Chapter 5: Landscaping

5.1 Introduction

Sustainable landscaping on university campuses is a growing trend in response to escalating environmental concerns. Sustainable landscaping comprises numerous practices that address environmental issues related to the design, construction, implementation, and management of landscapes on higher education campuses. In order to create an atmosphere for effective learning, campus landscaping should include an attractive environment that is suitable for the local climate and requires minimal inputs, such as fertilizer, water, labor, and associated resources such as energy and transportation of plants to campus. Taking into account all of these factors while planning campus landscaping can help universities become more environmentally friendly, make them more efficient with their financial resources and create an environment that encourages forward thinking.

Campus landscapes are a highly visible representation of Chapman’s relationship with nature and can therefore foster a biocentric ethic for sustainability. Native plant gardens can improve ecological and sustainable literacy on campus and make Chapman an environmental leader, inspiring the community around the University to also engage in environmentally sustainable practices. Just as Chapman has become involved in other social justice issues such as gender and race it should also take an interest in the environment. These types of landscapes have also proven to be not only good for the environment, but also attractive, easy to maintain, and healthier for the people who work around them as they do not require the application of chemical herbicides or fertilizers (Kermath, 2007). As stated in Orr’s book entitled, Ecological Literacy: Education and the Transition to a Postmodern World,

“…the way education occurs is as important as its content. Students taught environmental awareness in a setting that does not alter their relationship to basic life-support systems learn that it is sufficient to intellectualize, emote, or posture about such things without having to live differently” (97).

It is important to emphasize how the physical appearance of Chapman’s campus represents its relationship with nature and the contributions the University is making toward a more sustainable future. As a central location on campus, the Attallah Piazza (Figure 5.1) provides an example of the campus aesthetics and landscaping. Another way in which landscaping contributes to campus sustainability is through its impact on the energy consumption and cost in buildings. For example, if trees are planted close to buildings they can add an extra layer of insulation, saving on heating costs in the winter and cooling in the summer. As an institution striving to “provide personalized education of distinction that leads to inquiring, ethical and productive lives” (Chapman University, 2013) it is important that the University takes the next step to align itself with these already well-established principles.

The objectives of this chapter are to provide an overall assessment of the sustainability of existing landscaping features and practices. This will identify the aspects in which the University has already made progress in sustainability as well as those that are in most need of improvement for
future reference. This chapter will conclude by giving specific recommendations based on the initial findings.

5.1.1 A Southern California Comparable Campus: UC Irvine

A movement toward sustainable landscaping that is centered on native plants, reduced spending, and preserving local ecosystems has emerged as a holistic and environmentally sustainable alternative to conventional landscaping at universities all over the world. Some campuses in the Southern California region have already initiated sustainability programs in their campus design and landscaping that could act as models for a new sustainable landscaping plan at Chapman.

The University of California Irvine (UCI) has put into place what is called the Green and Gold Plan that “identifies ways to better manage existing campus landscape assets and provides direction for future development of landscaping that is environmentally suitable, more sustainable given natural and financial resource constraints, and that better addresses campus planning and design objectives” (The Regents of the University of California, 2008). Their goals are to create a landscape that is sustainable and will therefore conserve resources over the long term while providing functional value on campus to meet their design objectives.

UCI is able to accomplish these goals by incorporating native and exotic plants that are suitable to the climate, drought tolerant, and contribute to the overall campus design and aesthetics. They are still able to maintain themes throughout campus and maintain an overall campus design by using these more sustainable plants as well as the incorporation of hardscape to add personality. By maintaining campus aesthetics and incorporating native plants, UC Irvine serves as an example for future possibilities of sustainable landscaping at Chapman.

5.2 History of Landscaping at Chapman

5.2.1 Overview

Chapman University currently contracts with ValleyCrest Landscape Companies for all installation and maintenance of landscaping features on campus. This includes tree trimming and monitoring the health of all outdoor plants in order to maintain the classic historical feel of Chapman grounds.

Another important detail involving the landscaping at Chapman is that the school was recently ranked third in the nation by Newsweek Magazine in their 2012 college rankings for most beautiful schools (Newsweek/Daily Beast, 2012). It is therefore important to keep in mind throughout this chapter how important campus aesthetics is to the University and that it is a central part of the landscaping on campus.

