WELO LANDSCAPE DOCUMENT PACKAGE

Community Development • Planning & Building
2263 Santa Clara Ave., Rm. 190 Alameda, CA 94501-4477
510.747.6805 • TDD: 510.522.7538 • alamedaca.gov

On July 7, 2016, the City enacted the Water Efficient Landscape Ordinance (WELO) to bring the Alameda Municipal Code in compliance with the State of California's recently adopted Model WELO. WELO requires documentation from applicant/developers and landscape professionals regarding the water efficiency of proposed landscaped areas. The City's WELO requires the applicant/developer of qualified projects submit a complete Landscape Document Package prior to Design Review or Building Permit issuance.

This Landscape Document Package provides checklists of the required content of each individual component. Upon approval, projects will be required to comply with the City's Standard Landscaping Conditions of Approval. Applicant/developers will be required to submit a Certificate of Completion after the installation of project landscaping.

Qualified Projects Table:

Use this table to determine what forms are required based on the aggregate size of new or refurbished landscape areas.

New Landscaping - Total Area	**Required Form(s)**
0 - 500 square feet	None, project not subject to WELO.
501 - 2,499 square feet	Forms (1) through (5) and Appendix A; or Appendix B*
2,500 square feet or Greater	Forms (1) through (5) and Appendix A
Refurbished Landscaping- Total Area	**Required Form(s)**
0 - 2,499 square feet	None, project not subject to WELO.
2,500 square feet or Greater	Forms (1) through (5) and Appendix A

*Qualified projects with new landscaped areas in aggregate greater than 500 square feet but less than 2,500 square feet are eligible to submit the Prescriptive Option Form (Appendix B) in lieu of a Landscape Document Package. Projects opting to submit the Prescriptive Option Form (Appendix B) will be subject to the Standard Prescriptive Option Conditions of Approval (Appendix C).

Forms Contained in this Package:

Page

1) Landscape Document Package Checklist 1
2) Water Efficient Landscape Worksheet 2
3) Soil Management Report Checklist 3
4) Landscape Design Plan Checklist 4
5) Irrigation Design Plan Checklist 5

Appendix A – Certificate of Completion

Appendix B – Prescriptive Compliance Option Form and Standard Conditions of Approval

Appendix C – Standard Landscaping Conditions of Approval for Projects Over 2,500 sf

FORM (1) – COVER FORM AND SUBMITTAL CHECKLIST

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Project Address: 1245 McKay Ave, Alameda, CA **APN:** 74-1305-26-2

Property Owner(s): Alameda Point Collaborative - Doug Biggs, Executive Director

Address: 677 W Ranger Ave City: Alameda State: CA Zip: 94501

Email: dbiggs@apcollaborative.or Phone: 510-898-7849 (mobile):

Applicant(s): *(if different from owner)* Equity Community Builders - Tracy Hanna, Project Manager

Address: 38 Keyes Ave, Ste 201 City: San Francisco State: CA Zip: 94129

Email: tracy@ecbsf.com Phone: 510-265-4539 (mobile):

Project Information

Date Prepared: 9/4/2020 Project Type: Non-Residential

Total Landscape Area: 53,871 Sq. Ft. Water Supply Type: Potable

Submittal Checklist

1) Water Efficient Landscape Worksheet
   a) Hydrozone Information Table x
   b) Water Budget Calculations
      i) Maximum Applied Water Allowance (MAWA) x
      ii) Estimated Total Water Use (ETWU) x
2) Soil Management Report x
3) Landscape Design Plan x
4) Irrigation Design Plan x

Preparer of Landscape Plans: I agree to comply with the requirements of the Water Efficient Landscape Ordinance and submit a complete Landscape Document Package

X _____ 9/4/2020

Preparer(s) of Landscape Plans Signature Required Date

FORM (2) WATER EFFICIENT LANDSCAPE WORKSHEET

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FOR CALCULATIONS, REFER TO WELO CHART ON SHEET L7.02.

City of Alameda Reference Evapotranspiration (ETo) 41.8

Hydrozone # /Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (sq, ft,)	ETAF x Area	Estimated Total Water Use (ETWU)[e]
Regular Landscape Areas							
				Totals	(A)	(B)	
Special Landscape Areas							
				1			
				1			
				1			
				Totals	(C)	(D)	
						ETWU Total	
						Maximum Allowed Water Allowance (MAWA)[e]	

[a] ***Hydrozone #/Planting Description***
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

[b] ***Irrigation Method***
overhead spray or drip
or drip

[c] ***Irrigation Efficiency***
0.75 for spray head
0.81 for drip

[d] ***ETWU* (Annual Gallons Required) =**
Eto x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

[e] ***MAWA (Annual Gallons Allowed) =***
(Eto) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations
All Landscape Areas

Total ETAF x Area	(B+D)
Total Area	(A+C)
Sitewide ETAF	**(B+D) ÷ (A+C)**

Regular Landscape Area

Total ETAF x Area	(B)
Total Area	(A)
Sitewide ETAF	**B ÷ A**

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas and 0.45 or below for non-residential areas.

FORM (3) SOIL MANAGEMENT REPORT CHECKLIST

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Project Address/APN: 1245 McKay Ave, Alameda, CA/74-1305-26-2 **Date Prepared:** 09/04/2020

Submittal Checklist

1) Soil Sample Lab Report SEE ATTACHED SOILS REPORT

   a) Soil Sampling Conducted at Appropriate Depth for the Intended Plants x

   b) Soil Analysis:

      1. Soil Texture x
      2. Infiltration Rate x
      3. pH x
      4. Total Soluble Salts x
      5. Percent Organic Matter x
      6. Recommendations x

   c) Multiple Landscape Installations (Subdivision):

      a. Sample at Minimum 15% of Lots: NA

2) Soil Management Report Submittal (Select One Below) SEE ATTACHED SOILS RECOMMENDATIONS

   No Significant Mass Grading Planned x
   (Submit Soil Management Report with Landscape Document Package)

I verify that the Soil Management Report was provided to person(s) preparing the Landscaping Design Plan.

X _____ 09/04/2020
Preparer(s) of Landscape Plans Signature Required Date

   Significant Mass Grading Planned ..... NA
   (Submit Soil Management Report with Certificate of Completion)

I verify that a Soil Management Report will be prepared and submitted to the City along with the Certificate of Completion.

X _____ _____
Preparer(s) of Landscape Plans Signature Required Date

FORM (4) LANDSCAPE DESIGN PLAN CHECKLIST

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Project Address/APN: 1245 McKay Ave, Alameda, CA/74-1305-26-2 **Date Prepared:** 09/04/2020

Submittal Checklist

1) Hydrozone SEE ATTACHED HYDROZONE PLAN
   a) Delineate and Label Each Hydrozone by Number, Letter, or Other Method X
   b) Identify Each Hydrozone as Low, Moderate, High Water, or Mixed Water Use X
2) Identify on Plans: SEE ATTACHED PLANTING PLAN
   a. Recreational Areas ..... NA
   b. Areas Permanently and Solely Dedicated to Edible Plants ..... NA
   c. Areas Irrigated with Recycled Water ..... NA
   d. Type of Mulch and Application Depth X
   e. Soil Amendments, Type, and Quantity X
   f. Type and Surface Area of Water Features ..... NA
   g. Location of Hardscapes (Pervious and Non-Pervious x
   h. Applicable Rain Harvest or Catchment Technologies ..... NA
      i. 24-Hour Capacities ..... NA
   i. Graywater Systems (if applicable)
      i. Discharge Piping ..... NA
      ii. System Components ..... NA
      iii. Area(s) of Distribution ..... NA
3) Stormwater Requirements Checklist (C3) SEE ATTACHED C6.0 x
4) The following statement shall be printed on the front page of the Landscape Design Plan along with the signature of person(s) authorized to prepare the Landscape Design Plan:

I have complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the Landscape Design Plan

X _____ 09/04/2020

Preparer(s) of Landscape Plans Signature Required Date

FORM (5) IRRIGATION DESIGN PLAN CHECKLIST

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Project Address/APN: 1245 McKay Ave, Alameda, CA/74-1305-26-2 **Date Prepared:** 09/04/2020

Submittal Checklist

1) Location of Separate Water Meters for Landscaped Areas	TBD
2) Location, Type and Size of all System Components:	
a. Controllers	x
b. Main and Lateral Lines	X
c. Valves	X
d. Sprinkler Heads	X
e. Moisture Sensing Devices	N/A
f. Rain Switches	X
g. Quick Couplers	X
h. Pressure Regulators	N/A
i. Backflow Prevention Devices	x
3) For Each Station: INCLUDED IN HYDROZONE INFORMATION TABLE.	
a. Flow Rate (gallons per minute)	X
b. Application Rate (inches per hour)	X
c. Design Operating Pressure (pressure per square inch)	X
4) Location of Recycled Water Irrigation Systems	N/A

The following statement shall be printed on the front page of the Irrigation Design Plan along with the signature of person(s) authorized to design the landscaping plan:

I have complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the Irrigation Design Plan

X _____ 09/04/2020

Preparer(s) of Landscape Plans Signature Required Date

APPENDIX A – CERTIFICATE OF COMPLETION

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Project Address: _____ **APN:** _____

Property Owner(s): _____

Address: _____ City: _____ State: _____ Zip: _____

Email: _____ Phone: _____ (mobile): _____

Applicant(s): *(if different from owner)* _____

Address: _____ City: _____ State: _____ Zip: _____

Email: _____ Phone: _____ (mobile): _____

I certify that the landscape project has been installed per the approved Landscape Documentation Package (Must be signed by either preparer of the Landscape Design Plan, Irrigation Design Plan, or the Licensed Landscape Contractor

X _____ _____
Signature Date

Project Information

Date Prepared: _____ Project Type: _____

Total Landscape Area: _____ Sq. Ft. Water Supply Type: _____

Submittal Checklist

1) "As-Built" or Record Drawings that Reflect Significant Changes ☐
2) Irrigation Scheduling Parameters Used to set the Controller ☐
3) Landscape and Irrigation Maintenance Schedule ☐
4) Irrigation Audit Report ☐
5) Soil Analysis Report ☐
   (If not submitted with Landscape Document Package)

FOR OFFICE USE ONLY

File #: _____ Date Received: _____ Received By: _____

Zoning: _____ GP: _____

APPENDIX B – PRESCRIPTIVE COMPLIANCE

FOR PROJECTS BETWEEN 500 – 2,500 SF

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Project Address: _____ **APN:** _____

Property Owner(s): _____

Address:_____ City:_____ State: _____ Zip:_____

Email:_____ Phone:_____ (mobile):_____

Applicant(s): *(if different from owner)*_____

Address:_____ City:_____ State: _____ Zip:_____

Email:_____ Phone:_____ (mobile):_____

I agree to comply with the requirements of the Prescriptive Compliance Option of the Water Efficient Landscape Ordinance

X _____ _____
Signature Date

Project Information

Total Landscape Area: Turf:_____ Sq. Ft. Plant Material:_____ Sq. Ft. **Water Supply Type:**_____

FOR OFFICE USE ONLY

File #: _____ Date Received: _____ Received By: _____

Zoning: _____ GP: _____

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1. Incorporate compost at a rate of at least four cubic yards per 1,000 square feet to a depth of six inches into landscape area (unless contra-indicated by a soil test);
2. Plant material shall comply with all of the following:
    a. For residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 75% of the plant area excluding edibles and areas using recycled water; For non-residential reas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 100% of the plant area excluding edibles and areas using recycled water;
    b. A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated;
3. Turf shall comply with all of the following:
    a. Turf shall not exceed 25% of the landscape area in residential areas, and there shall be no turf in non-residential areas;
    b. Turf shall not be planted on sloped areas which exceed a slope of 1 vertical elevation change for every 4 feet of horizontal length;
    c. Turf is prohibited in parkways less than 10 feet wide, unless the parkway is adjacent to a parking strip and used to enter and exit vehicles. Any turf in parkways must be irrigated by sub-surface irrigation or by other technology that creates non overspray or runoff.
4. Irrigation Systems Shall Comply with the Following:
    a. Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor.
    b. Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.
    c. Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers recommended pressure range.
    d. Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point connection of the water supply.
    e. All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802-2014.
    f. Areas less than (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.
5. For non-residential projects with landscape areas of 1,000 square feet or more, a private submeter(s) to measure landscape water use shall be installed.
6. At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

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LANDSCAPE DESIGN PLAN

1. The use of invasive plant species, such as those listed by the California Invasive Plant Council, is prohibited
2. Recirculating Water Systems shall be used for water features
3. Where available, recycled water shall be used as a source for decorative water features.
4. Surface area of a water feature shall be included in the high water use hyrdozone area of the water budget calculation.
5. Prior to the planting of any Materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.
6. Soil amendments shall be incorporated according to recommendations of the Soil Report reviewed and approved as part of the project's Landscape Document Package.
7. Compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.
8. A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5% of the landscape area may be left without mulch. Designated insect habitat must be included in the landscape design plan as such.
9. The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.
10. Organic mulch materials made from recycled or post-consumer shall take precedence over inorganic materials or virgin forest products unless the recycled post-consumer organic products are not locally available.

IRRIGATION DESIGN PLAN

11. Landscape water meters, defined as either a dedicated water service meter or private submeter, shall be installed for all non-residential irrigated landscapes of 1,000 square feet but not more than 5,000 square feet, and residential irrigated landscapes of 5,000 square feet or greater. A landscape water meter may be either:
    a. A customer service meter dedeicated to landscape use provided by the local water purveyor; or
    b. A privately owned meter or submeter.
12. Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data utilizing non-volatile memory shall be required for irrigation scheduling in all irrigation systems.
13. If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.
    a. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps,

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or other devices shall be installed to meet the required dynamic pressure of the irrigation system.

b. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

14. Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.
15. Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.
16. Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the applicable local agency code (i.e., public health) for additional backflow prevention requirements.
17. Flow sensors that detect high flow conditions created by system damage or malfunction are required for all on non-residential landscapes and residential landscapes of 5000 sq. ft. or larger.
18. Master shut-off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.
19. The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.
20. Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.
21. The design of the irrigation system shall conform to the hydrozones of the landscape design plan.
22. The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as demonstrated in the submitted Water Efficient Landscape Worksheet regarding the Maximum Applied Water Allowance.
23. All irrigation emission devices must meet the requirements set in the American National Standards Institute (ANSI) standard, American Society of Agricultural and Biological Engineers'/International Code Council's (ASABE/ICC) 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard, All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.
24. The project applicant/developer should inquire with the local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

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25. In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.
26. Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.
27. Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.
28. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turfgrass.
29. Check valves or anti-drain valves are required on all sprinkler heads where low point drainage could occur.
30. Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.
31. Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from nonpermeable surfaces may include drip, drip line. Or other low flow non-spray technology. These restrictions may be modified if:
    a. the landscape area is adjacent to permeable surfacing; or
    b. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping;
32. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.
33. Plants in biotreatment soils shall be on a separate valve.
34. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.
35. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.
36. Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:
    a. plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
    b. the plant factor of the higher water using plant is used for calculations.
37. Individual hydrozones that mix high and low water use plants shall not be permitted.
38. On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Sample Water Efficient Landscape Worksheet. (see Appendix B). This table can also assist with the irrigation audit and programming the controller.

