CLARTS Organics Processing Facility (OPF)
Draft Feasibility Report
City of Los Angeles, Department of Public Works, LA Sanitation

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City of Los Angeles Sanitation Bureau
CLARTS Organics Processing Facility (OPF) Feasibility Report

I. Executive Summary

The City of Los Angeles, Department of Public Works, LA Sanitation (LASAN), proposes to develop an Organics Processing Facility (OPF) at its Central Los Angeles Recycling and Transfer Station (CLARTS) site. Providing an efficient and effective OPF near downtown Los Angeles is highly valuable and strategically important.

The OPF will process 300 tons per day of organics and food waste materials received from source-separated food waste collection programs. Source-separated food waste collection programs are basic to LASAN's vision and strategy to enable its businesses to comply with State regulations for organics collection and processing. The CLARTS OPF processing system is therefore based on a source-separated food waste collection program.

The proposed OPF project will require the demolition of the existing Green Waste Building and construction of a fully-enclosed facility that will replace it. The proposed OPF operations will be conducted inside the enclosed space designed to contain dust, odors and noise, promote good housekeeping, minimize environmental impacts, and provide a safe workplace environment.

The OPF processing system will separate food waste and other digestible organics from non-processible and non-digestible materials to create a wet organic slurry. This wet slurry will be discharged into the sewer system (Attachment 1) for transfer to the Hyperion Wastewater Treatment Plant (HTP).

At the digester site, the wet slurry will be converted into renewable energy – either electricity or renewable natural gas via anaerobic digestion (AD). Digestate (the remaining solids) from the AD process will be further processed for use as fertilizer or soil amendment.

The OPF processing system will also separate other materials (primarily soiled paper and cardboard) for use in composting. Additionally, materials such as metals, large cardboard and glass will be recovered for recycling.

In addition to generating renewable energy, the CLARTS OPF will reduce the volume of food waste and organics disposed at landfills, thereby reducing the potential for soil and ground water pollution, greenhouse gas emissions and other emissions and impacts from operations and truck traffic.

Locating the OPF at CLARTS has many advantages, including its central location and proximity to food service establishments and entertainment venues, which will decrease

transportation costs. Additionally, integrating the OPF into the existing CLARTS operations will result in operational synergies and cost savings compared to alternate locations.

II. Project Concept and Goals

The City of Los Angeles, Department of Public Works, LA Sanitation (LASAN), a world leader in solid waste and environmental management, proposes to develop an Organics Processing Facility (OPF) at its Central Los Angeles Recycling and Transfer Station (CLARTS) site.

The OPF will process 300 tons per day (TPD) of organics and food waste materials received from source-separated food waste collection programs. The OPF will separate food waste and other digestible organics from non-processible and non-digestible materials to produce a wet organic slurry that can be anaerobically digested to generate renewable energy at the Hyperion Wastewater Treatment Plant (HTP).

The purpose of the OPF project is to produce renewable energy and reduce the City's landfill disposal and greenhouse gas (GHG) emissions as part of its Zero Waste Plan. The OPF will also be an important asset in the City's efforts to provide solutions to local businesses for compliance with the California State Assembly Bill (AB) 1826, which requires processing of organic wastes for many organic and food waste generators.

III. Waste Stream Composition

The composition of the potential source-separated organics and food waste stream was modeled from data provided from pilot food-waste collection programs performed by various collection companies in the City within the last 11 years (Table 1). The main categories measured were food, old corrugated cardboard (OCC), glass, and metal, along with plastics, paper, and garbage (i.e., disposables).

	Weight	Food %	OCC	Glass	Metal	Plastic	Paper	Garbage
Athens, 5 / 12-16, 2008	2082	57.5%	12.5%	1.1%	0.9%	9.6%	16.0%	2.5%
Crown Valley West, 3/26, 2009	25040	68.9%	12.4%	0.6%	0.5%	14.0%		3.6%
Norcal, 6/16, 2005	540	60.8%	16.2%	0.5%	0.1%	5.0%	1.8%	15.6%
Norcal, 2/21-27, 2006	4645	59.0%	12.0%	2.0%	1.1%	7.0%	11.0%	7.9%
Athens, 2 / 23-27, 2009	8066	66.1%	9.3%	0.4%	1.1%	9.5%	5.9%	7.6%
Crown Valley East, 2/18, 2009	6440	66.1%	18.9%	0.6%	0.9%	2.2%		11.2%
Total =	46813							
Avg =		66.5%	12.8%	0.7%	0.7%	10.6%	2.8%	5.9%