5.2.2 Past accomplishments

Past initiatives on Chapman’s campus have contributed to the sustainability of landscaping at the University. There are currently a few areas on campus that are already using native plants as a part of the landscaping. Native plants were planted around the Fish Interfaith Center when it was built in 2004 (Figure 5.2). The mound grasses around the building contrast with the angular flat surfaces.
of the building, adding to the architecture of the building and requiring little maintenance by the University.

In 2006, Chapman replaced the grass athletic field with an artificial turf, which has resulted in water, fertilizer, and maintenance savings since then. This decision was made due to high traffic on the field because of the physical education classes, intramurals, club and University sport teams, and large events such as graduation (Chapman University, 2013).

During a 2011 remodel of Argyros Forum, native grasses were incorporated into the plans for the rooftop patio that is connected to the Marvin W. Meyer Faculty Athenaeum (Figure 5.3). The 1,918 square foot project was completed on December 12, 2011 using foam to fill planters to save weight. Although they only cover a small area these plant beds have the ability to reduce the overall heat absorption of the building, reducing energy consumption and cooling costs. Additionally, they help to reduce and slow the runoff from the building during rainfall events as the plant beds absorb and slow down the flow of water.

Most recently Cypress Street School (Figure 5.4), a historic school, was remodeled into The Early Human and Lifespan Development Research Facility. The official ribbon-cutting ceremony for the building was on March 19, 2013 and the area now incorporates native plants in the landscaping around the building (Chapman University, 2013).

Furthermore, there was once a native plant garden in front of the Hashinger Science Center that incorporated a variety of native species. This garden served as a learning opportunity for students and faculty on campus and as a forward step towards a more

![Figure 5.3. Argyros Forum rooftop garden boxes containing native grasses and plants.](image1)

![Figure 5.4. Native plants in front of the Cypress Street School.](image2)

![Figure 5.5. Landscape architect's sketch of the native plant garden, Hashinger Science Center. June 1, 2000.](image3)
sustainable campus. Although exact information on this garden is not available, it is believed to have existed for about 5 years from around 2000 to 2005 (Figure 5.5). The native garden was then removed as an eyesore and this area is now occupied by all white rosebushes (Figure 5.6), which require large amounts of water and maintenance to sustain their health and beauty and only bloom during the spring season.

5.3 Current Status of Landscaping at Chapman

The Master Landscaping Plan provides the landscaping framework for campus and is intended to “guide the University during the long-term build-out of the campus, while retaining and enhancing its landscape heritage” (Chapman University, 2004, p. 3). Therefore this document is influential over the future developments on campus and has the ultimate authority over decisions about Chapman’s campus.

Another prominent part of the Master Landscaping Plan is the Recommended Planet Pallette, which lists suggested species for trees, hedges, shrubs, and ground cover. Of the 46 species listed on the Recommended Plant Pallette, only 3 are native to California, Liquidambar styraciflua (Sweetgum), Prunus caroliniana (Carolina Cherry), and Quercus agrifolia (California Live Oak), leaving most of the plants as introduced or cultivated species. There are even 3 species listed, Hedera helix (English Ivy), vinca major (Periwinkle), and Schinus molle (Peruvian Peppertree) that are considered invasive or noxious species. This means that these species are considered to be weedy or invasive by the California Invasive Plant council (California Invasive Plant Council, 2006). By incorporating the requirements and suggestions in this document Chapman will be able to put together a plan for improvement of sustainability on its campus while maintaining the historical setting.

5.3.1 Watering

As a region that is classified as largely semi-arid to arid, limited water supplies are stretched to the limit particularly as the population of the area continues to grow. Because of these limitations of water supplies it becomes crucial to conserve these resources as much as possible by increasing water efficiency on campus. In addition, water costs have been rising in recent years, and are only expected to increase further in the future. See Chapter 10: Water for further details.

