

**APPENDIX K  
METHOD FOR ESTIMATING FUTURE  
WWTF PERMITTED FLOWS**

## **Appendix K - Methodology to Project Permitted Flows for WWTFs Discharging to the Clear Creek Watershed**

This methodology is intended to estimate future permitted WWTF flows on a watershed basis. The growth in wastewater flow is assumed to be the result of increases in population. A projected flow is initially determined for each WWTF and the flows are subsequently summed by watershed to allow a calculation of additional assimilative capacity and additional capacity for future waste load allocations that may be associated with expanding or new WWTFs. The steps followed for the flow projection are summarized below.

### **1. Projection of flows from municipal/residential mobile home discharges**

- Find population estimates from TWDB for municipalities and county facilities (Table K-1).
- For residential mobile home parks, determine the city where they are located
- Find all the municipal/home park outfalls for a given city and find the total permitted flow (Table K-2).
- Find gallons/capita/day (GPCD) by city by dividing the total permitted flow per city by the population in 2010 (Table K-3).
- Determine the fraction of flow that a given outfall corresponds to respect to the total permitted flow for the city it falls in (Table K-4).
- Calculate projected flow for 2050 by multiplying the GPCD for the city by the fraction of flow for the given facility by the population for 2050 for the city where the facility is located (Table K-4).

### **2. Projection of flows from industrial discharges**

- Determine the percent increase in water demand from manufacturing facilities between 2010 and 2050 by county (from the TWDB projections).
- Multiply the current permitted flow for the facility by the expected percent increase in manufacturing industry water demand for the county in which the facility is located. This is the projected flow for 2050 (Table K-4).
- The Gulf Coast Waste Disposal Authority facility (Blackhawk Regional WWTF) treats a combination of the municipal sewage from the city of Friendswood and effluent from manufacturing industries. Thus, the projected flow in 2050 was calculated as the sum of the projected flow from the city (calculated as outlined in the municipal/residential mobile homes category) and the projected increase in flow using the percent increase in water demand for the manufacturing industry in Harris County (Table K-4).

### **3. Calculation of flows by watershed**

- Add up the flows discharging to a given water body (Table K-5).
- Use the projected flow to recalculate LDCs or to re-run the tidal prism model for future conditions.

**Table K-1 TWDB Population Projections**

Water User Group	County Name	P2000	P2010	P2020	P2030	P2040	P2050
Alvin	Brazoria	21,413	23,231	25,123	26,935	28,605	30,375
Brazoria County MUD #3	Brazoria	4,110	7,517	11,063	14,458	17,587	20,904
Pearland	Brazoria	35,696	63,685	80,689	96,167	110,461	125,585
League City	Galveston	45,306	53,403	60,392	64,532	66,207	67,454
Friendswood	Galveston	21,237	24,553	27,415	29,110	29,796	30,307
Harris County WCID #89	Harris	2,430	2,475	2,519	2,562	2,605	2,648
Houston	Harris	1,919,813	2,199,988	2,472,783	2,741,099	3,006,695	3,270,641
Nassau Bay	Harris	4,170	4,170	4,170	4,170	4,170	4,170
Webster	Harris	9,083	13,076	16,964	20,788	24,573	28,334

**Table K-2 Total Permitted Flows by City**

Permit	Permittee	Segment	Use Population Projection For	Permitted Flow (MGD)
12332-001	Brazoria County MUD 3	1102G_01	Brazoria County MUD 3	2.4
10005-001	City of Alvin	2432	City of Alvin	5
14440-001	R. West Development Co Inc	1104	City of Alvin	0.24
12935-001	K C Utilities	1104	City of Alvin	0.05
12822-001	Walker Water Works Inc	1102	City of Alvin	0.035
14039-001	Walker Water Works Inc	2432	City of Alvin	0.056
10134-002	City of Pearland	1102	City of Pearland	4.5
10134-007	City of Pearland	1102	City of Pearland	6
10134-008	City of Pearland	1102	City of Pearland	2
10134-010	City of Pearland	1102	City of Pearland	2.5
10134-007	City of Pearland	1102	City of Pearland	2.5
12849-001	CMH Parks Inc	1102	City of Pearland	0.075
13865-001	TIKI Leasing Co Ltd	1102	City of Pearland	0.049
12680-001	H & R Realty Investments	1102	City of Pearland	0.012
13864-001	Fresno Manufacturing LLC	1102	N/A Used Manufacturing % Increase For Fort Bend County	0.0084
10568-005	City of League City	1101	City of League City	7.5
10568-003	City of League City	1101A_01	City of League City	0.66
10568-008	City of League City Southwest Reclamation WWTP	1101A_01	City of League City	12.0
10495-002	City of Houston	1007	City of Houston	25

