Spring 2018

Design of a Green Community Located at West Santa Clara Street and Delmas Avenue in San Jose

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I hereby recommend that the
SENIOR DESIGN PROJECT REPORT
prepared under my supervision by

STEVEN ASHE and EMELIA HAMILTON

entitled

DESIGN OF A GREEN COMMUNITY
LOCATED AT WEST SANTA CLARA STREET AND DELMAS AVENUE IN SAN JOSE

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BACHELOR OF SCIENCE IN CIVIL ENGINEERING

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DESIGN OF A GREEN COMMUNITY
LOCATED AT WEST SANTA CLARA STREET AND DELMAS AVENUE IN SAN JOSE

by

STEVEN ASHE
&
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SENIOR DESIGN PROJECT REPORT

submitted to
the Department of Civil Engineering

of

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in partial fulfillment of the requirements for the degree of
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Department of Civil Engineering
Santa Clara University, Spring 2018

Abstract

A mixed-use land development and transportation system was designed for a nine (9) acre plot of land near downtown San Jose. The goal of this project was to design a safe, green, and attractive community for residents to live, interact with their neighbors, and enjoy the amenities within the community. The community includes an apartment complex, park, playground, picnic area, retail stores, and offices. The scope of work and analysis for this project included drainage design, earthwork calculations, street design, and traffic analysis. Low impact designs were used to reduce the amount of waste, pollution, and runoff for the project. Additionally, the final design incorporates the elements of a community, encouraging a reduction in travel and use of alternative modes of transport, so that sustainability will carry on with the residents.

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Introduction and Problem Addressed

According to the U.S. Census Bureau, the population of San Jose has rapidly increased at a rate of 7.6% from April 2010 to July 2016 (U.S. Census Bureau, 2017). There is also a great shortage of housing, as indicated by the skyrocketing costs of housing in San Jose and the surrounding areas. The increase in population has caused a need for more housing and efficient land development. This project included the design and analysis of a mixed use, green community near downtown San Jose. The goal was to create a space that brings a community together and integrates sustainable practices that benefit the environment. Facilities such as retail shops, office buildings, a recreation center, a community center, a park, a walking trail, and bike lanes will bring the community together and encourage walking or riding a bike. The retail space would also help provide space for new businesses to start and grow since they will be conveniently located to attract customers. In addition, pollution in stormwater runoff has been a prominent issue in and around San Jose, so this project made use of Low-Impact Design methods to reduce the amount of runoff, which pollutes local watersheds. Under the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), pollution has already been greatly reduced, and this project followed the provisions of their C.3 Stormwater Handbook to ensure the design met their requirements. Both the lots and the streets were designed to maximize the use of space, minimize stormwater pollution, and reduce traffic. Land was also to be set aside for use in parks to allow for recreation and meeting places for the community. Based on this project, the community will provide a healthy and enjoyable living space that integrates residential and commercial lots to create a sustainable community.

The location that was chosen to be developed is near the intersection of Delmas Avenue and West Santa Clara Street (shown in Figure 1) because it is in a prime location for housing and will greatly benefit the area by adding much needed services and residential units in an area that has many jobs but lacks sufficient housing.

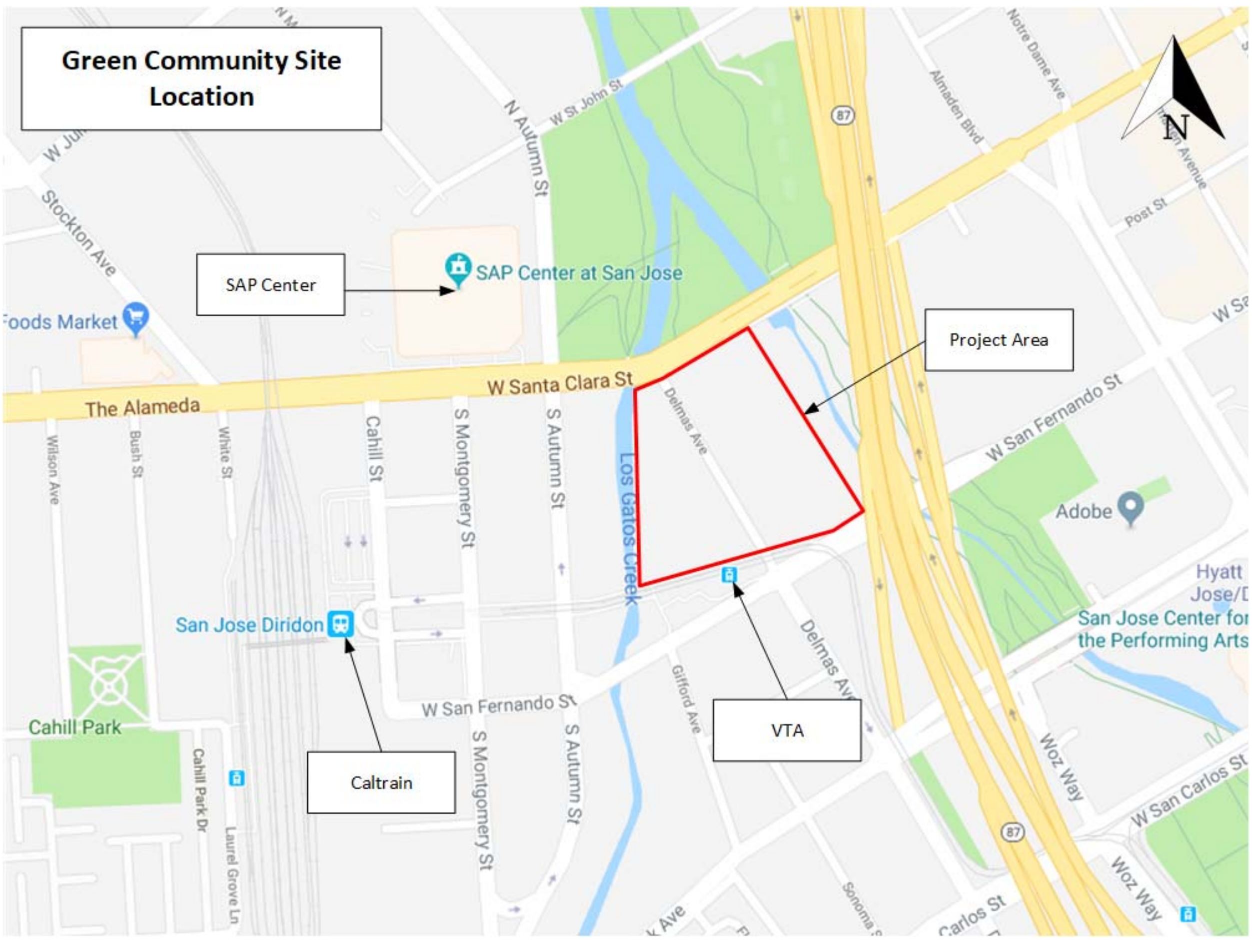

Figure 1: Location map for the site to be developed.

The site is also adjacent to a VTA light rail station and just a few blocks from San Jose Diridon Station, with a future BART extension also planned to go through this area, allowing for easy access to public transportation and making this an ideal location to build a community based around walkability. The lots that were developed are currently being underutilized, as they only serve as auxiliary parking lots for the nearby SAP center, as shown in Figure 2. An AutoCAD drawing showing the existing site conditions is shown on Sheet 11 in Appendix E.

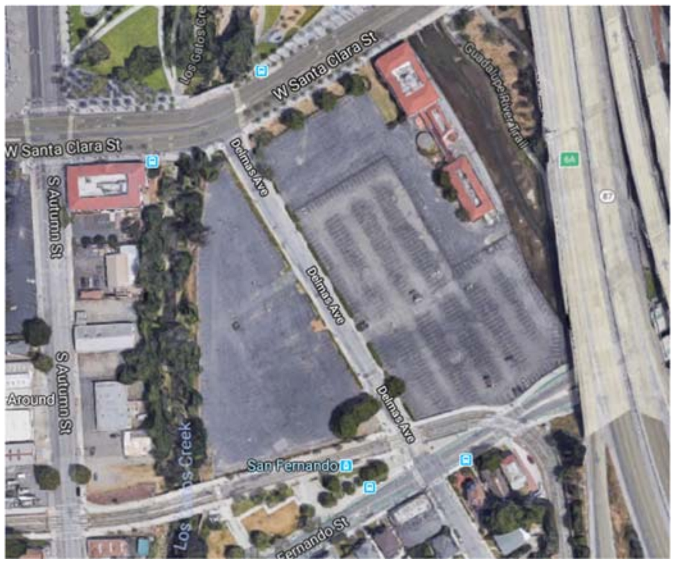

Figure 2: Satellite View of the current site conditions.

The proposed development would thus add vibrance to the area, increase economic benefits, and decrease runoff since parking lots are entirely impervious, whereas this development includes a park and other landscaped areas such as bioswales, allowing for infiltration. Runoff was an especially important consideration due to this site’s location, directly between Los Gatos Creek and the Guadalupe River. This project was based on the City of San Jose’s current project for the redevelopment of the site. The City of San Jose’s project has been approved for development and it is currently being designed.

Description of Solution

One goal of this project was to achieve a low impact and sustainable design. Various technologies and methods were considered to create the most cost effective, safe, and sustainable design. A comparison of the different options regarding sustainable design methods and traffic flow, are shown in Table 1 and Table 2, respectively.

Table 1: Comparison of sustainable design methods and their impact on the environment.

	Technical Feasibility and Constructability	**Environmental Impact**	**Overall Reliability**
Green Roof	Feasible, but required more complex structural design	Reduce stormwater runoff, reduce heat-island effect	Reliable, potential minimal upkeep
Bioswale	Feasible, required more excavation	Reduce stormwater runoff	Reliable, potential minimal upkeep
Solar Panel	Feasible	Reduce power usage	Reliable, potential maintenance required
Pervious Concrete	Feasible	Reduce stormwater runoff	Reliable, same lifespan as regular concrete
Pervious Pavers	Feasible	Reduce stormwater runoff	Reliable

The selected methods for this project were bioswales, pervious concrete, and pervious pavers. These technologies were chosen because they will greatly reduce stormwater runoff, minimizing runoff pollution, and provide a safe and attractive environment for the community. Green roofs were not selected because they require a stronger structural support, which would have increased the overall cost of the project. Additionally, bioswales can capture more runoff than green roofs. Solar panels were selected to reduce the amount of electricity usage for the green community. The solar panels are intended to be placed on the roofs of the buildings and provide a source of renewable energy to support the majority of the electric requirements from the offices, apartments, and shops.

Table 2: Comparison of traffic technologies and their impact on traffic flow.

	Technical Feasibility and Constructability	Traffic Flow	Overall Reliability
Through Lane	Feasible	Good flow, no stopping	Reliable, efficient
Roundabout	Feasible	Good flow, yielding	Reliable
Stop Signs	Very Feasible, easy installation	Slower flow allows pedestrian crossing	Reliable
Stop Lights	Feasible, but more complex installation	Controlled flow	Reliable, potentially required more maintenance

(a) (b) (c)

Figure 3: (a) Existing street design. Delmas Ave. is a two-way through street. (b) Design alternative 1 with a traffic control system in the center of Delmas Ave between West Santa Clara Street and West San Fernando Street. (c) Design alternative 2 with an added one-way street in the site area and an intersection towards the south end of the site.

Figure 3 shows the existing street design near the site. After considering the traffic needs for the green community, alternative street designs were considered to reduce the amount of cut-through traffic through the community and to allow easy access points for the residents of the community. Figure 4 shows the first design alternative which includes a two-way street on Delmas Avenue and an intersection in the center to allow for access to the buildings within the community. The traffic control system for this alternative may be either a roundabout or a stop sign with pedestrian crosswalks. Figure 5 shows the second design alternative which includes split two-way and one-way streets on Delmas Avenue between West Santa Clara Street and West San Fernando Street. There is also an added traffic control system at the southern intersection and a one-way street that wraps around the park. The traffic control system in this design was intended to be a roundabout, as it provides better traffic flow for the one-way and two-way street arrangement.

The street design selected for this project was alternative 2. This design achieves the goal of providing an easy way for the residents to enter and exit the development and to provide a smooth flow of traffic on the smaller street within the development. The one-way street also provides a safer environment for pedestrians crossing the street to and from the center park. Furthermore, the smaller street will discourage other vehicles from cutting through the green community as a shortcut to the surrounding larger streets.

Related Non-Technical Issues

The political climate would be generally favorable to this project since it aimed to address housing issues while also being sensitive to environmental concerns. Although the project is favorable, the team has anticipated a few non-technical related issues that may occur with the development of the green community.

Noise and pollution may become an issue, as there will be an increase in traffic and population in the area. The existing site was a parking lot and did not generate daily noise, however, the addition of mixed use facilities will cause the area to be busier and potentially increase the amount of noise. Additionally, although only for a limited amount of time, there will be a significant amount of noise during the construction phase of the project, which may affect the surrounding area and SAP Center. The increase in noise is not a significant issue, however, the surrounding community will need to be notified of the new development. Community meetings can also be held to address any questions and help alleviate any concerns from the surrounding community.

The team also anticipated that regulations on water pollution and flood control may control the design due to its proximity to Los Gatos Creek and Guadalupe River. This project was designed for a 20-year storm to account for potential flood events in the future.

This project is also related the social issue of affordable housing. While some people may be opposed to adding affordable housing units downtown, there are many benefits to consider. One benefit is that the city supports this type of development, therefore it is more likely for this project to gain approval and begin construction sooner. Another benefit is that it provides an affordable option for residents in the competitive housing market. The project also relates to the political issue of city zoning laws which limit what types of buildings can be developed on the site.

