SECTION 3: RECYCLED WATER OPPORTUNITIES

Several local and regional recycled water project alternatives are currently being considered by the Imperial Irrigation District (the region's supplier) as well as individual water agencies in the Imperial Valley region.

FINAL DRAFT

THIS PAGE LEFT BLANK INTENTIONALLY

FINAL DRAFT

Section 3

RECYCLED WATER OPPORTUNITIES

After years without recycled water, viable opportunities are on the horizon for the Imperial Valley Region.

FINAL DRAFT

3.1 OVERVIEW

"Recycled" or "reclaimed" water is defined as wastewater purified through primary, secondary, tertiary, or advanced treatment. Recycled water is acceptable for most non-potable water purposes such as irrigation and commercial/industrial processes. The Southern California region, from Ventura County southward, discharges nearly 2 billion gallons of treated wastewater either to the ocean or to permitted areas each day. This is considered a reliable and drought-proof water source that reduces the region's reliance on imported water. Recycled water will continue to be a critical part of the California water picture because of the area's high likelihood of drought. As technological advancements continue to reduce treatment costs and as legislation expands the use of recycled water, more reuse opportunities should develop.

This Section describes the existing and future recycled water opportunities available to the City. The section also includes estimates of potential recycled water supply and demand through 2040 in five year increments.

3.2 WASTEWATER COLLECTION SYSTEM

The City collects, treats and disposes of wastewater generated in its service area (City limits) at the City-owned Wastewater Treatment Plant (WWTP) located in the

southwest part of the City (north of the airport and south of the New River). The WWTP treats not only wastewater flows but also stormwater flows collected within the City.

To convey wastewater flows to the WWTP, the City currently maintains about 8,300 wastewater connections (sewer laterals) which connect various properties to the City's sewer system. The sewer laterals connect to a sewer pipeline network of about 75 miles which consists of pipes ranging in size from 6 inches to 30 inches in diameter. The smaller sewer mains discharge into one of two large interceptor sewer mains, which then carry the wastewater flows to the City's wastewater treatment plant. The South Interceptor serves the southeast portion of the City whereas the North Interceptor serves the northerly and westerly portions of the City. Due to the flat grades of the City, the collector sewer mains have relatively flat grades (minimum slopes for sewers) and thus the Interceptor Mains are relatively deep in some areas (up to 20 ft.). Newer developments in the City have resulted in the construction of small lift stations in order to properly convey wastewater flows to the Interceptors.

The City's wastewater collection system consists of 75 miles of sewer mains and 16 lift stations.

Wastewater Flows

Over the past five years (2011-2015), the wastewater flows collected by the City's mains and treated at the WWTP are shown in **Table 3.1** below:

Table 3.1
Wastewater Flows Collected and Treated*

Year	Flows (AF)	Flows (MG)
2015	2,876	937
2014	2,937	957
2013	3,032	988
2012	3,054	995
2011	3,103	1,011
Avg:	**3,000**	**978**

**Based on measured flows entering the WWTP*

On a daily average, wastewater flows entering the WWTP are slightly more than half of the WWTP's rated capacity (average capacity). For instance, flows are typically measured at 2.5 MGD, whereas the average daily capacity of the WWTP is 4.3 MGD. This extra capacity is not uncommon as many developing agencies must design their systems for peak flows and for future development within their service area. Although sufficient for the City's current population and average flows, the WWTP does operate close to capacity during peak conditions. Thus, the City is planning for a near-future expansion of the WWTP in order to be sufficient for build-out conditions. For planning purposes, the City anticipates that future wastewater flows

FINAL DRAFT

can be estimated using the average wastewater generated per person during the past five years (68 gallons per day -based on **Table 3.1**) multiplied by the projected population estimates. **Table 3.2** shows the estimated wastewater flows through 2040:

Table 3.2
Projected Wastewater Flows Collected & Treated

Year	Flows (AF)	Flows (MG)
2020	3,400	1,108
2025	3,850	1,255
2030	4,300	1,401
2035	4,749	1,548
2040	5,199	1,694
Avg:	**4,300**	**1,401**

As indicated by **Table 3.2**, the WWTP capacity will be unable to handle wastewater flows possibly as early as 2030. The age of the WWTP (about 40 years), is another factor in the City's plans for improvements to the WWTP.