<u>LANDSCAPE AND IRRIGATION MAINTENANCE SCHEDULE</u>

39. Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

40. A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
41. Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.
42. A project applicant is encouraged to implement established landscape industry sustainable Best Practices for all landscape maintenance activities.
43. It is highly recommended that the Bay-Friendly Maintenance Manual is used as an official reference document in the landscape maintenance contract and/or with on-site landscape staff.
44. Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

IRRIGATION SCHEDULING

45. For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:
46. (1) Irrigation scheduling shall be regulated by automatic irrigation controllers.
47. Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the local water purveyor, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
48. For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.
49. Parameters used to set the automatic controller shall be developed and submitted for each of the following:
    a. the plant establishment period;
    b. the established landscape; and
    c. temporarily irrigated areas.
    d. Each irrigation schedule shall consider for each station all of the following that apply:
        i. irrigation interval (days between irrigation);
        ii. irrigation run times (hours or minutes per irrigation event to avoid runoff);
        iii. number of cycle starts required for each irrigation event to avoid runoff;
        iv. amount of applied water scheduled to be applied on a monthly basis;
        v. application rate setting;
        vi. root depth setting;

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vii. plant type setting;
viii. soil type;
ix. slope factor setting;
x. shade factor setting; and
xi. irrigation uniformity or efficiency setting.

IRRIGATION AUDIT, IRIGATION SURVEY, AND IRRGATION WATER USE ANALYSIS

50. The project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;
    a. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.
51. The City of Alameda shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.
52. For the purpose of determining Estimated Total Water Use, average irrigation efficiency is assumed to be 0.75 for overhead spray devices and 0.81 for drip system devices.
53. The installation of recycled water irrigation systems shall allow for the current and future use of recycled water.
54. All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and State laws.
55. Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.
56. All graywater systems shall conform to the California Plumbing Code (Title 24, Part 5, Chapter 16) and any applicable local ordinance standards. Refer to § 490.1 (d) for the applicability of this ordinance to landscape areas less than 2,500 square feet with the Estimated Total Water Use met entirely by graywater.

WALLACE LABORATORIES, LLC
365 Coral Circle
El Segundo, CA 90245
phone (310) 615-0116 fax (310) 640-6863

April 9, 2020

SOILS REPORT
AND RECOMMENDATIONS

Katie Laurin, Katie@Mantlela.com
Mantle Landscape Architects
930 Carleton Street, Second Floor
Berkeley, CA 94710

RE: 1245 McKay Avenue, Alameda
28 samples received April 6, 2020

Dear Katie,

A, 0-4"
A, 12-18"
B, 0-4"
B, 12-18"
C, 0-4"
C, 12-18"
D, 0-4"
D, 12-18"
E, 0-4"
E, 12-18"
F, 0-4"
F, 12-18"
G, 0-4"
G, 12-18"
H, 0-4"
H, 12-18"
I, 0-4"
I, 12-18"
J, 0-4"
J, 12-18"
K, 0-4"
K, 12-18"
L, 0-4"
L, 12-18"
M, 0-4"
M, 12-18"
N, 0-4"
N, 12-18"

Analytical Findings

Acidity/Alkalinity - The pH values are acidic at 5.95 on average for the 0-4" samples. The average pH of 12-18" samples is acidic at 6.15. The pH values range from 5.05 to 7.40. Samples L, 12-18"; M, 12-18"; N, 0-4" and N, 12-18" are the only alkaline samples.

Salinity – Salinity is modest at 0.45 millimho/cm on average for the 0-4" samples. The average salinity of the 12-18" samples is modest at 0.27 millimho/cm. . Salinity ranges from 0.06 to 3.39 millimho/cm. The highest salinity is for samples M, 0-4". It contains a high amount of nitrogen.

Fertility -

Nitrogen – Nitrogen is low for:

G, 0-4"; G, 12-18"; F, 12-18"; L, 0-4"; N, 12-18"; N, 0-4"; L, 12-18"; K, 12-18"; D, 12-18"; F, 0-4"; E, 12-18"; C, 12-18"; K, 0-4"; A, 12-18"; I, 12-18" and D, 0-4"

Nitrogen is high for M, 0-4". Without M, 0-4" nitrogen is modest for both 0-4" and 12-18" on average.

SOILS REPORT
AND RECOMMENDATIONS

Phosphorus – Phosphorus is high on average for the 0-4” samples. Phosphorus is modest on average for the 12-18” samples.

Phosphorus is low for:

C, 12-18"; B, 12-18"; G, 12-18"; A, 12-18"; H, 12-18"; L, 0-4"; I, 0-4"; D, 12-18"; J, 12-18"; K, 0-4" and N, 0-4".

Potassium – Potassium is high on average for the 0-4” samples. Potassium is modest on average for the 12-18” samples.

Potassium is low for:

C, 12-18"; G, 12-18"; H, 12-18"; F, 12-18"; B, 12-18"; M, 12-18"; N, 12-18"; K, 0-4"; N, 0-4"; I, 12-18"; K, 12-18" and L, 12-18"

Iron – Iron is high. Iron is higher than desired for:

I, 0-4"; G, 0-4"; D, 0-4"; E, 0-4"; C, 0-4"; F, 0-4" and H, 0-4"

Iron is high in poorly aerated soil and in overly acidic soil. Excessive levels of iron can inhibit growth. Leaves may bronze. If iron is too high, leaves turn black.

Manganese – Manganese is low for:

C, 12-18"; M, 12-18"; N, 12-18"; I, 12-18"; H, 12-18"; F, 12-18"; K, 12-18"; L, 12-18" and G, 12-18".

Manganese is high for A, 0-4”.

Manganese is needed in low amounts. When too high, it can limit the uptake and metabolic functions of iron and induce iron deficiency. Manganese is commonly high in poorly aerated soils and in overly acidic soils.

Zinc – Zinc is excessively high for the following samples where it ranges from 34 to 60 parts per million.

H, 0-4"; C, 0-4"; I, 0-4"; A, 0-4" and B, 0-4".

The optimal level of zinc is several parts per million. It is essential but is toxic if it is too high. Sensitive plants such as woody plants frequently need plant available zinc below about 30 parts per million. Herbaceous plants generally need zinc below about 50 parts per million. Grasses are fairly tolerant of high zinc. Excessive zinc causes stunting, dieback and discoloration. Trees and shrubs do not fail immediately after installation but several years without rooting they fail. High zinc restricts the uptake of potassium and other micronutrients. Since heavy metals do not normally migrate through the soil profile, deeper soil is expected to

be more suitable. Initial growth may be slow but may improve over time if rooting moves into better soil.

Copper – Copper is high on average. Copper is higher than desired at 25 parts per million for C, 0-4".

The optimum level of copper is about half a part per million. The growth of sensitive plants is restricted when copper is over about 5 parts per million. Growth is frequently restricted if copper is over about 20 parts per million. Grasses are tolerant of high copper while woody plants are fairly sensitive. High copper induces iron chlorosis.

Boron – Boron is modest on average.
Magnesium – Magnesium is high.

Sulfur – Sulfur is low except for N, 12-18" where it is moderate.

Sodicity – Available sodium is low on average. SAR (sodium adsorption ratio) is 0.8 on average for the 0-4" samples. SAR is 1.0 on average for the 12-18" samples.

Aluminum – Aluminum is high for J, 12-18 and J, 0-4".

Aluminum restricts growth by interfering with the metabolism of phosphorus and calcium. It causes stunting and discoloration. Foliage may turn a dull gray green. Aluminum is high in poorly aerated soil and in overly acidic soils. Soluble calcium helps to reduce the toxicity of aluminum.

Heavy metals -

Plant-available lead is moderate on average. Plant-available lead is high for I, 0-4", A, 0-4" and B, 0-4" where it ranges from 30 to 33 parts per million.

Normally, plant available lead should be less than about 30 parts per million for good plant growth.