Identification of Applicable Design Criteria and Standards

The maximum square footage of office and retail space and housing units allowed on the plot of land that was developed is 1.04 million square feet and 650 single-family housing units, respectively. The guidelines in the San Jose Municipal Code (City of San Jose, 2010) were used to design the lots. The required number of parking spaces was determined based on the 2010 San Jose Municipal Code Zoning Ordinance. For runoff, the C.3 Stormwater Handbook was used to determine the target for pollution control and infiltration (Bicknell, 2016). The street design will be able to handle the peak hour volume to and from the lots, as determined by the traffic impact study based on the San Jose Traffic Impact Analysis Handbook, and the streets themselves were based on cross-sections from the City of San Jose's standard plans.

Key Resources Used in the Design Process

Various technical resources were used to assist in the street, lot, and drainage design for the project. The streets were designed using the Geometric Design Guidelines from the City of San Jose's website and a textbook, Land Development Handbook (Dewberry, 2009). The San Jose Traffic Impact Analysis Handbook and ITE Trip Generation handbook were also used to analyze the traffic impact and optimize the street design. The San Jose Municipal Code was used to design the lot layouts for the offices, retail space, and housing units. The C.3 Stormwater handbook was used to determine the target for pollution control and infiltration. The design team was in contact with the Department of Transportation at the City of San Jose to obtain the topographic map and intended purpose of the Delmas Avenue and Santa Clara Street site. The topographic map was used to calculate the cut and fill calculations for the pad elevations. Additionally, the City of San Jose's map of storm drains and sanitary sewers was used to assist with the street calculations. AutoCAD was used to produce the final street, lot, and drainage layout.

Design Results

The team's design process is summarized in Figure 4, below. Work started with the site layout and street design, which gave a general direction for the project and allowed the team to design the park layout and choose building locations and uses.

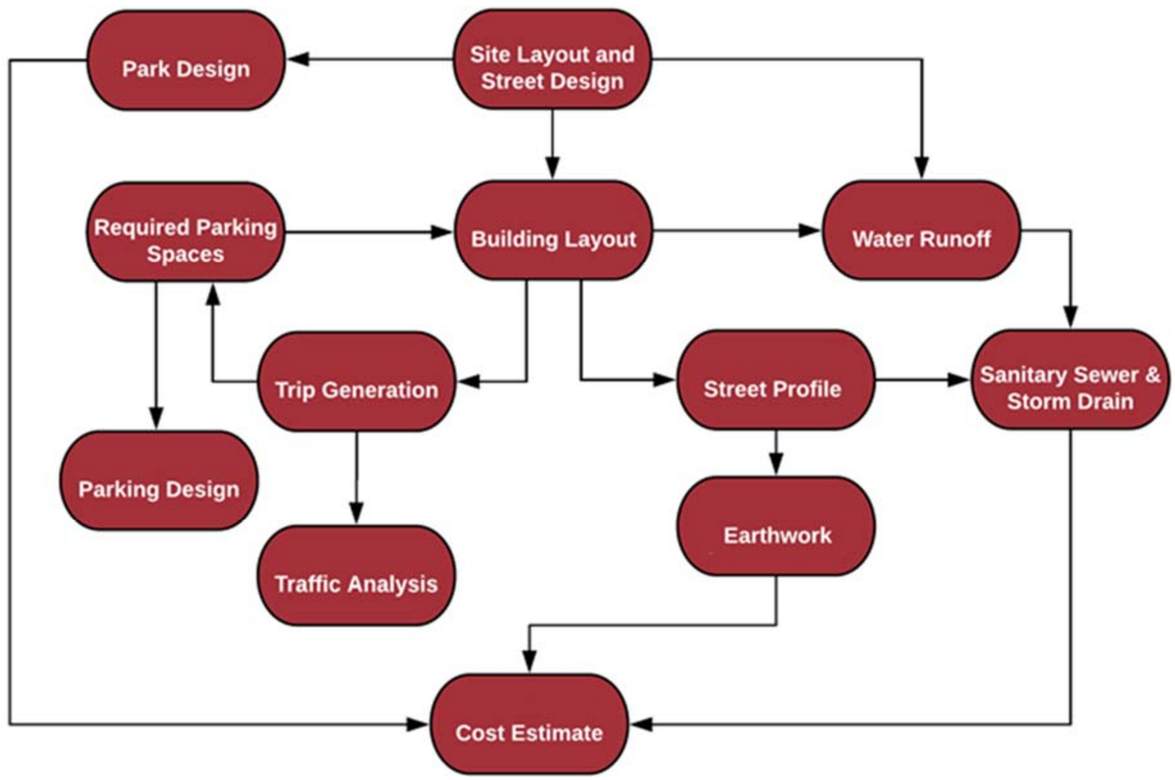

Figure 4: Flow chart for the team's design process.

After deciding on the uses of the buildings, the team used the total retail and office square footages and apartment unit counts to determine the estimated trips generated and required parking spaces. After the initial parking spaces required were calculated, the team had to redo the building layout since there was not enough space to feasibly fit in all the spaces that would be required. After the building revision was complete and the trip generation was recalculated, the number of parking spaces required was at a more reasonable level and the design could move forward.

Using the calculated trip generation rates, a traffic analysis was performed for the surrounding streets both with the existing traffic and with the extra estimated trips, so a comparison could be made. Preliminary layouts for the parking garages were also created to ensure the parking requirements would be met. The finalized building layout along with the site layout were then used to calculate the runoff for the site as well as the street profiles for the project. After that, the expected runoff and street profiles informed the storm drain and sanitary sewer designs and calculations. Then, the site layout, building layout, and street profiles all factored into the earthwork calculations. Lastly, a cost estimate was prepared using the designs produced by the team.

Site Layout

A plan view of the site can be viewed on Sheet 2 in Appendix E. The site consists of five buildings as described in Table 3, below.

Table 3: Building descriptions for Green Community project.

Building	Description of Building	Building Footprint (ft^2)	Floors
1	Parking and Apartments	62785	10
2	Offices	21546	6
3	Parking and Shops	37483	1
4	Apartments	21600	8
5	Shops and Apartments	42700	5

The total available office and retail space is approximately 90,500 square feet and 56,000 square feet, respectively. The combined number of one-bedroom and two-bedroom apartment units is 490. Building 1 consists of parking on floors 1 through 4, a gym on floor 5, and 280 one-bedroom apartments on floors 6 through 10 (800 ft^2 each). The gym is intended to be used by the residents within the green community and the people that work in the office building located in the green community. Building 3 has three floors of underground parking and one ground level floor for commercial use. Building 4 is an apartment complex with 98 two-bedroom units (1240 ft^2 each). Building 5 contains one floor for commercial use and four (4) floors for residential use. There are 112 two-bedroom apartment units in Building 5 (1240 ft^2 each).

In addition to the buildings, another important component of the green community is the park located in the center of the site. The park is approximately 34,000 ft^2 and is intended to be used by members and guests in the green community. The park has three walking paths that lead to the center fountain to provide easy access for people to cross and reach other facilities within the green community. The park also has a picnic area, two playgrounds, a garden, and bathrooms. An overview of the park layout can be viewed on Sheet 3 in Appendix E. The mixed use green community has multiple uses and provides various amenities that integrate the community and encourage people to walk around.

Street Layout

As previously mentioned, the chosen street layout for this project was a split two-way and one-way street on Delmas Avenue between West Santa Clara Street and West San Fernando Street and a roundabout. A horizontal and vertical alignment of the street design can be viewed on Sheet 2 and Sheets 7-8 in Appendix E, respectively. For this project's streets, the team used a design speed of 15 mph, which results in a minimum stopping sight distance (MSSD) of 81.4 ft. This speed allowed the team to design the tight corners which are needed due the limited space in the development. The team also wanted to use a slower speed in order to discourage people from shortcutting through the site, which would not be desirable.

Table 4: Design Criteria for Street Alignments.

Criterion	Goal	Constraint	Allowable Value	Chosen Design Value
Slope	*Safety*	Sight Distance	Sight distance > MSSD = 81.4 ft for 15 mph	**±1.5%**
	Drainage	Minimum Slope	> 0.4%	
Design Speed	*Safety, Prevent Cutting Through*	Stopping distance	Distance Available is 130 ft., so Speed < 31 mph	**15 mph**
Corner Radius	*Prevent Sliding*	Side Friction	15 mph: > 53.6 ft. 10 mph: > 23.8 ft.	**10 mph & 24 ft.**

For the intersection at the entrance to the parking in Building 1, a roundabout was chosen in order to facilitate traffic flow in and out of the parking garage. The vertical alignment of the streets was chosen with a few factors in mind. The street had to have slopes of at least 0.45% per city requirements in order to allow for proper drainage during storms. The team also had to consider sight distance over the tops of vertical curves in order to ensure that there would be enough space to stop after a potential hazard comes into view. The team ended up choosing slopes of ±1.5%, which was more than the minimum, in order to be able to fill in with the dirt which would be excavated for the parking garage under Building 3. Table 4, above, summarizes these design criteria and states the goals of each criterion, as well as the constraints that needed to be met. Street cross-sections were designed based on City of San Jose typical sections and are shown on Sheet 5 in Appendix E, and the striping plan for the streets can be found on Sheet 4. Delmas Avenue will have spaces marked for on-street parking, as well as crosswalks leading to the paths in the park. There are also turn lanes provided at the intersections with West Santa Clara Street and West San Fernando Street.

Earthwork

The team's goal on this project for earthwork was to balance the amount of cut and fill in order to minimize the costs during construction and also reduce waste from needing to export or import soil. Balancing the earthwork also reduces our environmental impact since transporting soil involves driving many trucks between the project site and the source, which uses a large amount of fuel. The cut and fill was calculated based on the existing surveying data points provided by the City of San Jose Department of Transportation.

As mentioned earlier, the streets were elevated, so soil could be filled in underneath them, which allowed the team to balance the earthwork by filling in approximately four to five feet above the existing ground. This design is shown on Sheets 7-8 in Appendix E, with the dotted line representing the existing ground and the dark solid line representing the proposed street alignment. The park and the landscaped areas around the buildings, as well as the buildings themselves, were also raised to match the streets. One percent (1%) slopes were provided on the ground around the buildings to facilitate drainage. A rough grading plan for the project site is shown on Sheet 9 of Appendix E.

Table 5: Earthwork Totals.

Area	Cut (yd^3)	Fill (yd^3)	Fill - Cut (yd^3)
Streets	8	4,069	4,061
Building Pads	37,469	12,418	-25,052
Site Grading	0	12,463	12,463
Correction for Asphalt	0	5,954	5,954
Correction for Soil Shrinkage	0	2,549	2,549
Total	37,477	37,452	-25

There were also corrections made to account for a couple of conditions specific to the site. Since the ground elevations represented the top of the parking lot pavement for the vast majority of the site, six inches (6”) of fill was added for the entire paved area since the asphalt would need to be removed and could not be reused as fill. The team also corrected for shrinkage of the soil after determining the soil type present from a previous Environmental Impact Report in the area (SJW Land Company, 2004). After accounting for these corrections, the earthwork was balanced to within 25 cubic yards, as shown in Table 5. Tables with more detailed calculations are available in Appendix A, Tables A-1 through A-5.

Traffic Analysis

The team anticipated that there would be a slight increase in traffic due to the trips generated to and from the development, but because various forms of public transportation are nearby, the traffic increase should not significantly impact the current traffic conditions.

Traffic count data from the existing intersections surrounding the site was obtained from the City of San Jose Department of Transportation. The peak volume for morning and evening was analyzed in Synchro to determine the level of service (LOS) for each intersection. The traffic with the existing conditions was acceptable, as each intersection was either LOS A, B, or C. After analyzing the existing traffic conditions, the team followed the same steps using Synchro to analyze the traffic conditions with the added green community. The number of trips generated was calculated based on the Trip Generation Rates found in the San Jose Traffic Impact Analysis Handbook (City of San Jose, 2009). Furthermore, the number of trips generated was allowed to be reduced according to the 2014 Santa Clara Valley Transportation Authority Transportation Analysis Guidelines (VTA, 2014). After finding the total trip generation from the new development, the traffic generated was distributed based on the morning and evening peak traffic rates found in the 2009 San Jose Traffic Impact Analysis Handbook and the ratios from the existing traffic conditions.

A summary of the trip generation and peak traffic splits can be viewed in Table 6 and Table 7, respectively. Additionally, the traffic analysis results from Synchro for both the existing site and new development can be viewed in Tables B-1 and B-2 in Appendix B, respectively.

Table 6: Trip Generation.

	Weekday Trip Generation Rate	**Trip Generation (trips/day)**	**Trip Reduction**	**Reduced Trip Generation (trips/day)**
Housing	6 / unit	2940	15% + 9%	2274
Shops	70 / 1000 sf	3929	0%	3929
Office	11/ 1000 sf	995	3% + 6%	908

Table 7: Morning and evening peak traffic splits.

	AM Peak-Hour Trips	**PM Peak-Hour Trips**
In Split	286	336
Out Split	226	382

Figure 5 and Figure 6 show the worst-case LOS from the morning or evening traffic for each intersection in the existing and new traffic analysis.

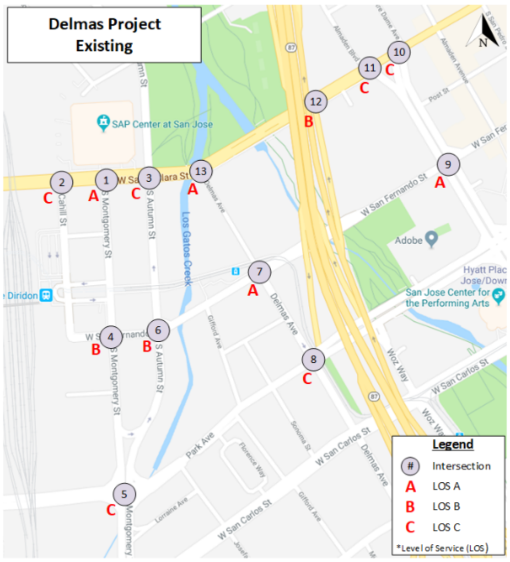

Figure 5: Existing traffic analysis LOS.

Figure 6: Green Community traffic analysis LOS.