Table 1 - Pilot Food Waste Collection Programs Data

Source-separated commercial food wastes collected from super markets and produce distributors typically have little packaging (Photo 1). By contrast, wastes collected from food service establishments or multi-family residences are often placed into plastic bags (Photo 2). As evidenced by the data in Table 1, approximately one third of the aggregate organic and food waste stream is non-food materials. The OPF system will remove these materials and sort them for recycling, composting or disposal.

Photo 1 – Unpacked Food Waste

Photo 2 – Food Waste in Plastic Bags

IV. Project Data

The proposed CLARTS OPF will receive and process up to 300 tons per day (TPD) (approximately 86,000 tons per year, TPY) of commercially collected source-separated organic and food waste materials. It is expected that approximately 20 percent of these materials (60 TPD, 17,200 TPY) will be removed prior to delivery to the organic separation equipment.

From the remaining amount (approximately 240 TPD, 68,800 TPY) of organic feedstock, it is expected that the organic separation equipment will produce up to 60% of this (140 TPD, approximately 40,000 TPY) of wet organic slurry for AD processing. Another 85 TPD

(approximately 24,300 TPD)of materials will be recovered for recycling or composting. Thus, of this incoming waste stream, approximately 75 percent will be recovered for beneficial use and diverted from landfill disposal.

The proposed CLARTS OPF will be co-located with the existing green waste transloading operation which receives 200 TPD of source-separated green waste and transfers it to composting operations. A separate receiving bay and truck loading lane will be provided for green waste. The truck loading lane will also be used for the CLARTS OPF.

V. Existing Facility

The CLARTS facility is a solid waste transfer station permitted to receive, process and transfer 4,025 tons per day of Municipal Solid Waste (MSW). Wastes are received in the Transfer Station building, which is a 49,600 sf steel-framed structure with a below-grade tunnel for transfer truck loading (Attachment 3).

A secondary 37,800 sf steel-framed building (Green Waste Building) is also located at the CLARTS site. A portion of this building is used for receiving approximately 200 tons per day of green waste (primarily yard trimmings) and transferring these materials to a composting yard for processing. The remainder of this building is used for vehicle maintenance and a variety of administrative and storage functions. The north wall of this building is almost entirely open.

In addition, the CLARTS site has a scale plaza with two platform scales. Incoming collection vehicles enter the site at the eastern driveway off of Washington Boulevard and travel north to the scale plaza for weighing. This is a necessary function for a solid waste receiving and processing facility and one of many existing operational functions available to the OPF.

A significant benefit of the CLARTS site is its location, which is 3.0 miles from Los Angeles City Hall (Figure 1). This location places the OPF in close proximity to a large number of food service establishments, entertainment venues and produce distributors, which are likely generators of significant amounts of organic and food wastes.

