Board of Adjustment Staff Report

Meeting Date: April 3, 2014

Subject:	Special Use Permit Case Number SB14-004
Applicant:	Washoe County Community Services Department, Water Resources
Agenda Item Number:	**8G**
Project Summary:	Expansion of the South Truckee Meadows Water Reclamation Facility, wastewater treatment facility [Major Public Facilities Use Type]
Recommendation:	**Approval with Conditions**
Prepared by:	Roger Pelham, MPA, Senior Planner Planning and Development Division Washoe County Community Services Department Phone: 775.328.3622 E-Mail: rpelham@washoecounty.us

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Description

Special Use Permit Case Number SB14-004 (Water Reclamation Facility) – To allow the expansion of a wastewater treatment facility [Major Public Facilities Use Type Development Code Section 110.304.20(i)(2)] greater than 50% the size of the existing facility, to allow Major Grading [Development Code Section 110.438.35] for improvement of the driveway access, to allow final slopes greater than 3 horizontal to 1 vertical [Development Code Section 110.438.35] and to eliminate required landscaping for the project [Development Code Article 412].

- Applicant: Washoe County Community Services Department, Water Resources Branch
- Property Owner: Washoe County
- Location: South of Alexander Lake Road, approximately two miles southeast of its intersection with South McCarran Boulevard
- Assessor's Parcel Numbers: 165-012-01, 164-022-05, 165-011-05 & 165-011-06
- Parcel Size: ± 83.3 acres total
- Master Plan Categories: Suburban Residential (SR) and Rural (R)
- Regulatory Zones: Public and Semi-Public Facilities (PSP) and General Rural (GR)
- Area Plan: Southeast Truckee Meadows
- Citizen Advisory Board: South Truckee Meadows/Washoe Valley
- Development Code: Article 810, *Special Use Permits* and Article 438, *Grading*
- Commission District: 2 – Commissioner Humke
- Section/Township/Range: Section 4, Township 18 North, Range 20 East, MDM

Staff Report Contents

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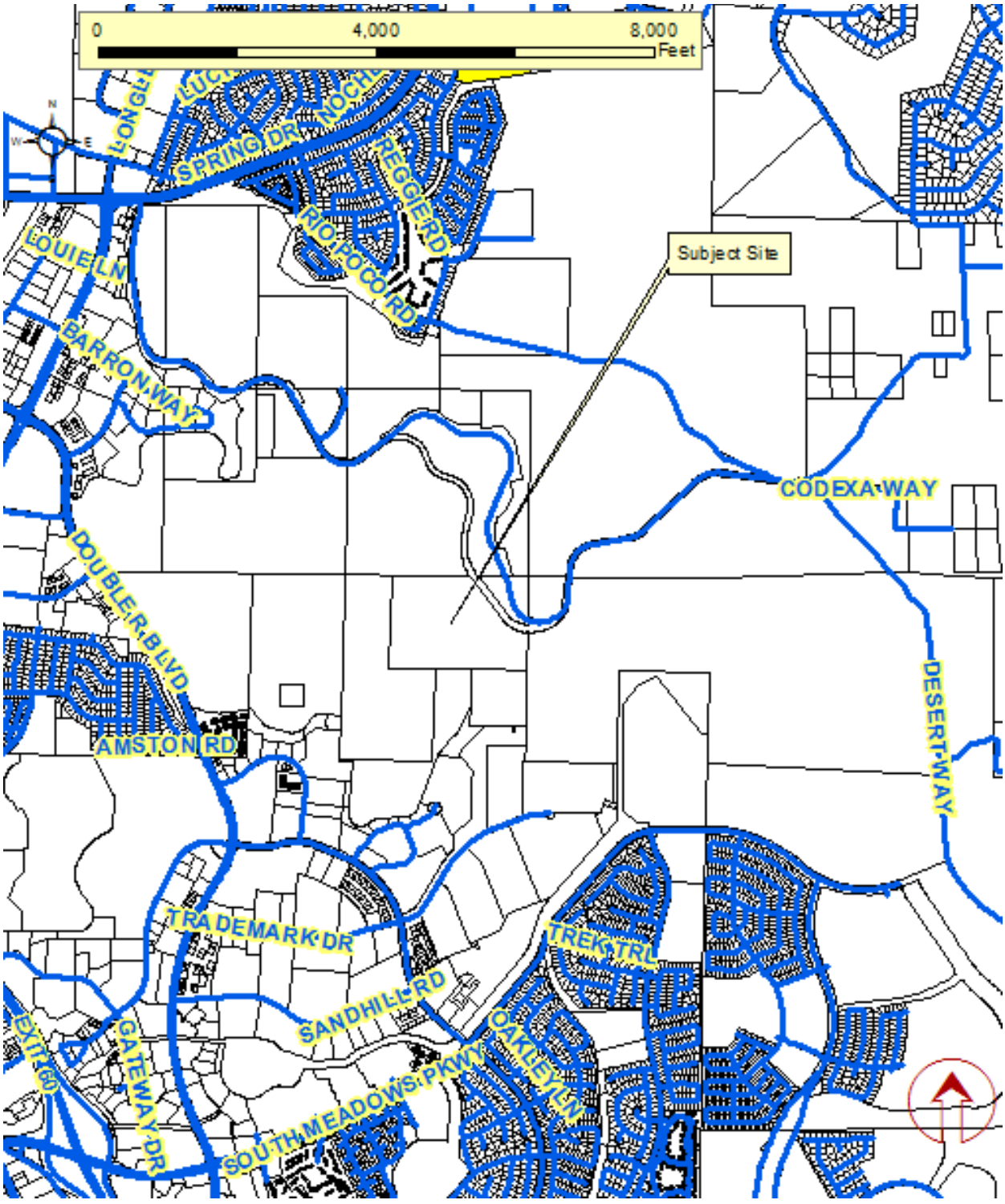
Special Use Permit

