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Project name:
LAWSS Water Master Plan Update

Project ref:

From:
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Date:
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Water Demand Projection Analysis

Objective:

AECOM would like to request that LAWSS members review and confirm the projected consumption to support the current LAWSS Master Plan Study. With the confirmed consumption projection, AECOM will then proceed with the Master Plan Update for LAWSS. This memo summarizes the approach and results for estimating the projected water demands for each municipality.

Population

The population information was obtained from the following sources:

- Census from Statistic Canada for years 2011 and 2016 for all LAWSS members
- Future population as per Development Charge Study for:
  - Sarnia
  - St. Clair
  - Plympton / Wyoming
  - Lambton Shores

The following table summarizes the population information for each LAWSS members. Please note that population information for Alvinston, Petrolia and Chatham-Kent was not listed as the demand analysis for these members was completed based on historical flows only.

Table 1: Population Summary

Residential Population	Sarnia	Point Edward	St. Clair	Plympton / Wyoming	Lambton Shores	Watford-Warwick
2011	72,366	2,034	14,515	7,576	2,664	3,717
2016	71,594	2,037	14,086	7,795	2,658	3,692
2026	75,080	2,040	14,975	7,981	2,849	3,667
2031	75,260	2,043	15,420	8,360	2,935	3,688

Note:

Font in **Black** = Census data
Font in **Blue** = Development Charge Study data
Font in **Red** = Estimation (extrapolation or interpolation)

Water Consumption

Water consumption records were provided for the period of 2010 to 2019 from LAWSS Flow Summary. The data was process in order to obtain the yearly average consumption for each LAWSS member. The following table summarizes the yearly flow in cubic meter per day.

Table 2: Historical Water Consumption for LAWSS members

Year	Sarnia	Point Edward	St. Clair	Plympton/ Wyoming	Lambton Shores	Watford-Warwick	Alvinston	LAWSS*
2010	30,001	1,229	11,665	2,394	1,051	1,431	257	48,027
2011	29,032	1,359	13,920	2,354	1,002	1,373	224	49,265
2012	29,720	1,198	13,002	2,353	1,015	1,397	226	48,919
2013	28,361	1,023	13,831	2,358	1,026	1,398	258	48,255
2014	27,656	962	12,743	2,434	1,139	1,442	258	46,654
2015	28,363	1,039	13,576	2,842	1,033	1,415	257	48,628
2016	29,549	1,168	13,915	2,685	1,031	1,381	270	50,005
2017	29,379	1,180	12,487	2,357	934	1,381	239	48,132
2018	28,448	1,169	14,508	2,425	942	1,256	235	49,225
2019	29,250	1,142	14,399	2,500	913	1,102	374	49,686

*Note: Included water supply for Petrolia and Chatham-Kent

Water Demand Analysis

Realizing the significance of the non-residential (also referred as ICI) water uses in LAWSS, the ICI water use was estimated by the following procedures:

- Based on various master planning studies that were completed by AECOM, a typical unit consumption for residential landuse of 255 L/ca/d was assumed and applied for demand estimations.
- Calculate the residential water use by applying 255L/ca/d to the existing (2011 and 2016) residential population as noted in Table 1
- Calculate the ICI water use by subtracting the calculated residential water use by the total water supply as per Table 2
- Analyze the trend for ICI water use and determine the projected ICI use
- Calculate the projected residential water uses by multiplying the 255L/ca/d and the projected residential population (2026 and 2031) as per Table 1

By applying the above noted procedures, the following summarizes the key findings from the water demand analysis:

- ICI water use rate (% per year):
  - LAWSS = 0.87%
  - Sarnia = 1.35%
  - Point Edward = -4.55%
    - Negative increase could be resulted from the abnormal water consumption drop in 2016,
    - For the purpose of the LAWSS Master Plan, overall ICI increase rate of 0.87% (LAWSS) was applied
  - St. Clair = 0.2%
  - Plympton / Wyoming = 0.82%
  - Lambton Shores = 1.86%
  - Watford-Warwick = 0.67%
- Due to lack of data for Alvinston, Petrolia and Chatham-Kent for completing the analysis, the flow projections for these LAWSS members were completed by analyzing the consumptions trend for 2010 to 2019.

Figure 1 shows the overall flow projections for LAWSS and the flow projections for each LAWSS member were presented in the subsequent figures. Table 3 summarizes the overall growth rates for each LAWSS member.

Table 3: Overall Growth Summary (2016 – 2031)

	Sarnia	Point Edward	St. Clair	Plympton / Wyoming	Lambton Shores	Watford-Warwick	LAWSS
Residential Growth	3.8%	0.3%	3.2%	5.3%	6.9%	-1.3%	3.6%
ICI Growth	21.2%	9.5%	3.1%	12.6%	29.6%	10.3%	11.5%
Total Growth	11.2%	7.6%	4.7%	8.2%	17.0%	3.2%	9.5%

Note: ICI Growth for Point Edward was adjusted to LAWSS Average; which is 9.5% as opposed to negative growth.

