	-	-	-	6	6	535	535	0	0	0	-	0.14	3.1	0.44	0.14	3.1	0.44
Multi-Family High Density	49.9	1%	-	-	-	-	20	30	748	1122	0	0	0	300	0.22	2.8	0.63	0.34	2.8	0.94
Multi-Family Low Density	266.7	7%	-	-	-	-	7	12	1400	2400	28	146	251	300	0.42	2	0.84	0.72	2	1.44
Multi-Family Medium Density	67.0	2%	-	-	-	-	12	20	603	1004	0	0	0	300	0.18	2.6	0.47	0.30	2.6	0.78
Mixed Use	59.1	2%	-	-	-	-	9	30	532	1773	0	0	0	-	0.09	3.3	0.31	0.09	3.3	0.31
Open Space	1053.6	30%	-	-	-	-	0	0	0	0	44	0	0	0	0	-	0.00	0	-	0.00
Parks	121.7	3%	-	-	-	-	0	0	0	0	0	0	0	0	0	-	0.00	0	-	0.00
Regional Commercial	110.8	3%	-	-	-	-	6	6	665	665	0	0	0	-	0.18	3.1	0.55	0.18	3.1	0.55
Public Quasi-Public	179.3	5%	-	-	-	-	6	6	1076	1076	0	0	0	1600	1.72	2.3	3.96	1.72	2.3	3.96
Single Family	557.8	16%	-	-	-	-	1	4	558	2231	34	34	135	400	0.22	2.8	0.62	0.89	2.8	2.50
Single Family High Density	532.5	15%	-	-	-	-	4	7	2130	3728	31	124	217	400	0.85	2.3	1.96	1.49	2.3	3.43
Roads	226.1	6%	-	-	-	-	0	0	0	0	18	0	0	0	0	-	0.00	0	-	0.00
[1] Multi Family units considered 75% of the units per SASD design standards [2]	3565	100%	22035	8586	14618	777			9757	16045	189	511	810		4.44			6.28		

Using max area peaking factor per Folsom design standards with average total flow | 2.3 | **10.21** | | 2.3 | **14.44**

	Q_{PWWF}[1]	Q_{PWWF}[2]	Q_{PWWF}[2]	Q_{PWWF}[3]		Q_{PWWF}[2]	Q_{PWWF}[2]		Q_{PWWF}[2]	Q_{PWWF}[2]
Gross Acreage	-	3329	3329	189		3565	3565		189	189
Total Shed Flow (MGD)	**14.48**	**6.04**	**10.72**	**0.59**		**9.18**	**11.63**		**0.49**	**0.60**

[1] MP 2000: Flow factor = 310gpd/ESD, 3,672AC, synthetic storm, model generated flow based on hydrographs (no equations were derived)
[2] ISS Conservative Flow Factor = 250gpd/ESD, fast RDI/I, equation fitted to model output

APPENDIX B

ISS Flow Modeling Results

Memorandum

To: Kyle Frazier
        SRCSD

From: Mark Wilcox
        SASD Capacity Management

Date: February 1, 2011

Subject: **Req #665 Mid Range Plan Folsom SOI**

The SRCSD Interceptor Sequencing Study (ISS) model was used to obtain Peak Wet Weather Flow (using the 2006 New Year's Storm event) and ESD data for the Folsom SOI shed (FSP in the Consolidated Land Use map. See figure 1) for the Realistic and Conservative model scenarios. The data is presented below:

Realistic

PWWF = 7.4 MGD
ESD = 9,159
Contributing Area = 3,329 Acres

Conservative

PWWF = 9.2 MGD
ESD = 13,690
Contributing Area = 3,329 Acres

Figure 1. Folsom SOI (FSP) Shed Area
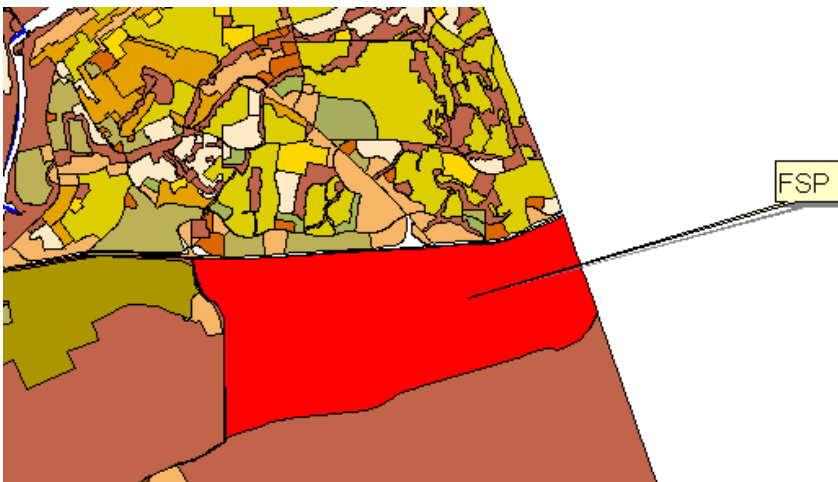
An equation similar to the one provided for conservative buildout flows (5-27-2009 TM) may be developed for realistic buildout flows and will be provided within 2 weeks.

Please contact me if you have any questions regarding the information provided in this memo.

Mark Wilcox
SASD Capacity Management
876-6078

Original Request:
Using SRCSD updated ISS model: Realistic PWWF and ESD count from Folsom SOI (FSP in CLU map) Conservative PWWF and ESD count from Folsom SOI (FSP in CLU map) If possible, an equation to estimate realistic BO flows from interceptor sheds similiar to equation provided for conservative BO flows in 5-27-2009 TM (if eguation is different than conservative). Charge time to general SRCSD modeling charge code.

APPENDIX C

ISS Flow Equation Development

Memorandum

Date: February 18, 2011

To: Kyle Frazier,
           SRCSD Engineering

From: Li-Kai Huang,
           SASD Capacity Management

Subject   **Equations to Calculate SRCSD's Realistic and Conservative Flows**
_____

Background and Summary

This memo is in response to your request to derive equations to calculate SRCSD's realistic and conservative flows for new development sheds and under the 12/31/2005 storm conditions. This memo presents the derived equations and summarizes how the equations were derived from modeling flow data. These equations will supersede the equations provided to Steve Norris by Capacity Management in May 2009 (to calculate SRCSD's conservative flows).

If more clarifications are needed, please contact me at 876-6298.

Derived Flow Equations:

The derived equations (Eqn) to calculate SRCSD's realistic and conservative flows under the 12/30/2005 storm conditions are listed below:

PLEASE NOTE THE FOLLOWING LIMITATIONS AND RECOMMENDATIONS:
- ➢ These equations should be used for **new development** sheds only.
- ➢ These equations were derived from SASD model PWWF data (ranging from 1 mgd to 60 mgd).
- ➢ **SASD recommends only applying these equations within:**
- ➢ The 1 to 60mgd PWWF range
- ➢ Inside SASD's study area.

Eqn 1:   ADWF = 250 gpd/ESD * # of ESD * 1 MGal/10^6 gal + GWI
Eqn 2:   GWI = GWI factor * Acre/10^6
Eqn 3:   PDWF = (ADWF – GWI) * PF + GWI
Eqn 4:   PF = 1.5831 - 0.004 ADWF   **(Derived from the equation in Figure 2)**
Eqn 5:   RDI/I = RDI/I factor * Acre/10^6
Eqn 6:   PWWF = PDWF + RDI/I   **(Applicable to flows from 1 to 60 mgd)**

Where:

- ➢ ADWF (mgd): Average dry weather flow
- ➢ PDWF (mgd): Peak dry weather flow
- ➢ PWWF (mgd): Peak wet weather flow (under the 12/31/2005 storm conditions)
- ➢ GWI (mgd): Groundwater infiltration
- ➢ GWI factor: Ranges from 0 to 500 gpd per gross acre (depending on location)
    - o 500 gpd/ac – Natomas, west of Main Drainage Canal
    - o 200 gpd/ac - West of Union Pacific Railroad (UPRR) (except Natomas area)
    - o 0 gpd/ac – East of UPRR

    Data source: SASD's 2005 Sewer System Capacity Plan

- ➢ PF: Dry weather flow peaking factor
- ➢ RDI/I: Rainfall-directed inflow and infiltration (mgd)
- ➢ RDI/I factor:
    - o Use 800 gpd/ac for realistic flow calculation
    - o Use 1500 gpd/ac to conservative flow

    See Figures 3 and 4 for generation of these factors.

- ➢ Acre: Contributing acre
- ➢ # of ESD: Contributing ESD

Derivation of the Equations

Study Area
SASD's Southeastern Expansion Model was used to derive SRCSD's realistic and conservative flow equations. This model contains only new development sheds. See Figure 1.

The RDI/I rates of new development sheds are:
- ➢ 0.6% under realistic conditions
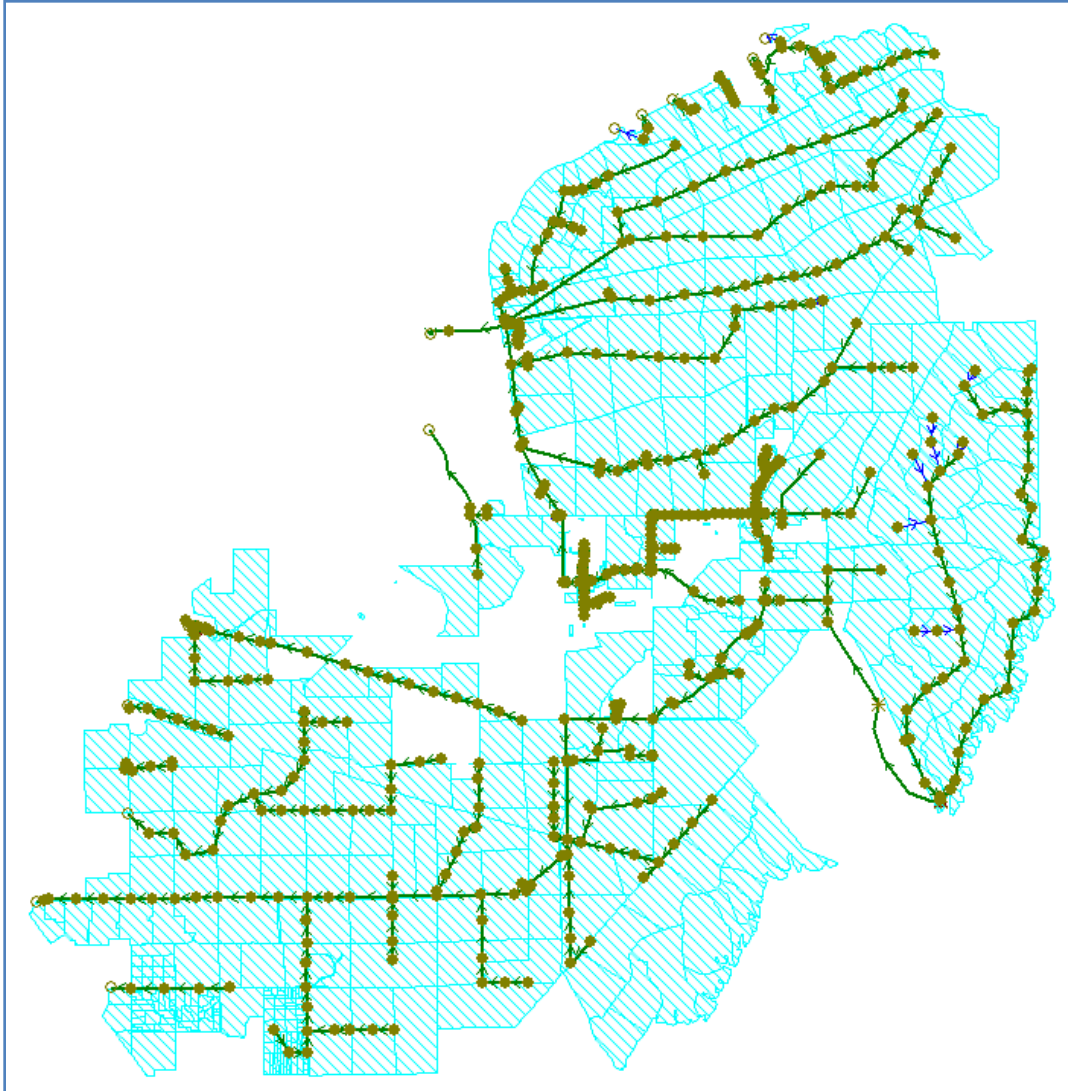- ➢ 1.0% under conservative conditions