As expected, there was a slight increase in traffic with the green community, however, the LOS of the intersections remained either C or better. Additionally, the maximum volume to capacity ratio, average delay time, and fuel consumption increased by 8%, 7%, and 10% respectively. The results from the traffic analysis with the green community supported the conclusion that the addition of the new community will not significantly impact the nearby traffic conditions in downtown San Jose.

Storm Drain and Sanitary Sewer

The existing storm drain was analyzed to ensure that the velocity was between two (2) to eight (8) feet per second (ft/s) and that the capacity was greater than the expected runoff. The expected rainfall intensity, 1.3 inches per hour (in/hr), for this location was determined based on a 20-year, 20-minute duration storm according to the San Jose Intensity-Duration-Frequency Chart (He, 2017). A layout of the storm drain can be found on Sheet 10 in Appendix E. With the addition of the new community, the team decided to add two (2) catch basins at the north and south end of the site to direct the water from the site to the storm drains on Delmas Avenue. When performing the calculations for velocity and capacity, the team adjusted the slope of the storm drain pipes due to the increase in elevation of the new street design. The velocity and capacity were found to meet the requirements stated earlier. Detailed storm drain calculations can be viewed in Table C-1 in Appendix C. Furthermore, information about the existing storm drain pipes was obtained from the City of San Jose Geographic Information Systems (GIS) data.

Table 8: Values used to calculate flow for sanitary sewer.

Peaking Factor	3
Average Daily Flow (gal/person/day)	120
Design Flow (gal/person/day)	360
Pipe Slope	0.005
Pipe Diameter (in)	10
Cross-Sectional Area (ft^2)	0.55
Flow Velocity (ft/s)	2.73
Hydraulic Radius	0.208
Friction Coefficient	0.14

The sanitary sewer was analyzed to verify that the current capacity would meet the demand with the green community. Information about the existing sanitary sewer pipes was obtained from the City of San Jose GIS data online and from the City of San Jose Department of Public Works. The values used to calculate the flow can be viewed in Table 8, above.

The flow capacity for the existing sanitary sewer pipes was 962,000 gal/day and the demand flow was 720,000 gal/day. This result shows that the current capacity was sufficient for the demand with the added development. The existing sanitary sewer layout is also shown on Sheet 10 of Appendix E

Runoff Calculations

The amount of stormwater runoff was calculated to find the amount of runoff reduced by incorporating sustainable methods such as bioswales and pervious surfaces. The SCVURPPP guidelines were used to obtain the runoff coefficient for various surfaces within the green community. Table 9 shows the different surfaces and their appropriate runoff coefficient. Table 10 shows the comparison of the flow calculation for both the existing parking lot and new development of the green community.

Table 9: Runoff coefficient for surfaces in green community.

Runoff Coefficient = 0.9	**Runoff Coefficient = 0.1**
- Buildings - Fountains - Covered Picnic Area - Streets (asphalt)	- Bioswales - Park (grass) - Pervious Concrete - Playground Area

Table 10: Flow calculation for existing parking lot and new development of the green community.

	Existing Parking Lot	**Green Community**
Runoff Coefficient: C	0.89	0.29
Intensity: I (in/hr)	0.734	0.734
Area: A (acres)	8.93	8.93
Flow: Q (cfs)	5.84	1.93

The runoff coefficient in Table 10 is a weighted average runoff coefficient for the entire development site. The intensity used for both calculations was 0.734 in/hr. This value was based on a 20-year, 20-minute duration storm from NOAA. The flow in the green community was reduced by 3.91 cubic feet per second (cfs), or 66.9%, by incorporating sustainable methods such as incorporating bioswales and landscaped areas to reduce stormwater runoff. The bioswales will catch rain coming from the roofs of the buildings, filter it, and allow it to infiltrate into the ground, thereby reducing the runoff. The bioswales also increase the time of concentration, or the time it takes for rainwater to reach a certain point downstream, which reduces peak flow rates. Decreasing the peak flow rate reduces the risk of flooding and also decreases erosion of riverbanks.

Cost Estimate

A cost estimate for the site work only can be viewed in Table 11 below. The project was estimated to be approximately 1.7 million dollars. A more detailed cost estimate can be viewed in Table D-1 in Appendix D. The cost estimate was based on the rates in the RS Means book (RS Means, 2016).

Table 11: Green Community cost estimate for site work only.

Item	**Details**	**Cost**
Earthwork	Cut: 37477 cy Fill: 37452 cy	$637,000
Paving	Asphalt: 29478 sqft Pervious Concrete: 9836 sqft	$246,000
Underground Utilities	4 Manholes 4 Catch Basins 290 lf of 10" Concrete Pipes	$58,000
Finish Details	ADA Ramps, Street Lights, Crosswalks, Stop Signs, Fire Hydrants, 3 Traffic Signals	$141,000
Landscaping	Finish Grading, Bioswales, Park Features, Plants	$501,000
Contingency	10%	$158,000
Total		**$1,741,000**

Summary and Conclusions

The final design of this project is a success because it achieves the team's goal to provide a sustainable mixed-use area for the community to live, shop, eat, work, and play. A 3D model of the finalized site layout is shown in Figure 7, below. With the increase in population and housing shortage, developing land with mixed uses and maximizing small spaces is critical. This design also reduces environmental impact by minimizing waste by balancing earthwork, as well as reducing runoff using landscaped areas and bioswales. Additionally, this community will promote sustainability and encourage people to walk, ride a bike, or take public transportation around the area. The green community has many benefits for the overall community and environment.

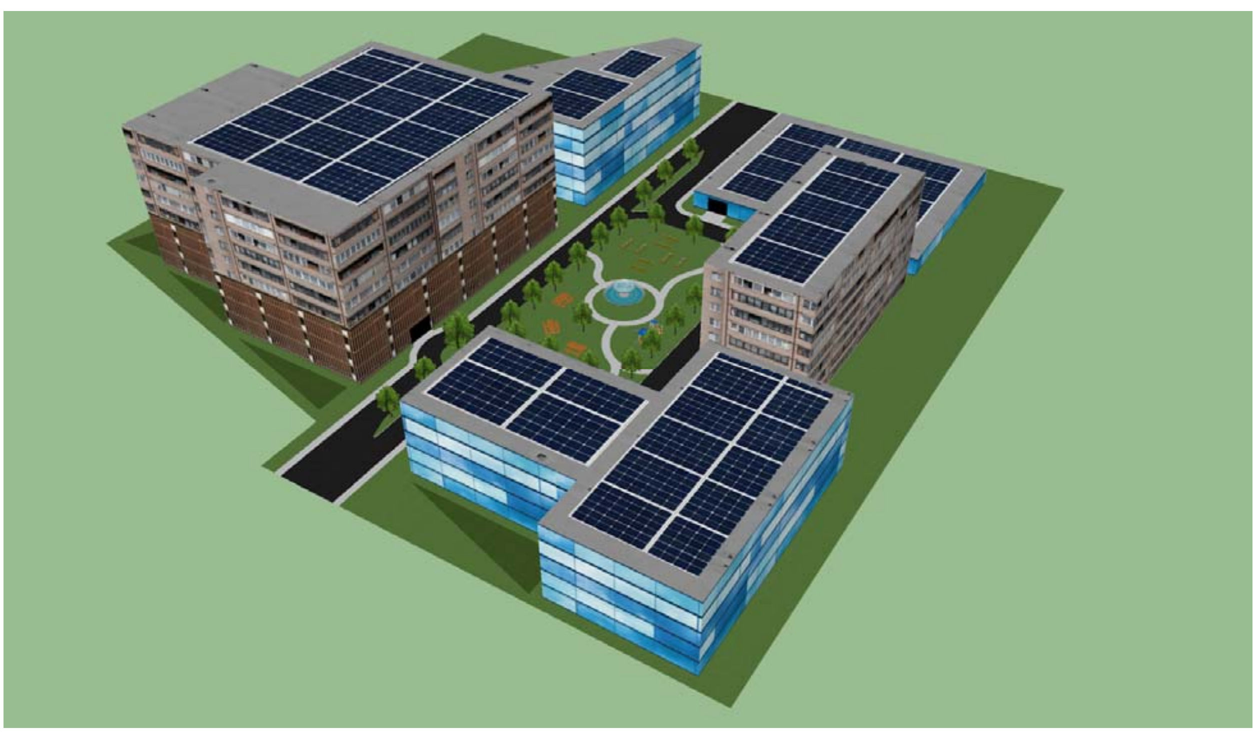

Figure 7: 3D Visualization of the proposed development on the site.

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Appendix A

Earthwork Calculations

Table A-1: Earthwork Totals for Streets.

Section	**Cut (yd^3)**	**Fill (yd^3)**
Delmas (0+00 to 2+09)	4.01	609
Delmas SB (2+09 to 5+09)	0	1174
Delmas NB (0+00 to 5+79)	0	2115
Delmas (5+09to6+18)	3.63	171
Total	7.64	4069

Table A-2: Earthwork Calculation for Building Pads.

Building	**Avg. Existing Elev.**	**Proposed Elev.**	**Area (ft^2)**	**Cut (yd^3)**	**Fill (yd^3)**
1	87.24	88.2	62785	292	2524
2	86.22	88.1	21546	0	1500
3	86.28	59.5	37483	37178	0
4	87.19	91	21600	0	3048
5	86.62	90	42700	0	5345
			Total	37469	12418

Table A-3: Earthwork Calculations for Site Grading.

Area	Avg. Existing Elev.	Avg. Prop. Elev.	Area (ft^2)	Cut (yd^3)	Fill (yd^3)
Park	85.88	90.51	37739	0	6472
A	88.17	90.89	3742	0	377
B	88.95	89.61	2768	0	68
C	87.53	87.79	4498	0	43
D.1	86.12	90.21	1532	0	232
D.2	86.12	88.95	4718	0	495
E	86.29	90.76	6847	0	1134
F	86.53	91.86	4669	0	922
G	86.25	91.72	1773	0	359
H	85.38	87.95	2862	0	272
I	85.93	86.02	998	0	3
J	85.75	87.36	2544	0	152
K	86.03	87.75	2645	0	168
L	86.36	88.59	1376	0	114
M	85.69	90.12	2758	0	453
N	86.77	91.09	1907	0	305
O	87.31	91.44	3954	0	605
P	87.12	90.46	2442	0	302
Q	86.69	89.61	1960	0	212
R	86.39	88.66	2983	0	251
S	85.93	90.88	3634	0	666
T	86.33	90.65	2272	0	364
U	86.48	88.25	1645	0	108
V	86.46	90.65	1474	0	229
W	87.51	89.25	2269	0	146
			Total	0	14450

Table A-4: Earthwork Calculations for Bioswales

Location	Depth (ft)	Area (ft^2)	Volume (yd^3)
A	3	1749	194
B	3	1484	165
C	3	2026	225
E	3	3514	390
F	3	2677	297
O	3	1587	176
S	3	1771	197
U	2	4616	342
	Total	**19424**	**1987**

Table A-5: Earthwork Calculation Corrections.

	Depth (ft)	Area (ft^2)	Volume (yd^3)
Additional fill due to paved area:	0.5	321490	5954
Additional fill due to shrinkage:	0.2	344097	2549
		Total	**8502**

Appendix B

Detailed Traffic Analysis Results

Table B-1: Synchro Analysis Results for Existing Traffic.

	Existing AM Traffic				**Existing PM Traffic**			
Intersection	**Max v/c Ratio**	**Avg. Delay (sec)**	**Fuel Consumption (gal/hr)**	**LOS**	**Max v/c Ratio**	**Avg. Delay (sec)**	**Fuel Consumption (gal/hr)**	**LOS**
1	0.37	2.8	7	A	0.57	4.7	11	A
2	0.71	17.4	19	B	0.84	21.7	19	C
3	0.91	21.4	25	C	0.79	17.3	21	B
4	0.46	9.9	8	A	0.55	10.6	18	B
5	0.86	18.5	25	B	0.75	23.2	38	C
6	0.59	11.4	14	B	0.25	8.8	8	A
7	0.30	7.7	4	A	0.46	9.5	9	A
8	0.76	31.2	28	C	0.46	29.2	13	C
9	0.50	7.9	64	A	0.55	7.4	21	A
10	0.81	24.0	28	C	0.77	17.1	19	B
11	0.95	26.2	27	C	0.92	20.6	24	C
12	0.63	9.8	27	A	0.60	10.9	30	B
13	N/A	N/A	N/A	A	N/A	N/A	N/A	A

Table B-2: Synchro Analysis Results with Added Traffic from Development.

	Green Community AM Traffic				**Green Community PM Traffic**			
Intersection	**Max v/c Ratio**	**Avg. Delay (sec)**	**Fuel Consumption (gal/hr)**	**LOS**	**Max v/c Ratio**	**Avg. Delay (sec)**	**Fuel Consumption (gal/hr)**	**LOS**
1	0.38	2.9	9	A	0.61	4.9	11	B
2	0.73	17.9	19	B	0.84	21.6	20	C
3	0.94	23.6	32	C	0.82	15.2	22	B
4	0.52	10.2	9	B	0.57	10.7	19	B
5	0.87	19.3	31	B	0.77	23.5	40	C
6	0.59	11	15	B	0.26	9.3	9	A
7	0.44	9.5	8	A	0.63	12.9	13	B
8	0.76	31.8	29	C	0.49	30.7	37	C
9	0.8	21.9	44	C	0.58	16.3	34	B
10	0.85	20.4	27	C	0.79	24.1	26	C
11	0.92	21.6	25	C	0.92	20.9	27	C
12	0.63	12.5	32	B	0.69	12	33	B
13	0.72	11.2	25	B	0.66	7.6	19	A
14	-	-	-	A	-	-	-	A
15	0.16	-	-	A	0.23	-	-	A

Appendix C

Storm Drain Calculations

Table C-1: Storm Drain Calculations.