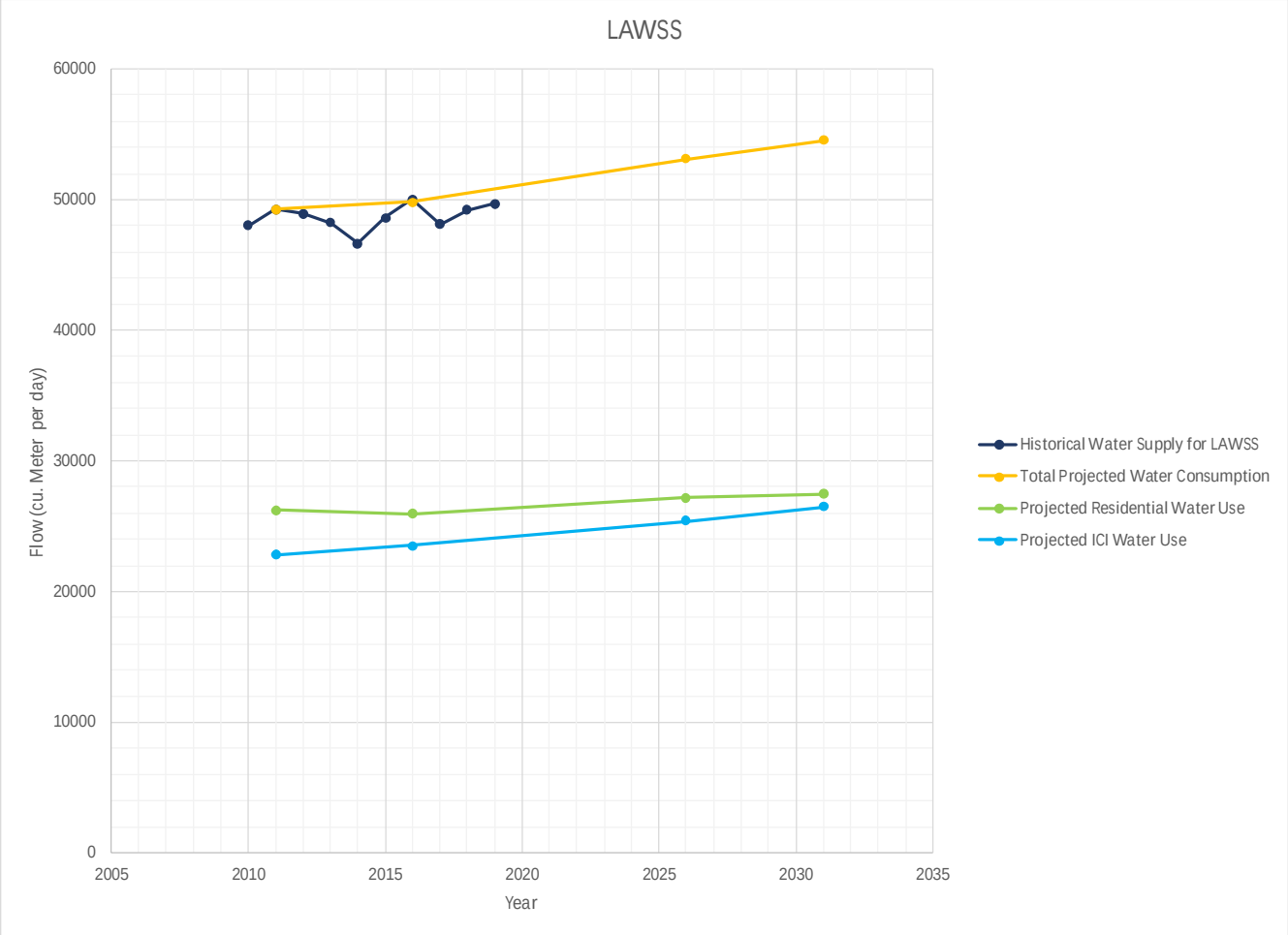

Figure 1: Flow Projections for LAWSS

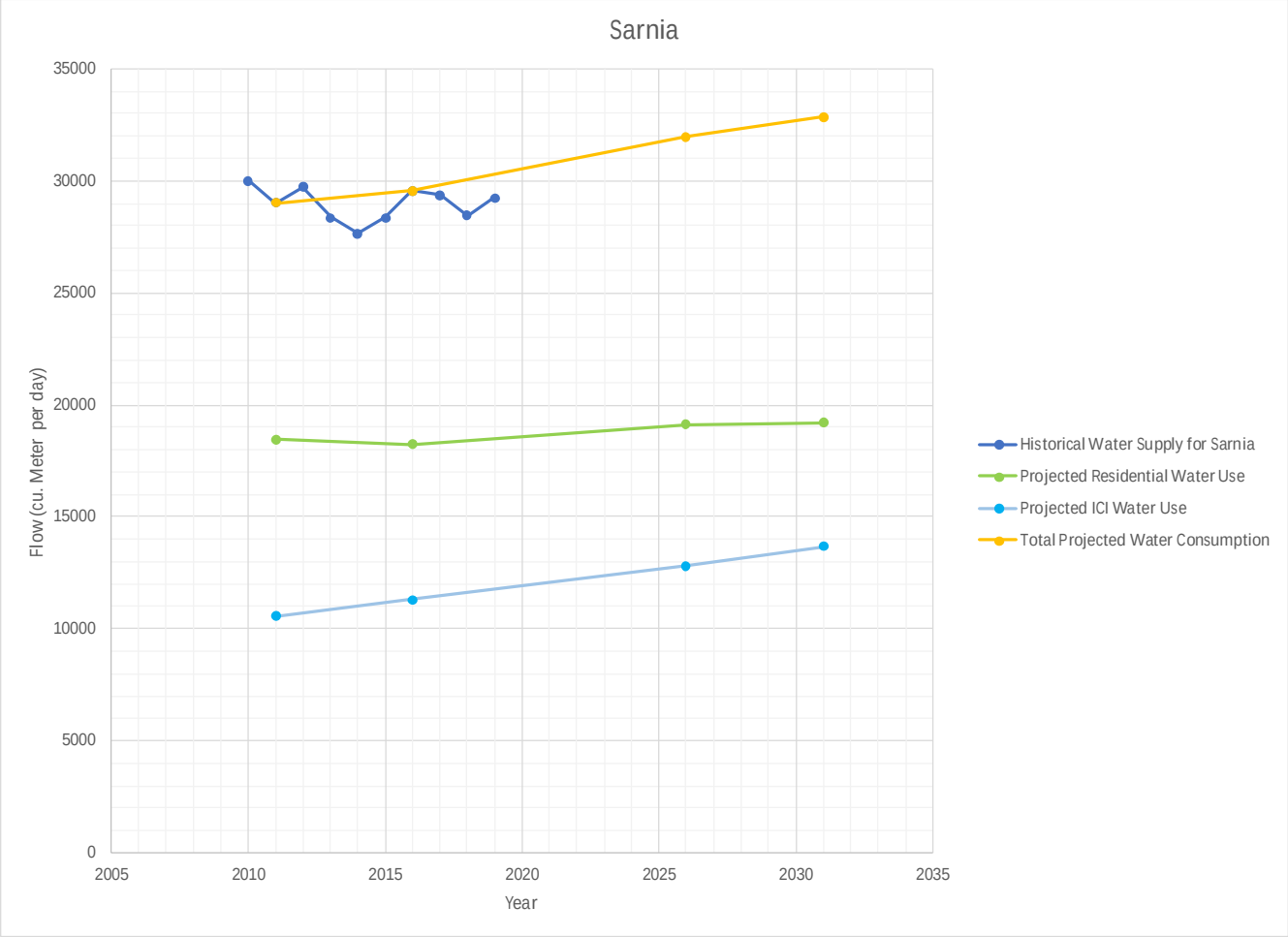