Hydrophobicity – Samples A, 0-4"; A, 12-18"; B, 0-4"; G, 0-4"; J, 0-4" and J, 12-18" are hydrophobic. They are difficult to wet. Water beads up on the soil surface initially and then slowly moves into the soil.

Recommendations

For the best growth of plants which are sensitive to heavy metals, use a more suitable soil or do not use sensitive plants. Increase soil aeration. Use nitrate-based fertilizers. Nitrate helps to increase soil aeration. If not over applied, calcium nitrate (15.5-0-0) will slowly increase the pH and reduce the concentrations of iron and manganese.

Balance soil aeration with soil moisture.

General soil preparation on a square foot basis. Broadcast the following uniformly; rates are per 1,000 square feet for a 6-inch lift. Incorporate them homogeneously 6" deep.

Calcium nitrate (15.5-0-0) – 6 pounds where nitrogen is low
Potassium sulfate (0-0-50) – 8 pounds where potassium is low
Triple superphosphate (0-45-0) – 4 pounds where phosphorus is low
agricultural gypsum - 20 pounds except N, 12-18”
Organic soil amendment - about 3 to 4 cubic yards, sufficient for 3% to 5% soil organic matter on a dry weight basis

For the preparation on a volume basis, homogeneously blend the following materials into the soil. Rates are expressed per cubic yard:

Calcium nitrate (15.5-0-0) – 1/4 pound where nitrogen is low
Potassium sulfate (0-0-50) – 1/3 pound where potassium is low
Triple superphosphate (0-45-0) – 1/4 pound where phosphorus is low
agricultural gypsum – 1 pound except N, 12-18”
Organic soil amendment - about 15% to 20% by volume, sufficient for 3% to 5% soil organic matter on a dry weight basis

Organic soil amendment:

1. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. Organic matter shall be at least 50% on a dry weight basis.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 part per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
10. Carbon:nitrogen ratio is less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	12	copper	100	selenium	20
cadmium	10	lead	200	silver	10
chromium	200	mercury	10	vanadium	50
cobalt	20	molybdenum	20	zinc	200
		nickel	100		

Higher amounts of salinity or boron may be present if the soils are to be preleached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

Irrigate hydrophobic areas slowly. Use multiple starts and soaking periods between irrigation cycles. Slightly moist soils are easier to wet than dry soils. Balance soil aeration with soil moisture.

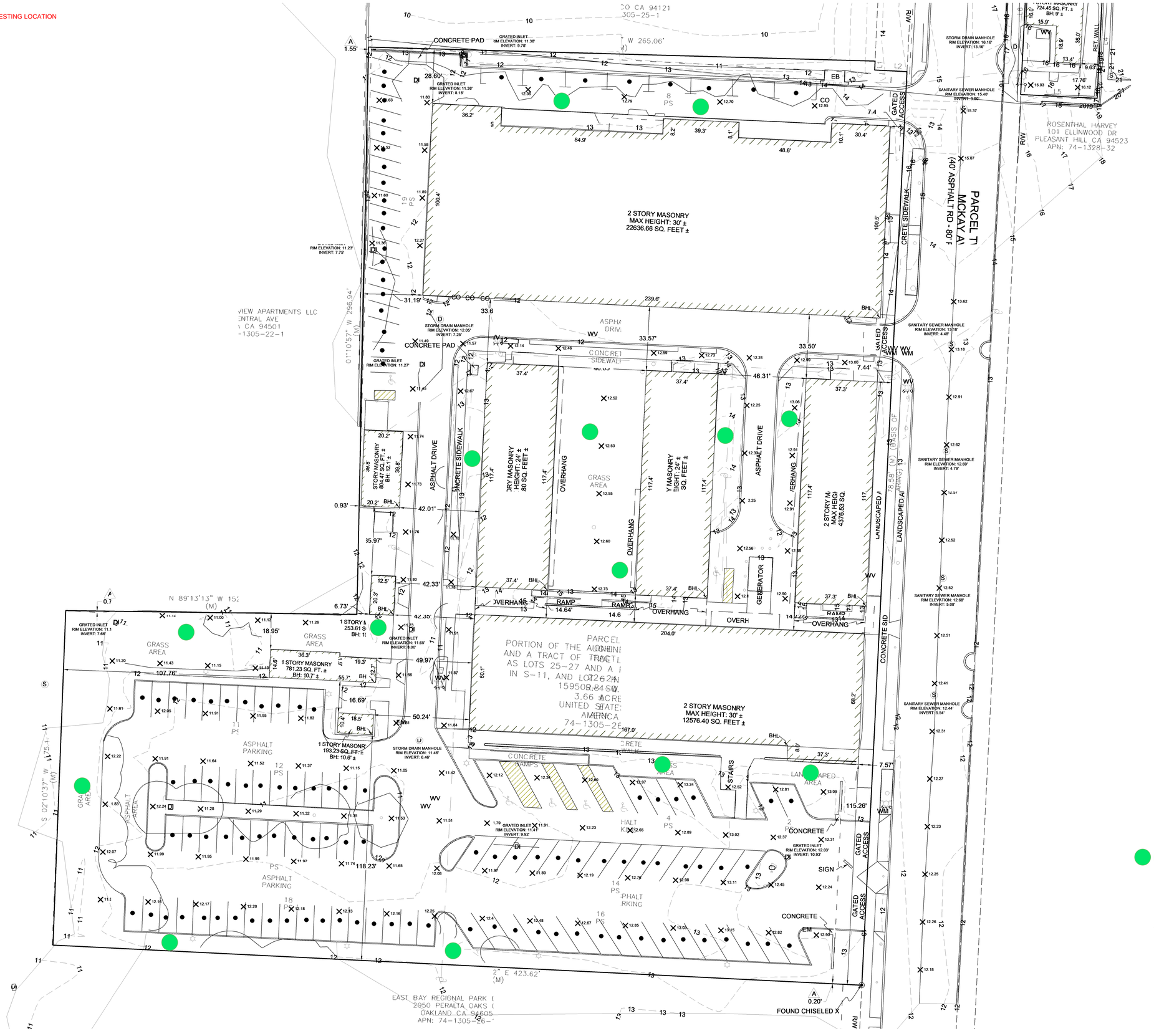
For site maintenance, apply calcium nitrate (15.5-0-0) at 6 pounds per 1,000 square feet about once per quarter.

Monitor the site with periodic soil testing. Adjust the maintenance program as needed.

Sincerely,

Garn A. Wallace, Ph. D.
GAW:n

SOILS TESTING LOCATION



KEY

● (14) SOIL SAMPLE LOCATIONS.

SOILS TO BE TAKE AT 18" AND 4". SUBMIT TO WALLACE LABORATORIES FOR TESTING.
http://us.wlabs.com/

Scale: 1"=20'

SOIL TESTING REQUEST
SUPPORTIVE SENIOR HOUSING | RESPITE CAMPUS
ALAMEDA POINT COLLABORATIVE | MERCY HOUSING
JANUARY 08 2020

MANTLE
LANDSCAPE ARCHITECTURE

WALLACE LABS
365 Coral Circle
El Segundo, CA 90245
(310) 615-0116

SOILS REPORT

Print Date Apr. 8, 2020 Receive Date 4/6/20

Location 1245 McKay Avenue, Alameda

Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate, **** high, ***** very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low medium high

0 - 7 8-15 over 15 phosphorus
0-60 60 -120 121-180 potassium
0 - 4 4 - 10 over 10 iron
0- 0.5 0.6- 1 over 1 manganese
0 - 1 1 - 1.5 over 1.5 zinc
0- 0.2 0.3- 0.5 over 0.5 copper
0- 0.2 0.2- 0.5 over 1 boron

calcium
magnesium
sodium
sulfur
molybdenum
nickel

The following trace elements may be toxic. The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions

aluminum
arsenic
barium
cadmium
chromium
cobalt
lead
lithium
mercury
selenium
silver
strontium
tin
vanadium

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils:
under 5.2 is too acidic
6.5 to 7 is ideal
over 8.0 is too alkaline

The ECe is a measure of the soil salinity:
1-2 affects a few plants
2-4 affects some plants,
> 4 affects many plants.

problems over 150 ppm
good 20 - 30 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 3

est. gypsum requirement-lbs./1000 sq. ft.