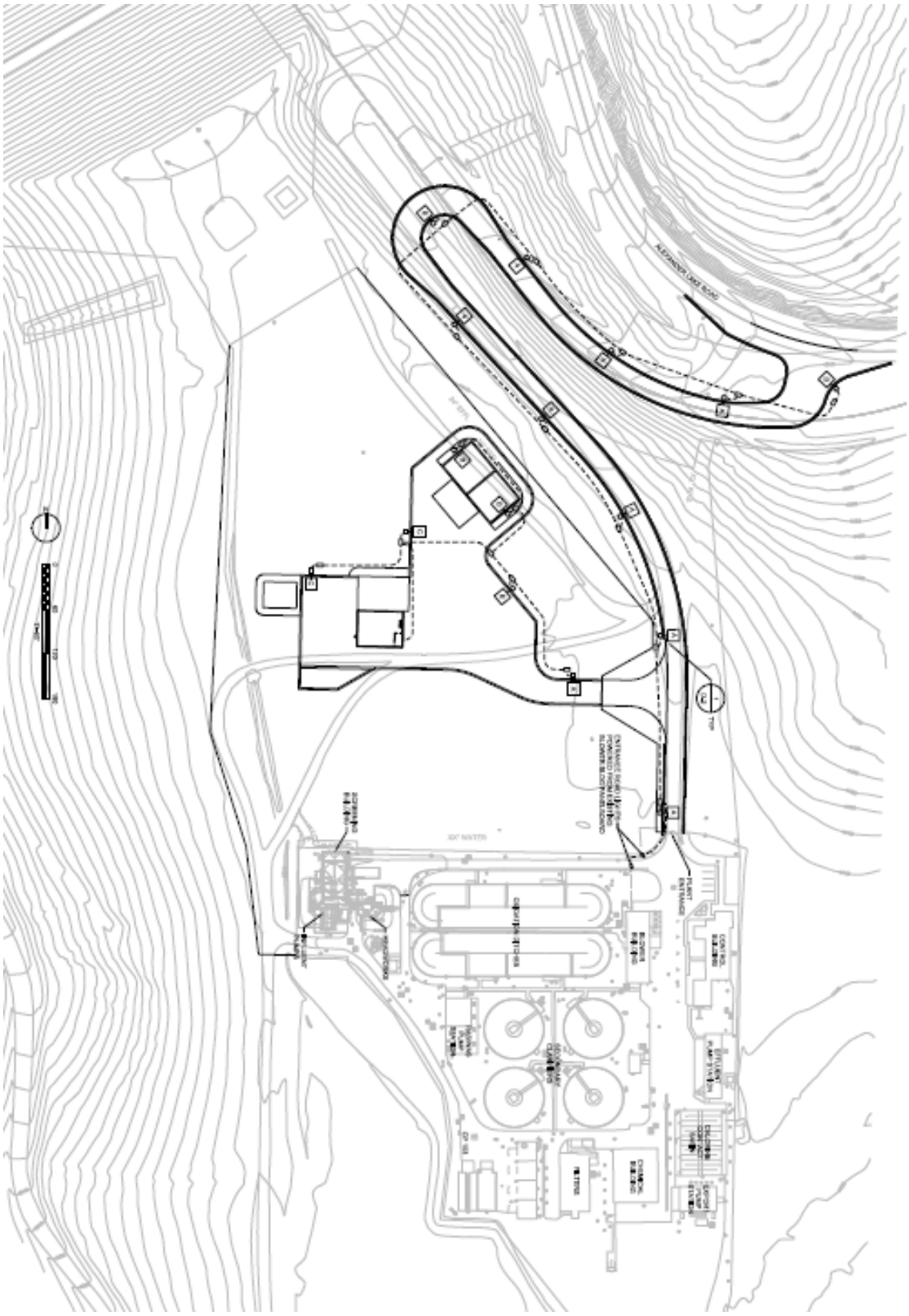
The purpose of a Special Use Permit is to allow a method of review to identify any potential harmful impacts on adjacent properties or surrounding areas for uses that may be appropriate within a regulatory zone; and to provide for a procedure whereby such uses might be permitted by further restricting or conditioning them so as to mitigate or eliminate possible adverse impacts. If the Board of Adjustment grants an approval of the Special Use Permit, that approval is subject to Conditions of Approval. Conditions of Approval are requirements that need to be completed during different stages of the proposed project. Those stages are typically:

- Prior to permit issuance (i.e., a grading permit, a building permit, etc.).
- Prior to obtaining a final inspection and/or a certificate of occupancy on a structure.
- Prior to the issuance of a business license or other permits/licenses.
- Some Conditions of Approval are referred to as "*Operational Conditions.*" These conditions must be continually complied with for the life of the business or project.

The Conditions of Approval for Special Use Permit Case No. SB14-004 are attached to this staff report and will be included with the Action Order.