Pt. of Con.	Ground Elev. (ft)	C	I (in/hr)	A (acres)	Runoff Q (cfs)	Diameter (in)	Slope	Velocity (ft/s)	Cap. Q (cfs)	Invert in Elev. (ft)	Invert out Elev. (ft)
CB #1	87.54	0.54	1.3	1.33	0.934						81.697
						10.00	0.005	3.09	1.68		
CB #2	87.54	0.67	1.3	1.02	0.891						81.73
						10.00	0.005	3.09	1.68		
CB #3	86.44	0.66	1.3	1.70	1.463						81.44
						10.00	0.013	5.01	2.73		
CB #4	86.40	0.59	1.3	2.14	1.633						81.40
						10.00	0.015	5.33	2.91		
MH #2	88.56	0.60	1.28	2.35	1.797					81.45	81.38
						10.00	0.010	4.36	2.38		
MH #1	86.53	0.62	1.27	3.84	3.025					80.22	80.15
						12.00	0.010	4.93	3.87		

Appendix D

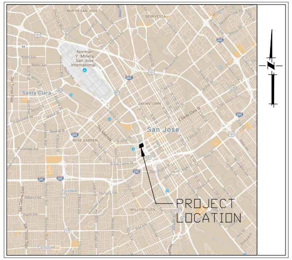
Detailed Cost Estimate

Table D-1: Detailed Cost Estimate.

Item	Quantity	Unit	Unit cost	Total Cost
Earthwork Total				$636,859.00
Cut (Rough Grading)	37477	cy	$7.00	$262,339.00
Fill (Rough Grading)	37452	cy	$10.00	$374,520.00
Offhaul	0			$0.00
Paving Total				$245,720.00
Asphalt for Streets	29478	sqft	$6.00	$176,868.00
Pervious Concrete for Sidewalk	9836	sqft	$7.00	$68,852.00
Underground Utilities Total				$58,350.00
Pipes	290	lf	$55.00	$15,950.00
Sanitary Sewer (Manhole)	3	each	$10,000.00	$30,000.00
Storm Drain (Manhole)	1	each	$10,000.00	$10,000.00
Catch Basin	4	each	$600.00	$2,400.00
Finish Details Total				$140,610.00
ADA Ramps	11	each	$810.00	$8,910.00
Street Lights	6	each	$6,000.00	$36,000.00
Cross Walks	4	each	$750.00	$3,000.00
Stop Signs	0	each		$0.00
Fire Hydrants	3	each	$900.00	$2,700.00
Traffic Signal	3	each	$30,000.00	$90,000.00
Landscaping Total				$501,260.54
Finish Grading	13913	sy	$10.00	$139,126.67
Bioswale	19424	sqft	$10.00	$194,240.00
Fountain	2	each	$2,000.00	$4,000.00
Playground	2	each	$15,000.00	$30,000.00
Park Path	3371	sqft	$7.00	$23,597.00
Grass	0.4968778696	acre	$1,000.00	$496.88
Planters	51	each	$1,000.00	$51,000.00
Trees	196	each	$300.00	$58,800.00
10 % Contingency				$158,279.95
TOTAL COST				$1,741,079.50

Appendix E

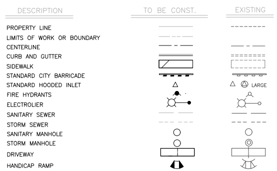
Design Drawings



LOCATION MAP

(NTS)

LEGEND

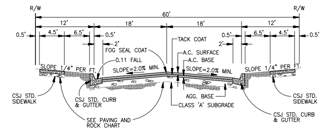


SAN JOSE MUNICIPAL WATER SYSTEM RECYCLED WATER SYSTEM NOTES

1. RECYCLED WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE "1992 STANDARD SPECIFICATIONS FOR THE CITY OF SAN JOSE PUBLIC WORKS" AND "1992 STANDARD DETAILS FOR THE CITY OF SAN JOSE PUBLIC WORKS." COPIES CAN BE PURCHASED IN ROOM 320 OF SAN JOSE CITY HALL.
2. RECYCLED WATER FACILITIES SHALL BE CONSTRUCTED AS SHOWN ON THESE PLANS, STANDARD DETAILS W-1 THROUGH W-18, AND STANDARD SPECIFICATIONS SECTIONS 101 THROUGH 104. ALL CHANGES MUST BE APPROVED BY MUNI WATER INSPECTOR PRIOR TO BEING CONSTRUCTED. A REVISED DRAWING MUST BE APPROVED BY MUNI WATER ENGINEER.
3. NOTIFY MUNI WATER INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO REQUIRED INSPECTIONS. INSPECTOR MAY BE PHONED AT (408) 277-3671 BETWEEN 8:00 AM AND 4:30 PM, MONDAY THROUGH FRIDAY, EXCEPT HOLIDAYS. NO WEEKEND INSPECTIONS UNLESS APPROVED 72 HOURS IN ADVANCE.
4. CONSTRUCTION OF RECYCLED WATER FACILITIES SHALL PROCEED ONLY AFTER THE CURB AND GUTTER IS COMPLETED. PRIOR TO PRESSURIZING WATER MAINS, A MINIMUM OF 30" COVER SHALL BE CONSTRUCTED AND MAINTAINED BETWEEN THE TOP OF WATER MAIN AND TOP OF STREET SUBGRADE.
5. STAMP "RW" ON FACE OF CURB FOR EACH WATER SERVICE.
6. BEDDING AND BACKFILL SHALL BE AS PER SECTION 1301 OF THE STANDARD SPECIFICATIONS. IMPORTED SAND SHALL BE USED FOR TYPE A BEDDING. NO JETTING OF BACKFILL IS ALLOWED.
7. ALL METALLIC WATER MAINS SHALL BE ENCASED WITH PURPLE POLYETHYLENE WRAP AS SPECIFIED IN AWWA C105. PVC PIPE SHALL BE PURPLE COLORED OR WRAPPED IN PURPLE AND HAVE A 4 TO 1 SAFETY FACTOR.
8. BACTERIOLOGICAL TEST:
   A. WATER SAMPLING SHALL BE WITNESSED BY MUNI WATER INSPECTOR. THE SAMPLING AND TEST SHALL BE PERFORMED BY A LABORATORY APPROVED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH.
   B. THE ORIGINAL TEST REPORTS MUST BE APPROVED BY THE MUNI WATER ENGINEER PRIOR TO PRESSURE TESTING.
9. LEAKAGE AND PRESSURE TEST SHALL BE FOR A MINIMUM OF 2 HOURS AT ___ PSI.
10. STATIC WATER PRESSURE: ___ PSI AT ELEVATION ___ FT. PRESSURE ZONE: ___.
11. RECYCLED WATER MAIN SHALL BE RATED FOR WORKING PRESSURE OF ___ PSI.
12. RECYCLED METER BOXES SHALL BE INSTALLED AT BACK OF ATTACHED RESIDENTIAL SIDEWALKS, OTHERWISE AT BACK OF CURB. METER BOXES SHALL HAVE "RECYCLED WATER" STAMPED OR ETCHED ON THE LID AND PAINTED PURPLE. SERVICE LINES UNDER PARKSTRIPS SHALL BE INSTALLED WITH SAND BACKFILL AND MARKER TAPE. ALL SERVICE LINES SHALL BE ENCASED IN POLYETHYLENE WRAP OR WRAPPED IN 10 MIL PVC TAPE HALF-LAPPED (PURPLE).
13. TRACER WIRE SHALL BE INSTALLED ON ALL WATER LINES. WIRE SHALL BE TYPE RHW #10 AWG STRANDED. WIRE SHALL BE SECURELY FASTENED TO TOP OF RECYCLED WATER LINE AND SHALL BE PLACED ALONG THE OUTSIDE OF VALVE BOX RISERS WITH ONE FOOT OF SLACK PLACED INSIDE OF VALVE BOX. WIRE SHALL TERMINATE IN EACH BOX IN THE DIRECTION OF THE VALVE CONTROLS AND BE EXTENDED INTO BLOW-OFF BOXES.
14. CLEARANCES (UNLESS OTHERWISE NOTED ON PLAN)
   A. ONE FOOT MINIMUM VERTICAL CLEARANCE BETWEEN RECYCLED WATER MAIN AND OTHER FACILITIES.
   B. TEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER MAIN AND SANITARY MAIN.
   C. SEVEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER MAIN AND STORM MAIN.
   D. FIVE FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER MAIN AND POTABLE WATER MAIN.
   E. TEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER SERVICE AND SEWER OR POTABLE WATER LATERALS.
   F. FIVE FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER METER SERVICE AND STREET TREES.
   G. TWO FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN RECYCLED WATER METER BOX AND EDGE OF DRIVEWAY.
15. ALL RECYCLED WATER MAIN VALVES SHALL HAVE "RECYCLED WATER" STAMPED, ETCHED, OR "BEAD WELDED" ON THE VALVE BOX LID AND RIM, WHICH SHALL BE PAINTED PURPLE.
16. ALL RECYCLED WATER MAIN BLOW-OFF ASSEMBLIES AND AIR RELIEF VALVES SHALL HAVE "RECYCLED WATER" STAMPED OR ETCHED ON THE BOX LID AND SHALL BE PAINTED PURPLE ALONG WITH THE LID.

SAN JOSE MUNICIPAL WATER SYSTEM POTABLE WATER SYSTEM NOTES

1. WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE "1992 STANDARD SPECIFICATIONS FOR THE CITY OF SAN JOSE PUBLIC WORKS" AND "1992 STANDARD DETAILS FOR THE CITY OF SAN JOSE PUBLIC WORKS." COPIES CAN BE PURCHASED IN ROOM 320 OF SAN JOSE CITY HALL.
2. WATER FACILITIES SHALL BE CONSTRUCTED AS SHOWN ON THESE PLANS, STANDARD DETAILS W-1 THROUGH W-18, AND STANDARD SPECIFICATIONS SECTIONS 101 THROUGH 104. ALL CHANGES MUST BE APPROVED BY MUNI. WATER INSPECTOR PRIOR TO BEING CONSTRUCTED. A REVISED DRAWING MUST BE APPROVED BY MUNI. WATER ENGINEER.
3. NOTIFY MUNI. WATER INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO REQUIRED INSPECTIONS. INSPECTOR MAY BE PHONED AT (408) 277-3671 BETWEEN 8:00 AM AND 4:30 PM, MONDAY THROUGH FRIDAY, EXCEPT HOLIDAYS. NO WEEKEND INSPECTIONS UNLESS APPROVED 72 HOURS IN ADVANCE.
4. CONSTRUCTION OF WATER FACILITIES SHALL PROCEED ONLY AFTER THE CURB AND GUTTER IS COMPLETED. CONNECTIONS TO EXISTING MAINS SHALL BE COORDINATED AND APPROVED BY MUNI. WATER INSPECTOR. PRIOR TO PRESSURIZING WATER MAINS, A MINIMUM OF 30" COVER SHALL BE CONSTRUCTED AND MAINTAINED BETWEEN THE TOP OF WATER MAIN AND TOP OF STREET SUBGRADE.
5. BEDDING AND BACKFILL SHALL BE AS PER SECTIONS 101 AND 1301 OF THE STANDARD SPECIFICATIONS. BEDDING SHALL BE TYPE "A" WITH BEDDING MATERIAL NOT EXCEEDING 3/8" MAX. AGGREGATE AND CONTAINING A SAND EQUIVALENT NOT LESS THAN 25. COMPACTION OF BEDDING SHALL BE ACHIEVED USING HAND-OPERATED MECHANICAL TAMPERS OR APPROVED ALTERNATE METHOD. NO JETTING OF BACKFILL IS ALLOWED.
6. BACTERIOLOGICAL TEST:
   A. WATER SAMPLING SHALL BE WITNESSED BY MUNI. WATER INSPECTOR. THE SAMPLING AND TESTING SHALL BE PERFORMED BY A LABORATORY APPROVED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH.
   B. THE ORIGINAL TEST REPORTS MUST BE DELIVERED TO AND APPROVED BY THE MUNI. WATER ENGINEER PRIOR TO PRESSURE TESTING.
7. LEAKAGE AND PRESSURE TEST SHALL BE FOR A MINIMUM OF 2 HOURS AT _____ PSI.
8. STATIC WATER PRESSURE: _____ PSI AT ELEVATION _____ FT. PRESSURE ZONE: ___.
9. WATER MAIN AND ALL WATER SERVICES SHALL BE RATED FOR WORKING PRESSURE OF _____ PSI. ALL METALLIC WATER MAINS SHALL BE ENCASED IN POLYETHYLENE WRAP AS SPECIFIED IN AWWA C105. PVC PIPE SHALL HAVE A 4 TO 1 SAFETY FACTOR. MAIN VALVES SHALL HAVE STAINLESS STEEL TRIM AND BE BOLTED TO TEES, BENDS, OR OTHER FITTINGS, AS SHOWN ON PLANS UNLESS OTHERWISE NOTED.
11. ALL SERVICE SADDLES ON METALLIC WATER MAINS SHALL BE STAINLESS STEEL SINGLE OR DOUBLE STRAP. ALL SERVICE LINES SHALL BE ENCASED IN POLYETHYLENE WRAP OR WRAPPED IN 10 MIL PVC TAPE HALF-LAPPED. SERVICE LINES UNDER PARK STRIPS SHALL BE INSTALLED WITH SAND BACKFILL AND MARKER TAPE.
12. METER BOXES SHALL BE INSTALLED AT BACK OF ATTACHED RESIDENTIAL SIDEWALKS, OTHERWISE AT BACK OF CURB. ALL METER BOXES FOR 3/4" METERS SHALL BE CHRISTY B9 WITH ARMORCAST LIDS A6001922BG. ALL METER BOXES FOR 1" METERS SHALL BE CHRISTY B12 WITH ARMORCAST LIDS A6000484BG. STAMP "W" ON FACE OF CURB FOR EACH WATER SERVICE.
13. TRACER WIRE SHALL BE INSTALLED ON ALL WATER MAINS. WIRE SHALL BE TYPE RHW #10 AWG STRANDED. WIRE SHALL BE SECURELY FASTENED TO TOP OF WATER LINE AND SHALL BE PLACED ALONG THE OUTSIDE OF VALVE BOX RISERS WITH ONE FOOT OF SLACK PLACED INSIDE OF VALVE BOX. WIRE SHALL TERMINATE IN EACH BOX IN THE DIRECTION OF THE VALVE CONTROLS AND BE EXTENDED INTO BLOW-OFF BOXES. CONDUCTIVITY TEST FOR TRACER WIRE SHALL BE PERFORMED AFTER BACKFILL AND COMPACTION.
14. FIRE HYDRANTS SHALL BE PURCHASED AT THE SAN JOSE FIRE DEPARTMENT'S BUREAU OF FIRE PREVENTION, LOCATED AT 4 N. 2ND STREET, SUITE 1100, PHONE: 277-4656. A FIRE HYDRANT AUTHORIZATION LETTER MUST BE PRESENTED TO FIRE DEPARTMENT STAFF IN ORDER TO PURCHASE ANY HYDRANTS. THIS AUTHORIZATION LETTER WILL BE AVAILABLE FROM THE MUNI. WATER INSPECTOR. HYDRANT LATERALS SHALL BE DIP WITH RESTRAINED JOINTS. BLUE REFLECTIVE PAVEMENT MARKERS SHALL BE INSTALLED AT EACH HYDRANT.
15. CLEARANCES (UNLESS OTHERWISE NOTED ON PLAN)
   A. ONE FOOT MINIMUM VERTICAL CLEARANCE BETWEEN POTABLE WATER MAIN AND OTHER FACILITIES.
   B. FOUR FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE WATER MAIN AND OTHER FACILITIES.
   C. TEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE WATER MAIN AND SANITARY MAIN.
   D. SEVEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE WATER MAIN AND STORM MAIN.
   E. FIVE FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE WATER MAIN AND RECYCLED MAIN.
   F. TEN FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE AND RECYCLED OR SEWER LATERALS.
   G. FIVE FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN POTABLE WATER SERVICE AND STREET TREES.
   H. TWO FEET MINIMUM HORIZONTAL CLEARANCE BETWEEN METER BOX AND EDGE OF DRIVEWAY.



