



## Memo

Date: Monday, September 09, 2019

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Project: Anderson Place Development

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To: Scott Albert

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From: John Peterson, PE, CFM

Subject: Water and Wastewater Capacity Acquisition Fee

The City of Angleton has received interest from a developer on a track of land that is referred to as the Anderson Place Development located along Anderson Street between Southside Drive and Cemetery Road. The total development is projected to be 16 homes. Based on this information and using the planning criteria for water demand and sewer loading from the master plan, below is the summary of the assumptions, analysis and model results.

### Capacity Verification

- Water Demand
  - Average Daily Demand (ADD): 300 gallons per day per connection,  $16 \times 300 = 4,800$  gpd or 3.33 gpm
  - Max Daily Demand (MDD):  $1.7 \times \text{ADD} = 5.66$  gpm
  - Peak Hour Demand (PHD):  $1.25 \times \text{MDD} = 7.08$  gpm
- Water Model Run
  - There are three existing water mains in the development area (See Exhibit #1). A 12" water main runs along the north side of Cemetery Road, an 8" water main runs along the west side of S. Anderson Street, and an 6" water main runs between the development in an existing utility easement.
  - **The existing model was run for the scenario above. The model shows that there is sufficient pressure and fire flow when the three systems are looped together.**
- Wastewater Flows
  - Average Daily Flow (ADF): 255 gallons per day per connection,  $16 \times 255 = 4,080$  gpd or 2.83 gpm
  - Peak Hour Wet Weather Flow (PWF):  $4 \times \text{ADF} = 11.34$  gpm
- Wastewater Analysis
  - An analysis of the wastewater system discharged from the proposed development has been performed by reviewing the system route (See Exhibit #2).
  - A Peak Hour Wet Weather Flow (PF-4) was used to analyze the capacity used in each segment of wastewater line.
  - There is an existing 6" sewer main along the back lots of the development which has available capacity at that location; however, it is recommended that the existing pipes be

reviewed and rehabilitated by trenchless method (pipe bursting) to update the existing pipe material and size in an effort to reduce I/I entering the wastewater system.

- The 6" gravity sewer mains discharge into a 12" gravity main prior to discharging into Lift Station No 15.
- It is pumped from Lift Station No. 15 through an 8" force main and discharges into a gravity system, ranging from 12" to 27" which runs east from Cemetery Road to Shanks Road, and then south along Shanks Road to E. Phillips Road, and then west along E. Phillips Road, and then north on Front Street (CR288) into Lift Station No. 27 near the intersection of E. Phillips Road and Front Street (CR 288).
- Under normal operations, it is pumped from Lift Station No. 27 through a 12" force main which runs north along Front Street, and then west along Bryan Street, and discharges into a 30" gravity system on Bryan Street and continues to run west to the Oyster Creek WWTP.
- The 30" sewer main reduces down to 24" pipe approximately 550-ft from a manhole at the WWTP. This was confirmed by City Staff.
- The 24" pipe is currently creating a bottleneck for peak weather flow as noted in the master plan. The model shows the pipe is surcharged and runs pressurized. The surcharge is less than 6 inches.
- **With the continued growth in Angleton and this being one of the 2 large interceptors for the City. It is recommended that the pipe be upsized to a 30" pipe prior to commencing the Anderson Place Development. A percentage of the cost for the replacement of this section of pipe is included in the Capacity Acquisition Fee cost that is associated with the Anderson Place Development.**

#### Capacity Acquisition Fee:

Please see Appendix A for the calculations for the Capacity Acquisition Fee.