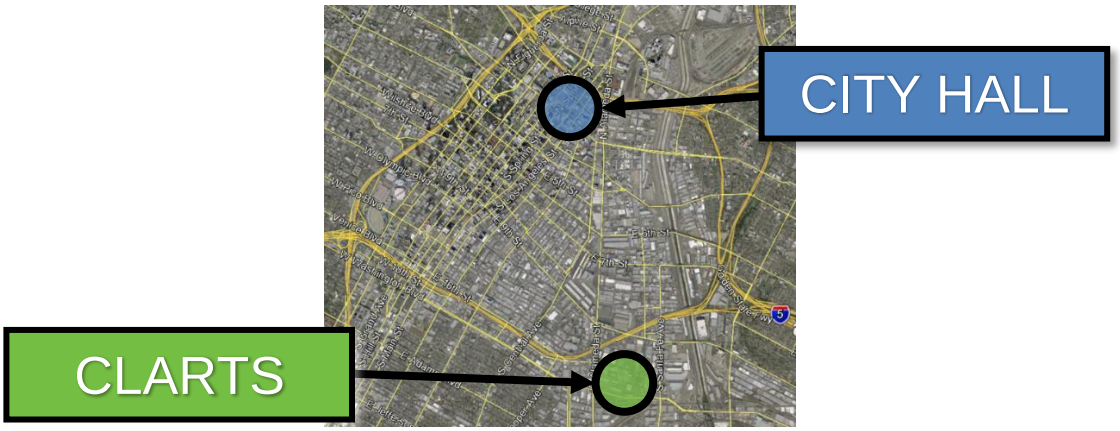


Figure 1 – Vicinity Map

Another very important benefit of the location is its convenience to the Downtown, East Downtown and Southeast Franchise Zones as described in the *City-Wide Exclusive Franchise System for Municipal Solid Waste Collection and Handling* program (Figure 2). CLARTS and the OPF will provide a close and convenient location of essential receiving, processing and transfer capability in support to the franchise service providers and their commercial customers.

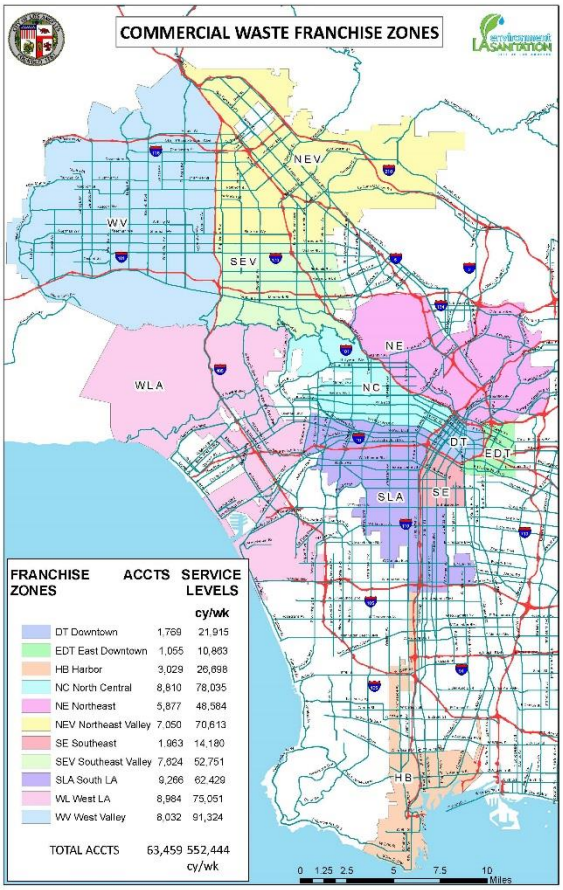


Figure 2 – Commercial Waste Franchise Zones

By locating the OPF at the CLARTS site, LASAN will be able to take advantage of the existing infrastructure and realize operational and maintenance efficiencies. These include administration, equipment maintenance and the ability to convey compostable and residual materials to other locations on the site for transfer.

Dry fraction from the separators, which has high organic content, will be conveyed to the green waste receiving area as indicated in revised Attachment 2 and included in the materials to be transported for composting. A bunker is indicated for non-processibles which would need to be loaded into an on-site truck and driven to the transfer station. Instead, a conveyor could be installed to transfer these materials.

VI. Location of OPF on the CLARTS Site

The CLARTS facility is space-constrained with multiple operations. Two possibilities for the location of the OPF were considered: 1) an extension of the Transfer Station building to the south, and 2) within the Green Waste building.

Both of these possibilities present operational and physical challenges. Analysis of both potential OPF locations considered its integration into the existing CLARTS physical property, operations, vehicle circulation and flow, and personnel amenities. Minimizing the potential for negative impact of the OPF on existing Transfer Station operations, a vital community service, was given high priority.

Based on this analysis, it was determined that locating the OPF in the Green Waste building would result in the most efficient and effective overall operation with the least negative impact on the existing Transfer Station operations (Attachment 4).