TYPICAL 60' R/W STREET SECTION

(NTS)

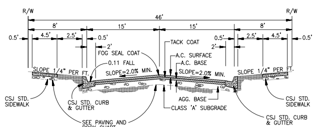
CITY STANDARD NOTES

1. APPROVAL OF THESE PLANS DOES NOT RELEASE THE OWNER OF THE RESPONSIBILITY FOR THE CORRECTION OF MISTAKES, ERRORS, OR OMISSIONS CONTAINED THEREIN. IF DURING THE COURSE OF CONSTRUCTION OF THE IMPROVEMENTS, PUBLIC INTEREST REQUIRES A MODIFICATION OF OR A DEPARTURE FROM THE CITY SPECIFICATIONS OR THESE IMPROVEMENT PLANS. THE CITY ENGINEER SHALL HAVE THE AUTHORITY TO REQUIRE SUCH MODIFICATION OR DEPARTURE AND TO SPECIFY THE MANNER IN WHICH THE SAME IS TO BE MADE.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 1992 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND THE 1992 STANDARD DETAILS AND SUBSEQUENT ADDENDA FOR PUBLIC WORKS CONSTRUCTION AS ADOPTED BY THE CITY COUNCIL.
3. CONTRACTOR SHALL NOTIFY THE PROJECT INSPECTOR, ______________ AT LEAST 24 HOURS PRIOR TO STARTING WORK AT *(408)*______________, (VOICE MAIL), MAIN OFFICE – *(408) 277-5161*.
4. ALL CONTRACTORS WILL BE RESPONSIBLE FOR THE VERIFICATION OF LOCATIONS OF ALL EXISTING UTILITIES IN THE FIELD. ALL CONTRACTORS SHALL CALL U.S.A. (CA. 1-800-227-2600) 48 HOURS BEFORE DIGGING, AND OBTAIN AN IDENTIFICATION NUMBER (SECTION 4210.1 OF THE GOVERNMENT CODE).
5. COMPACT SUBGRADE FOR SIDEWALK, DRIVEWAYS, AND SIMILAR STRUCTURES TO 90% MINIMUM RELATIVE DENSITY IN LIEU OF THE 95% REQUIRED IN SECTION 21-1.05 OF THE STANDARD SPECIFICATIONS. COMPACT CURB AND GUTTER SUBGRADE TO 95% RELATIVE COMPACTION AND MOISTURE CONTENT OF ALL NATIVE MATERIALS SHALL BE DETERMINED BY ASTM D2922/D3017 AND D1557. (UNLESS OTHERWISE NOTED)
6. ALL ASPHALT CONCRETE MIX SHALL BE TYPE 'A' – 3/4" COARSE FOR BASE, 3/4" MEDIUM FOR SURFACE AND 1/2" MEDIUM FOR CONFORMS. AC COMPACTION SHALL BE DETERMINED BY ASTM D2950 OR BY TESTING CORES SELECTED PER ASTM D979/D3665 AND TESTED PER CAL 308. AC MAXIMUM DENSITY AND AIR VOID CONTENT SHALL BE DETERMINED ON CAL 304 SPECIMENS TESTED PER ASTM D1188. AIR VOID CONTENT OF ALL AC SHALL BE 3-6% PER ASTM D3203. PRIOR TO CONSTRUCTING AC OVERLAY, FILL ALL CRACKS GREATER THAN 1/4" WIDE WITH CRACKFILLER AND REMOVE AND REPLACE FAILED AREAS. ALL AC SURFACES TO BE 98% RELATIVE COMPACTION (U.O.N.).
7. ASPHALT COATING:
   A. APPLY TACK COAT (AKA PAINT BINDER) TO SURFACES DESIGNATED IN, AND ACCORDANCE WITH, SECTION 39-4.02 OF THE 1988 CALTRANS STANDARD SPECIFICATIONS. THE ASPHALTIC EMULSION USED SHALL BE SS-1H.
   B. PRIME COAT ALL AGGREGATE BASE SURFACES PRIOR TO PLACING AC PAVING UNLESS THE TOTAL THICKNESS OF AC PAVING IS 0.5 FOOT OR GREATER. PRIME COAT ALL AGGREGATE BASE SURFACES THAT WILL BE SUBJECTED TO TRAFFIC PRIOR TO PAVING.
   C. CONSTRUCT PRIME COAT IN ACCORDANCE WITH SECTION 39-4.02 OF THE 1992 CALTRANS STANDARD SPECIFICATION, WITH THE EXCEPTION THAT SS-1H ASPHALTIC EMULSION SHALL BE USED IN LIEU OF LIQUID ASPHALT. PRIME COAT NOT REQUIRED FOR FULL DEPTH AC ALTERNATE.
8. ALL IRRIGATION LINES OR OTHER PRIVATELY OWNED UNDERGROUND LINES THAT REQUIRE RELOCATION AS DETERMINED BY THE CITY ENGINEER SHALL BE AT THE SOLE EXPENSE OF THE DEVELOPER.
9. TEMPORARY STREET SIGNS TO BE INSTALLED AT ALL INTERSECTIONS BEFORE UNITS ARE OCCUPIED.
10. AS A WATER CONSERVATION MEASURE, USE OF FIRE HYDRANT WATER OR ANY OTHER SOURCE OF POTABLE WATER FOR CONSTRUCTION PURPOSES IS PROHIBITED. RECLAIMED WATER IS AVAILABLE, ON A COST RECOVERY BASIS, AT THE CITY WATER POLLUTION CONTROL PLANT LOCATED AT 700 LOS ESTEROS ROAD. FOR MORE INFORMATION, PLEASE CALL TOM HOGAN OR PATRICK KWOK AT (408) 945-5300.
11. HAZARDOUS MATERIAL:
   UPON DISCOVERY OF HAZARDOUS MATERIAL THE CONTRACTOR SHALL PROMPTLY NOTIFY THE CITY IN WRITING OF ANY:
   A. MATERIAL THAT THE CONTRACTOR BELIEVES MAY BE MATERIAL THAT IS HAZARDOUS WASTE, AS DEFINED IN SECTION 25117 OF THE HEALTH AND SAFETY CODE, THAT IS REQUIRED TO BE REMOVED TO A CLASS I, CLASS II, OR CLASS III DISPOSAL SITE IN ACCORDANCE WITH PROVISIONS OF EXISTING LAW.
   B. SUBSURFACE OR LATENT PHYSICAL CONDITIONS AT THE SITE DIFFERING FROM THOSE INDICATED.
   C. UNKNOWN PHYSICAL CONDITIONS AT THE SITE OF ANY UNUSUAL NATURE, DIFFERENT MATERIALLY FROM THOSE ORDINARILY ENCOUNTERED AND GENERALLY RECOGNIZED AS INHERENT IN WORK OF THE CHARACTER PROVIDED FOR IN THE CONTRACT. THE DEVELOPER'S AGENT SHALL PROMPTLY INVESTIGATE THE SUSPECTED CONDITION AND, AS NECESSARY, INITIATE FURTHER ANALYSIS OF THE PROBLEM. IF REMEDIATION IS REQUIRED, A REMEDIATION PLAN WILL BE SUBMITTED TO THE DIRECTOR OF PUBLIC WORKS FOR REVIEW BY ENVIRONMENTAL MANAGEMENT AND, UPON APPROVAL BY THE DIRECTOR, BE IMPLEMENTED AT DEVELOPER'S SOLE EXPENSE.
12. IN THE EVENT THAT HUMAN REMAINS AND/OR CULTURAL MATERIALS ARE FOUND, ALL PROJECT-RELATED CONSTRUCTION SHALL CEASE WITHIN A 100-FOOT RADIUS. THE CONTRACTOR SHALL, PURSUANT TO SECTION 7050.5 OF THE HEALTH AND SAFETY CODE, AND SECTION 5097.94 OF THE PUBLIC RESOURCES CODE OF THE STATE OF CALIFORNIA, NOTIFY THE SANTA CLARA CORONER IMMEDIATELY.
13. CONTRACTOR SHALL PROVIDE VIDEO INSPECTION OF ALL STORM AND SANITARY SEWER MAINS. VIDEO INSPECTION OF ALL MAINS SHALL BE PERFORMED AFTER ALL TESTING HAS BEEN COMPLETED.
14. CONTRACTOR SHALL REMOVE ALL U.S.A. MARKING AS SOON THEY ARE NO LONGER NEEDED. ONLY CHALK PAINT SHALL BE USED IN THE REDEVELOPMENT AREA (BOUNDED BY JULIAN STREET AND HIGHWAY 280, AND BETWEEN HIGHWAY 87 AND FOURTH STREET). REMOVAL OF PAINT SHALL BE HIGH WATER PRESSURE METHOD ONLY.
15. CONTRACTOR SHALL STENCIL ALL NEW STORM DRAIN INLETS AND CATCH BASINS WITH "NO DUMPING-FLOWS TO BAY" STENCIL. THE CONTRACTOR SHALL LOCATE THE STENCIL ON THE FACE OF THE CURB, ADJACENT TO THE CATCH BASIN HOOD. THE LEFT SIDE IS PREFERRED. THE STENCILS MAY BE OBTAINED, AT NO CHARGE THROUGH THE ENVIRONMENTAL SERVICES DEPARTMENT (BILL SMITH) BY CALLING (408) 945-3054. COLORS TO BE USED ARE: BACKGROUND – BAUER WHITE, LETTERING – BAUER BLUE (HANDICAP). PAINT WILL BE A SEMI-GLOSS CURB PAINT FORMULATION.
16. INSTALLATION OF STREET TREES REQUIRES A PERMIT FROM THE DEPARTMENT OF STREETS AND TRAFFIC. THE CITY ARBORIST SPECIFY SPECIES. CONTACT THE CITY ARBORIST AT (408) 277-4373 FOR A TREE PERMIT.
17. ALL VCP PIPE APPLICATIONS 10" IN DIAMETER AND GREATER SHALL REQUIRE RESILIENT COMPRESSION JOINTS (BELL & SPIGOT) AS PER SECTION 1302-4.2.2 OF THE CITY STANDARD SPECIFICATIONS.
18. IF CONTRACTOR DAMAGES EXISTING ASPHALT SECTION DURING THE REMOVAL OF EXISTING CURB AND GUTTER OR AT THE DISCRETION OF THE PROJECT INSPECTOR, THE ASPHALT CONCRETE SHALL BE REPAIRED BY SAWCUTTING 12" MINIMUM FROM THE LIP OF GUTTER AND INSTALLING A 9" MINIMUM 'DEEP-LIFT' AC SECTION.
19. CITY SURVEY MONUMENTS SHALL BE PRESERVED. IN THE EVENT THAT A CITY MONUMENT IS LOST TO CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL, AT THE CONTRACTOR'S SOLE EXPENSE, BE RESPONSIBLE FOR ITS RE-ESTABLISHMENT AND THE FILING OF A CORNER RECORD WITH THE COUNTY SURVEYOR'S OFFICE. A RECORD OF SURVEY SHALL BE FILED FOR ALL NEW CITY MONUMENT SET IN CONJUNCTION WITH THIS IMPROVEMENT PLAN, UNLESS A FINAL OR PARCEL MAP REQUIRING SAID MONUMENTS IS RECORDED AS PART OF THIS PROJECT.
20. BENCH MARK:
21. PLAN REFERENCES:

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

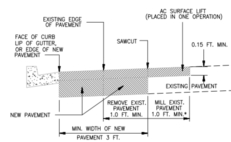
ELECTRICAL NOTES – STREET LIGHTING

1. MATERIALS SUBMITTAL:
   A LIST OF THE MATERIALS PROPOSED BY THE CONTRACTOR TO BE USED ON THIS PROJECT FOR STREET LIGHTING INCLUDING, BUT NOT LIMITED TO LUMINAIRES, POLES, CONDUIT, CONDUCTORS, PULL BOXES, AND SERVICE EQUIPMENT SHALL BE SUBMITTED TO THE CITY'S PROJECT INSPECTOR FOR REVIEW PRIOR TO THE START OF WORK. THIS LIST SHALL INCLUDE THE MANUFACTURER'S SPECIFICATIONS FOR ALL APPLICABLE PRODUCTS.
2. SERVICES:
   A. INSTALL A 240 V SERVICE NEXT TO EACH P.G.&E. SECONDARY BOX USED FOR STREETLIGHT SERVICE, UNLESS SPECIFIED OTHERWISE.
   B. ALL ELECTRIC SERVICE POINTS SHOWN ON THESE PLANS WERE DETERMINED BY P.G.&E. AND ARE TENTATIVE AND SHOWN FOR REFERENCE ONLY. THE ACTUAL AND FINAL SERVICE POINT(S) MUST BE CONFIRMED WITH P.G.&E. PRIOR TO CONSTRUCTION OF ELECTRICAL WORK. ALL ADDITIONAL COSTS INCURRED FOR WORK MODIFICATIONS REQUIRED DUE TO FINAL SERVICE POINT LOCATIONS/ADJUSTMENTS SHALL BE BORN BY THE PERMITTEE. IF THE FINAL SERVICE POINT(S) LOCATION(S) DIFFER FROM THE TENTATIVE LOCATION(S) SHOWN ON THE PLANS, THE PERMITTEE SHALL REVISE THE PLANS AND NOTIFY THE PUBLIC WORKS INSPECTOR, (408) 277-5161 OF ANY CHANGES AND SHALL OBTAIN CITY APPROVAL OF CHANGES PRIOR TO INSTALLATION OF ELECTRICAL WORK.
3. SALVAGE OF EQUIPMENT:
   STREET LIGHTING SERVICE CABINETS TO BE SALVAGED SHALL BE DELIVERED TO THE CITY OF SAN JOSE ELECTRICAL MAINTENANCE SHOP AT 1404 MABURY ROAD. OTHER EQUIPMENT TO BE SALVAGED SHALL BE DELIVERED TO THE CITY OF SAN JOSE CENTRAL SERVICE YARD AT 1661 SENTER ROAD. CONTACT THE DEPARTMENT OF TRANSPORTATION AT(408) 277-5515, 48 HOURS IN ADVANCE TO ARRANGE FOR ACCEPTANCE OF SALVAGED EQUIPMENT.
4. OVERHEAD UTILITY CONFLICTS:
   PERMITTEE IS RESPONSIBLE FOR PROVIDING CLEARANCE FOR ELECTROLIERS AND TRAFFIC SIGNAL STANDARDS FROM OVERHEAD UTILITY LINES. CLEARANCE MUST BE A MINIMUM OF 10 FEET FROM HIGH VOLTAGE LINES, 3 FEET FROM SECONDARY LINES, AND 1 FOOT FROM COMMUNICATION LINES. NO ELECTROLIER OR TRAFFIC SIGNAL STANDARD SHALL BE INSTALLED UNTIL PROPER CLEARANCE IS OBTAINED. ALL EXPENSES ASSOCIATED WITH PROVIDING THESE CLEARANCES SHALL BE BORNE BY THE DEVELOPER.
5. ALL ELECTROLIER LOCATIONS SHALL BE STAKED IN THE FIELD BY THE PERMITTEE.
6. ALL NEW CONDUIT SHALL BE 1-½" PVC (SCH. 40) WITH 2 #8 STREETLIGHT AND 1 #8 GROUND CONDUCTORS UNLESS NOTED OTHERWISE.
7. ALL NEW ELECTROLIERS SHALL BE TYPE 10B POLE WITH C-8 MAST ARM AND LUMINAIRE AS INDICATED UNLESS NOTED OTHERWISE.
8. ALL NEW PULLBOXES SHALL BE #3-½" UNLESS NOTED OTHERWISE.



TYPICAL 46' R/W STREET SECTION

(NTS)



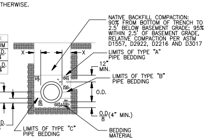
* REQUIRED IF JOINT LONGER THAN 50 FEET. NOT REQUIRED IF JOINT IS SHORTER THAN 50 FT. OR IF EXISTING PAVEMENT TO RECEIVE NEW OVERLAY.

CONSTRUCTION JOINT DETAIL

BEDDING MATERIAL SHALL BE CLASS I (CRUSHED STONE) IN ACCORDANCE WITH THE 1992 CITY STANDARD SPECIFICATION 1301-2.

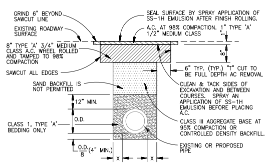
PIPE SIZE	LIMITS OF X	
	MINIMUM	MAXIMUM
24" OR LESS	4"	4"+ O.D./4
27" AND GREATER	6"	6"+ O.D./4

BEDDING TYPE	CATEGORY OF PIPE
A	VITRIFIED CLAY PIPE, CONCRETE PIPE 25" DIA. AND GREATER
B	CONCRETE PIPE 24" DIA. AND LESS
C	DUCTILE IRON PIPE



NEW STREET PIPE BEDDING DETAIL

FOR ALL PUBLIC STORM AND SANITARY SEWER PIPE



EXISTING STREET TRENCH RESTORATION

SHEET INDEX

SHT. NO.	DESCRIPTION
1.	COVER SHEET
2.	DELMAS AVE. PLAN
3.	PARK AND FINISH DETAILS
4.	STRIPING PLAN
5.	TYPICAL SECTIONS
6.	TC ELEVATIONS AND STATIONS
7.	PROFILE VIEWS
8.	PROFILE VIEWS (2)
9.	ROUGH GRADING PLAN
10.	SANITARY SEWER, STORM DRAIN, AND BIOSWALES
11.	EXISTING CONDITIONS

WARNING • CAUTION

EXISTING UNDERGROUND UTILITIES
CONTACT : UNDERGROUND SERVICE ALERT
PHONE: (800) 642-2444
FOR MARKING PRIOR TO DIGGING

Green Community Development at Delmas Ave & Santa Clara St.

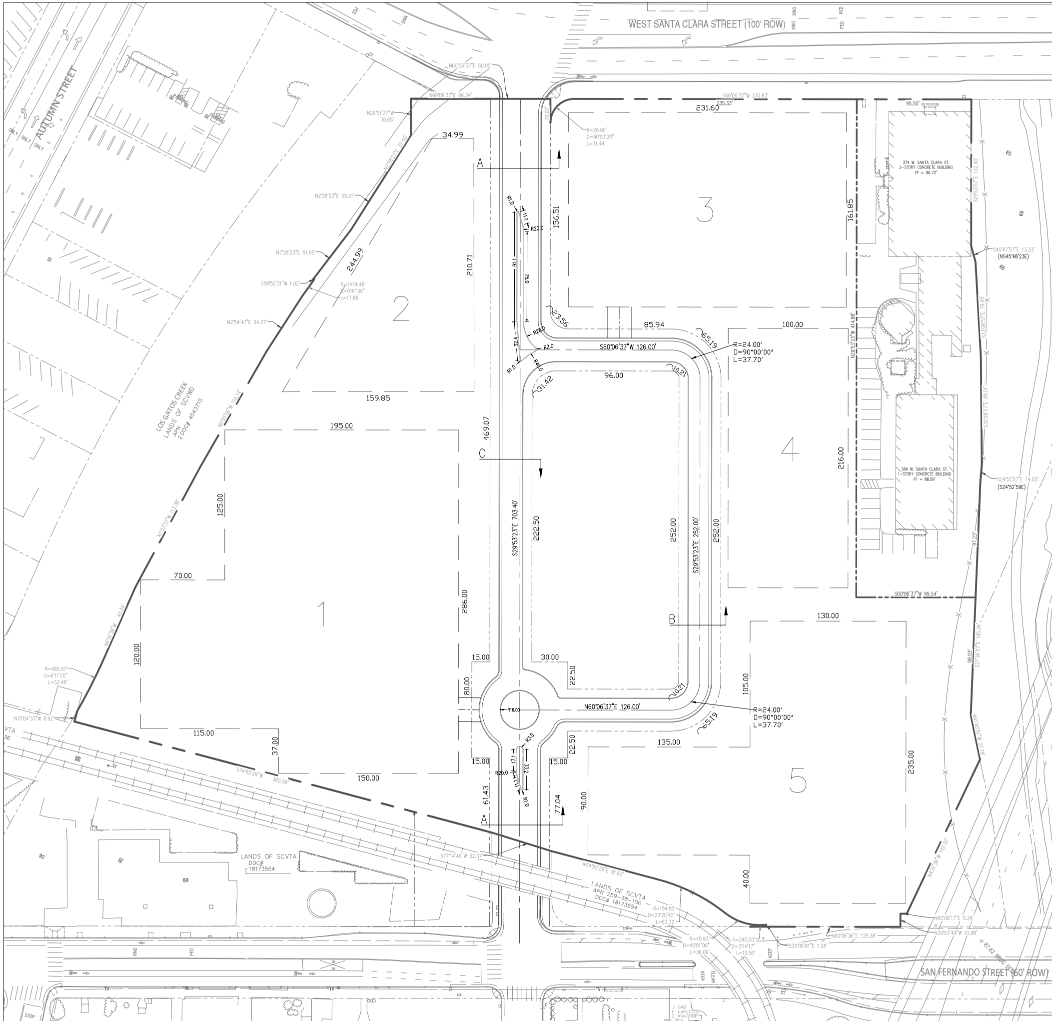
Cover Sheet	Sheet 1

Steven Ashe, Emelia Hamilton

Santa Clara University
Santa Clara, CA

Date: 4-3-18

Scale: N/A



LEGEND

CENTERLINE	
GUTTER	
FACE OF CURB	
BACK OF CURB	
MEDIAN	
PROPOSED ROW	
BOUNDARY	
LOT BOUNDARY	
PROPOSED BUILDING	
EXISTING FEATURES	

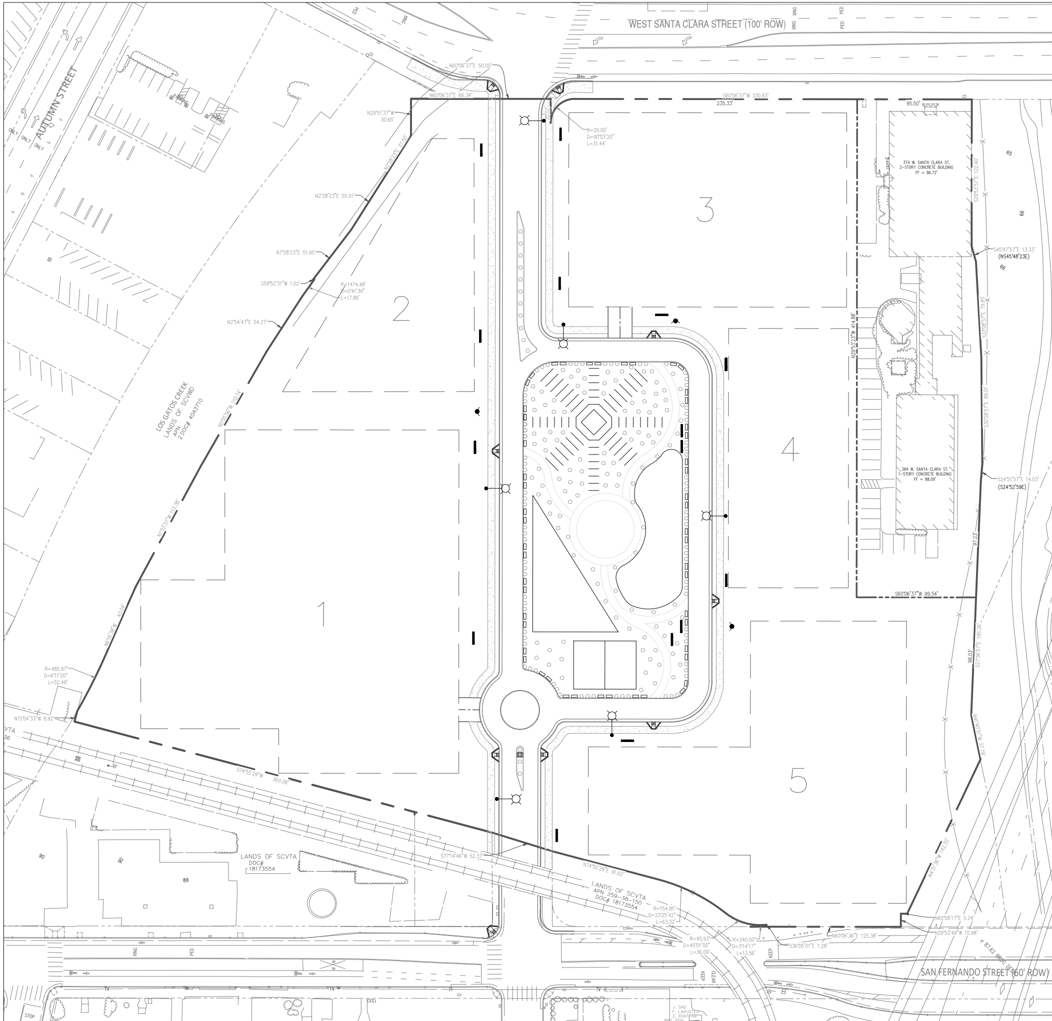
NOTE: TYPICAL SECTIONS INDICATED ON THIS DRAWING CAN BE FOUND ON SHEET 5

Green Community Development at Delmas Ave & Santa Clara St.