Sample ID Number	20-99-18		20-99-19		20-99-20		20-99-21	
Sample Description	A, 0-4"		A, 12-18"		B, 0-4"		B, 12-18"	
elements		graphic		graphic		graphic		graphic
phosphorus	12.51	****	5.19	**	12.26	****	3.91	**
potassium	483.99	*****	106.17	***	182.54	*****	34.54	**
iron	192.49	*****	110.10	*****	139.99	*****	55.36	*****
manganese	31.76	*****	14.87	*****	1.82	****	1.84	****
zinc	48.57	*****	5.19	****	59.78	*****	8.72	****
copper	7.05	*****	2.29	****	7.36	*****	1.95	****
boron	0.35	***	0.17	**	0.20	**	0.15	**
calcium	393.18	***	386.74	***	437.45	****	435.19	****
magnesium	171.54	*****	193.07	*****	145.49	****	314.92	*****
sodium	207.15	****	121.66	***	76.83	**	114.39	***
sulfur	20.64	*	6.53	*	11.84	*	3.60	*
molybdenum	0.11	****	0.02	**	0.14	****	0.05	***
nickel	4.92	**	2.52	**	4.94	**	1.71	**
aluminum	n d	*	n d	*	2.58	****	0.56	***
arsenic	0.11	*	0.07	*	0.09	*	0.03	*
barium	2.27	*	1.28	*	2.02	*	0.88	*
cadmium	0.43	*	0.07	*	0.29	*	0.07	*
chromium	0.23	*	0.09	*	0.06	*	0.01	*
cobalt	0.79	**	0.41	*	0.04	*	0.02	*
lead	32.84	****	7.23	***	30.51	****	6.48	***
lithium	0.18	*	0.20	*	0.22	*	0.23	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	n d	*	n d	*	n d	*	n d	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	1.74	*	1.71	*	1.74	*	1.97	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.56	*	0.27	*	0.45	*	0.18	*
Saturation Extract								
pH value	5.83	**	5.62	**	5.85	**	6.06	***
ECe (milli-mho/cm)	0.55	**	0.40	**	0.43	**	0.34	*
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	34.2	1.7	18.3	0.9	35.2	1.8	18.8	0.9
magnesium	9.5	0.8	6.2	0.5	9.8	0.8	5.9	0.5
sodium	69.1	3.0	48.8	2.1	29.7	1.3	35.7	1.6
potassium	23.9	0.6	5.0	0.1	5.9	0.1	1.2	0.0
cation sum		6.1		3.7		4.0		3.0
chloride	122	3.4	109	3.1	38	1.1	69	2.0
nitrate as N	10	0.7	8	0.5	44	3.1	19	1.3
phosphorus as P	1.1	0.0	0.3	0.0	0.3	0.0	0.1	0.0
sulfate as S	10.5	0.7	5.8	0.4	5.6	0.4	2.5	0.2
anion sum		4.9		4.0		4.6		3.4
boron as B	0.34	**	0.28	**	0.28	**	0.15	*
SAR	2.7	**	2.5	**	1.1	*	1.8	**
	35		21		13		41	
relative infiltration rate	slow		slow		slow/fair		slow/fair	
estimated soil texture	sandy loam		sandy loam		sandy loam		sandy loam	
lime (calcium carbonate)	no		no		no		no	
organic matter	fair	hydrophobic	fair	hydrophobic	fair	hydrophobic	fair/low	
moisture content of soil	13.1%		7.0%		14.5%		8.7%	
half saturation percentage	33.8%		21.1%		30.0%		18.9%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

WALLACE LABS
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El Segundo, CA 90245
(310) 615-0116

SOILS REPORT

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Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate

* * * * high, * * * * * very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low	medium	high
0 - 7	8-15	over 15
0-60	60 -120	121-180
0 - 4	4 - 10	over 10
0- 0.5	0.6- 1	over 1
0 - 1	1 - 1.5	over 1.5
0- 0.2	0.3- 0.5	over 0.5
0- 0.2	0.2- 0.5	over 1

The following trace elements may be toxic The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic 6.5 to 7 is ideal over 8.0 is too alkaline

The ECe is a measure of the soil salinity: 1-2 affects a few plants 2-4 affects some plants, > 4 affects many plants.

problems over 150 ppm good 20 - 30 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 3

est. gypsum requirement-lbs./1000 sq. ft.

Sample ID Number	20-99-22		20-99-23		20-99-24		20-99-25	
Sample Description	C, 0-4"		C, 12-18"		D, 0-4"		D, 12-18"	
elements		graphic		graphic		graphic		graphic
phosphorus	18.51	*****	2.87	*	17.16	*****	6.81	**
potassium	164.88	****	17.20	*	212.10	*****	86.40	***
iron	315.54	*****	23.17	*****	285.14	*****	92.21	*****
manganese	2.51	****	0.22	*	0.81	***	0.72	***
zinc	37.23	*****	1.55	****	14.20	*****	2.79	****
copper	25.14	*****	2.09	****	4.89	*****	2.33	****
boron	0.23	***	0.16	**	0.41	***	0.13	**
calcium	483.32	****	408.66	****	505.95	****	456.20	****
magnesium	192.96	*****	235.03	*****	192.38	*****	207.66	*****
sodium	27.43	*	60.11	**	36.05	*	23.26	*
sulfur	20.65	*	2.95	*	14.09	*	4.57	*
molybdenum	0.09	***	0.04	***	0.05	***	0.05	***
nickel	7.32	***	0.46	*	4.46	**	1.98	**
aluminum	n d	*	n d	*	n d	*	0.95	***
arsenic	0.19	*	0.05	*	0.13	*	0.08	*
barium	2.99	*	1.28	*	2.97	*	1.94	*
cadmium	0.53	*	0.03	*	0.32	*	0.08	*
chromium	0.34	*	n d	*	0.21	*	0.06	*
cobalt	0.02	*	0.01	*	0.02	*	0.02	*
lead	23.21	***	27.03	****	7.92	***	2.14	**
lithium	0.25	*	0.28	*	0.26	*	0.22	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	n d	*	n d	*	n d	*	n d	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	2.66	*	1.94	*	2.77	*	2.62	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.46	*	0.06	*	0.60	*	0.27	*
Saturation Extract								
pH value	5.56	**	6.13	***	5.91	**	5.98	**
ECe (milli-mho/cm)	0.25	*	0.13	*	0.15	*	0.08	*
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	22.5	1.1	7.7	0.4	11.7	0.6	3.0	0.1
magnesium	6.7	0.6	2.8	0.2	4.3	0.4	1.9	0.2
sodium	9.4	0.4	11.4	0.5	9.7	0.4	6.4	0.3
potassium	3.4	0.1	1.3	0.0	3.0	0.1	1.0	0.0
cation sum		2.2		1.1		1.4		0.6
chloride	21	0.6	16	0.5	25	0.7	25	0.7
nitrate as N	17	1.2	6	0.4	9	0.6	3	0.2
phosphorus as P	0.1	0.0	0.3	0.0	0.1	0.0	0.1	0.0
sulfate as S	11.1	0.7	5.3	0.3	5.8	0.4	2.8	0.2
anion sum		2.5		1.2		1.7		1.1
boron as B	0.08	*	0.10	*	0.10	*	0.10	*
SAR	0.4	*	0.9	*	0.6	*	0.7	*
	5		10		6		4	
relative infiltration rate	slow/fair		slow		slow/fair		slow	
estimated soil texture	loam		sandy loam		sandy loam		sandy loam	
lime (calcium carbonate)	no		no		no		no	
organic matter	fair		low/fair		fair/low		low/fair	
moisture content of soil	29.9%		14.7%		26.6%		11.3%	
half saturation percentage	32.2%		15.3%		29.2%		15.1%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