VII. Building Improvements

Locating the OPF operations in the Green Waste building presents many physical challenges. Due to its age, the Green Waste building does not comply with current seismic codes. Although it doesn't qualify for mandatory seismic upgrading, the non-compliance of the Green Waste building structure should not be ignored, as evidenced by the measurable physical abuse the building structure has endured during its many years of use. Essential structural repairs are currently being performed, but more repairs would be necessary to extend the service life beyond the near term. Additionally, the clear height is insufficient for the proposed OPF operations, and building columns are in locations that create obstacles for vehicle maneuvering (these are also issues with the current green waste operations).

To fully resolve these issues and provide the best investment for the City, it is recommended that the Green Waste building be demolished and replaced with a modern, fully-enclosed steel framed building with sufficient clear height and appropriate column location. The proposed building is fully enclosed with fast-acting overhead doors at each truck unloading position. Protection for building columns and door framing will be in the form of guardrails, bollards or curbs. Columns only occur at the building perimeter and their spacing is irrelevant since they will not intrude into door openings or maneuvering space. The new building will include adequate overhead clearance for the intended uses, including green waste and organics processing operations.

In order to control the migration of odors, dust and noise, the OPF and Green Waste receiving and tipping floors and all areas where organic and food waste materials will be openly conveyed or handled will be fully enclosed. The enclosed space will include a ventilation system that will maintain air flow into the building at all times. A bio-filter will be provided to treat exhaust air from the OPF building.

The replacement building will house the OPF, the green waste operation, vehicle maintenance, and administrative and personnel areas.

At a maximum anticipated inflow of 300 tons per day (TPD) of food/organics waste and 200 TPD of green waste, approximately 40 tons and 25 tons respectively per operating hour will be received. If we assume only 5 tons per truck, approximately 8 food/organics trucks and 5 green waste trucks can be expected per hour, an average of one truck every 5 minutes.

The lane closest to the proposed new building can be designated solely for vehicle maneuvering for green waste and OPF vehicles in order to minimize impacts to transfer truck circulation. Transfer truck queuing, or staging will be east of the green waste and OPF tipping and loading areas.

VIII. Proposed Processing System

Attachment 1 is a Process Flow Diagram and Attachment 2 is a floor plan of the proposed Organics Processing Facility.

Primary OPF Processing System elements are:

A. Receiving/Tipping Floor

Source-separated organic and food waste materials collected from food service establishments will be delivered to the CLARTS OPF. Collection trucks will enter the receiving/tipping area by backing through rapid-action overhead doors that will remain open for a very short time to minimize the potential for dust, odor and noise emissions.

Once inside the enclosed receiving/tipping area, collection trucks will discharge the organic and food waste materials onto a tipping floor specially-designed to direct excess liquids away from the exterior doors and to collection points. A closed drainage system will be provided to capture these liquids, which will be delivered to the processing system or treatment. A tire cleaning device will be provided to minimize tracking of organic residues outside the building.

Due to daily routing and timing of collections, deliveries tend to converge into small time frames. In addition, a system such as the proposed organics processing system may require temporary stoppages for cleaning or mechanical issues. As a result, surges in the volume of materials staged for processing can be expected, and the tipping floor will be sized to provide adequate staging capacity for these surges. Preliminary calculations indicate approximately 8,000 sf will be needed for the tipping floor, including vehicle maneuvering.

Organic and food waste materials have high levels of moisture and acidity. In addition, discharging of solid waste from collection vehicles along with movement of

materials with front-end loaders will subject tipping floors to extraordinary impacts and abrasion. The tipping floor and receiving bunker walls will be designed to endure these elements and forces, and will be constructed from high-strength, low permeability concrete material.

Because the existing CLARTS facility is already space-constrained with multiple operations including separate buildings for receiving and transfer of municipal solid waste and green waste, the design of the OPF will focus on its integration into the existing CLARTS facility. This includes the physical property, complete operations, personnel amenities, as well as safe and efficient circulation of vehicles.

B. Screening and Materials Segregation Equipment

The screening and separation process will remove non-processibles and contaminants not suitable for AD processing as well as recyclables, including bottles and cans that have California Redemption Value. The amount of these materials may reach or exceed 35 percent.

The remaining organic materials will be conveyed directly to the organics processing system.