Where these sheds are located, no groundwater infiltration is expected. The modeled system is free of capacity deficiencies, so free flow data was used to derive the equations.

Figure 1: Southeastern Expansion Shed Model *(used to generate flow data to derive the equations)*

Derivation of Peaking Factor (Eqn 4)

According to *Eqn 3:*

  ➢ PDWF = (ADWF – GWI) * PF + GWI

The Southeastern Expansion Sheds have no GWI; therefore,
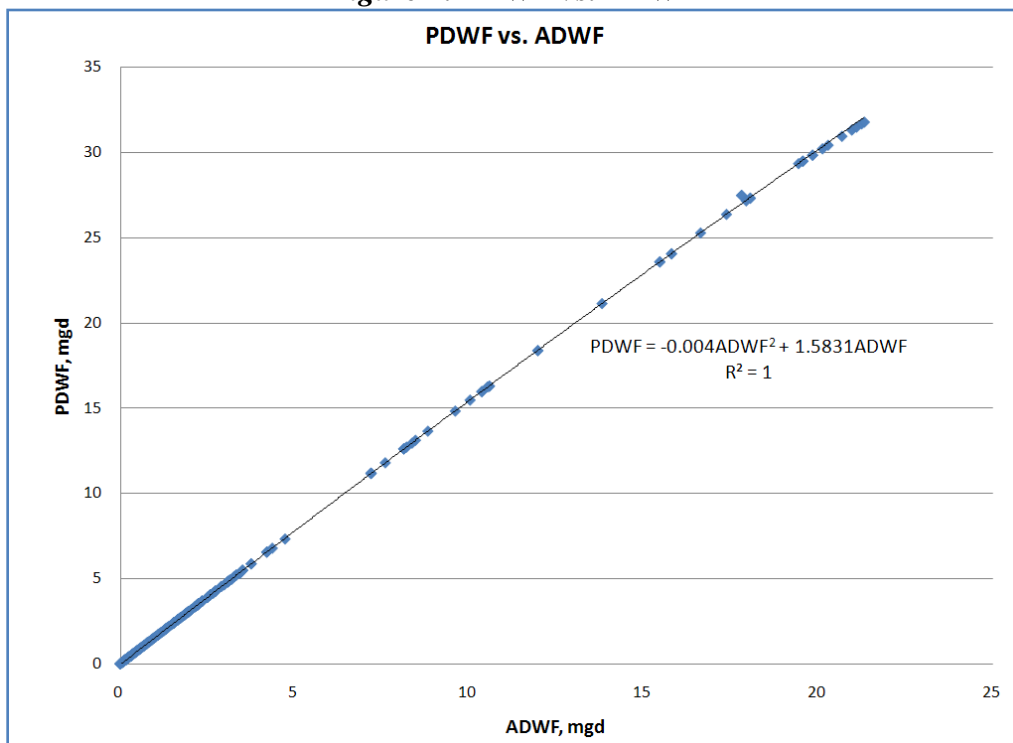
  ➢ PDWF = (ADWF – 0) * PF + 0
  ➢ PDWF = ADWF * PF