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Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate

* * * * high, * * * * * very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low medium high

Sample ID Number	20-99-26		20-99-27		20-99-28		20-99-29	
Sample Description	E, 0-4"		E, 12-18"		F, 0-4"		F, 12-18"	
elements		graphic		graphic		graphic		graphic
phosphorus	32.01	*****	12.46	****	18.36	*****	9.79	***
potassium	232.11	*****	89.70	***	112.83	***	30.04	**
iron	303.47	*****	94.79	*****	316.96	*****	86.85	*****
manganese	2.57	****	0.82	***	1.92	****	0.41	**
zinc	20.76	*****	2.80	****	20.63	*****	5.30	****
copper	4.22	*****	1.78	****	11.58	*****	2.30	****
boron	0.37	***	0.14	**	0.29	***	0.14	**
calcium	543.76	****	456.87	****	428.48	****	391.66	***
magnesium	170.55	*****	116.46	****	207.85	*****	104.00	****
sodium	40.24	*	20.56	*	37.36	*	22.12	*
sulfur	17.86	*	7.64	*	12.39	*	2.80	*
molybdenum	0.05	***	0.02	**	0.06	***	0.04	***
nickel	4.49	**	1.73	**	5.93	***	1.91	**
aluminum	n d	*	0.32	**	n d	*	0.23	*
arsenic	0.14	*	0.10	*	0.13	*	0.06	*
barium	2.56	*	3.03	**	2.28	*	4.60	**
cadmium	0.89	*	0.09	*	0.34	*	0.04	*
chromium	0.28	*	0.07	*	0.31	*	0.06	*
cobalt	0.06	*	0.02	*	0.03	*	0.01	*
lead	10.20	***	1.77	**	17.63	***	12.37	***
lithium	0.28	*	0.22	*	0.21	*	0.19	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	n d	*	n d	*	n d	*	n d	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	2.71	*	2.65	*	2.19	*	2.77	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.72	*	0.31	*	0.54	*	0.28	*
Saturation Extract								
pH value	5.60	**	5.67	**	5.65	**	6.03	***
ECe (milli-mho/cm)	0.21	*	0.12	*	0.09	*	0.06	*
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	12.0	0.6	5.7	0.3	4.4	0.2	2.6	0.1
magnesium	4.7	0.4	2.7	0.2	2.5	0.2	2.7	0.2
sodium	11.6	0.5	8.8	0.4	7.5	0.3	5.6	0.2
potassium	5.7	0.1	2.2	0.1	1.8	0.0	1.8	0.0
cation sum		1.6		0.9		0.8		0.6
chloride	21	0.6	21	0.6	25	0.7	25	0.7
nitrate as N	15	1.1	4	0.3	4	0.3	1	0.1
phosphorus as P	0.3	0.0	0.1	0.0	0.1	0.0	0.4	0.0
sulfate as S	7.8	0.5	8.2	0.5	2.1	0.1	1.9	0.1
anion sum		2.2		1.4		1.1		0.9
boron as B	0.08	*	0.07	*	0.10	*	0.09	*
SAR	0.7	*	0.8	*	0.7	*	0.6	*
est. gypsum requirement-lbs./1000 sq. ft.	7		3		6		4	
relative infiltration rate	slow/fair		slow		slow/fair		slow	
estimated soil texture	loam		sandy loam		sandy loam		sandy loam	
lime (calcium carbonate)	no		no		no		no	
organic matter	fair/low		fair/low		fair		low/fair	
moisture content of soil	30.9%		15.4%		21.1%		10.3%	
half saturation percentage	31.9%		14.2%		27.0%		13.3%	

The following trace elements may be toxic The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic 6.5 to 7 is ideal over 8.0 is too alkaline

The ECe is a measure of the soil salinity: 1-2 affects a few plants 2-4 affects some plants, > 4 affects many plants.

problems over 150 ppm

good 20 - 30 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 3

0 - 7 8-15 over 15
0-60 60 -120 121-180
0 - 4 4 - 10 over 10
0- 0.5 0.6- 1 over 1
0 - 1 1 - 1.5 over 1.5
0- 0.2 0.3- 0.5 over 0.5
0- 0.2 0.2- 0.5 over 1

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

WALLACE LABS
365 Coral Circle
El Segundo, CA 90245
(310) 615-0116

SOILS REPORT

Print Date Apr. 8, 2020 Receive Date 4/6/20

Location 1245 McKay Avenue, Alameda

Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate

* * * * high, * * * * * very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low medium high

	Sample ID Number	20-99-30		20-99-31		20-100-22		20-100-23	
	Sample Description	G, 0-4"		G, 12-18"		H, 0-4"		H, 12-18"	
	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	14.07	****	4.68	**	31.20	*****	5.46	**
0-60 60 -120 121-180	potassium	84.98	***	17.99	*	250.59	*****	26.94	*
0 - 4 4 - 10 over 10	iron	253.86	*****	80.75	*****	381.07	*****	127.59	*****
0- 0.5 0.6- 1 over 1	manganese	3.36	****	0.54	**	4.74	****	0.38	**
0 - 1 1 - 1.5 over 1.5	zinc	23.51	*****	3.37	****	34.25	*****	10.34	*****
0- 0.2 0.3- 0.5 over 0.5	copper	6.37	*****	2.69	****	7.58	*****	5.92	*****
0- 0.2 0.2- 0.5 over 1	boron	0.32	***	0.10	**	0.49	***	0.14	**
	calcium	481.80	****	447.20	****	628.21	*****	391.55	***
	magnesium	335.78	*****	118.57	****	263.66	*****	105.14	****
	sodium	60.05	**	28.86	*	50.94	**	48.00	*
	sulfur	12.64	*	4.02	*	36.85	**	9.05	*
	molybdenum	0.09	***	n d	*	0.06	***	0.03	***
	nickel	6.28	***	2.43	**	3.93	**	2.18	**
The following trace	aluminum	n d	*	0.43	**	2.56	****	n d	*
elements may be toxic	arsenic	0.13	*	0.10	*	0.21	*	0.12	*
The degree of toxicity	barium	1.94	*	3.19	**	2.80	*	1.50	*
depends upon the pH of	cadmium	0.32	*	0.03	*	0.28	*	0.13	*
the soil, soil texture,	chromium	0.16	*	0.05	*	0.16	*	0.15	*
organic matter, and the	cobalt	0.04	*	n d	*	0.06	*	0.01	*
concentrations of the	lead	12.74	***	8.33	***	16.37	***	16.09	***
individual elements as well	lithium	0.23	*	0.22	*	0.34	*	0.21	*
as to their interactions	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	2.08	*	1.70	*	3.31	*	1.46	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.46	*	0.23	*	1.10	**	0.26	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 8.0 is too alkaline	pH value	5.81	**	5.90	**	6.09	***	6.64	***
The ECe is a measure of	ECe (milli-mho/cm)	0.10	*	0.10	*	0.54	**	0.29	*
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	5.4	0.3	4.8	0.2	54.3	2.7	27.3	1.4
2-4 affects some plants,	magnesium	2.9	0.2	2.8	0.2	17.9	1.5	6.6	0.5
> 4 affects many plants.	sodium	8.5	0.4	10.0	0.4	15.0	0.7	17.2	0.7
	potassium	1.2	0.0	1.0	0.0	12.6	0.3	1.4	0.0
	cation sum		0.9		0.9		5.2		2.7
problems over 150 ppm	chloride	16	0.5	25	0.7	51	1.4	15	0.4
good 20 - 30 ppm	nitrate as N	1	0.0	1	0.1	34	2.4	19	1.3
	phosphorus as P	0.3	0.0	0.1	0.0	0.6	0.0	0.2	0.0
toxic over 800	sulfate as S	3.7	0.2	3.5	0.2	22.1	1.4	9.6	0.6
	anion sum		0.7		1.0		5.3		2.4
toxic over 1 for many plants	boron as B	0.08	*	0.07	*	0.02	*	0.07	*
increasing problems start at 3	SAR	0.7	*	0.9	*	0.5	*	0.8	*
est. gypsum requirement-lbs./1000 sq. ft.		39		5		13		8	
	relative infiltration rate	slow/fair		slow/fair		fair/slow		slow	
	estimated soil texture	loam		sandy loam		loam		sandy loam	
	lime (calcium carbonate)	no		no		no		no	
	organic matter	fair	hydrophobic	low/fair		fair/low		low/fair	
	moisture content of soil	22.9%		9.6%		51.7%		12.5%	
	half saturation percentage	34.6%		14.6%		54.7%		16.9%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