- Water Service
  - The City has adopted a flat fee of \$536.70 per ESU for water service throughout the City
- Wastewater Service
  - Total Capacity of 6" Sanitary Sewer set at TCEQ minimum slope is approximately 180 gpm
  - Percentage utilization of 6" Sanitary Sewer for Anderson Place is 6.32% (peak flow)
  - Total Capacity of 12" Sanitary Sewer set at TCEQ minimum slope is approximately 714 gpm
  - Percentage utilization of 12" Sanitary Sewer for Anderson Place is 1.59% (peak flow)
  - Total Capacity of 18" Sanitary Sewer set at TCEQ minimum slope is approximately 1,598 gpm
  - Percentage utilization of 18" Sanitary Sewer for Anderson Place is 0.71% (peak flow)
  - Total Capacity of 24" Sanitary Sewer set at TCEQ minimum slope is approximately 2,871 gpm
  - Percentage utilization of 24" Sanitary Sewer for Anderson Place is 0.40% (peak flow)
  - Total Capacity of 27" Sanitary Sewer set at TCEQ minimum slope is approximately 3,676 gpm
  - Percentage utilization of 27" Sanitary Sewer for Anderson Place is 0.31% (peak flow)
  - Total Capacity of 30" Sanitary Sewer set at TCEQ minimum slope is approximately 4,511 gpm
  - Percentage utilization of 30" Sanitary Sewer for Anderson Place is 0.25% (peak flow)
  - Total Firm Capacity (assumed) of LS No. 15 is 470 gpm
  - Based on the assumed capacity of the lift station, the percent utilization of LS No. 15 pumping capacity and 8" force main is 1.81% (peak flow)
  - Total Firm Capacity (assumed) of LS No. 27 is 1,059 gpm



- Based on the assumed capacity of the lift station, the percent utilization of LS No. 27 pumping capacity and 12" force main is 1.07% (peak flow)
- Total Fee for wastewater service is \$2,353.35 per ESU

Therefore, the combined cost per ESU (water & wastewater) will be approximately \$2,890.05. The total fee for the projected 16 homes for Anderson Place is approximately \$46,240.80.

#### ATTACHMENTS

Appendix A – Capacity Acquisition Fee Calculations

Exhibit 1 – Existing Water Model System Map

Exhibit 2 – Wastewater System Map

APPENDIX A - PROPOSED COST PER CONNECTION

Water Plants								
Asset Name	Current Construction Cost Estimate	Year Constructed	ENR Value for Construction Year	Estimated Construction Cost in Year of Construction	Number of Assets	Total Estimated Construction Cost	Production (gpd)	Cost per ESU (1 ESU = 300 gpd)
<b>Henderson Water Plant</b>								
1 MG GST	\$ 2,000,000	1988	4519	\$ 825,992	1	\$ 825,992		
750 gpm pumps	\$ 51,250	2006	7751	\$ 36,304	2	\$ 72,608		
850 gpm pumps	\$ 51,250	2010	8802	\$ 41,227	3	\$ 123,680		
<b>Total Henderson Water Plant</b>						<b>\$ 1,022,280</b>	<b>3,672,000</b>	<b>\$83.52</b>
<b>Chenango Water Plant</b>								
1 MG GST	\$ 2,000,000	1953	600	\$ 109,669	1	\$ 109,669		
850 gpm pumps	\$ 51,250	2005	7446	\$ 34,875	3	\$ 104,626		
<b>Total Chenango Water Plant</b>						<b>\$ 214,296</b>	<b>3,672,000</b>	<b>\$17.51</b>
<b>Jamison Water Plant</b>								
450k GST	\$ 987,500	2009	8570	\$ 773,430	1	\$ 773,430		
850 gpm pumps	\$ 51,250	2015	10035	\$ 47,002	3	\$ 141,005		
10k Hydro Tanks	\$ 77,500	2009	8570	\$ 60,700	2	\$ 121,399		
<b>Total Jamison Water Plant</b>						<b>\$ 1,035,835</b>	<b>3,672,000</b>	<b>\$84.63</b>
<b>Water Well #11</b>	\$ 1,062,500	1985	4195	\$ 407,347	1	\$ 407,347	1,224,000	\$99.84
Asset Name	Current Construction Cost Estimate	Year Constructed	ENR Value for Construction Year	<sup>1</sup> Estimated Construction Cost in Year of Construction	Number of Assets	Total Estimated Construction Cost	Production (gpd)	Cost per ESU (1 ESU = 200 gpd)
Northside EST	\$ 2,000,000	1961	847	\$ 154,816	1	\$ 154,816	500,000	\$61.93
Southside EST	\$ 2,000,000	1977	2576	\$ 470,846	1	\$ 470,846	500,000	\$188.34
<sup>1</sup> Total Cost Per Connection for Water Purchased From Brazosport Water Authority (BWA)								\$0.94
<sup>2</sup> Total Estimated Cost Per Water Connection								\$536.70