By plotting the data points of PDWF and ADWF(in each pipe from the model) on a scattergraph, the data shows a strong polynomial relationship between PDWF and ADWF, with R-squared value = 1.

Based on *Figure 2*,

➢ PDWF = -0.004 ADWF^2 + 1.5831 ADWF

➢ PDWF = 1.5831 ADWF – 0.004 ADWF^2

➢ PDWF = ADWF (1.5831 – 0.004 ADWF)

  where PF = 1.5831 – 0.004 ADWF *(Eqn 4)*

Figure 2: PDWF vs. ADWF

RDI/I Factor Derivation

To determine the RDI/I factor used for *Eqn 5* (RDI/I = RDI/I factor * Acre/10^6), the model RDI/I was plotted against contributing acre of each pipe on a scattergraph. *Figure 3* shows the RDI/I plot under realistic condition (0.6% fast RDI/I rate). *Figure 4* shows the RDI/I plot under conservative conditions (1.0% fast RDI/I rate). Both figures show a good linear relationship between RDI/I and contributing acres.
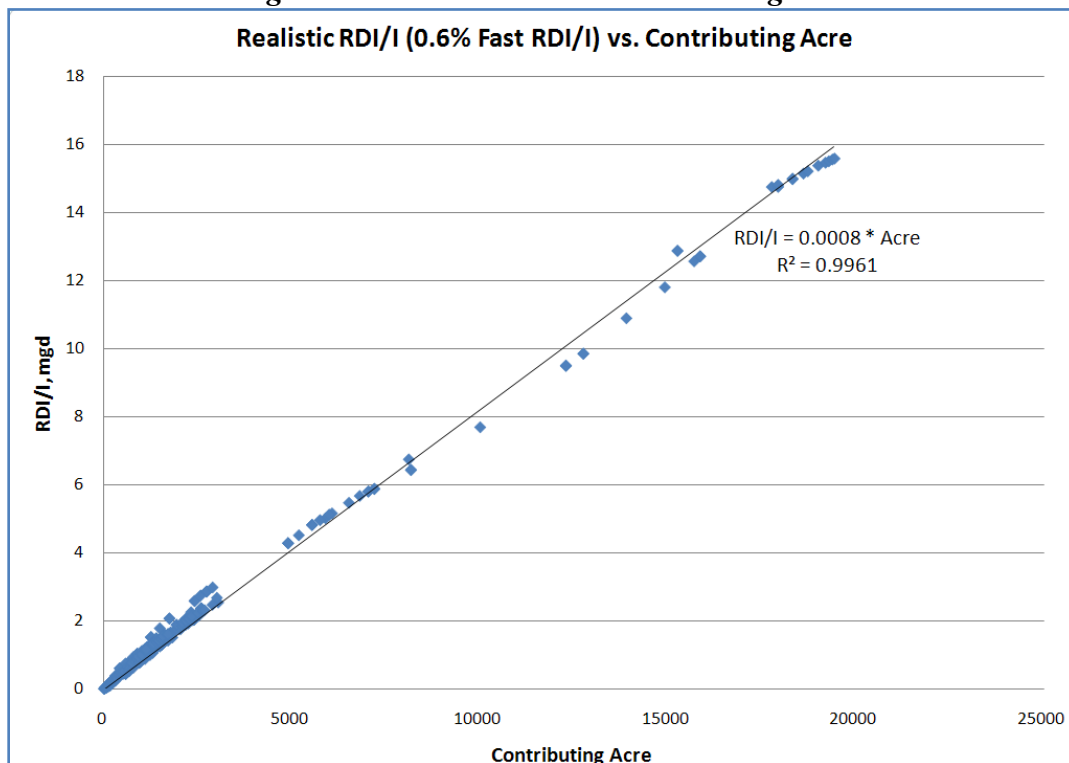
Based on these relationship:

- ➤ Realistic RDI/I factor = 800 gpd/ac
- ➤ Conservative RDI/I factor = 1500 gpd/ac

This conservative RDI/I factor (1500 gpd/ac) is slightly higher than the RDI/I factor determined in May 2009 (1100 gpd/ac). This is due to the previously modeled pipes being slightly capacity constrained, which resulted in a lower RDI/I factor. The new RDI/I factor should supersede the old factor.
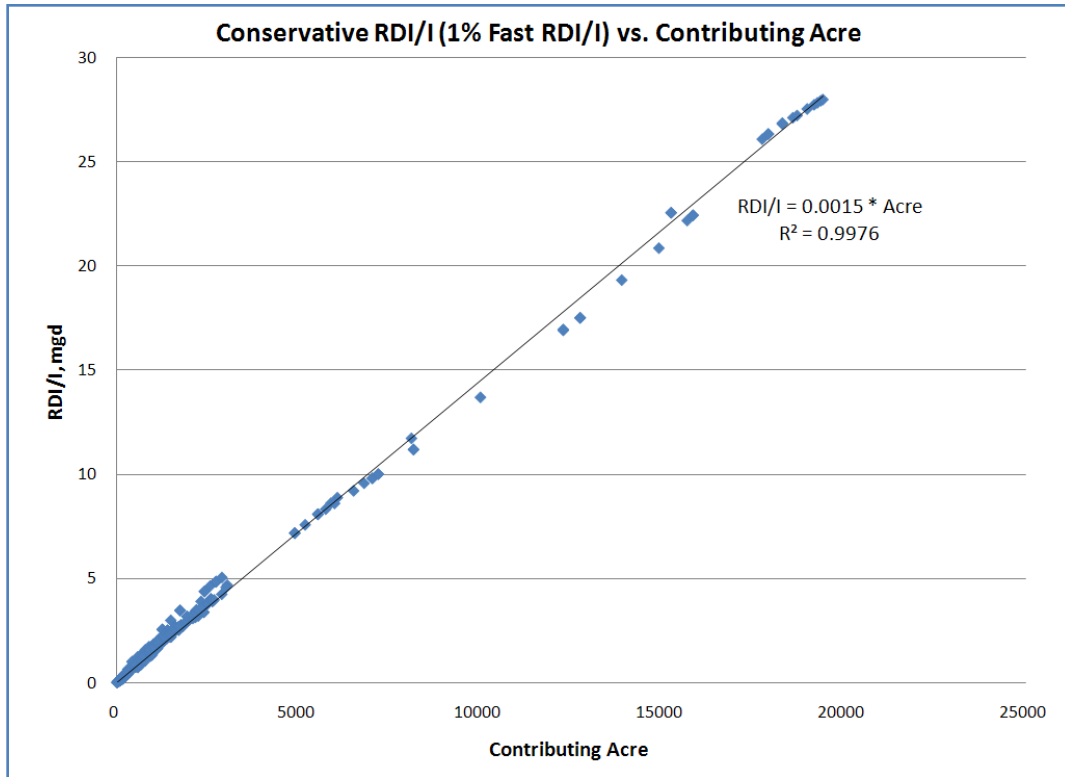
Figure 3: Realistic RDI/I vs. contributing acre

Figure 4: Conservative RDI/I vs. contributing acre

Conservative RDI/I (1% Fast RDI/I) vs. Contributing Acre

RDI/I = 0.0015 * Acre
R^2 = 0.9976

CC: Steve Norris,
         Policy & Planning