Vicinity Map



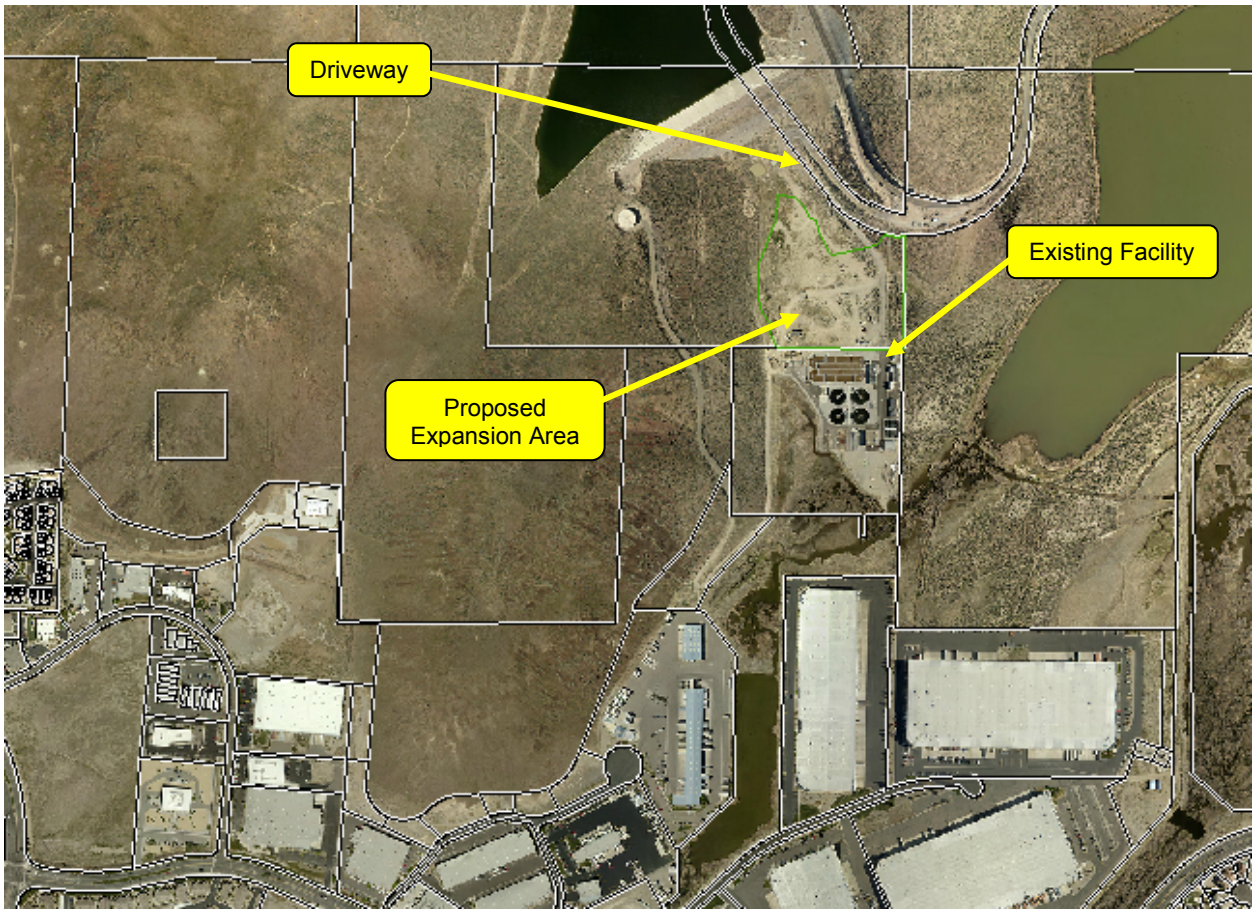
Site Plan

Project Evaluation

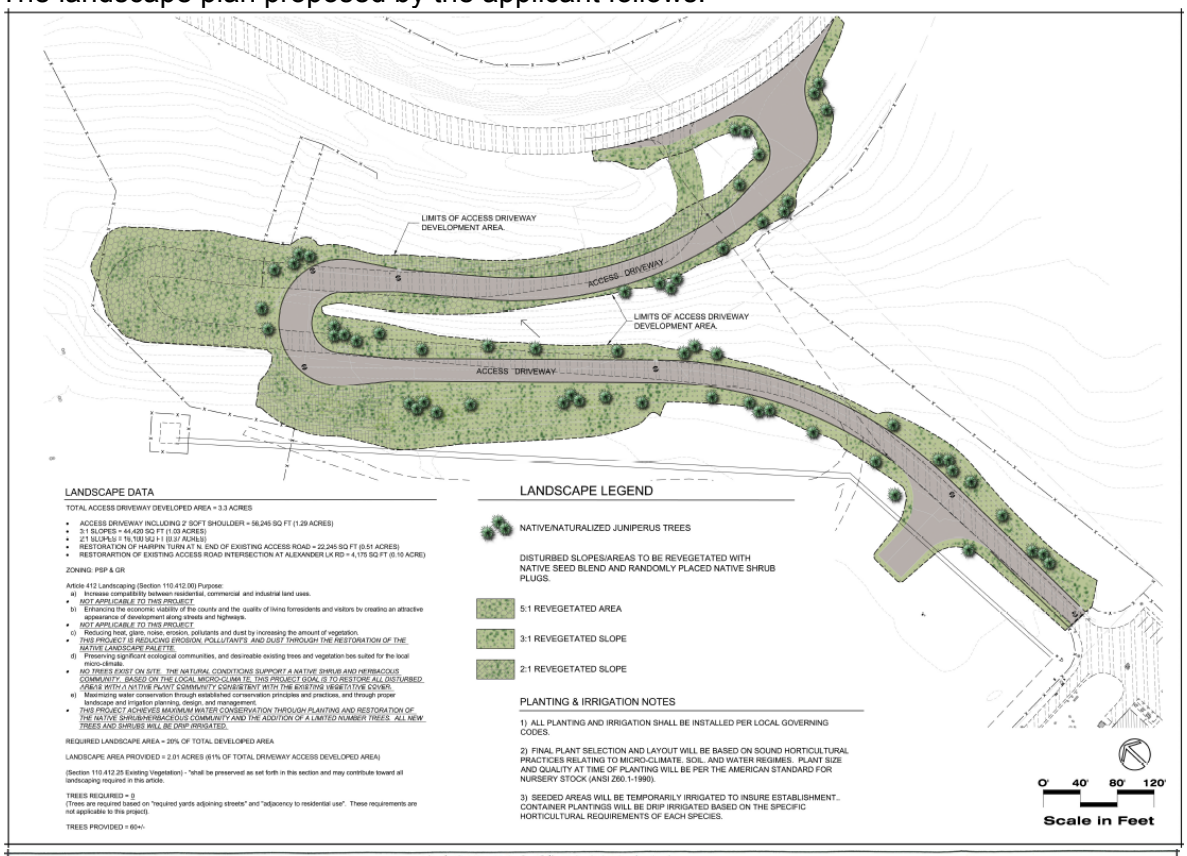
Washoe County Community Services Department, Water Resources is seeking to expand the south Truckee Meadows Water Reclamation Facility by approximately doubling the size and capacity of the facility. The expansion will include several buildings and extensive grading to the driveway access to accommodate large trucks that will be used to haul solid waste. The natural topography of the site is quite steep from Alexander Lake Road to the project site, which is on level ground. The applicant is requesting that the Board of Adjustment approve several modifications to grading and landscaping standards.

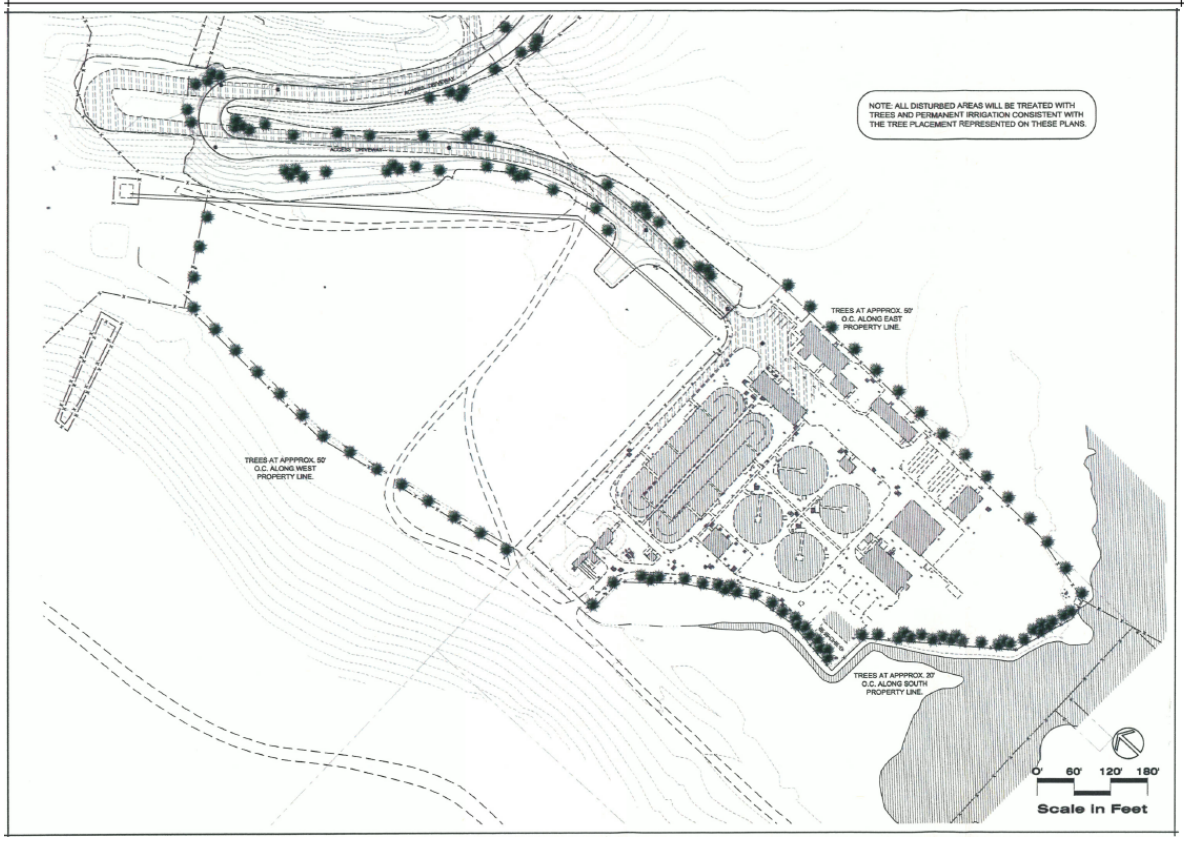
The use of the subject site for a wastewater treatment facility has been ongoing since 1990. The facility is non-conforming as it does not meet current Development Code requirements for parking, lighting and landscaping. The expansion of the facility by more than 50% requires that the entire facility be brought into conformance with current Development Code standards.

The following overhead photo shows that the facility is now adjacent to other commercial and industrial uses. This use type has the potential to have impact upon the surrounding area particularly in terms of odor and visual impacts. The design of the facility has incorporated mitigation to reduce odor emission. Landscaping, particularly evergreen trees, has been conditioned to help to visually screen the facility and to mitigate the off-site impact.