WALLACE LABS
365 Coral Circle
El Segundo, CA 90245
(310) 615-0116

SOILS REPORT

Print Date Apr. 9, 2020 Receive Date 4/6/20

Location 1245 McKay Avenue, Alameda

Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate

* * * * high, * * * * * very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low	medium	high
0 - 7	8-15	over 15
0-60	60 -120	121-180
0 - 4	4 - 10	over 10
0- 0.5	0.6- 1	over 1
0 - 1	1 - 1.5	over 1.5
0- 0.2	0.3- 0.5	over 0.5
0- 0.2	0.2- 0.5	over 1

The following trace elements may be toxic The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic 6.5 to 7 is ideal over 8.0 is too alkaline

The ECe is a measure of the soil salinity:
1-2 affects a few plants
2-4 affects some plants,
> 4 affects many plants.

problems over 150 ppm
good 20 - 30 ppm

toxic over 800

toxic over 1 for many plants

increasing problems start at 3

est. gypsum requirement-lbs./1000 sq. ft.

Sample ID Number	20-100-24		20-100-25		20-100-26		20-100-27	
Sample Description	I, 0-4"		I, 12-18"		J, 0-4"		J, 12-18"	
elements		graphic		graphic		graphic		graphic
phosphorus	6.01	**	13.28	****	15.72	*****	7.64	**
potassium	244.07	*****	45.33	**	102.03	***	94.39	***
iron	229.25	*****	130.72	*****	115.02	*****	89.49	*****
manganese	1.84	****	0.35	**	2.60	****	2.62	****
zinc	48.37	*****	16.18	*****	7.05	****	6.78	****
copper	10.14	*****	7.42	*****	1.09	****	0.68	****
boron	0.35	***	0.13	**	0.28	***	0.24	***
calcium	474.33	****	411.04	****	247.41	***	310.68	***
magnesium	154.85	*****	77.87	***	110.55	****	210.13	*****
sodium	26.95	*	21.11	*	19.22	*	99.39	**
sulfur	9.09	*	6.08	*	7.37	*	6.21	*
molybdenum	0.06	***	0.03	***	0.04	***	0.03	***
nickel	2.74	**	2.13	**	1.09	**	1.83	**
aluminum	1.03	***	0.74	***	10.93	*****	4.30	****
arsenic	0.13	*	0.14	*	n d	*	0.04	*
barium	1.74	*	1.73	*	1.39	*	4.40	**
cadmium	0.33	*	0.12	*	n d	*	0.02	*
chromium	0.15	*	0.11	*	0.15	*	0.17	*
cobalt	0.03	*	0.02	*	0.14	*	0.26	*
lead	32.63	****	29.11	****	4.64	**	2.40	**
lithium	0.27	*	0.20	*	0.15	*	0.23	*
mercury	n d	*	n d	*	n d	*	n d	*
selenium	n d	*	n d	*	n d	*	n d	*
silver	n d	*	n d	*	n d	*	n d	*
strontium	2.40	*	1.72	*	1.48	*	2.50	*
tin	n d	*	n d	*	n d	*	n d	*
vanadium	0.55	*	0.30	*	0.76	*	0.38	*
Saturation Extract								
pH value	6.13	***	6.32	***	5.05	*	5.19	*
ECe (milli-mho/cm)	0.37	*	0.15	*	0.17	*	0.25	*
		millieq/l		millieq/l		millieq/l		millieq/l
calcium	33.0	1.6	11.3	0.6	8.7	0.4	7.6	0.4
magnesium	10.5	0.9	4.2	0.3	4.2	0.3	5.4	0.4
sodium	12.3	0.5	10.5	0.5	13.3	0.6	36.7	1.6
potassium	22.0	0.6	2.0	0.1	10.5	0.3	6.3	0.2
cation sum		3.6		1.4		1.6		2.6
chloride	43	1.2	17	0.5	15	0.4	47	1.3
nitrate as N	22	1.6	9	0.6	14	1.0	10	0.7
phosphorus as P	1.5	0.0	0.6	0.0	0.9	0.0	0.7	0.0
sulfate as S	14.3	0.9	3.9	0.2	2.1	0.1	2.6	0.2
anion sum		3.8		1.4		1.6		2.2
boron as B	0.10	*	0.09	*	0.14	*	0.07	*
SAR	0.5	*	0.7	*	0.9	*	2.5	**
	5		4		3		17	
relative infiltration rate	fair/slow		slow/fair		fair		fair/slow	
estimated soil texture	sandy loam		sandy loam		sandy loam		sandy loam	
lime (calcium carbonate)	no		no		no		no	
organic matter	fair		low/fair		fair/low	hydrophobic	fair/low	hydrophobic
moisture content of soil	19.9%		6.5%		2.2%		3.5%	
half saturation percentage	31.2%		16.5%		20.1%		19.8%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

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El Segundo, CA 90245
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SOILS REPORT

Print Date Apr. 9, 2020 Receive Date 4/6/20

Location 1245 McKay Avenue, Alameda

Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate

* * * * high, * * * * * very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low medium high