Preliminary Redesign for Delmas Ave. | Sheet 2

Steven Ashe, Emelia Hamilton

Date: 2-1-18 | Santa Clara University Santa Clara, CA | Scale: 1:40



LEGEND

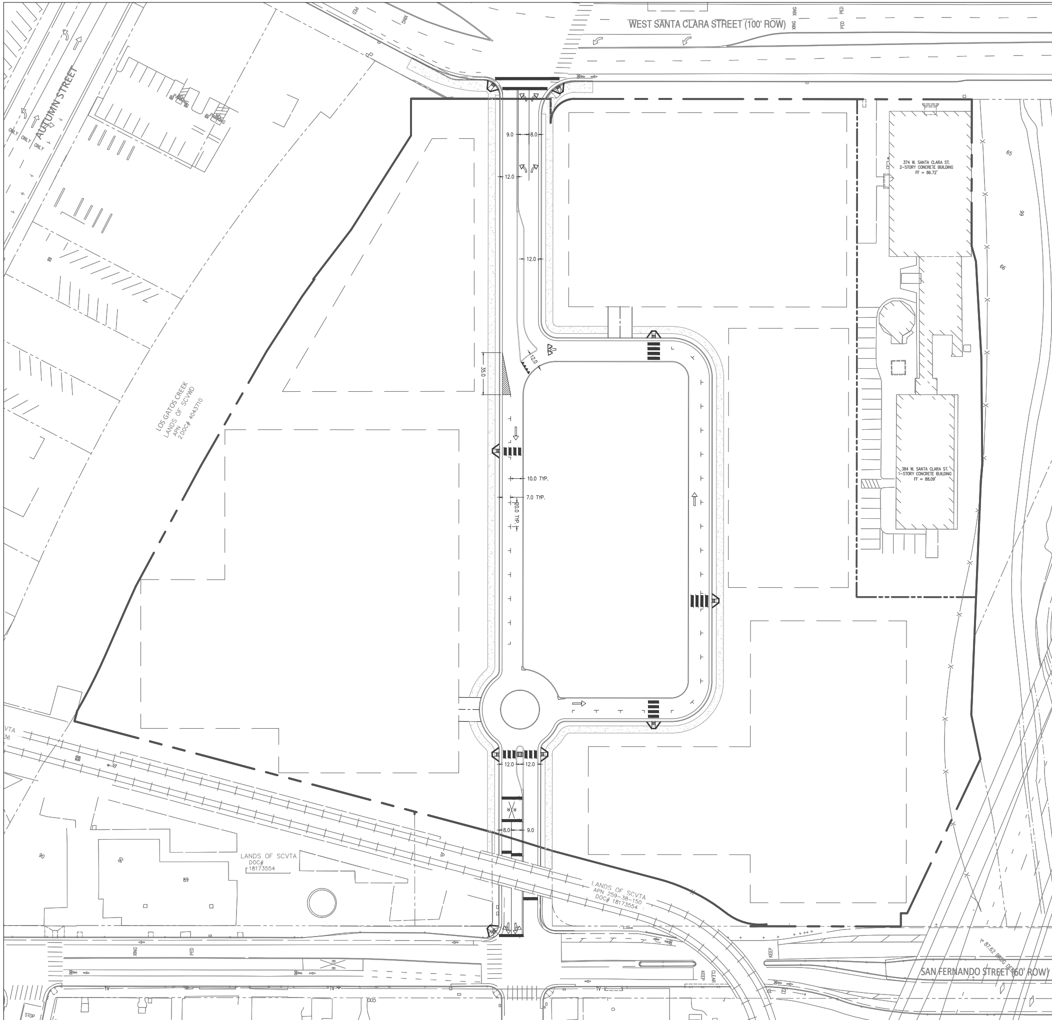
- SIDEWALK
- GUTTER
- FACE OF CURB
- BACK OF CURB
- MEDIAN
- STRIPING
- CURB RAMP
- TREE
- FOOTPATH
- STREETLIGHT
- FIRE HYDRANT
- BIKE RACK
- PARK FEATURE
- BOUNDARY
- LOT BOUNDARY
- PROPOSED BUILDING
- EXISTING FEATURES

Green Community Development at Delmas Ave & Santa Clara St.

Park and Finish Deatails for Delmas Ave. | Sheet 3

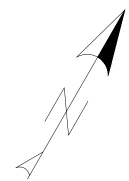
Steven Ashe, Emelia Hamilton

Date: 3-15-18 | Santa Clara University, Santa Clara, CA | Scale: 1:40



LEGEND

- CENTERLINE
- GUTTER
- FACE OF CURB
- BACK OF CURB
- PROPOSED STRIPING
- MEDIAN
- BOUNDARY
- LOT BOUNDARY
- PROPOSED BUILDING
- EXISTING FEATURES
- SIDEWALK
- CURB RAMP



Green Community Development at Delmas Ave & Santa Clara St.

Delmas Ave. Striping Plan

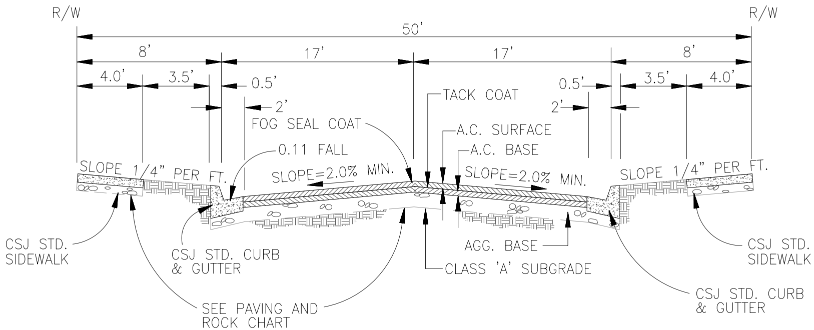
Sheet 4

Steven Ashe, Emelia Hamilton

Date: 4-3-18

Santa Clara University
Santa Clara, CA

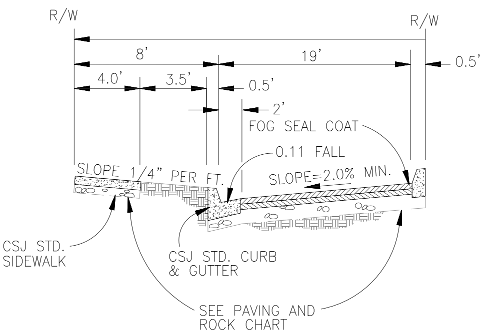
Scale: 1:40



SECTION A

(NTS)

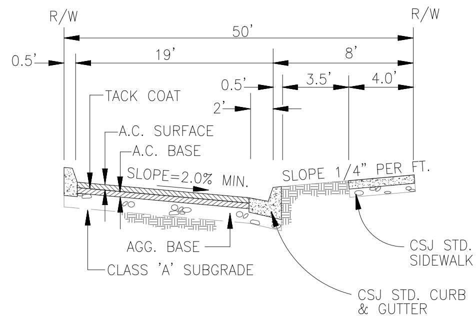
STA. 0+00.00 to 2+09.07
STA. 5+09.07 to 6+18.40



SECTION B

(NTS)

STA. 0+00.00 to 5+79.40 NB



SECTION C

(NTS)

STA. 2+09.07 to 5+09.07 SB

LEGEND

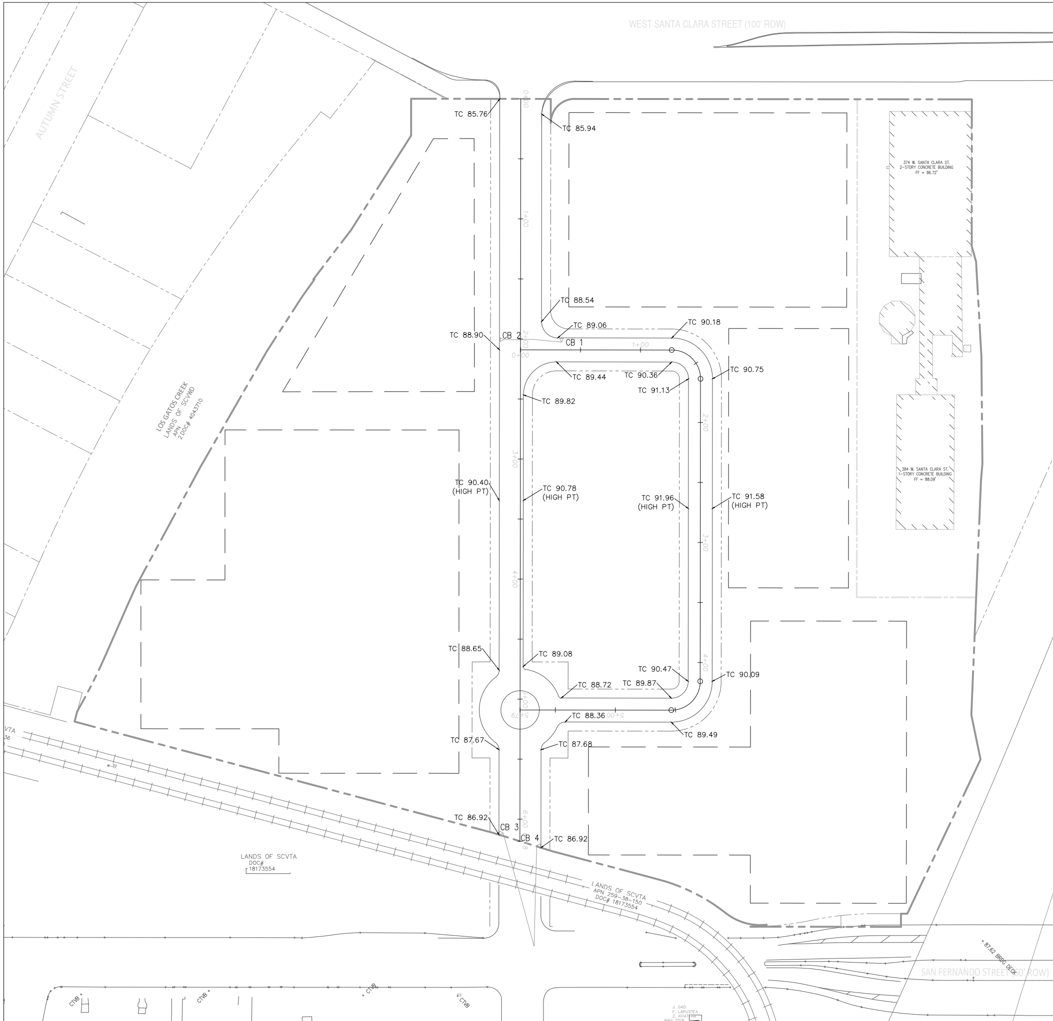
- CENTERLINE
- GUTTER
- FACE OF CURB
- BACK OF CURB
- PROPOSED STRIPING
- MEDIAN
- BOUNDARY
- LOT BOUNDARY
- PROPOSED BUILDING
- EXISTING FEATURES
- SIDEWALK
- CURB RAMP

Green Community Development at Delmas Ave & Santa Clara St.

Delmas Ave. Typical Sections | Sheet 5

Steven Ashe, Emelia Hamilton

Date: 4-3-18 | Santa Clara University Santa Clara, CA | Scale: 1:40



LEGEND

TOP OF CURB (TC)

PROPOSED ROW

BOUNDARY

LOT BOUNDARY

PROPOSED BUILDING

Green Community Development at Delmas Ave & Santa Clara St.

Delmas TC Elevations and Stations

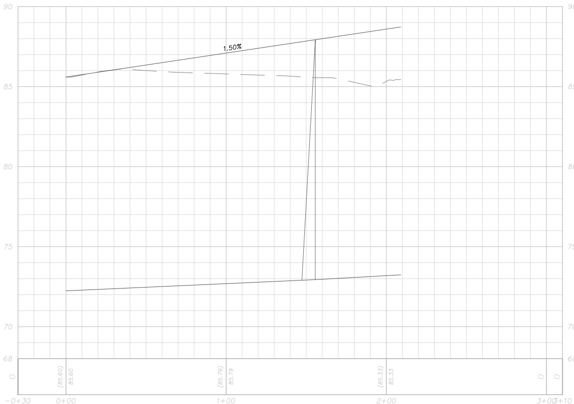
Sheet 6

Steven Ashe, Emelia Hamilton

Date: 4-17-18

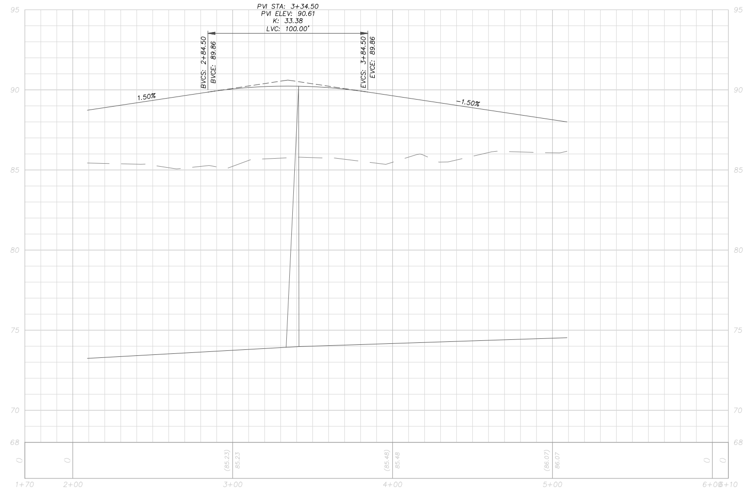
Santa Clara University
Santa Clara, CA

Scale: 1:40



PROFILE
1" = 30' HORIZ.
1" – 3' VERT.