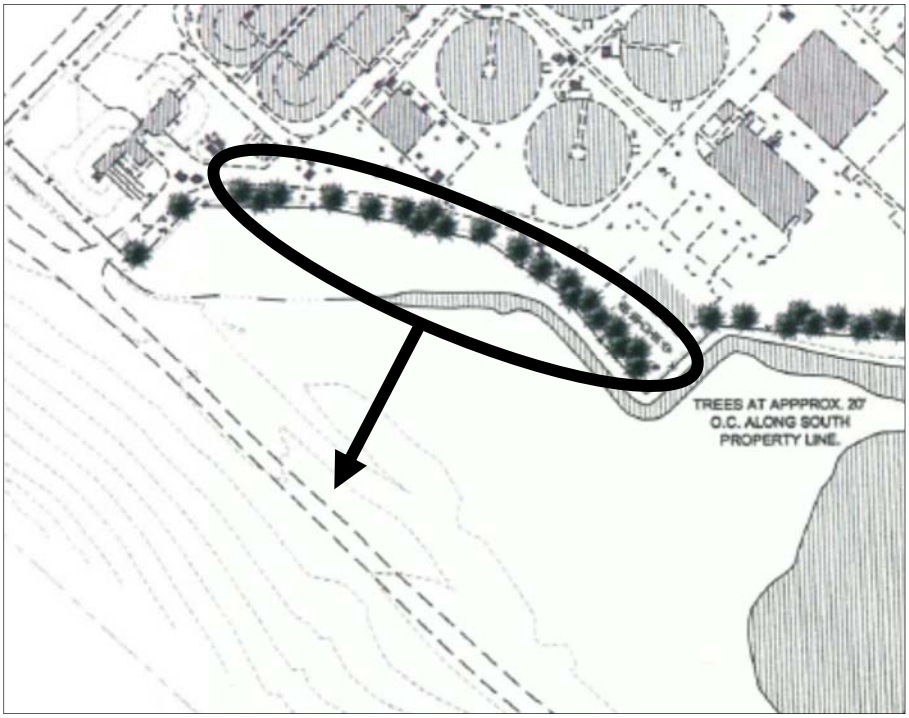
The landscape plan proposed by the applicant follows:



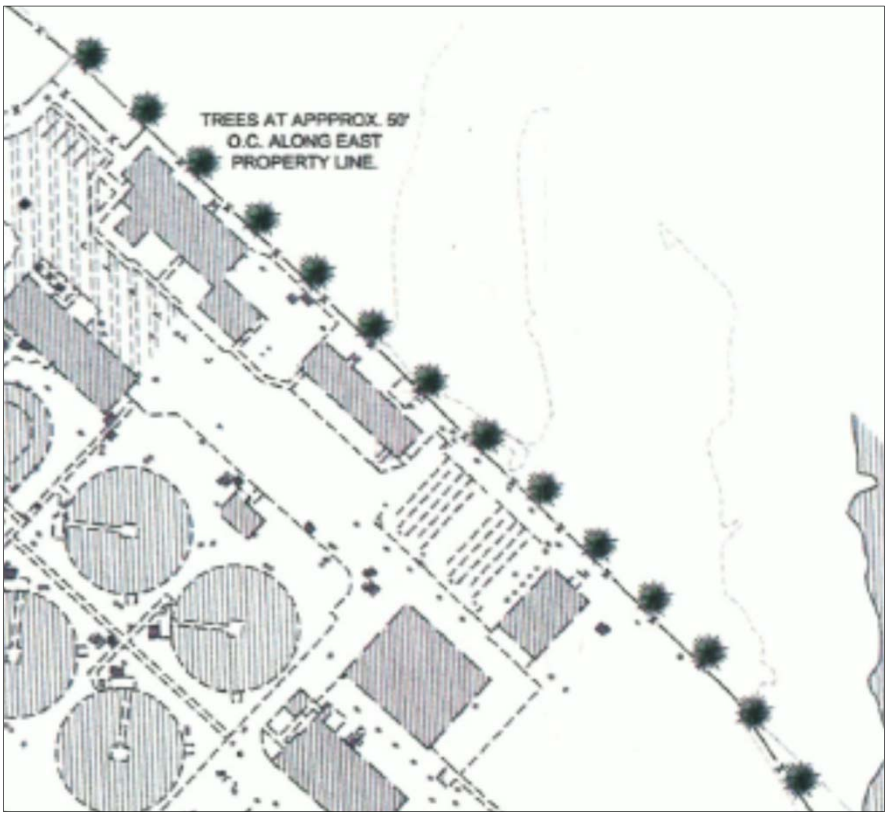


After conducting an on-site inspection staff identified several challenges that must be addressed in the final landscaping plans. Conditions of approval have been included to require that the applicant modify the landscaping in several ways. First the trees shown on the southwestern portion of the existing facility seem to be located in an area which cannot be practically planted, due to a steep manufactured slope and adjacent wetlands, a photo of that area follows.

Conditions have been included to require relocation of those trees to the area east of the access road located to the west of the wetlands as generally depicted on the following graphic.



The trees shown along the eastern side of the existing facility seem to be shown on the adjacent parcel. The applicant must either obtain an easement for planting and maintenance of the trees on that parcel or locate the trees within the subject parcel. If the trees are located within the parcel they may be planted in clusters to help screen the existing facilities and to avoid planting the trees where underground infrastructure exists.



No trees are shown to the north of the upper portion of the proposed driveway alignment. Trees will be required in that area at a ratio of one tree for every 40 lineal feet of driveway, in addition to those shown at other areas surrounding the driveway.

The trees planted throughout the project must be suited to the soil and water conditions of the site. 65% will be evergreens and 35% will be deciduous. The final landscape plans must be prepared by a landscape architect, registered in Nevada.

Exterior lighting in use at the facility does not comply with current Code requirements. Code [Section 110.414.21(a)(1)] requires that “covers must be installed on all lighting fixtures and

lamps must not extend below the bottom of the cover." A photo of a typical lighting fixture at the current facility follows. Covers will be required to be installed throughout the existing facility prior to a final inspection of the new portion of the facility.

During the site inspection staff noted two areas in which various unused items were being stored. Outdoor storage areas are required by Code to be screened. A condition of approval has been included to require slats to be installed in the fencing surrounding the storage area, for all outdoor storage to be in one area and for none of the stored items to be visible above the screening fence.

Grading to modify the driveway presents perhaps the most significant potential for impact created by the project proposed. The applicant is seeking to create slopes steeper than 3:1 (Horizontal : Vertical) and therefore a variance to standards is required. The Board of Adjustment has the authority [Section 110.810.20(e)] to "…vary standards of the Development Code as part of the approval of a special use permit application." The applicant is seeking such an approval. The Grading Code prohibits manufactured slopes steeper than 3:1, the intent is that steeper slopes should be stabilized by means of retaining walls to conserve undisturbed

slopes and maintain natural vegetation. The entire area of this project shows extensive prior disturbance and limited revegtation efforts. There is little, if any, natural slope remaining to be protected. While it is difficult to determine what the natural slope might have been prior to disturbance, it is likely that it was 2:1 or steeper, so it is reasonable that final slopes of 2:1 be constructed with this project. Stringent conditions of approval have been included to ensure complete stabilization and revegetation of all disturbed areas. Permanent irrigation is required to be provided to all trees and temporary irrigation is required for a period of not less than five years, at which time revegetation of the slopes will be evaluated and irrigation may be required to be maintained for a longer period of time. A photo of the existing slope, which includes the area proposed for grading with this permit, follows.

South Truckee Meadows/Washoe Valley Citizen Advisory Board

The proposed project was presented by the applicant at the regularly scheduled Citizen Advisory Board meeting on March 13th. The attached CAB memorandum reflects discussion on the following items: Odor control

- Visual mitigation
- Operational costs

Reviewing Agencies

The following agencies received a copy of the project application for review and evaluation.

- Nevada Division of Environmental Protection
- Washoe County Community Services Department
    - Land Development
    - Roads

  - Water / Sewer
  - Planning and Development
- Washoe County Health District
  - Air Quality
  - Vector-Borne Diseases Division
  - Environmental Health Division
- Truckee Meadows Fire Protection District
- Regional Transportation Commission
- Washoe/Storey Conservation District

Five out of the eleven above listed agencies/departments provided comments and/or recommended conditions of approval in response to their evaluation of the project application. A **summary** of each agency's comments and/or recommended conditions of approval and their contact information is provided. The Conditions of Approval document is attached to this staff report and will be included with the Action Order.