Wastewater Plants

Asset Name	Current Construction Cost Estimate	Year Constructed	ENR Value for Construction Year	<sup>3</sup> Estimated Construction Cost in Year of Construction	Number of Assets	Total Estimated Construction Cost	Production (gpd)	Cost per ESU (1 ESU = 255 gpd)
Oyster Creek Sanitary Sewer Treatment Plant	\$ 36,000,000	1980	3237	\$ 10,377,772	1	\$ 10,377,772	3,600,000	\$ 735.09

Wastewater Infrastructure

Asset Name	Current Construction Cost Estimate	Est. Year Constructed	ENR Value for Construction Year	<sup>3</sup> Estimated Construction Cost in Year of Construction	% of Capacity	Total Estimated Construction Cost	Development ESU's	Cost per ESU (1 ESU = 255 gpd)	
<b>Gravity Sewer</b>									
6" Main (1,065)	\$ 37,275	1997	5826	\$ 19,340	6.32%	\$ 1,222	16	\$ 76.35	
12" Main (4,610)	\$ 345,750	1970	1381	\$ 42,522	1.59%	\$ 676		\$ 42.23	
18" Main (2,940)	\$ 602,700	2004	7115	\$ 381,887	0.71%	\$ 2,710		\$ 169.39	
24" Main (375 feet)	\$ 95,625	2004	7115	\$ 60,591	0.40%	\$ 239		\$ 14.96	
Remove and replace 24" RCP with 30" PVC (560 feet; WWTP)	\$ 156,750	2019	11229	\$ 156,750	0.40%	\$ 619		\$ 38.70	
27" Main (2,570)	\$ 706,750	2004	7115	\$ 447,816	0.31%	\$ 1,381		\$ 86.33	
30" Main (7,920)	\$ 2,336,400	1998	5920	\$ 1,231,765	0.25%	\$ 3,097		\$ 193.54	
<b>Total Gravity Sewer</b>						<b>\$ 8,722</b>		<b>\$ 621.50</b>	
<b>Force Main</b>									
8" Force Main (2,840 feet)	\$ 213,000	1985	4195	\$ 79,574	2.00%	\$ 1,591		\$ 99.47	
12" Force Main (7,745 feet)	\$ 1,278,000	1998	5920	\$ 673,770	0.36%	\$ 2,426		\$ 151.60	
<b>Total Force Main</b>						<b>\$ 4,017</b>		<b>\$ 251.07</b>	
<b>Lift Station</b>									
No. 15	\$ 805,000	1985	4195	\$ 300,737	1.81%	\$ 5,439	\$ 339.93		
No. 27	\$ 1,150,000	1998	5920	\$ 606,287	1.07%	\$ 6,492	\$ 405.77		
<b>Total Lift Station</b>						<b>\$ 11,931</b>	<b>\$ 745.69</b>		
<b>Total Wastewater Infrastructure</b>						<b>\$ 24,671</b>	<b>\$ 1,618.26</b>		

<b>Total Estimated Cost Per Wastewater Connection</b>	<b>\$2,353.35</b>
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<sup>1</sup> The City purchases approximately 1.8 MGD from BWA which is provided at a rate of \$3.12 per 1,000 gallons. Therefore, one (1) ESU or 300 gallons, is approximately \$0.94.

<sup>2</sup> The cost shown is the adopted flat fee per ESU for water service.

<sup>3</sup> The cost shown is taken by dividing the current construction cost estimate by the 2019 ENR Value of 11229.