Figure 2: Flow Projections for Sarnia

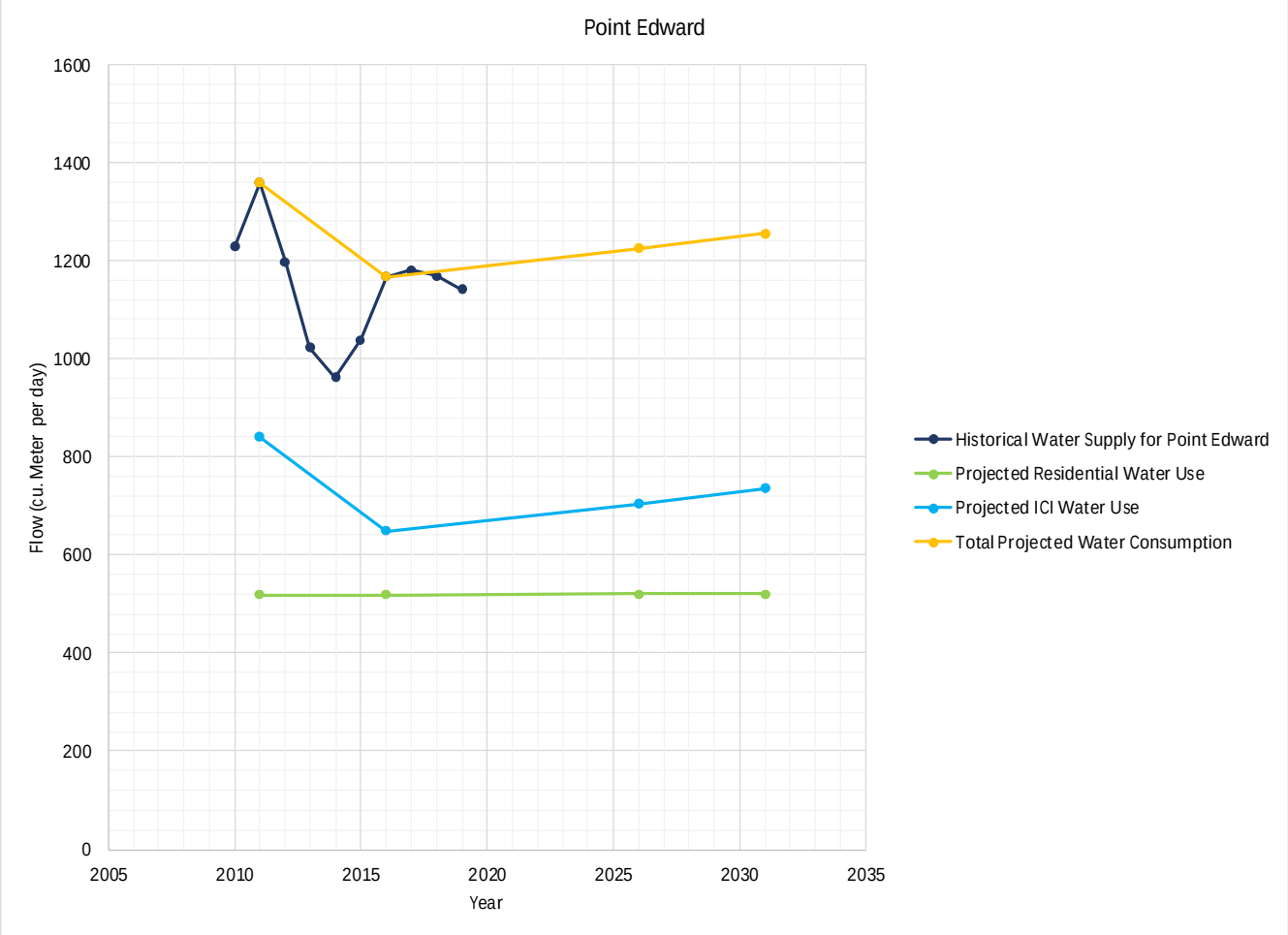

Figure 3: Flow Projections for Point Edward