- Washoe County Planning and Development addressed landscaping, grading and lighting standards and imposed operational conditions that will be in effect for the life of the project.
  Contact: Roger Pelham, 775.328.3622, rpelham@washoecounty.us

- Truckee Meadows Fire Protection District provided a comment that, "The Truckee Meadows Fire Protection District (TMFPD) will require compliance with Washoe County Code 60. As submitted for the Special Use Permit, the project appears to meet those conditions, however the project is required to comply with these conditions upon project submittal for review for permit."
  Contact: Amy Ray, 775.326.6005, ARay@tmfpd.us

- Washoe County Engineering addressed standard grading and storm-water standards.
  Contact: Leo Vesely, 775.325.8032, lvesely@washoecounty.us

- Washoe County Roads addressed standard provisions for creating or modifying an access from a public roadway.
  Contact: Kimble Corbridge, 775.325.2054, kcorbridge@washoecounty.us

- Health District, Vector Control addressed drainage standards to limit the mosquito habitat.
  Contact: Jim Shaffer, 775.325.2434, jshaffer@washoecounty.us

Staff Comment on Required Findings

Section 110.810.30 of Article 810, *Special Use Permits*, within the Washoe County Development Code, requires that all of the following findings be made to the satisfaction of the Washoe County Board of Adjustment before granting approval of the request. Staff has completed an analysis of the special use permit application and has determined that the proposal is in compliance with the required findings as follows.

1. Consistency. That the proposed use is consistent with the action programs, policies, standards and maps of the Master Plan and the Southeast Truckee Meadows Area Plan.

   Staff Comment: The facility is in existence at this time, it is being expanded into an area that is already substantially disturbed and will be stabilized in accordance with the Conditions of Approval.

2. Improvements. That adequate utilities, roadway improvements, sanitation, water supply, drainage, and other necessary facilities have been provided, the proposed improvements are properly related to existing and proposed roadways, and an adequate public facilities determination has been made in accordance with Division Seven.

   Staff Comment: The facility is in existence at this time, and is being expanded.

3. Site Suitability. That the site is physically suitable for a water reclamation facility, and for the intensity of such a development.

   Staff Comment: The facility is in existence at this time, and is being expanded.

4. Issuance Not Detrimental. That issuance of the permit will not be significantly detrimental to the public health, safety or welfare; injurious to the property or improvements of adjacent properties; or detrimental to the character of the surrounding area.

   Staff Comment: Additional mitigation in the form of trees and screening fencing as well as slope stabilization will mitigate any significant detriment to the public health, safety or welfare and will not be injurious to the improvements of adjacent properties. As the facility is in existence at this time, expansion will not be detrimental to the character of the surrounding area.

5. Effect on a Military Installation. Issuance of the permit will not have a detrimental effect on the location, purpose or mission of the military installation.

   Staff Comment: There is no military installation in the vicinity of the project.

Recommendation

Those agencies which reviewed the application recommended conditions in support of approval of the project. Therefore, after a thorough analysis and review, Special Use Permit Case Number SB14-004 is being recommended for approval with conditions. Staff offers the following motion for the Board's consideration.

Motion

I move that after giving reasoned consideration to the information contained in the staff report and information received during the public hearing, the Washoe County Board of Adjustment approve with conditions Special Use Permit Case Number SB14-004 for the Washoe County Community Services Department, Water Resources, having made all five findings in accordance with Washoe County Development Code Section 110.810.30:

1. Consistency. That the proposed use is consistent with the action programs, policies, standards and maps of the Master Plan and the Southeast Truckee Meadows Area Plan;
2. Improvements. That adequate utilities, roadway improvements, sanitation, water supply, drainage, and other necessary facilities have been provided, the proposed improvements are properly related to existing and proposed roadways, and an adequate public facilities determination has been made in accordance with Division Seven;
3. Site Suitability. That the site is physically suitable for a water reclamation facility, and for the intensity of such a development;
4. Issuance Not Detrimental. That issuance of the permit will not be significantly detrimental to the public health, safety or welfare; injurious to the property or improvements of adjacent properties; or detrimental to the character of the surrounding area; and
5. Effect on a Military Installation. Issuance of the permit will not have a detrimental effect on the location, purpose or mission of the military installation.

Appeal Process

Board of Adjustment action will be effective 10 days after the public hearing date, unless the action is appealed to the County Commission, in which case the outcome of the appeal shall be determined by the Washoe County Commission.

xc: Applicant/Developer: Washoe County Community Services Department, Water Resources

Property Owner: Washoe County

EXHIBIT A

Conditions of Approval

Special Use Permit Case Number SB14-004

The project approved under Special Use Permit Case Number SB14-004 shall be carried out in accordance with the Conditions of Approval granted by the Board of Adjustment on April 3, 2014. Conditions of Approval are requirements placed on a permit or development by each reviewing agency. These Conditions of Approval may require submittal of documents, applications, fees, inspections, amendments to plans, and more. These conditions do not relieve the applicant of the obligation to obtain any other approvals and licenses from relevant authorities required under any other act or to abide by all other generally applicable Codes.

Unless otherwise specified, all conditions related to the approval of this Special Use Permit shall be met or financial assurance must be provided to satisfy the Conditions of Approval prior to issuance of a grading or building permit. The agency responsible for determining compliance with a specific condition shall determine whether the condition must be fully completed or whether the applicant shall be offered the option of providing financial assurance. All agreements, easements, or other documentation required by these conditions shall have a copy filed with the County Engineer and the Planning and Development Division.

Compliance with the Conditions of Approval related to this Special Use Permit is the responsibility of the applicant, his/her successor in interest, and all owners, assignees, and occupants of the property and their successors in interest. Failure to comply with any of the conditions imposed in the approval of the Special Use Permit may result in the initiation of revocation procedures.

Washoe County reserves the right to review and revise the Conditions of Approval related to this Special Use Permit should it be determined that a subsequent license or permit issued by Washoe County violates the intent of this approval.

For the purpose of conditions imposed by Washoe County, "may" is permissive and "shall" or "must" is mandatory.

Conditions of Approval are usually complied with at different stages of the proposed project. Those stages are typically:

- Prior to permit issuance (i.e., grading permits, building permits, etc.).
- Prior to obtaining a final inspection and/or a certificate of occupancy.
- Prior to the issuance of a business license or other permits/licenses.
- Some "Conditions of Approval" are referred to as "Operational Conditions." These conditions must be continually complied with for the life of the project or business.

The Washoe County Commission oversees many of the reviewing agencies/departments with the exception of the following agencies.

- **The DISTRICT BOARD OF HEALTH, through the Washoe County Health District, has jurisdiction over all public health matters in the Health District.**

Any conditions set by the District Health Department must be appealed to the District Board of Health.

- **The RENO-TAHOE AIRPORT AUTHORITY is directed and governed by its own Board. Therefore, any conditions set by the Reno-Tahoe Airport Authority must be appealed to their Board of Trustees.**

- **The REGIONAL TRANSPORTATION COMMISSION (RTC) is directed and governed by its own board. Therefore, any conditions set by the Regional Transportation Commission must be appealed to that Board.**

FOLLOWING ARE CONDITIONS OF APPROVAL REQUIRED BY THE REVIEWING AGENCIES. EACH CONDITION MUST BE MET TO THE SATISFACTION OF THE ISSUING AGENCY.

Washoe County Planning and Development Division

1. The following conditions are requirements of the Planning and Development Division, which shall be responsible for determining compliance with these conditions.