3.3 TREATMENT AND RE-USE

The City's WWTP serves as the only wastewater treatment facility for the City. It receives raw wastewater from the aforementioned Interceptors as well as raw stormwater from the City's storm drains and produces secondary level (includes de-nitrification) treated wastewater. The overall process consists of a head works structure, primary clarifier, aeration tanks, secondary clarifiers and sludge drying beds that provide preliminary, primary, and secondary treatment before being disinfected and discharged. The WWTP utilizes two treatment systems to provide the secondary treatment. The first is an activated sludge treatment system with a design capacity of 2.5 MGD. The second is an aerated lagoon treatment system with a design capacity of 1.8 MGD. Combined, these treatment systems provide a capacity of 4.3 MGD. Ultimately, all wastewater is passed through preliminary, primary, and secondary treatment before being disinfected and discharged to the New River.

Treatment Process

Influent flow is split at the diversion structure to the individual treatment trains. All influent flow passes through preliminary treatment, which consists of a mechanical bar screen, manual bypass bar screen, and aerated grit chamber. The bar screens remove or filter out the larger obstructions whereas the grit chamber remove the smaller, denser/hard material to settle at the bottom using a unique flow pattern. Lighter organic material that remains in suspension is then directed to the two primary clarifiers which are operated in parallel. The clarifiers essentially work to remove the diluted and dense impurities from the water to settle at the bottom (sludge), while also causing the lighter materials to float at the top (scum). This is done using chemical and mechanical means.

FINAL DRAFT

Figure 3.1: City Wastewater Treatment Plant and Percolation Ponds – Looking South

FINAL DRAFT

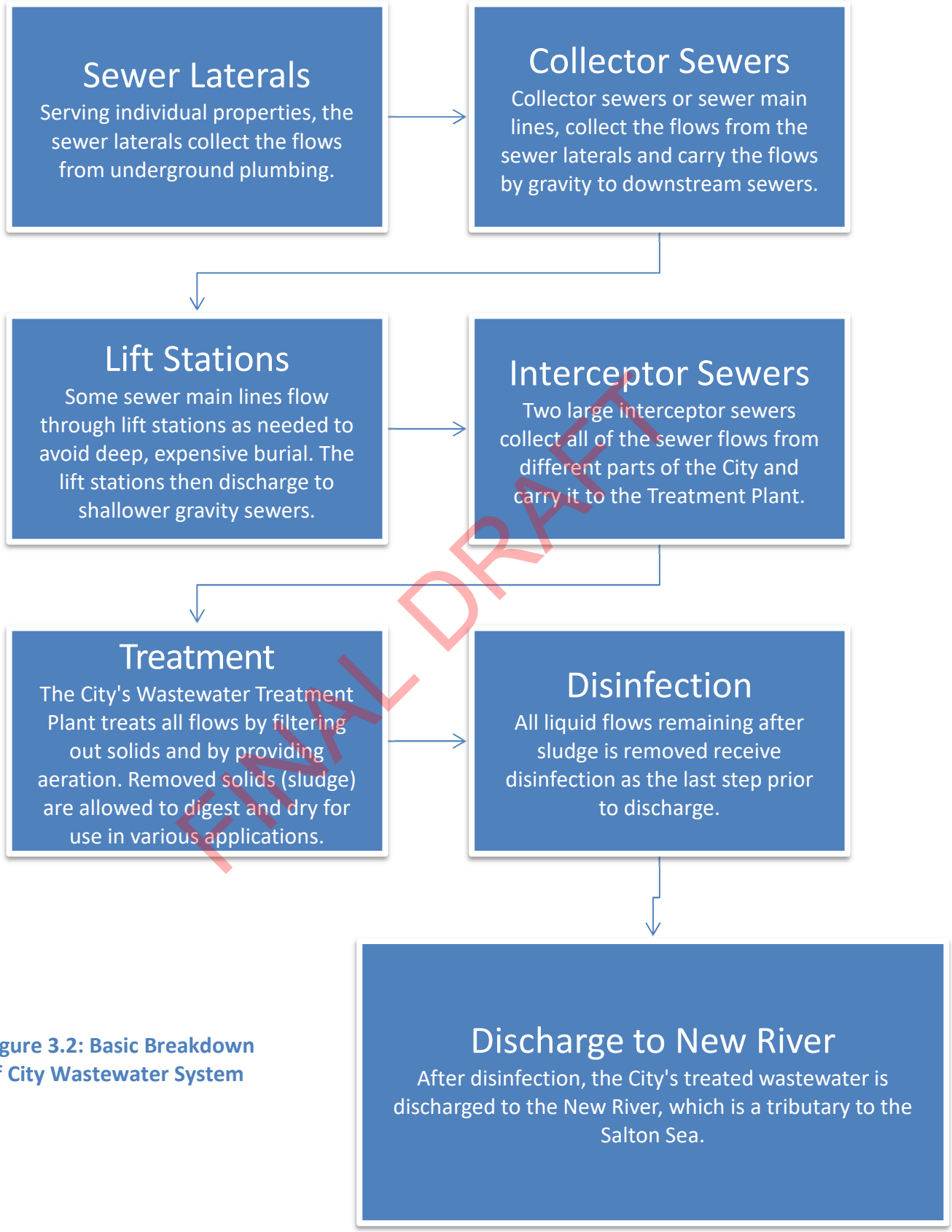
After the clarifiers, wastewater is then stabilized in either the 1) activated sludge treatment system or 2) the aerated lagoon treatment system.