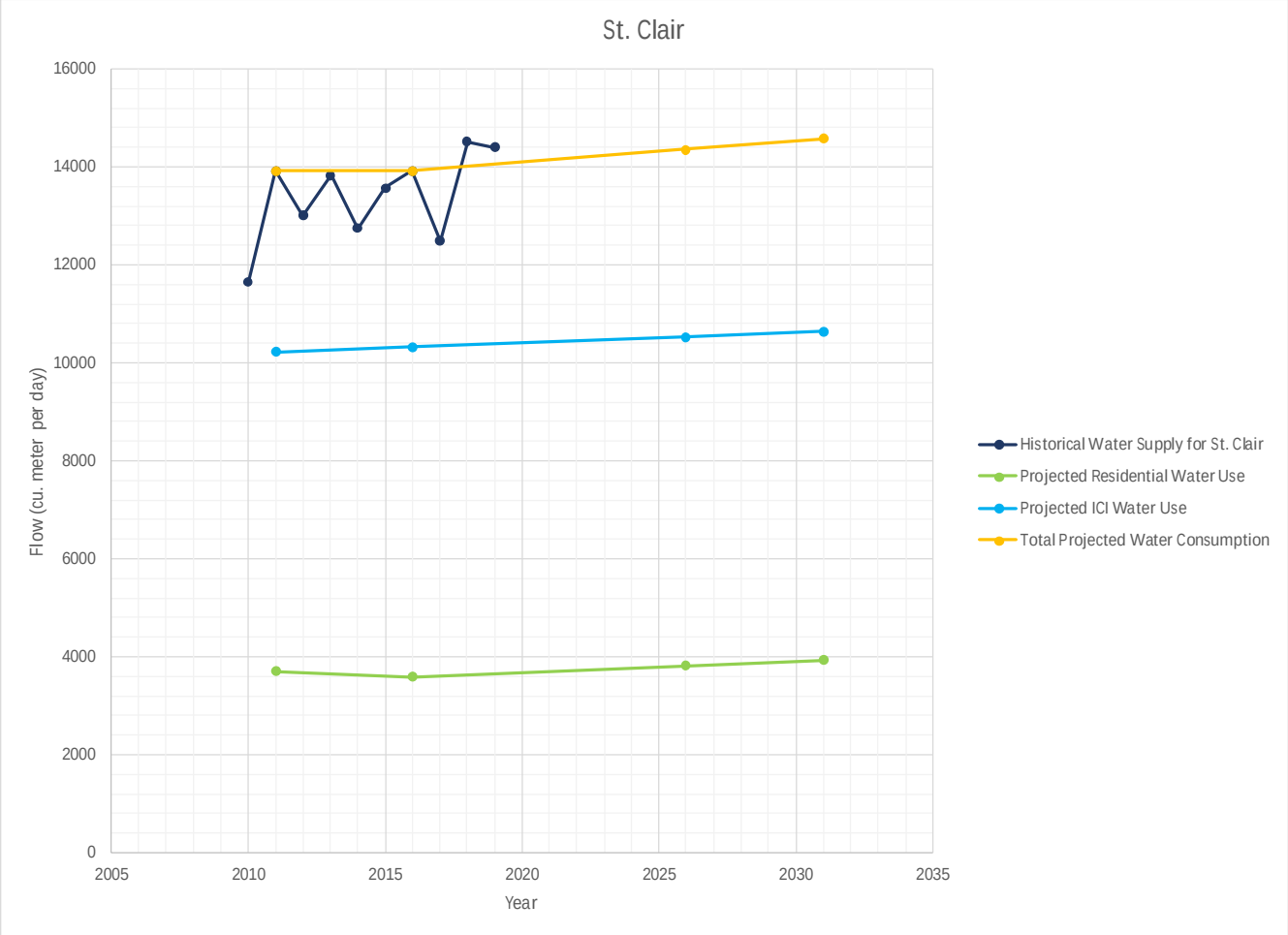

Figure 4: Flow Projections for St. Clair

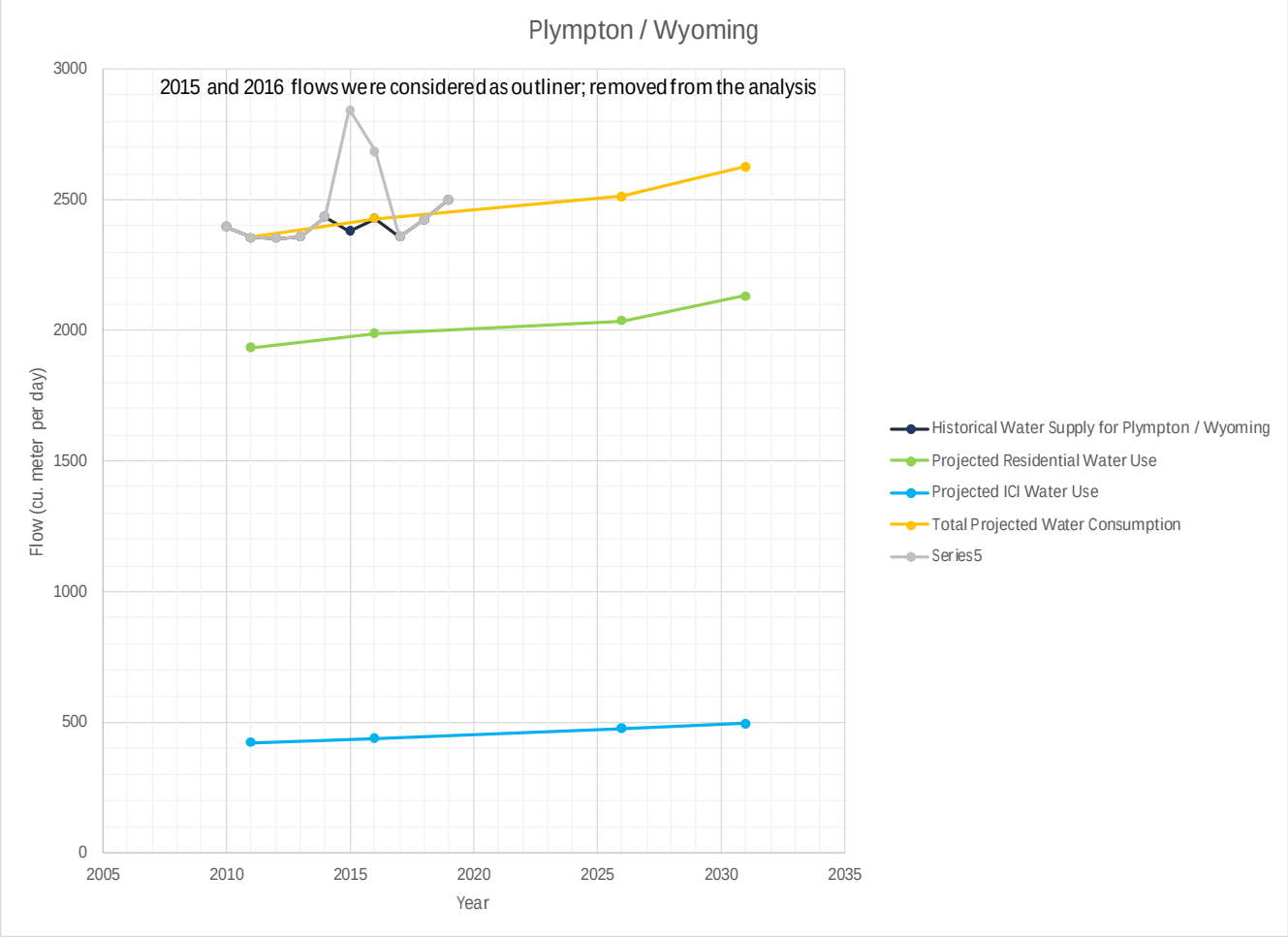