Watering of campus flora is done in rounds throughout the campus from 11PM to 4AM daily which minimizes water loss due to evaporation. Each section is watered for 2 rounds of 10 minutes for each section of campus except in summer, when lawns receive 3 rounds of 10 minutes because of the hotter weather. The planter boxes only receive 1 round of ten minutes of watering throughout the year. Although most of the campus is still on a sprinkler head system, ValleyCrest has started to convert to a drip system where it is most feasible, such as in planter boxes. As sprinkler heads break and require replacement an estimated 5% of the existing systems have been converted to drip watering. It would be useful to know the quantities of water consumed by the landscaping alone on campus, but because the water meters only provide bulk measurements in the various sections of campus it is impossible to differentiate between water used in the buildings and for the landscaping.
5.3.2 Plant Waste

All compostable plant waste from the University campus is taken to Agromin’s compost facility in Huntington Beach, CA and turned into mulch, which Chapman also purchases from Agrmin. In this way plant waste is sustainable as the services of Agromin are utilized to recycle plant waste back into the mulch that is used on campus. Even so, the Agromin compost facility is 14.1 miles from Chapman’s campus: because of this it is costly to transport the plant waste and the gas required for this transportation adds to greenhouse gas emissions. It is therefore important to be mindful of the landscaping waste produced on campus. If waste can be cut down enough to reduce the number of trips made to the Agromin compost facility, the environmental impact and landscaping costs can be greatly mitigated.

Seasonal Flower Replacement

In order to accent certain areas and features on campus Chapman University has incorporated flowering plants of varying seasonal colors that are changed 4 times a year (every 3 months). These colorful plants are strategically placed around campus in locations such as under the Schmid Gate entry to campus, around the statue of Charles C. Chapman (Figure 5.7), in front of the Chapman University sign on Memorial Lawn and more. While these flowers add to the aesthetic beauty of campus, they are expensive initially and require large quantities of fertilizer and water to maintain. Historically the cost has ranged from $12 to $30 for a flat, depending on the season and type of flowers selected by campus designers. 350 flats are purchased each time the flowers are replaced, so between $16,800 and $42,000 is spent annually to provide 4 different varieties of flowers on campus. Additionally their seasonal removal after their flowering season generates large volumes of plant waste.

Memorial Lawn Sod Replacement

The centrally-located Memorial Lawn (Figure 5.8) receives high amounts of traffic on a daily basis and is also host to many annual University events. Because of this the turf requires frequent replacement in order to meet the standard of campus character established by the campus Master Landscape Plan, which can become expensive at $1 per square foot for the sod plus labor. This 19,263 square foot area has to be almost completely redone twice a year after both the American Celebration fundraiser and the May commencement ceremonies held on the field. Just to maintain the lawn for one year the entire lawn needs to be replaced twice a year, costing the University $38,526 not including labor. Included in that maintenance are the applications of herbicide, fertilizer, and water. Although the quantity and price of water is hard to calculate due to the combined metering of landscaping and buildings around memorial lawn, according to ValleyCrest employees 40 gallons of herbicide and 200 pounds of fertilizer are used annually (Contreras & Cotroneo, 2013). This adds up to $1,880 spent a year on herbicide and fertilizer bringing the maintenance of the field a total of $40,406, again, not
including any of the labor required. Additionally, small portions of Memorial Lawn also require new sod periodically throughout the year due to heavy traffic, construction on campus, and other smaller events such as orientation, and those hosted by student organizations. This high turnover rate implies a large amount of green waste generated by Memorial Lawn every year and large amounts of money spent on maintenance of the area.

5.3.3 Herbicide, Fertilizer, Insecticide

In order to maintain pristine lawns without encroaching weeds herbicides are applied to the landscaped areas on campus every 6 months. As mentioned earlier in this chapter, slow-release fertilizers are also applied twice a year to ensure green lawns and healthy landscaping on campus. The nitrogen-phosphorous-potassium proportions in the fertilizer are 21-0-0 in the fall, 39-0-0 in the winter and 16-6-8 in the summer, respectively, changing to accommodate the needs of the plants throughout the season. The use of these chemical products can have adverse effects on the surrounding environment by finding their way into the runoff water and getting tracked around on the bottoms of shoes by pedestrians. Quantities used on campus as a whole and their cost are kept record of by the facilities department, but these numbers were not readily available for this study. There is currently no use of insecticides on campus.

5.3.4 Landscaping Equipment

Landscaping on the Chapman campus is trimmed and maintained everyday as well as cleaned by blowing away the leaf litter that accumulates on campus. All of the landscaping equipment used by ValleyCrest (mowers, trimmers, edgers, etc.) is gas-powered except for electric leaf blowers which were introduced to campus in 2012 and run on rechargeable batteries. Plants are transported to campus via gas-powered flatbed trucks from various nurseries in and around the city of Orange and Huntington Beach, California. In addition, all of the vehicles used by ValleyCrest employees to navigate campus are electric.