The activated sludge treatment system consists of three aeration basins which are operated in parallel. Wastewater is then directed through three secondary clarifiers operated in parallel. The second treatment system, the aerated lagoon treatment system, consists of four lagoons operated in series. Following treatment in the individual treatment systems, wastewater is combined and disinfected by an ultraviolet (UV) disinfection system before being discharged to the New River.

As for the primary sludge separated from the wastewater generated in the primary clarifiers, the sludge is pumped to two anaerobic digesters for stabilization. As for the secondary sludge generated from the two of the three secondary clarifiers, it is also pumped to the anaerobic digesters for stabilization. After stabilization, the primary and secondary sludge is discharged from the two anaerobic digesters to fourteen sludge drying beds. Digested sludge is dried in the drying beds prior to removal and eventual application in Dateland, Arizona.

Recycled Water Production Capacity

The WWTP currently provides only secondary treatment, and the treated waste-



FINAL DRAFT

Figure 3.2: Basic Breakdown of City Wastewater System

water does not meet Title 22 Standards. Further, the City does not use any recycled water produced by any other agencies. Thus, no wastewater is "recycled" (i.e. re-used) within the City's service boundary, as **Table 3.3** indicates:

Table 3.3
Recycled Water Produced and/or Use

Year	Recycled Water Produced or Used (AF)
2015	0
2014	0
2013	0
2012	0
2011	0

As projected in the City's 2010 UWMP, no recycled water was produced or used in the last five years. The treated wastewater is simply discharged into New River or IID drainage canals where it ultimately reaches the Salton Sea.

3.4 RECYCELD WATER USE

As indicated in the previous section, the City neither produces itself nor uses recycled water produced by any other agencies within its service area, as there are no other producers of recycled water. Furthermore, the City does not anticipate the production or use of recycled water for the foreseeable future, due to financial reasons. Recent City estimates put recycled water infrastructure costs (pipelines and WWTP improvements) at over $500 per AF. Compared to the City's cost to purchase treat water from the All-American Canal ($177 per AF), it would simply be too costly to construct and maintain recycled water infrastructure. Thus, the City projects no recycled water production and/or use for the current UWMP planning period, as shown in **Table 3.4** below:

Table 3.4
Projected Recycled Water Production and/or Use

Year	Recycled Water Production/Use (AF)
2020	0
2025	0
2030	0
2035	0
2040	0

Despite the projected non-use of recycled water from an economic standpoint, there are no physical barriers or constraints which would cause the construction of recycled water facilities to be unfeasible. In fact, from an engineering and construction standpoint, the City's flat grades would allow for a feasible design of pipelines and WWTP expansion to provide Title 22 water ("tertiary recycled water"). In addition, the WWTP is within reasonable distance to open spaces and industrial facilities which would be able to

Recycled water, although not financially viable, is physically practical due to flat terrain & proximity of potential users.