Figure 5: Flow Projections for Plympton and Wyoming

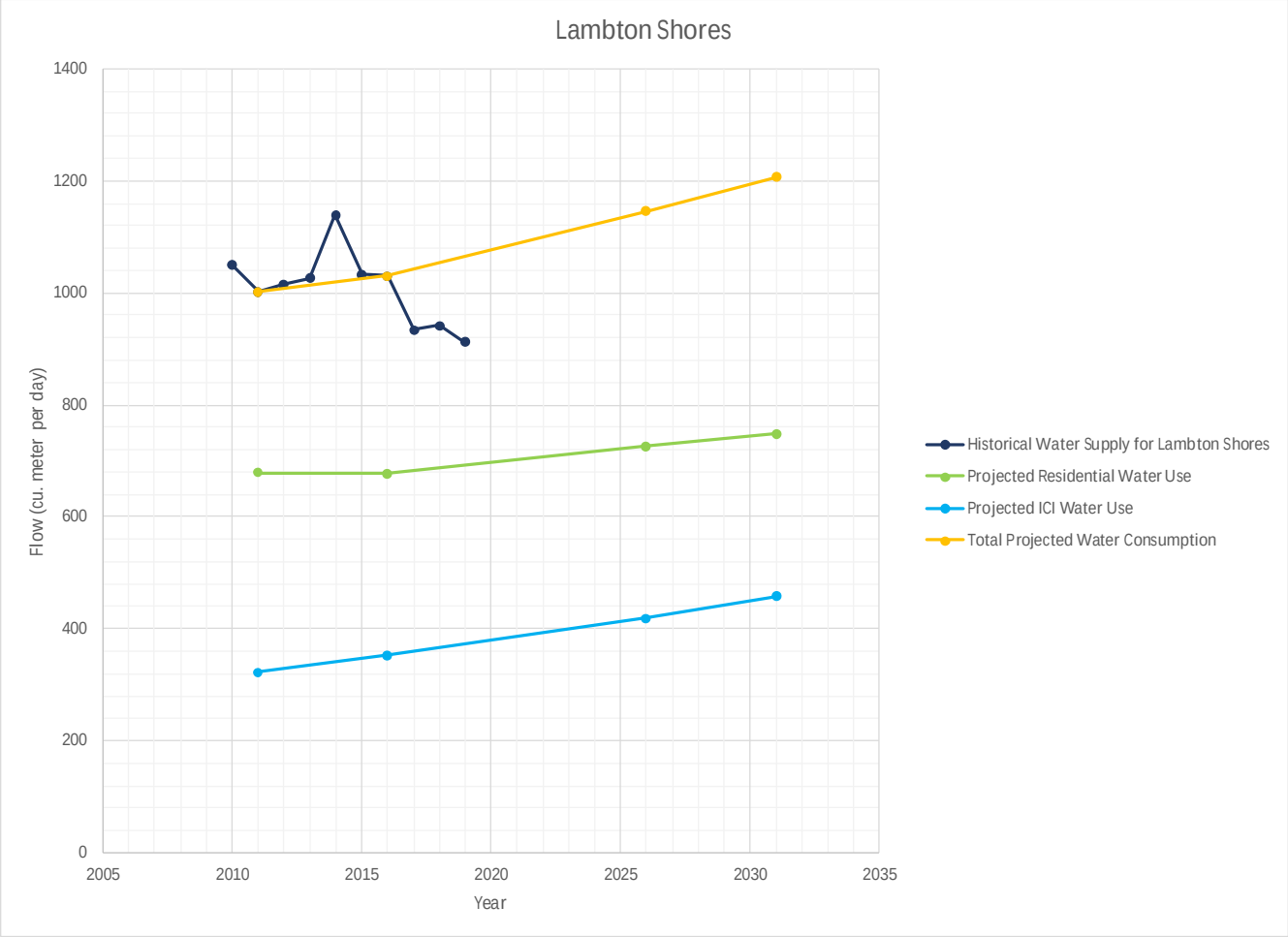

Figure 6: Flow Projections