5.3.5 Campus Layout

The concrete used at Chapman in between the landscaped portions is relatively porous and therefore allows any rainwater or excess sprinkler water that does not run off to filter through and eventually replenish groundwater supplies. Also, there are no tarps underneath the landscaping features so water that sinks below the surface is also able to filter through the ground to the water table.

Placing large plants and trees on the south and west perimeters of buildings can help to provide shading in the hot summer months and save energy costs (Cummins, 2011). Although there have been no official plans of the campus design to incorporate the use of tall plants as a weather buffer for buildings, there are trees on campus that offer protection from the summer sun. Trees to the west of Hashinger Science Center, south and west of Waltmar Theater, and south of DeMille Hall (Figure 5.9) all shade the respective buildings and keep them cooler in the hottest months of the year.

5.3.6 2013 Chapman Environmental Audit Survey Results
It is important to take into account the opinions of the students on campus when assessing sustainability and looking into future improvements. In a survey conducted for the purpose of this audit, 55.3% of 997 respondents somewhat or strongly disagreed with the statement “Maintaining lawns and aesthetic plants is an important use of resources at Chapman” (Figure 5.10). Therefore, there is little support for the University spending large amounts of time, effort and money on maintaining lawns and flowers that also have a high environmental impact.

This is especially true when 62.5% of Chapman student participants responded that they “would support the use of native plants on campus to save water and fertilizer even if it meant reducing the number of seasonal flowering plants on campus” and 25.2% of participants were neutral on the subject (Figure 5.11). Even more convincingly, 80.5% of respondents confirmed that they would “be more supportive of plants on campus if it were possible to plant a variety of native species that flowered at different times of the year…” and 18.5% were neutral leaving only 1.0% opposed (Figure 5.12).

If native plants were planted on campus they would require minimal maintenance and could reduce water and fertilizer use of campus significantly. In the past the incorporation of native plants on campus has been turned down because native species do not flower frequently enough. Would you support the use of native plants on campus to save water and fertilizer even if it meant reducing the amount of seasonal time that the plants on campus are flowering?

Would you be more supportive of native plants on campus if it were possible to plant a variety of native species that flowered at different times of the year to ensure that we always have some flowers on campus?

5.4 Concluding Assessment

5.4.1 Areas of progress

Chapman landscaping has already initiated the process of switching out old watering systems with drip systems as they need to be replaced, which can help with more efficient watering and therefore less wasted water. Also, watering during the night hours can help to reduce evaporation of water and ensure that the water being put on the landscaping initially is actually used by the plants. Another area where Chapman is already sustainable is in the recycling of their plant waste into mulch. Additionally, the use of electric appliances where possible and switching to electric power more frequently as the equipment needs replacement is an area of positive change on campus.
5.4.2 Areas in which to improve

The largest areas that could use improvement are in water use and waste production. Although previous changes have already been implemented, there is much more that can be done. The frequent replacement of plants with high water needs generates a high water demand in the landscaping, creates a cycle of creating plant waste, and is a costly endeavor for the University.

The areas on campus that produce the most excessive waste are the seasonal flower beds and Memorial Lawn. These areas have high rates of replacement and therefore generate large amounts of green waste. In order to reduce this waste production on campus native plants can be used which have much longer life spans because they are acclimated to the climate of Southern California. Additionally, Memorial Lawn is an ideal candidate for the installation of artificial turf because it is an area of high traffic, having detrimental effects on the health of the turf. See Section 5.5 for more details on these suggested improvements.

5.4.3 Existing gaps in knowledge

Because this is the first time that an environmental audit has been performed at Chapman University, data is not always readily available. Many of the departments on campus operate separately and keep separate records of their projects. Therefore, it is difficult to analyze and acquire all of the data needed to perform an environmental audit when it is so scattered, unavailable, or undocumented. In the future, it would beneficial to keep detailed records of campus endeavors, especially when hiring contracted work in order to accurately account for past actions and develop a plan for the future.