FINAL DRAFT

receive recycled water. If the funding for WWTP improvements and pipeline infrastructure was covered by developers and an agreement was in place for the use of recycled water, the City would then be able to provide recycled water to existing potential users and future potential users.

Potential Recycled Water Options – IID

Since the QSA has been approved, recycled water may become more of a feasible option for new industry within the Imperial Valley, provided that the funding be provided by the energy developers. Additionally, IID has identified in its 2012 IRWMP options for constructing recycled water facilities, including a regional facility and also individual facilities at each of the major cities in the Imperial Valley (Brawley, Calexico, El Centro, & Imperial). The IRWMP listed three types of sub-options for the individual facilities, including 1) Disinfected Secondary applied to Agriculture, 2) Tertiary Water applied to the local market, and 3) Tertiary Water applied to All-American Canal.

Recycled water opportunities are starting to gain the attention of IID and Imperial Valley agencies.

IID's IRWMP then looked at three options for use of a regional facility. The IRWMP concluded that two of the three regional options (Tertiary Water to the All-American Canal) were within the cost limits of the study, and recommended that the options be studied further. Thus, as of this 2015 UWMP, it is reasonable to expect that IID may develop recycled water to replenish the All-American Canal in the not too distant future (potentially within the planning period of this UWMP – 2040).

Potential Recycled Water Options – City

The costs of the recycled water options listed for the City of Calexico in IID's IRWMP were as follows:

- *Disinfected Secondary to Agriculture:* Capital costs of about $6.6 million and annual O&M costs of about $500,000 for a total of about $160 per AF
- *Tertiary to Local Market:* Capital costs of about $40 million and O&M Costs of about $680,000 for a total of about $960 per AF
- *Tertiary to All-American Canal* Capital costs of about $22 million and O&M Costs of about $593,000 for a total of about $612 per AF

Potential Recycled Water Users – City

A recycled water master plan has not been prepared for the City to date, and the City has not made a formal identification of potential recycled water users. However, typical potential recycled water users include the following:

FINAL DRAFT

- Landscape Users (parks, sports fields)
- Industrial Users (manufacturing)
- Energy/Power Production

The City already has plenty of large landscape customers as well as industrial customers, so there would theoretically be existing customers already available to purchase recycled water if and/or when recycled water infrastructure is in place. More specifically, the City will be able to identify existing or future potential recycled water users through the following means:

- Existing water consumption records *(determine high volume users of water)*
- Existing company manufacturing data *(to determine if the type of manufacturing can use recycled water)*
- Land use maps (2015 General Plan)
- Development Plans (2015 General Plan)

To help identify potential users of recycled water, the City has been and will be participating in IID's Water Forums and workshops. Collectively, IID can help the City identify its own potential recycled water users and in turn, the City can research and provide IID with refined data.

3.5 ENCOURAGING RECYCLED WATER USE

Currently, there are no methods or financial incentives to encourage the use of recycled water because the City does not have the facilities to provide recycled water. As the City's Wastewater Treatment Plant (WWTP) is about 40 years old, the City is considering expansion and rehabilitation of the WWTP. As a result, the City is open to discussions with future developers and industry leaders regarding upgrades to the WWTP for recycled production; provided the cost of such improvements are covered by the developer and/or industry and an agreement is in place for the purchase and use of recycled water by all involved parties throughout the life of the facility.

If and when the City has the capacity to recycle water, then they would consider incentives to encourage recycled water use by potential users other than those involved in the development of the recycled water facilities (including new customers in the future). The incentives method would be developed as implementation of the IID's recycled water program progresses. The City may want to consider providing (1) monitoring, enforcement and training for recycled water use, and (2) delivery of recycled water at a reduced rate or a rate less than that of potable water (at least for a period of time).

FINAL DRAFT