for Lambton Shores

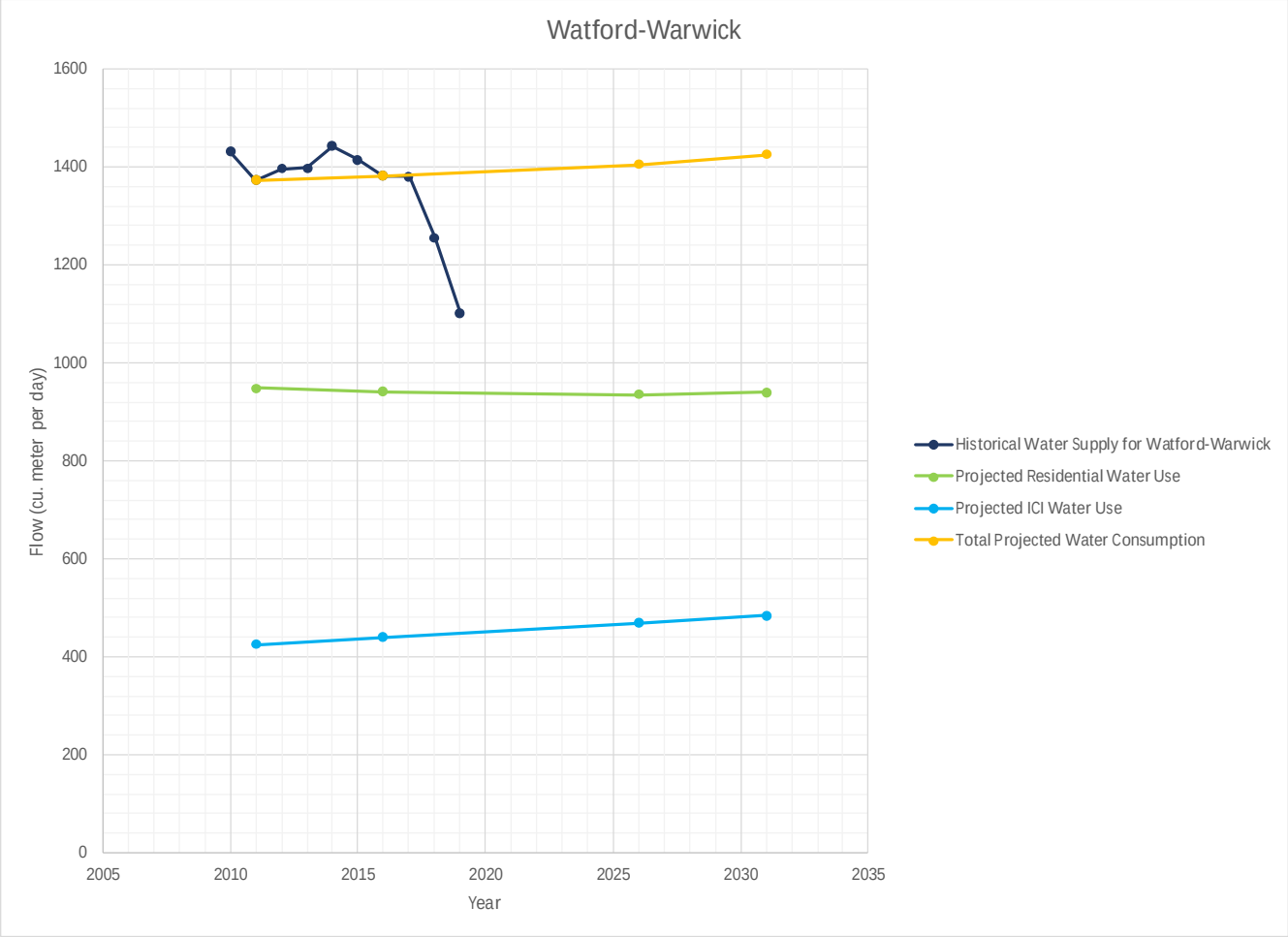

Figure 7: Flow Projections for Watford-Warwick