C. Organics Processing

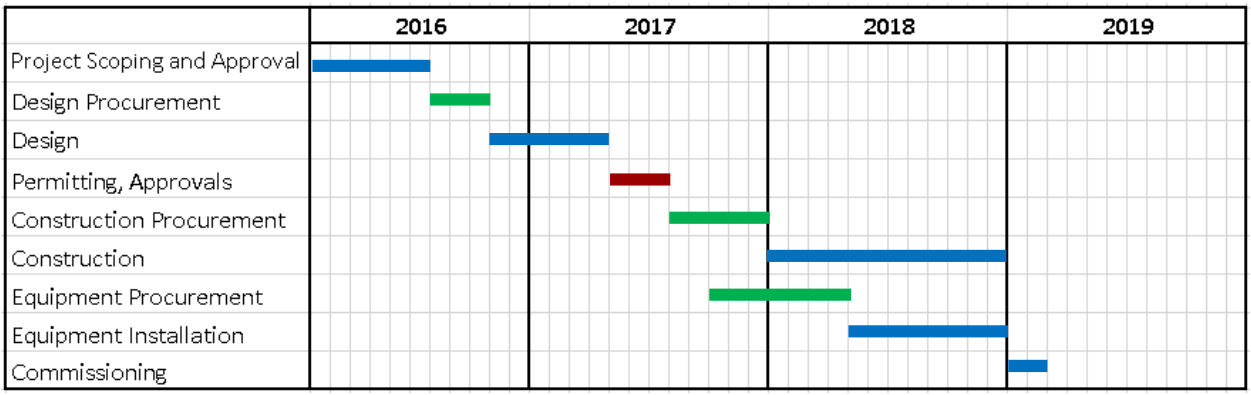
Organics processing is the key unit process of the entire system. System throughput and the remainder of unit processes for pre- and post-processing are determined by the throughput and feedstock characterization necessary for efficient and effective organics processing.

The organics processing system should mechanically remove additional contaminants and non-processibles larger than approximately ½" and produce a wet slurry with solids content in the range of 15 percent. LASAN is considering options for dilution water.

The processed organics materials will form a slurry that will be discharged to the sewer system. A new sewer force main will need to be constructed from CLARTS to a designated connection point.

The residual fraction from the Organics Processing System, which will have very high organic content, will be conveyed to the green waste tipping floor for addition to the compost feedstock.

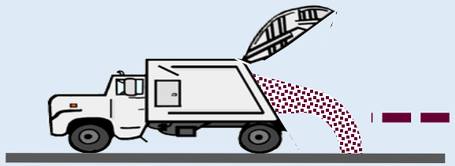
IX. Preliminary CLARTS OPF Implementation Schedule



CLARTS ORGANICS PROCESSING FACILITY

Source-separated Organic/Food Waste

Organics Receiving



Enclosed Tipping Floor

Green Waste Receiving and Transfer

Composting

Compostables

Organics Processing System

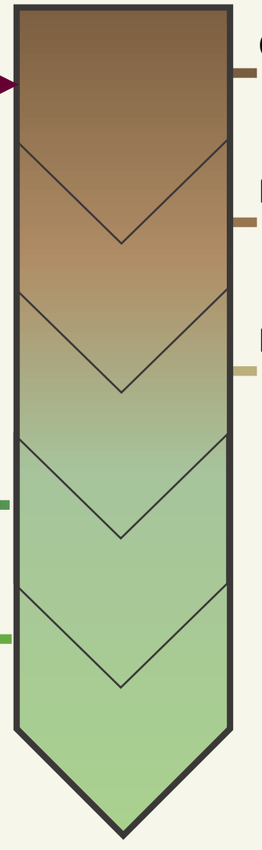
Organic Feedstock

Discharge to sewer (10 - 15% Solids)