Specifically, keeping track of the species of plants used on campus is essential to analyzing the ecological impact of the campus landscaping. Though there is a general sense of recommended plants in the Master Landscaping Plan, there are currently no official records kept by ValleyCrest itemizing the species present on campus or where they are located. Knowing every species present on campus would be possible to account for their water, fertilizer, and labor needs, and in turn find the most efficient ways to improve landscaping sustainability. Lastly, organizing the meters on campus so that it is possible to discern how much water is being used only by the landscaping would aid in impact assessment. If it is not possible to track the use of water on campus specifically by the landscaping features, it is unfeasible to designate areas for positive change. The same concept applies with fertilizer and herbicide used. Clear records have not been kept by ValleyCrest in terms of the amount of products used throughout campus; accordingly, their expenses incurred and environmental impacts are unclear.

5.5 Recommendations

5.5.1 Low cost/effort

- Reduce the number of times per year that the seasonal color flowers are changed
- Stop or reduce herbicide use

Changes which are easy to make in Chapman’s landscaping plan will save money and improve the sustainability of the campus gradually. The first suggestion is to reduce the number of times a year that the seasonal color flowers are changed throughout the campus. By only planting 3 varieties of flowers a year, Chapman will reduce the cost
and plant waste produced by the flower beds on campus, by 25% and maintain the floral accents. This change will also improve sustainability by eliminating trips to the Agromin compost facility. The second easy recommendation is to stop or reduce the use of herbicide use on campus. This would mean that natural weeds and flowers would start to grow in the lawns, slightly changing the look of the lawns (Figure 5.13). On the other hand, this change would reduce the harmful chemical added to the runoff water from Chapman’s campus and reduce landscaping costs.

5.5.2 Moderate cost/effort

- Incorporate plants that flower during different seasons into the permanent landscaping plan

One major downfall of the landscaping at Chapman is the excessive replacement of flowering plants that are still alive with those of a different color. With some forethought, it is possible to incorporate plants that flower during different seasons into the permanent landscaping plan so that the colors change seasonally without having to remove and replant the areas of focus every 3 months. This sustainability initiative includes the further incorporation of the use of native plants as a more permanent part of the campus design for providing color. Once established, plants that are native to Southern California will need only minimal upkeep as they are naturally accustomed to the climate and soil in this region.

Master Landscaping Plan: Recommended Plant Palette

- Eliminate invasive species that are listed as part of the recommended plant palette
- Incorporate more native species into the master plan

In order to minimize resource consumption on campus and have the greatest long-term effect sustainability should be incorporated into the Master Landscaping Plan. The goals of campus landscaping should be not only to maintain an aesthetically beautiful and historical campus, but also to uphold Chapman’s moral obligations to future generations by incorporating sustainability methods into campus planning.

This should include the elimination of the invasive species that are listed as part of the recommended plant palette: *Hedera helix* (English Ivy), *Vinca major* (Periwinkle), and *Schinus molle* (Peruvian Peppertree). In addition the incorporation of more native species into the master plan would ensure the incorporation of sustainability practices in landscaping on campus in future projects. One native species that should be added to the Master Landscape Plan is *Arctostaphylos manzanita*, commonly known as Manzanita (Figure 5.14). This plant requires minimal water and flowers once a year which can add color to the campus and can easily be incorporated as manicured hedges or as shrubbery to fit into the refined aesthetic on campus.

Native Plant Gardens

- Initiate native gardens featuring plants of varying flowering seasons
Native plant garden can reduce the environmental impact of the campus landscape and if strategically placed, species can even be intermixed with others of different flowering seasons to provide year-round color. Also, by incorporating plants of different forms, the areas can be structurally diverse including a mixture of trees, shrubs and low-lying plants. In a project researched by Dr. Jennifer Funk in 2009, a number of different native species have been suggested taking into account their flowering time, life form, size, and price (Appendix 5.8.1).

This native plant landscaping scheme should first be implemented in areas that are currently being occupied by grass fillers. An ideal location would be the area just south of Memorial Hall and west of Doti Hall. Currently, the area contains 9 palm trees with grass filling the space in between them. This space could be exchanged for native riparian plants as a trial to reduce water, labor, fertilizer, and herbicide use and costs. Riparian species would have the most success in this area because it is shaded for much of the day. There are many native fern species that could provide a beautiful landscape in this space and could be showcased as a native plant area.

Secondly, flowering native species that grow close to the ground should replace some of the flower beds that are in less central areas in order to reduce costs on the replacement of seasonally changed flowers. These native species could be selected by their flowering season and be planted with a variety of species that have different flowering times so that there are always flowers present.