Contact Name – Roger Pelham, 775.328.3622, rpelham@washoecounty.us

a. The applicant shall demonstrate substantial conformance to the plans approved as part of this special use permit. The Planning and Development Division shall determine compliance with this condition.

b. The applicant shall submit complete construction plans and building permits shall be issued within two years from the date of approval by Washoe County. The applicant shall complete construction within the time specified by the building permits. Compliance with this condition shall be determined by the Planning and Development Division.

c. The applicant shall attach a copy of the action order approving this project to all administrative permit applications (including building permits) applied for as part of this special use permit.

d. rior to approval of any building or grading permit the applicant shall supply a photometric study for all exterior lighting on the subject site. There shall be no light spill-over at any property line belonging to any other property owner.

e. All exterior lighting fixtures, throughout the existing facility and the proposed improvements, shall be shielded such that light is emitted downward only.

f. A note shall be placed on all construction drawings and grading plans stating:

NOTE

Should any prehistoric or historic remains/artifacts be discovered during site development, work shall temporarily be halted at the specific site and the State Historic Preservation Office of the Department of Museums, Library and Arts shall be notified to record and photograph the site. The period of temporary delay shall be limited to a maximum of two (2) working days from the date of notification.

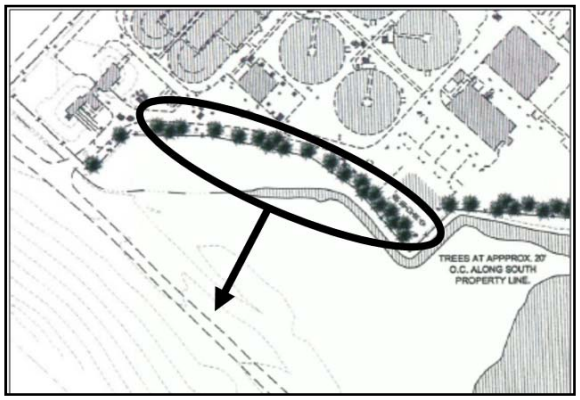
g. Prior to any ground disturbing activity, the applicant shall submit a landscaping/architectural design plan to the Planning and Development Division for review and approval. Said plan shall address, but not be limited to: type and color of building materials, general architectural design, parking, parking lot circulation and striping, signage, exterior lighting, fencing, trash enclosures, landscaping material (if plant material: type, size at time of planting, maturation size at full growth, period of time between planting and full growth), landscaping location, landscaping irrigation system, and financial assurances that landscaping will be planted and maintained. The trees planted throughout the project must be suited to the soil and water conditions of the site. Approximately 65% of the trees shall be evergreens and 35% shall be deciduous. All trees shall be provided with permanent irrigation which shall be maintained in good operational order for the life of the facility.

h. A certification letter or series of letters by a registered landscape architect or other persons permitted to prepare landscaping and irrigation plans pursuant to N.R.S. 623A shall be submitted to and approved by the Planning and Development Division. The letter(s) shall certify that all applicable landscaping provisions of Articles 408, 410 and 412 of the Development Code have been met. Any landscaping plans and the letter shall be wet-stamped. The letter shall indicate any provisions of the code that the Director of the Planning and Development Division has waived.

i. All landscaping shall be maintained in accordance with the provisions found in Section 110.412.75, Maintenance. A three-year maintenance plan shall be submitted by a licensed landscape architect registered in the State of Nevada to the Planning and Development Division, prior to a Certificate of Occupancy. The plan shall be wet-stamped.

j. Whenever possible trees shall be planted in staggered rows or clusters to provide a more natural appearance.

k. The trees shown on the southwestern portion of the existing facility are proposed to be located in an area in which trees cannot be practically planted, due to a steep manufactured slope and adjacent wetlands. Those trees shall be relocated to the to the area east of the access road located to the west of the wetlands as generally depicted on the following graphic.



l. The applicant must either obtain an easement for planting and maintenance of the trees on the adjacent parcel to the east **or** locate the trees within the subject

parcel. If the trees are located within the parcel they may be planted in clusters to help screen the existing facilities and to avoid planting the trees where underground infrastructure exists.Trees are required to be planted north of the upper portion of the proposed driveway alignment at a ratio of one tree for every 40 lineal feet of driveway, in addition to those shown at other areas surrounding the driveway.

n. All exterior material storage shall be in one location. That location shall be identified on building and grading plans. That location shall be surrounded by a fence, not less than six feet in height, that includes screening slats that result in at least 75% visual screening. No stored items shall extend above the required screening fence.

o. All disturbed areas on the subject site, not stabilized by buildings, asphalt or compacted road-base material, shall be re-vegetated with native plant species. The applicant shall submit a plan for the re-vegetation with an emphasis on quickly establishing complete vegetative coverage. Temporary irrigation shall be supplied to all disturbed areas. Prior to any final inspection the applicant shall arrange for an inspection by Planning and Development to demonstrate that the required sprinklers cover all disturbed areas. Temporary irrigation shall be maintained in good operational order for a period of not less than five years from the date of Final Inspection. At the end of five years the applicant shall arrange for an inspection by Planning and Development to determine if irrigation may be removed. Irrigation may be removed if all disturbed areas have vegetative ground cover equal to the surrounding, undisturbed areas.

p. The following **Operational Conditions** shall be required for the life of the development:

1. This special use permit shall remain in effect until or unless it is revoked or is inactive for one year.

2. Failure to comply with the Conditions of Approval shall render this approval null and void. Compliance with this condition shall be determined by the Planning and Development Division.

3. The applicant and any successors shall direct any potential purchaser/operator of the site and/or the special use permit to meet with the Planning & Development Division to review Conditions of Approval prior to the final sale of the site and/or the special use permit. Any subsequent purchaser/operator of the site and/or the special use permit shall notify the Planning and Development Division of the name, address, telephone number, and contact person of the new purchaser/operator within 30 days of the final sale.

Washoe County Engineering and Capital Projects Division

2. The following conditions are requirements of the Engineering and Capital Projects Division, which shall be responsible for determining compliance with these conditions.

Contact Name – Leo Vesely, 775.325.8032, lvesely@washoecounty.us

a. A complete set of construction improvement drawings, including an on-site grading plan, shall be submitted when applying for a building/grading permit. Grading shall comply with best management practices (BMP's) and shall include detailed plans for grading, site drainage, erosion control (including BMP locations and installation details), slope stabilization, and mosquito abatement. Placement or removal of any excavated materials shall be indicated on the grading plan. Silts shall be controlled on-site and not allowed onto adjacent property.

b. The applicant shall obtain from the Nevada Division of Environmental Protection a Stormwater Discharge Permit for construction and submit a copy to Engineering prior to issuance of a grading permit.

c. The applicant shall complete and submit the Construction Permit Submittal Checklist, the Performance Standards Compliance Checklist and pay the Construction Stormwater Inspection Fee prior to obtaining a grading permit. The County Engineer shall determine compliance with this condition.

d. A grading bond of $2,000/acre of disturbed area shall be provided to Engineering prior to issuance of a grading permit.

e. All disturbed areas left undeveloped for more than 30 days shall be treated with a dust palliative. Disturbed areas left undeveloped for more than 45 days shall be re-vegetated. Methods and seed mix must be approved by the County Engineer with technical assistance from the Washoe-Storey Conservation District.

f. A hydrology/hydraulic report prepared by a registered engineer shall be submitted to Engineering for review and approval. The report shall include the locations, points of entry and discharge, flow rates and flood limits of all 5- and 100-year storm flows impacting both the site and offsite areas and the methods for handling those flows. The report shall include all storm drain pipe and ditch sizing calculations and a discussion of and mitigation measures for any impacts on existing offsite drainage facilities and properties

g. Any increase in storm water runoff resulting from the development shall be retained on site to the satisfaction of the County Engineer.

h. Standard reinforced concrete headwalls or other approved alternatives shall be placed on the inlet and outlet of all drainage structures and rip rap shall be used to prevent erosion at the inlets and outlets of all pipe culverts to the satisfaction of the County Engineer.

i. The applicant shall provide pretreatment for petrochemicals and silt for all storm drainage from the site to the satisfaction of the County Engineer.

j. The minimum pavement requirements for on-site paving shall be four inches (4") of asphalt over six inches (6") of granular base to the satisfaction of the County Engineer.

k. The applicant shall obtain a street excavation permit for the driveway approach.

l. All improvements in the County right of way shall be constructed in accordance with County standards.

m. The abandoned driveway shall be restored to the satisfaction of the County Engineer.