	Sample ID Number	20-100-28		20-100-29		20-100-30		20-100-31	
	Sample Description	K, 0-4"		K, 12-18"		L, 0-4"		L, 12-18"	
	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	7.71	**	16.27	*****	5.71	**	13.91	****
0-60 60 -120 121-180	potassium	44.17	**	52.07	**	85.15	***	67.78	***
0 - 4 4 - 10 over 10	iron	100.31	*****	173.32	*****	18.10	*****	51.68	*****
0- 0.5 0.6- 1 over 1	manganese	1.09	****	0.45	**	0.66	***	0.47	**
0 - 1 1 - 1.5 over 1.5	zinc	10.78	*****	18.48	*****	3.42	****	9.17	****
0- 0.2 0.3- 0.5 over 0.5	copper	4.32	*****	3.77	*****	2.58	****	4.45	*****
0- 0.2 0.2- 0.5 over 1	boron	0.16	**	0.16	**	0.14	**	0.18	**
	calcium	436.64	****	479.52	****	376.26	***	453.54	****
	magnesium	180.34	*****	284.14	*****	298.21	*****	245.49	*****
	sodium	27.91	*	61.44	**	16.42	*	23.77	*
	sulfur	4.92	*	8.83	*	2.01	*	6.67	*
	molybdenum	0.04	***	0.03	***	0.02	***	0.03	***
	nickel	3.27	**	6.85	***	1.45	**	2.40	**
The following trace	aluminum	n d	*	n d	*	n d	*	n d	*
elements may be toxic	arsenic	0.08	*	0.14	*	0.10	*	0.15	*
The degree of toxicity	barium	1.87	*	2.71	*	2.16	*	1.99	*
depends upon the pH of	cadmium	0.18	*	0.35	*	0.09	*	0.18	*
the soil, soil texture,	chromium	0.07	*	0.12	*	n d	*	0.06	*
organic matter, and the	cobalt	0.04	*	0.02	*	0.01	*	0.03	*
concentrations of the	lead	6.31	***	6.83	***	2.78	**	6.33	***
individual elements as well	lithium	0.23	*	0.25	*	0.22	*	0.24	*
as to their interactions	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	n d	*
The pH optimum depends	silver	n d	*	n d	*	n d	*	n d	*
upon soil organic	strontium	1.63	*	2.47	*	1.93	*	1.89	*
matter and clay content-	tin	n d	*	n d	*	n d	*	n d	*
for clay and loam soils:	vanadium	0.21	*	0.28	*	0.22	*	0.25	*
under 5.2 is too acidic									
6.5 to 7 is ideal	Saturation Extract								
over 8.0 is too alkaline	pH value	6.17	***	6.35	***	6.30	***	7.12	***
The ECe is a measure of	ECe (milli-mho/cm)	0.12	*	0.11	*	0.07	*	0.14	*
the soil salinity:			millieq/l		millieq/l		millieq/l		millieq/l
1-2 affects a few plants	calcium	12.4	0.6	9.8	0.5	7.2	0.4	13.3	0.7
2-4 affects some plants,	magnesium	4.3	0.4	3.9	0.3	3.9	0.3	4.9	0.4
> 4 affects many plants.	sodium	6.5	0.3	8.9	0.4	5.0	0.2	6.1	0.3
	potassium	1.3	0.0	1.2	0.0	2.0	0.1	0.7	0.0
	cation sum		1.3		1.2		1.0		1.4
problems over 150 ppm	chloride	15	0.4	19	0.5	22	0.6	19	0.5
good 20 - 30 ppm	nitrate as N	6	0.4	3	0.2	2	0.1	2	0.2
	phosphorus as P	0.4	0.0	0.3	0.0	0.6	0.0	0.4	0.0
toxic over 800	sulfate as S	2.0	0.1	3.6	0.2	3.0	0.2	6.1	0.4
	anion sum		1.0		1.0		0.9		1.1
toxic over 1 for many plants	boron as B	0.09	*	0.11	*	0.07	*	0.15	*
increasing problems start at 3	SAR	0.4	*	0.6	*	0.4	*	0.4	*
est. gypsum requirement-lbs./1000 sq. ft.		5		22		19		4	
	relative infiltration rate	slow		slow		very slow		slow	
	estimated soil texture	sandy loam		loam		clay loam		sandy loam	
	lime (calcium carbonate)	no		no		no		no	
	organic matter	low/fair		low/fair		low		low/fair	
	moisture content of soil	14.1%		18.2%		13.9%		13.6%	
	half saturation percentage	23.6%		28.5%		19.8%		20.4%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.

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Location 1245 McKay Avenue, Alameda

Requester Katie Laurin, Mantle Landscape Architects

graphic interpretation: * very low, ** low, *** moderate, **** high, ***** very high

ammonium bicarbonate/DTPA

extractable - mg/kg soil

Interpretation of data

low medium high

	Sample ID Number	20-100-32		20-100-33		20-100-34		20-100-35	
	Sample Description	M, 0-4"		M, 12-18"		N, 0-4"		N, 12-18"	
	elements		graphic		graphic		graphic		graphic
0 - 7 8-15 over 15	phosphorus	24.26	*****	16.46	*****	7.88	**	12.25	****
0-60 60 -120 121-180	potassium	157.51	****	34.54	**	45.24	**	42.29	**
0 - 4 4 - 10 over 10	iron	27.09	*****	100.82	*****	57.65	*****	133.58	*****
0- 0.5 0.6- 1 over 1	manganese	4.90	****	0.33	**	1.12	****	0.35	**
0 - 1 1 - 1.5 over 1.5	zinc	11.90	*****	13.24	*****	8.11	****	22.14	*****
0- 0.2 0.3- 0.5 over 0.5	copper	3.06	*****	6.10	*****	5.32	*****	5.87	*****
0- 0.2 0.2- 0.5 over 1	boron	0.14	**	0.14	**	0.15	**	0.15	**
	calcium	447.22	****	417.44	****	421.20	****	416.45	****
	magnesium	197.04	*****	201.25	*****	158.42	*****	260.33	*****
	sodium	67.42	**	16.41	*	42.29	*	122.44	***
	sulfur	19.41	*	12.74	*	6.86	*	370.70	***
	molybdenum	0.03	***	0.02	***	0.04	***	0.03	***
	nickel	0.74	*	1.79	**	1.30	**	3.69	**
The following trace elements may be toxic The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions	aluminum	n d	*	n d	*	n d	*	n d	*
	arsenic	0.07	*	0.09	*	0.09	*	0.11	*
	barium	0.87	*	1.62	*	1.37	*	0.22	*
	cadmium	0.11	*	0.16	*	0.13	*	0.37	*
	chromium	n d	*	0.13	*	n d	*	0.22	*
	cobalt	0.06	*	0.02	*	0.03	*	n d	*
	lead	3.15	**	12.13	***	6.84	***	10.29	***
	lithium	0.24	*	0.21	*	0.23	*	0.21	*
	mercury	n d	*	n d	*	n d	*	n d	*
	selenium	n d	*	n d	*	n d	*	n d	*
The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic 6.5 to 7 is ideal over 8.0 is too alkaline	silver	n d	*	n d	*	n d	*	n d	*
	strontium	2.09	*	1.59	*	1.91	*	1.54	*
	tin	n d	*	n d	*	n d	*	n d	*
	vanadium	0.37	*	0.42	*	0.31	*	0.20	*
	Saturation Extract								
	pH value	6.86	***	7.34	***	7.40	***	6.69	***
The ECe is a measure of the soil salinity: 1-2 affects a few plants 2-4 affects some plants, > 4 affects many plants.	ECe (milli-mho/cm)	3.39	****	0.43	**	0.18	*	1.15	***
			millieq/l		millieq/l		millieq/l		millieq/l
	calcium	493.1	24.7	52.8	2.6	18.0	0.9	160.7	8.0
	magnesium	86.4	7.1	14.4	1.2	5.5	0.5	35.4	2.9
	sodium	58.0	2.5	10.8	0.5	10.7	0.5	34.5	1.5
	potassium	15.3	0.4	1.1	0.0	1.2	0.0	-0.4	0.0
	cation sum		34.7		4.3		1.8		12.5
problems over 150 ppm	chloride	255	7.2	23	0.7	15	0.4	19	0.5
good 20 - 30 ppm	nitrate as N	597	42.6	40	2.9	2	0.2	2	0.1
	phosphorus as P	0.4	0.0	0.4	0.0	0.3	0.0	0.1	0.0
toxic over 800	sulfate as S	32.8	2.1	14.5	0.9	10.4	0.6	191.7	12.0
	anion sum		51.9		4.4		1.3		12.7
toxic over 1 for many plants	boron as B	0.07	*	0.07	*	0.07	*	0.15	*
increasing problems start at 3	SAR	0.6	*	0.3	*	0.6	*	0.6	*
est. gypsum requirement-lbs./1000 sq. ft.		11		3		7		24	
	relative infiltration rate	fair/slow		slow/fair		slow		fair/slow	
	estimated soil texture	sandy loam		sandy loam		sandy loam		loam	
	lime (calcium carbonate)	slight		slight		no		no	
	organic matter	low/fair		low/fair		low/fair		low/fair	
	moisture content of soil	14.5%		13.2%		19.4%		18.9%	
	half saturation percentage	24.0%		18.8%		20.5%		28.6%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Analytical data determined on soil fraction passing a 2 mm sieve.