Native plants should be planted where the seasonal flowers currently are in the open space north of Memorial Hall and west of Roosevelt Hall and along Glassell Street in front of Beckman Hall to replace the flowers under the sign for the Argyros School of Business and Economics (Figure 5.15). To make a statement about sustainability on campus and emphasize the educational benefits of native plants, a native plant display could even be added in more central places at Chapman like under the Schmid Gate which reads, “Let all who depart use their knowledge in the pursuit of truth”, with a placard describing the plants and their purpose on Chapman campus. From there further decisions can be made as to how to move forward with the incorporation of native plants into the landscaping at Chapman. In the future Chapman can hopefully establish a native plant garden that incorporates a variety of flowering plants to add to the aesthetic beauty of the area and to maintain interest from the student body.

5.5.3 High cost/effort

Memorial Lawn Case study

- Convert Memorial Lawn to artificial turf

A more challenging and long-term investment toward the sustainability of landscaping at Chapman University is the conversion of Memorial Lawn to artificial turf. As it stands, Memorial Lawn is too trampled over the course of year due to heavy foot traffic and bi-annual large events that smother the majority of the grass there. It is a waste of resources to keep replacing it over and over, knowing that it will only be a continuous cycle and not finding a longer-lasting solution.

Although artificial turf has a higher initial cost, it is a worthwhile investment because the product is guaranteed for the first 8 years by the most common brand of artificial turf, Tiger Turf.
Even so, artificial lawns have been proven to last between 12 and 20 years, averaging around 15 years (Kroen, 2009). Therefore when compared to the current 6 month lifespan of Memorial Lawn artificial turf could last 40 times longer. Additionally, once installed, the artificial turf will require minimal maintenance, only the occasional sweeping and addition of rubber fill when the blades become flattened.

As established earlier in the chapter, the maintenance of the field adds up to a total of $40,406 annually not including labor, water, the patching of small areas that occurs from time to time or irrigation maintenance costs. In fact, irrigation on Memorial Lawn has caused complications in trying to keep the entire lawn green all year long. Because of the uneven surface of the turf, the middle of the lawn never receives as much water as the outer edges, creating discrepancies in the turf health and quality. Over a period of 15 years turf replacement, fertilizer and herbicide costs alone add up to $606,090.

In comparison INSTALL-IT-DIRECT has placed a bid of $128,122 for the installation and the associated labor (Appendix 5.8.2). Installing artificial turf on Memorial Lawn would also qualify Chapman for the Turf Removal Program through the Municipal Water District of Orange County and the Metropolitan Water District of Southern California (Municipal Water District of Orange County). The program was initiated to encourage water conservation throughout the city and rewards the removal of turf areas with $1 per square foot rebate, totaling $19,263. The overall maintenance is much lower for artificial turf, requiring only occasional sweeping and the one-time replenishing of the rubber fill at half of the initial installation cost, $64,061, bringing the total over 15 years to $172,920. This is only 28.5% of the cost of turf replacement, herbicide and fertilizer on Memorial Lawn alone saving a total of $433,170 over the 15 year period.

Lastly, as a part of the 2013 Chapman Environmental Audit Survey, 977 students were asked whether or not they would be supportive of the conversion of Memorial Lawn to artificial turf. 25.3% of respondents responded positively and 31.8% were neutral on the subject.

5.5.4 Future areas of research

Future research about the landscaping at Chapman should look into the individual plant species at Chapman once more data is available to work with. These studies should look into the plants or areas on campus that consume the most resources and find aesthetically comparable species that are either native or drought tolerant. This research could help give a solid assessment of the consumption of resources by the plants on campus and the easiest ways to improve Chapman University’s ecological impact.

5.6 Contacts

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5.7 References
5.8 Appendices

5.8.1 Native Garden Suggestion

Table 5.1. Native plant species suggestions for Chapman University for 500 ft² area by Dr. Jennifer Funk, 2009. Notes: This landscaping plan meets several objectives, including (1) native vegetation, (2) low water consumption, (3) provide year-round color (e.g., species chosen with different flowering times), and (4) structural diversity (a mix of tall trees, mid-size shrubs and low-lying herbaceous plants).