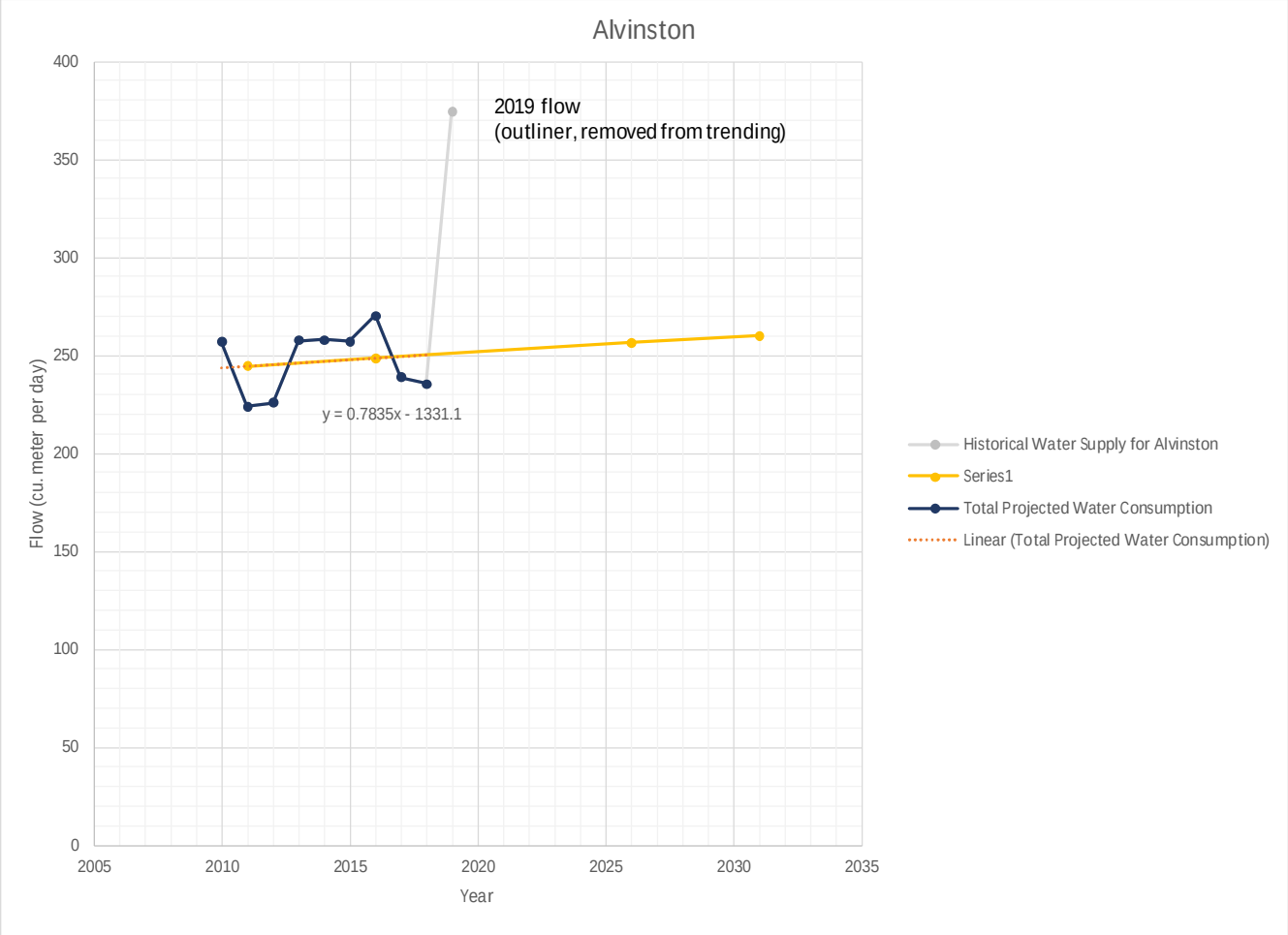

Figure 8: Flow Projections for Alvinston

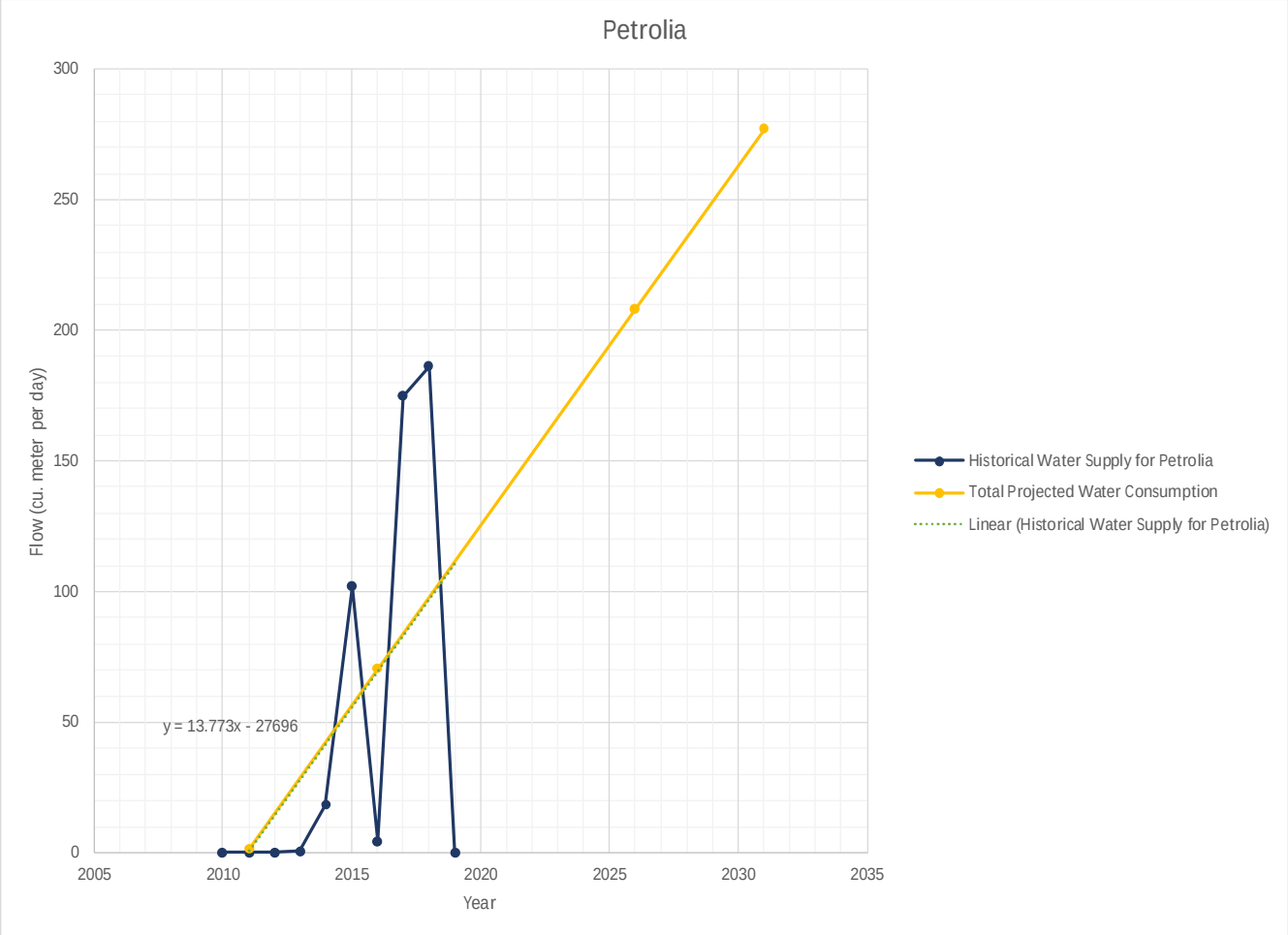