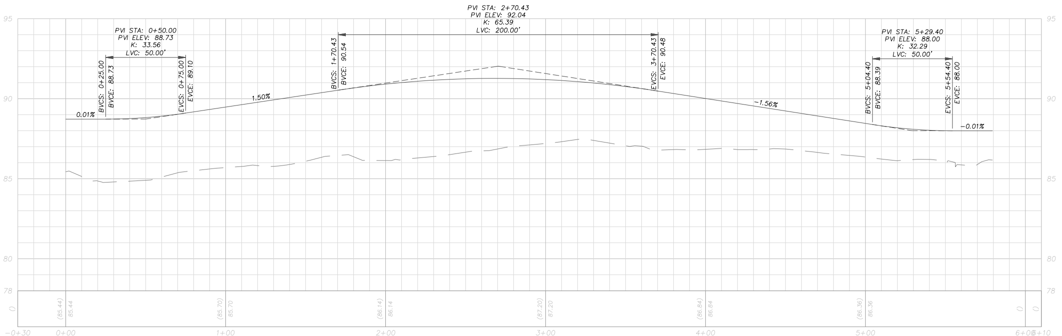
Delmas Ave – Sta. 0+00' to Sta. 2+09'



PROFILE
1" = 30' HORIZ.
1" – 3' VERT.

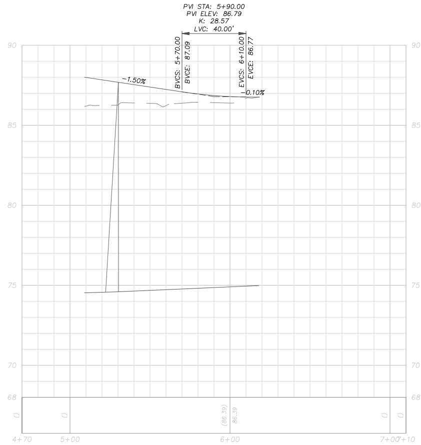
Delmas Ave SB – Sta. 2+09' to Sta. 5+09'

Green Community Development at Delmas Ave & Santa Clara St.		
Delmas Ave Profile Views		Sheet 7
Steven Ashe, Emelia Hamilton		
Date: 4-21-18	Santa Clara University Santa Clara, CA	Scale: 1"=30'



PROFILE
1" = 30' HORIZ.
1" - 3' VERT.

Delmas Ave NB – Sta. 0+00' to Sta. 5+79'



PROFILE
1" = 30' HORIZ.
1" - 3' VERT.

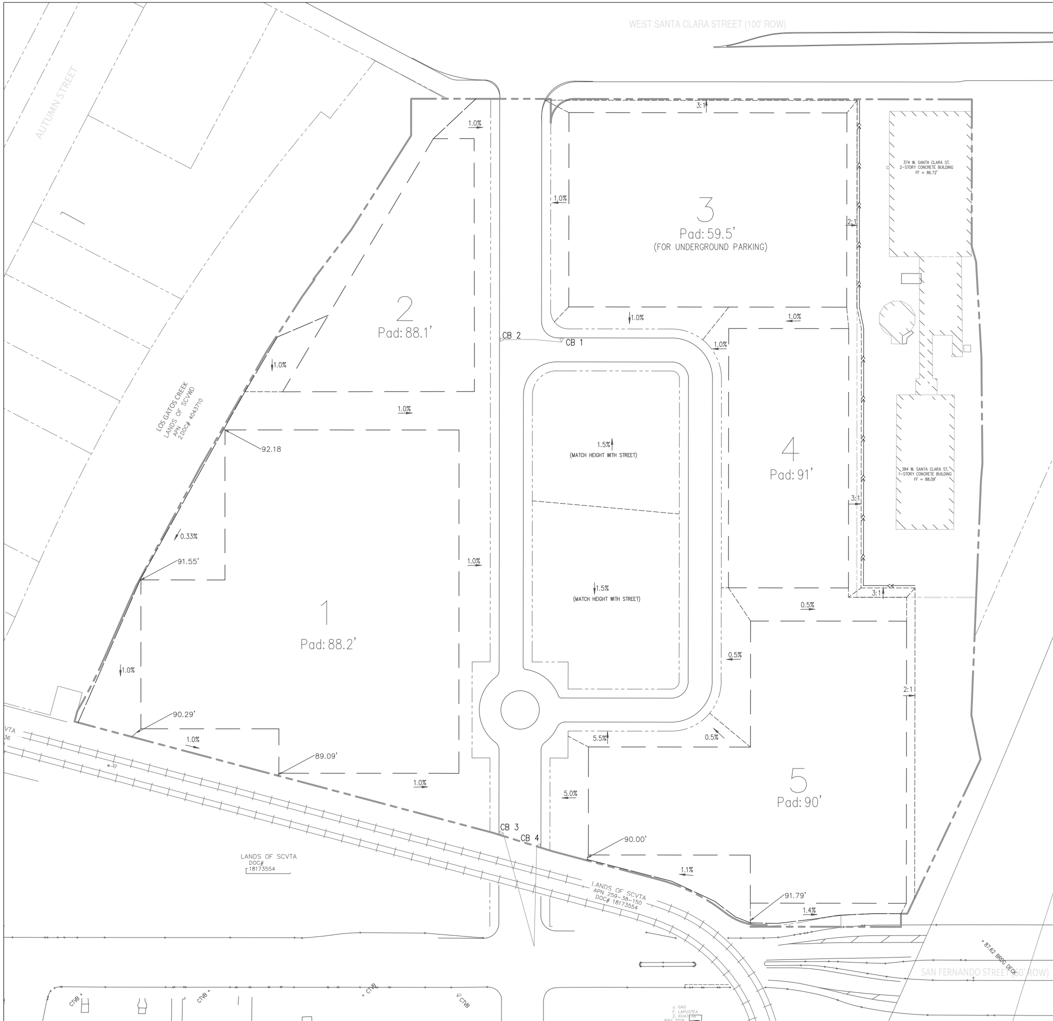
Delmas Ave – Sta. 5+09' to Sta. 6+18'

Green Community Development at Delmas Ave & Santa Clara St.

Delmas Ave Profile Views | Sheet 8

Steven Ashe, Emelia Hamilton

Date: 4-21-18 | Santa Clara University
Santa Clara, CA | Scale: 1"=30'



LEGEND

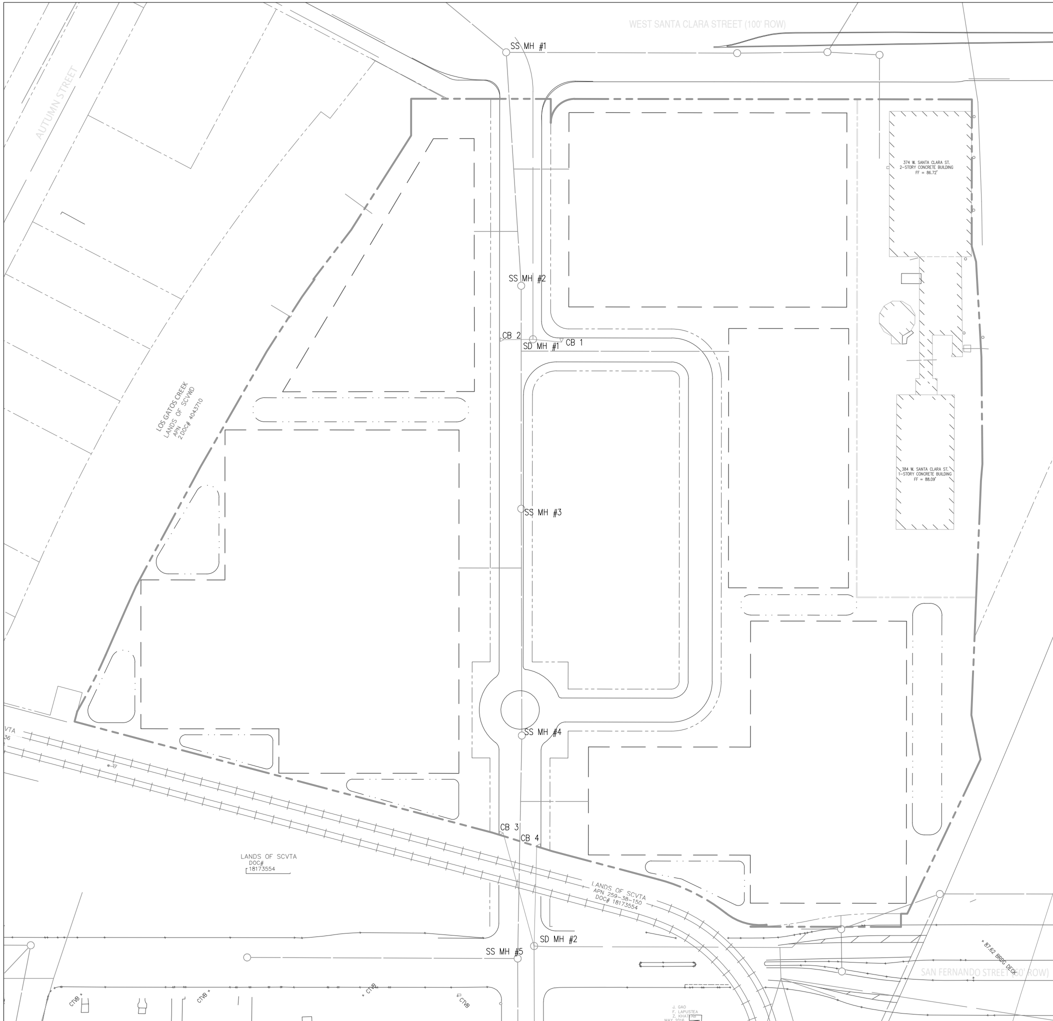
- TOP OF CURB (TC)
- PROPOSED ROW
- BOUNDARY
- LOT BOUNDARY
- PROPOSED BUILDING
- DRAINAGE DITCH
- GRADE BREAK/TOE OF SLOPE
- RETAINING WALL
- SLOPE AND DIRECTION OF FLOW — 1.0%

Green Community Development at Delmas Ave & Santa Clara St.

Rough Grading Plan	Sheet 9

Steven Ashe, Emelia Hamilton

Date: 4-21-18	Santa Clara University Santa Clara, CA	Scale: 1:40



LEGEND

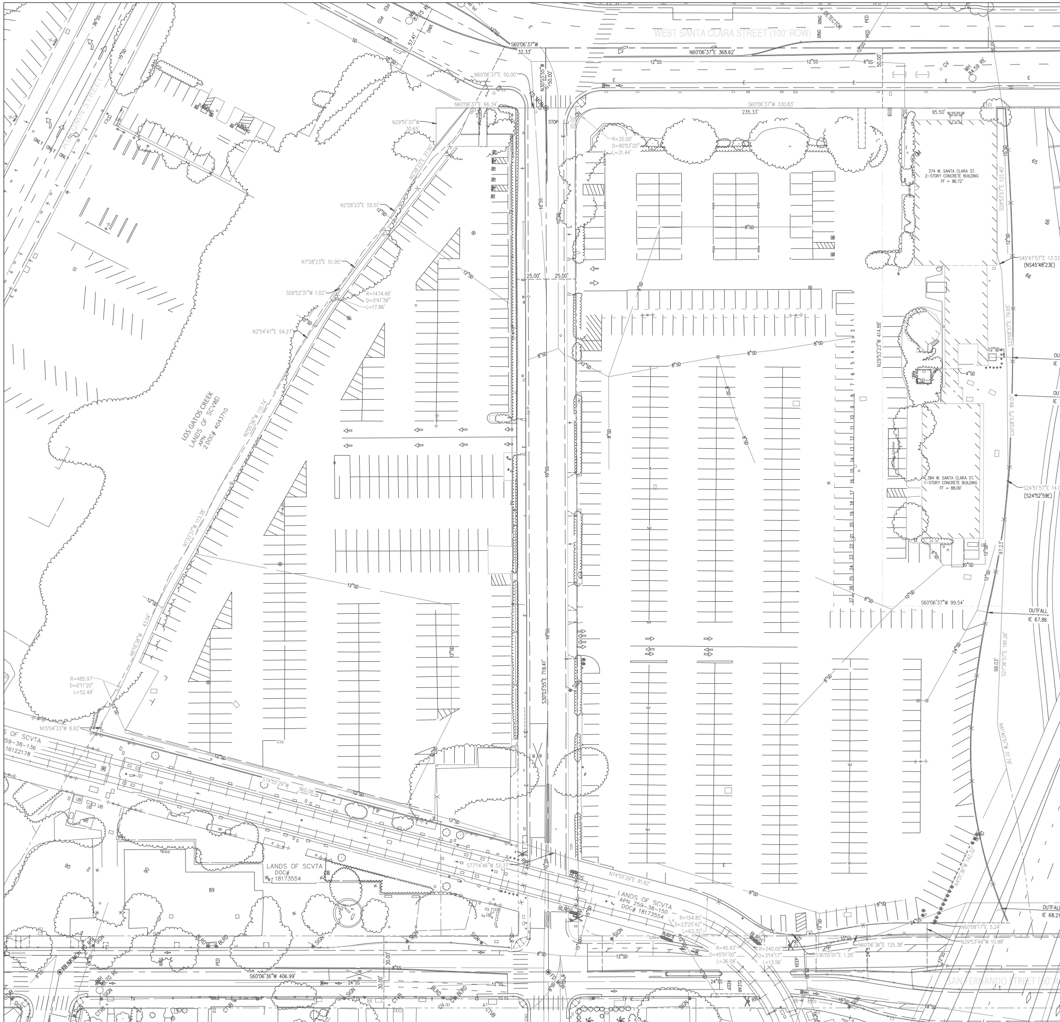
- TOP OF CURB (TC)
- PROPOSED ROW
- BOUNDARY
- LOT BOUNDARY
- PROPOSED BUILDING
- SS PIPE
- SD PIPE
- BIOSWALE
- MANHOLE

Green Community Development at Delmas Ave & Santa Clara St.

Sanitary and Storm Sewers, and Bioswales | Sheet 10

Steven Ashe, Emelia Hamilton

Date: 4-24-18 | Santa Clara University, Santa Clara, CA | Scale: 1:40



LEGEND

- CENTERLINE
- GUTTER
- CURB
- UTILITY
- STRIPING
- ROW
- BOUNDARY
- LOT BOUNDARY

Green Community Development at Delmas Ave & Santa Clara St.

Existing Conditions	Sheet 11

Steven Ashe, Emelia Hamilton

Date: 11-26-17		Scale: 1:40