Washoe County District Health Department

3. The following conditions are requirements of the District Health Department, which shall be responsible for determining compliance with these conditions. The District Board of Health has jurisdiction over all public health matters in the Health District. Any conditions set by the District Health Department must be appealed to the District Board of Health.

Contact Name – Jim Shaffer, 775.328.2434, jshaffer@washoecounty.us

a. Any new private catch basins will require a water quality insert placed within all basins to improve water quality downstream and prevent mosquitoes from colonizing this infrastructure (040.013).

b. Water run-off originating on unpaved areas will be collected in cut off ditches and not allowed to enter the driveway. This cut off ditch will require 4-6 inch rock placed in the flow line of this ditch (040.021).

c. The existing drainage ditch that discharges to Alexander Lake will require 4-6 inch cobble rock in the flow section of this waterway. This will reduce the downstream transport of sediment (040.021).

d. Prior to the sign off of the building plans the above detail designs are required on the plans.

*** End of Conditions ***

WASHOE COUNTY
COMMUNITY SERVICES DEPARTMENT
Engineering and Capital Projects Division

EXHIBIT B

"Dedicated to Excellence in Public Service"

1001 East 9th Street PO Box 11130 Reno, Nevada 89520 Telephone: (775) 328-2040 Fax: (775) 328-3699

INTEROFFICE MEMORANDUM

DATE: March 06, 2014

TO: Roger Pelham, Planning and Development Division

FROM: Leo R. Vesely, P.E., Engineering and Capitol Projects Division

SUBJECT: **SB14-004**
APN 165-011-05
WATER RECLAMATION FACILITY

I have reviewed the referenced special use permit and have the following conditions:

1. A complete set of construction improvement drawings, including an on-site grading plan, shall be submitted when applying for a building/grading permit. Grading shall comply with best management practices (BMP's) and shall include detailed plans for grading, site drainage, erosion control (including BMP locations and installation details), slope stabilization, and mosquito abatement. Placement or removal of any excavated materials shall be indicated on the grading plan. Silts shall be controlled on-site and not allowed onto adjacent property.

2. The applicant shall obtain from the Nevada Division of Environmental Protection a Stormwater Discharge Permit for construction and submit a copy to the Engineering Division prior to issuance of a grading permit.

3. The applicant shall complete and submit the Construction Permit Submittal Checklist, the Performance Standards Compliance Checklist and pay the Construction Stormwater Inspection Fee prior to obtaining a grading permit. The County Engineer shall determine compliance with this condition.

4. A grading bond of $2,000/acre of disturbed area shall be provided to the Engineering Division prior to issuance of a grading permit.

5. All disturbed areas left undeveloped for more than 30 days shall be treated with a dust palliative. Disturbed areas left undeveloped for more than 45 days shall be re-vegetated. Methods and seed mix must be approved by the County Engineer with technical assistance from the Washoe-Storey Conservation District.

6. A hydrology/hydraulic report prepared by a registered engineer shall be submitted to the Engineering Division for review and approval. The report shall include the locations, points of entry and discharge, flow rates and flood limits of all 5- and 100-year storm flows impacting both the site and offsite areas and the methods for handling those flows. The report shall include all storm drain pipe and ditch sizing calculations and a

discussion of and mitigation measures for any impacts on existing offsite drainage facilities and properties

7. Any increase in storm water runoff resulting from the development shall be retained on site to the satisfaction of the County Engineer.

8. Standard reinforced concrete headwalls or other approved alternatives shall be placed on the inlet and outlet of all drainage structures and rip rap shall be used to prevent erosion at the inlets and outlets of all pipe culverts to the satisfaction of the County Engineer.

9. The applicant shall provide pretreatment for petrochemicals and silt for all storm drainage from the site to the satisfaction of the County Engineer.

10. The minimum pavement requirements for on-site paving shall be three inches (4") of asphalt over six inches (6") of granular base to the satisfaction of the County Engineer.

11. The applicant shall obtain a street excavation permit for the driveway approach.

12. All improvements in the County right of way shall be constructed in accordance with County standards.

13. The abandoned driveway shall be restored to the satisfaction of the County Engineer.

LRV/lrv

Exhibit C

Amy Ray
Fire Marshal

Tim Leighton
Division Chief

Charles A. Moore
Fire Chief

March 7, 2014

Washoe County Community Services Department
1001 East Ninth Street
Reno, NV 89512

Re: Special Use Permit Case Number: SB 14-004 – South Truckee Meadows Water Reclamation Facility

The Truckee Meadows Fire Protection District (TMFPD) will require compliance with Washoe County Code 60. As submitted for the Special Use Permit, the project appears to meet those conditions, however the project is required to comply with these conditions upon project submittal for review for permit.

Please contact me with any questions at (775) 326-6005.

Thank you,

Amy Ray
Fire Marshal

Exhibit D

Washoe County Health District

ENVIRONMENTAL HEALTH SERVICES DIVISION

Public Health
Prevent. Promote. Protect.

Washoe County
Community Development
C/O Roger Pelham
1001 E Ninth St.
Reno, NV 89512

March 27, 2014

Dear Roger,

After having reviewed the special use permit request for the Water Reclamation Facility (SB14-004), please be advised of the following.

1. Any new private catch basins will require a water quality insert placed within all basins to improve water quality downstream and prevent mosquitoes from colonizing this infrastructure (040.013).

2. Water run-off originating on unpaved areas will be collected in cut off ditches and not allowed to enter the driveway. This cut off ditch will require 4-6 inch rock placed in the flow line of this ditch (040.021).

3. The existing drainage ditch that discharges to Alexander Lake will require 4-6 inch cobble rock in the flow section of this waterway. This will reduce the downstream transport of sediment (040.021).

4. Prior to the sign off of the building plans the above detail designs are required on the plans.

If there are any questions concerning the aforementioned vector-planning conditions as it relates to environmental health, please call us at 785-4599.