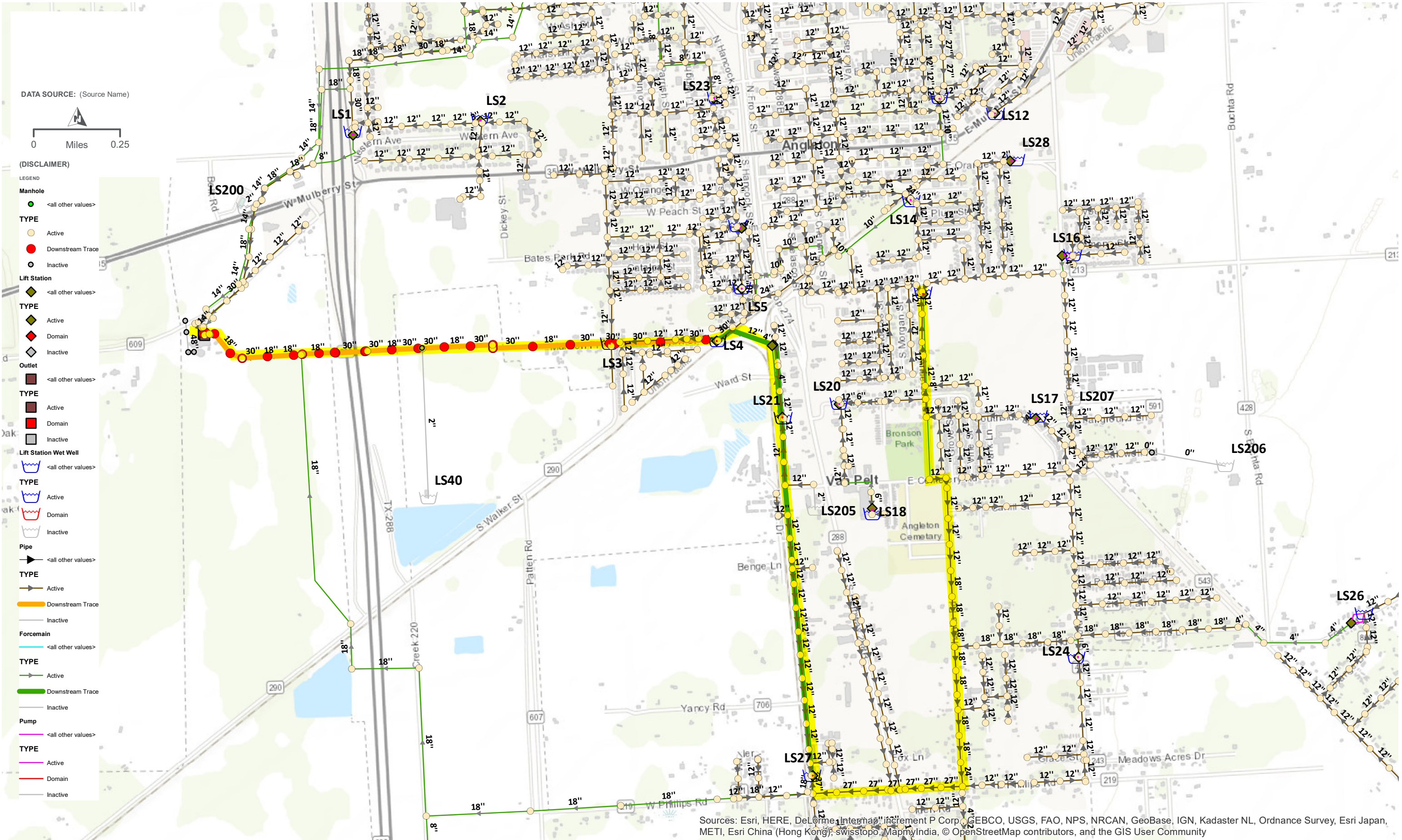


Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**EXHIBIT 1 - EXISTING WATER SYSTEM**  
**SYSTEM PRESSURE AND AVAILABLE FIRE FLOW - MAXIMUM DAILY DEMAND**  
 DEMAND FACTOR OVER AVERAGE DAILY = 1.70





DATA SOURCE: (Source Name)



(DISCLAIMER)

LEGEND

Manhole

<all other values>

TYPE

Active

Downstream Trace

Inactive

Lift Station

<all other values>

TYPE

Active

Domain

Inactive

Outlet

<all other values>

TYPE

Active

Domain

Inactive

Lift Station Wet Well

<all other values>

TYPE

Active

Domain

Inactive

Pipe

<all other values>

TYPE

Active

Downstream Trace

Inactive

Forcemain

<all other values>

TYPE

Active

Downstream Trace

Inactive

Pump

<all other values>

TYPE

Active

Domain

Inactive

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