Hyperion Treatment Plant

Process Water

Mechanical Processing



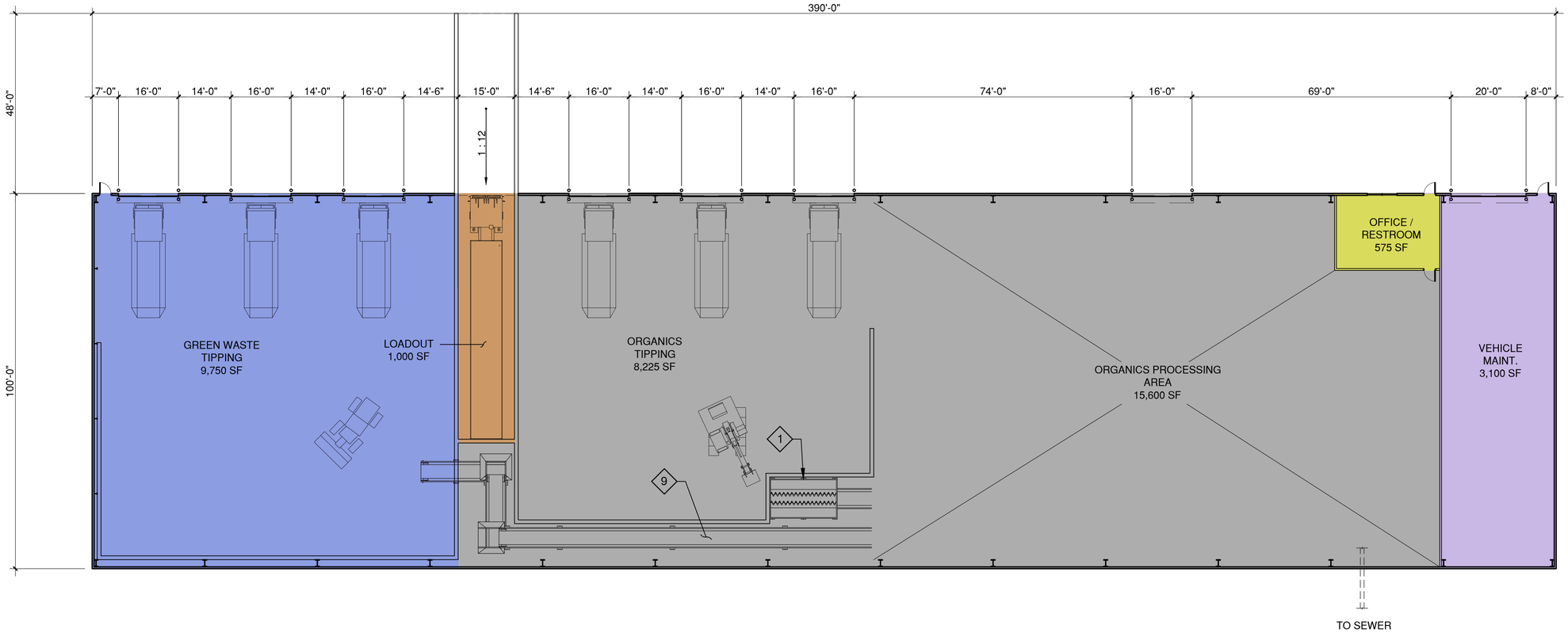
Contaminants → HW Disposal

Non-Processibles → Transfer Station

Recyclables → Market

BLOCK FLOW DIAGRAM

ATTACHMENT 1



KEYNOTE LEGEND

1. METERING BIN
2. QUALITY CONTROL STATION
3. BAG OPENER
4. PRIMARY SCREEN
5. DENSITY SEPARATOR
6. SECONDARY SCREEN
7. DOSING BIN
8. ORGANIC SEPARATOR
9. RESIDUALS CONVEYOR
10. WATER TANK
11. POLISHING UNIT
12. MIXER

N

SCALE: $\frac{1}{32}$"=1'-0"

0' 8' 16' 32' 64'

CLARTS ORGANICS PROCESSING FACILITY AND TRANSFER STATION

2201 WASHINGTON BLVD
LOS ANGELES, CALIFORNIA

ATTACHMENT 2
FLOOR PLAN

JOB # 5070 JULY 6, 2016

N

SCALE: 1"=100'-0"