Figure 9: Flow Projections for Petrolia

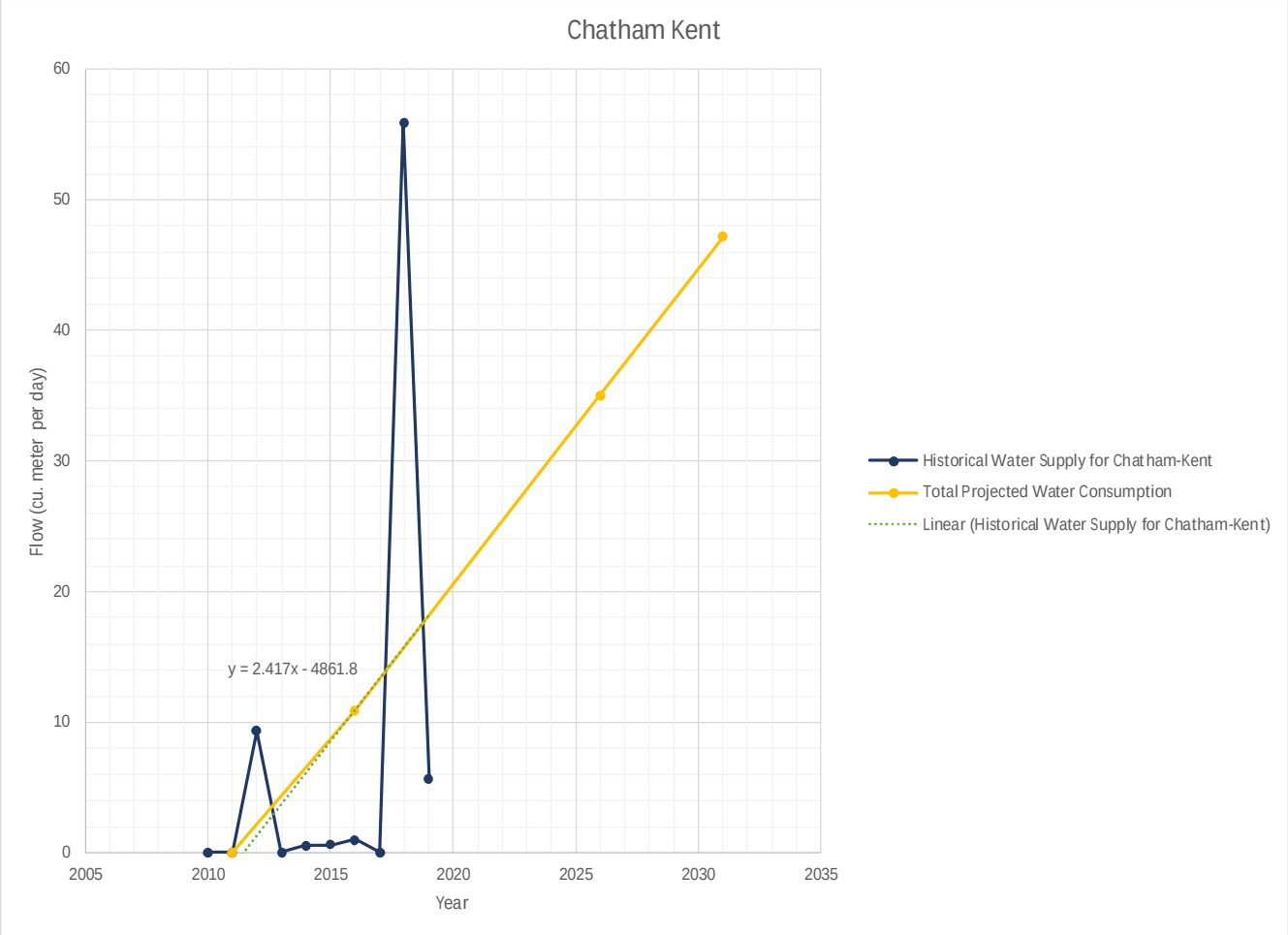

Figure 10: Flow Projections for Chatham Kent