Permit	Permittee	Segment	Use Population Projection For	Permitted Flow (MGD)
10495-003	City of Houston	1007	City of Houston	28
10495-009	City of Houston	1007	City of Houston	7
10495-010	City of Houston	1007	City of Houston	2
10495-016	City of Houston	1006	City of Houston	7
10495-030	City of Houston	1014	City of Houston	26.4
10495-037	City of Houston	1007	City of Houston	60
10495-050	City of Houston	1007	City of Houston	3.75
10495-053	City of Houston	1007	City of Houston	4
10495-065	City of Houston	1007	City of Houston	3
10495-075	City of Houston	1102	City of Houston	6.14
10495-076	City of Houston	1017	City of Houston	21
10495-077	City of Houston	1006	City of Houston	7.25
10495-078	City of Houston	1016	City of Houston	8
10495-079	City of Houston	1102	City of Houston	5.33
10495-090	City of Houston	1007	City of Houston	200
10495-095	City of Houston	1007	City of Houston	7.2
10495-099	City of Houston	1017	City of Houston	4
10495-100	City of Houston	1016	City of Houston	3.7
10495-101	City of Houston	1016	City of Houston	4
10495-109	City of Houston	1014	City of Houston	12
10495-111	City of Houston	1007	City of Houston	13.3
10495-112	City of Houston	902	City of Houston	0.82
10495-115	City of Houston	1016	City of Houston	3
10495-116	City of Houston	1007	City of Houston	18
10495-119	City of Houston	1007	City of Houston	23
10495-122	City of Houston	1016	City of Houston	5
10495-126	City of Houston	1016	City of Houston	2
10495-133	City of Houston	1016	City of Houston	3
10495-135	City of Houston	1014	City of Houston	3.5
10495-136	City of Houston	1113	City of Houston	5
10495-139	City of Houston	1017	City of Houston	0.995
10495-146	City of Houston	1002	City of Houston	6.6
10495-148	City of Houston	1016	City of Houston	0.49
10495-149	City of Houston	1002	City of Houston	0.95
10495-150	City of Houston	1016	City of Houston	0.7
10495-151	City of Houston	1006	City of Houston	0.75
10526-001	City of Nassau Bay	1101	City of Nassau Bay	1.33

Permit	Permittee	Segment	Use Population Projection For	Permitted Flow (MGD)
10520-001	City of Webster	1101	City of Webster	3.3
11571-001	Gulf Coast WDA & City of Friendswood	1101	City of Friendswood and % Increase Manufacturing for Harris County	9.25
12939-001	Harris County WCID #89	1102	Harris County WCID #84	0.95

**Table K-3 GPCD by City**

Municipality/County MUD	Total Permitted Flow (MGD) <sup>a</sup>	Population 2010 <sup>b</sup>	GPCD Year 2010 <sup>c</sup>
Brazoria County MUD 3	2.4	7,517	319
City of Alvin	5.381	23,231	232
City of Friendswood	9.25	24,553	377
City of Houston	532.026	2,199,988	242
City of League City	20.16	53,403	378
City of Nassau Bay	1.33	4,170	319
City of Pearland	13.636	63,685	214
City of Webster	3.3	13,076	252
Harris County WCID #84	0.95	2,475	384

<sup>a</sup> Sum of permitted flows in Table K-2 for each city

<sup>b</sup> From Table K-1

<sup>c</sup> Total permitted flow \* 10<sup>6</sup> / Population 2010

**Table K-4 Flow Projections**

Permit #	Facility	Permitted Flow (MGD)	Receiving Segment	Use Pop Projection from	GPCD <sup>a</sup>	Pop 2050 <sup>b</sup>	% Flow In City <sup>c</sup>	Flow 2050 <sup>d</sup> (MGD)	Adj Flow 2050 <sup>e</sup> (MGD)
12332-001	Brazoria County Mud No. 3	2.4	1102G_01	Brazoria County MUD 3	319	24,368	100%	7.78	7.78
10568-003	City of League City	0.66	1101A_01	City of League City	378	67,454	3.3%	0.834	0.834
10568-008	City of League City Southwest Reclamation WWTP	12.0	1101A_01	City of League City	378	67,454	59.5%	15.157	15.157

<sup>a</sup> From Table K-3

<sup>b</sup> From Table K-1

<sup>c</sup> Permitted flow for facility/total permitted flow for the city in which the facility is located

<sup>d</sup> GPCD\*Population 2050\*%flow in city

<sup>e</sup> Flow 2050+Permitted Flow\*% increase of manufacturing industry water demand by county (Harris 23% and Fort Bend 14%)

**Table K-5 Projected Flows by Watershed**

<b>Watershed</b>	<b>Segment</b>	<b>Projected Permitted Flow (MGD)</b>
Unnamed Tributary of Mary's Creek	1102G_01	7.78
Magnolia Creek	1101A_01	15.991
Cow Bayou	1101C_01	NA
Unnamed Tributary of Clear Creek Tidal	1101E_01	NA

*NA = Allocation not applicable at this time. There are no WWTFs discharging to the Assessment Unit.*