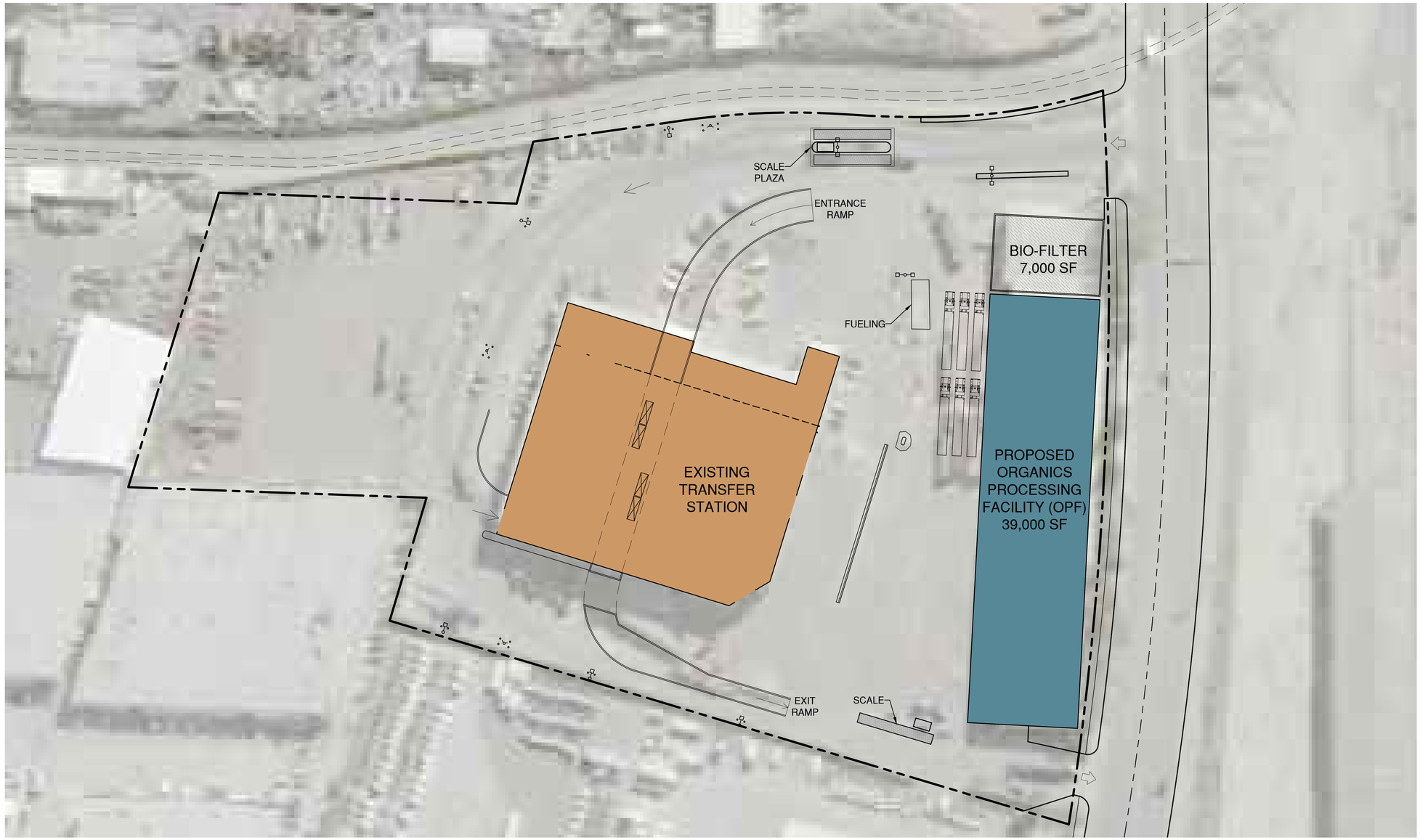
0' 25' 50' 100' 200'

CLARTS ORGANICS PROCESSING FACILITY AND TRANSFER STATION

2201 WASHINGTON BLVD
LOS ANGELES, CALIFORNIA

ATTACHMENT 3
EXISTING SITE PLAN

JOB # 5070 JULY 6, 2016



N

SCALE: 1"=100'-0"

0' 25' 50' 100' 200'

CLARTS ORGANICS PROCESSING FACILITY AND TRANSFER STATION

2201 WASHINGTON BLVD
LOS ANGELES, CALIFORNIA

ATTACHMENT 4
PROPOSED SITE PLAN

JOB # 5070 JULY 6, 2016