<table>
<thead>
<tr>
<th>Species</th>
<th>Life form</th>
<th>Flowering time</th>
<th>Number/500 ft²</th>
<th>Size</th>
<th>Price</th>
<th>Total price</th>
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<td>3.80</td>
<td>11.40</td>
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<td>1 gallon</td>
<td>4.10</td>
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<td>3.80</td>
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<td>4.10</td>
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<td>1 gallon</td>
<td>3.45</td>
<td>10.35</td>
</tr>
<tr>
<td><em>Trichostema lanatum</em></td>
<td>Shrub</td>
<td>April-November</td>
<td>3</td>
<td>1 gallon</td>
<td>5.45</td>
<td>10.90</td>
</tr>
<tr>
<td><em>Verbena lilacina</em></td>
<td>Shrub</td>
<td>August-October</td>
<td>3</td>
<td>1 gallon</td>
<td>3.80</td>
<td>11.40</td>
</tr>
<tr>
<td><em>Dichelostemma capitatum</em></td>
<td>Herb</td>
<td>March</td>
<td>5</td>
<td>4&quot; pots</td>
<td>3.00</td>
<td>15.00</td>
</tr>
<tr>
<td><em>Epilobium canum</em></td>
<td>Herb</td>
<td>August</td>
<td>5</td>
<td>1 gallon</td>
<td>3.80</td>
<td>19.00</td>
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<tr>
<td><em>Hunnemannia fumariifolia</em></td>
<td>Herb</td>
<td>April-September</td>
<td>5</td>
<td>1 gallon</td>
<td>4.55</td>
<td>22.75</td>
</tr>
<tr>
<td><strong>Wildflower seed mix</strong></td>
<td></td>
<td></td>
<td></td>
<td>3 oz seed mix</td>
<td>4.15</td>
<td>4.15</td>
</tr>
<tr>
<td><em>Eschscholzia californica</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
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</tr>
<tr>
<td><em>Achillea millefolium</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Phacelia campanularia</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
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</tr>
<tr>
<td><em>Lupinus bicolor</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
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</tr>
<tr>
<td><em>Clarkia unguiculata</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
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<tr>
<td><em>Eriophyllum confertiflorum</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Nemophila menziesii</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Baileya multiradiata</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gilia capitata</em></td>
<td>Herb</td>
<td>March-June</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

| Plant Cost | $252.90 |
| Labor estimate | $600.00 |
| Total cost  | $804.60 |
5.8.2 Memorial Lawn Artificial Turf Quote

### Estimate

**CUSTOMER:**

333 Glassell Street, Orange, CA.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>INVESTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove grass, grade dirt, compact sand and install 19,263 square feet of Sierra or Everglade Fescue Light</td>
<td>$165,750.00</td>
</tr>
</tbody>
</table>

**OTHER COMMENTS**

Hi Kellie...I reviewed the install location at the college twice, and I pushed to give you the lowest possible price and I included every discount that we offer. After reviewing the bid...call me with any questions that you might have. [the synthetic turf that I selected has the specific qualities that the location will require...the blades have a "W" shape with spines at every angle...this will allow the turf to spring back up as the grass gets walked on. We also use green sand instead of the black rubber that heats up the grass and sticks to everything!] The lawn area will look amazing as the turf I selected looks "very natural". Best Regards...Jeff

| SUBTOTAL | $165,750.00 |
| 20% Discount | $33,150.00 |
| Cash/Check Discount | |
| Referral Discount | $3,978.00 |
| Avail. Dates Offer(500-999 Pavers) | $0.00 |
| Avail. Dates Offer(1000+ Pavers) | $500.00 |
| **INVESTMENT** | **$128,122.00** |

Make all checks payable to:

INSTALL-IT-DIRECT, INC.

This is not a contract. INSTALL-IT-DIRECT reserves the right to withdraw this estimate at any time.

Should you choose to accept this estimate, please sign below and return via email or fax (858-270-0788) A formal contract will be sent.

If you have any questions about this estimate, please contact your design consultant or our office at 858-925-3000

Thank You For Your Consideration and We Look Forward To Working With You!

Accepted: ___________________ Date: 4/10/2013

INSTALL-IT-DIRECT, INC. | 5580 La Jolla Blvd. #188 La Jolla, Ca 92037

Office: 858-925-3000 | Fax: 858-270-0788

www.installitdirect.com