Sincerely,

J. L. Shaffer
Coordinator/Planner
Vector-Borne Diseases
Environmental Health Division

Exhibit E

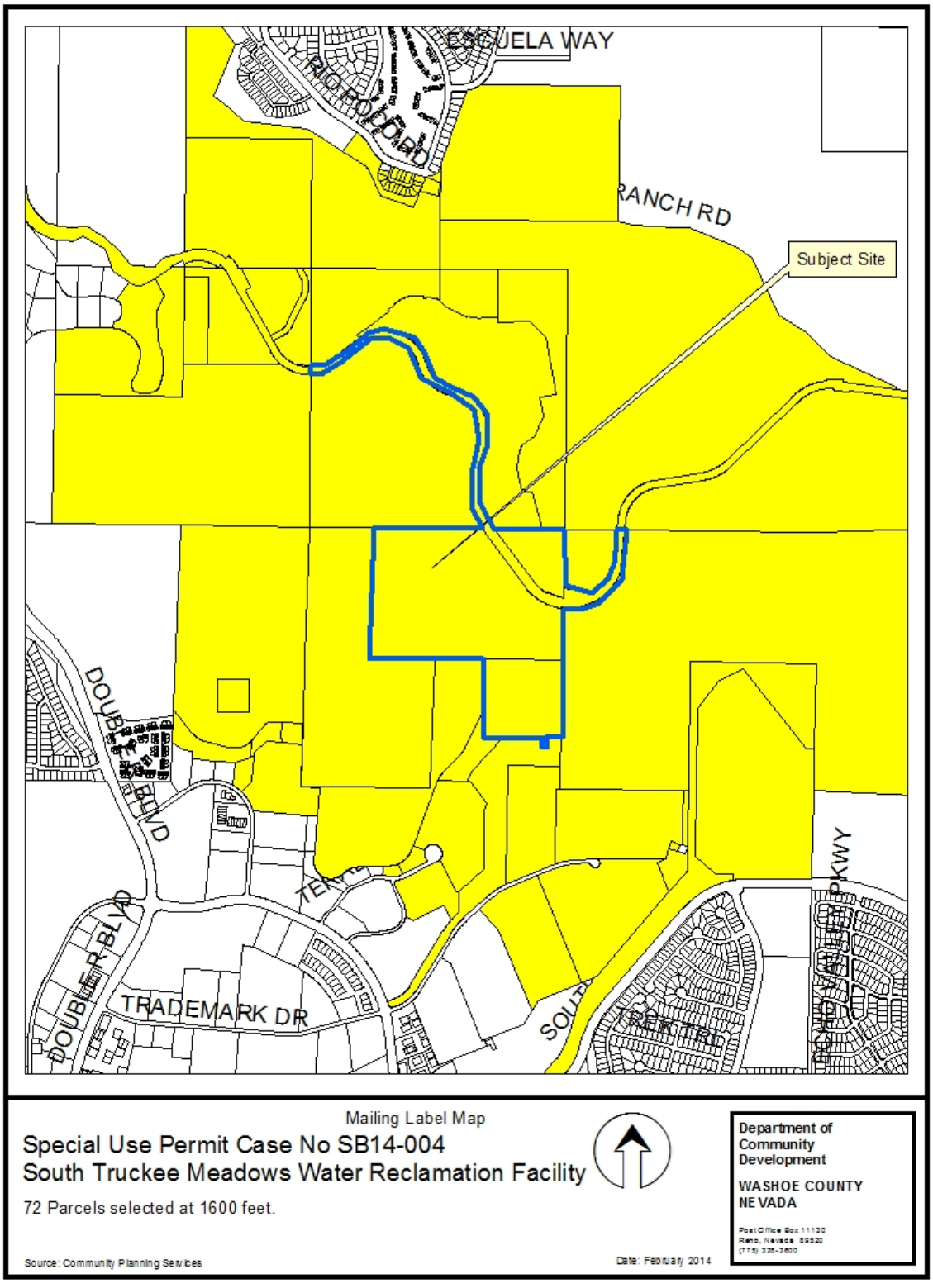
From: Corbridge, Kimble
Sent: Monday, March 03, 2014 1:20 PM
To: DeLozier, Sara
Cc: Vesely, Leo
Subject: Special Use Permit Case Number SB14-004 (Water Reclamation Facility)

Sara,
I have reviewed the referenced SUP and have the following conditions for the road.

1. The applicant shall obtain a street cut permit for the driveway.
2. The improvements in the County right of way shall be constructed in accordance with County standards.
3. The abandoned driveway shall be restored to the satisfaction of the County Engineer

Thx,
Kimble

EXHIBIT F



Mailing Label Map

Special Use Permit Case No SB14-004
South Truckee Meadows Water Reclamation Facility

72 Parcels selected at 1600 feet.

Source: Community Planning Services

Date: February 2014

Department of Community Development

WASHOE COUNTY NEVADA

Post Office Box 11130
Reno, Nevada 89520
(775) 328-3600

Community Services Department

Planning & Development

SPECIAL USE PERMIT APPLICATION

Washoe County Development Application

Your entire application is a public record. If you have a concern about releasing personal information, please contact Community Development staff at 775.328.6100.

Project Information	**Staff Assigned Case No.:** _____
Project Name (commercial/industrial projects only): South Truckee Meadows Water Reclaimation Facility Solids Management Project	
Project Description:	Expansion of the South Truckee Meadow Water Reclaimation Facility and driveway improvements.
Project Address: 8500 Alexander Lake Road, Reno, Nevada 89512	
Project Area (acres or square feet): 34 acres	
Project Location (with point of reference to major cross streets **AND** area locator):	

Assessor's Parcel No(s):	Parcel Acreage:	Assessor's Parcel No(s):	Parcel Acreage:
165-012-01	7.28	165-011-05	49.43
164-022-05	11.65	165-011-06	14.97

Section(s)/Township/Range: S4 T18 R20

Indicate any previous Washoe County approvals associated with this application:
Case Nos.

Applicant Information (attach additional sheets if necessary)

Property Owner:		**Professional Consultant:**	
Name: Washoe County		Name: CH2M Hill	
Address: 4930 Energy Way		Address: 2525 Airpark Dr.	
Reno, NV	Zip: 89502	Redding, CA	Zip: 96001
Phone: 775-954-4600	Fax: 775-954-4610	Phone: 530-243-5831	Fax:
Email: tsimpson@washoecounty.us		Email: Jerry.Dehn@CH2M.com	
Cell:	Other:	Cell:	Other:
Contact Person: Timothy Simpson		Contact Person: Jerry Dehn, P.E.	
Applicant/Developer:		**Other Persons to be Contacted:**	
Name:		Name: Gray and Assoc.	
Address:		Address: 130 Vine St.	
	Zip:	Reno, NV	Zip: 89503ethomas
Phone:	Fax:	Phone: 775-329-2911	Fax:
Email:		Email: ethomas@grayassociates.net	
Cell:	Other:	Cell:	Other:
Contact Person:		Contact Person: Ed Thomas, P.E.	

For Office Use Only

Date Received:	Initial:	Planning Area:
County Commission District:		Master Plan Designation(s):
CAB(s):		Regulatory Zoning(s):

Special Use Permit Application
Supplemental Information

(All required information may be separately attached)

Chapter 110 of the Washoe County Code is commonly known as the Development Code. Specific references to special use permits may be found in Article 810, Special Use Permits.

1. What is the type of project being requested?

The expansion of the South Truckee Meadow Water Reclamation Facility (STMWRF) to include solids handling and improvements to the plants driveway.

2. What currently developed portions of the property or existing structures are going to be used with this permit?

The current treatment facility is immediately south of the proposed expansion and there is an existing driveway to the facility.

3. What improvements (e.g. new structures, roadway improvements, utilities, sanitation, water supply, drainage, parking, signs, etc.) will have to be constructed or installed and what is the projected time frame for the completion of each?

Plans include the construction of 2 digesters with an adjoining equipment building, a dewatering building, odor control, fencing, and improvements to the driveway.

The entire project will go to bid in July - Oct. Construction is anticipated to begin Dec 1, 2014 and continue until approximately June 30, 2016. Driveway construction is anticipated to begin in July 2014

4. What is the intended phasing schedule for the construction and completion of the project?

The project will not be phased.

5. What physical characteristics of your location and/or premises are especially suited to deal with the impacts and the intensity of your proposed use?

The current treatment facility was constructed in 1990. The facility has continued to operate since that time and today operates at approx. 3 million gallons per day. A cultural resource report was prepared by Kautz Environmental Consultants, Inc. that identified the site as not significant or eligible for nomination to the National Register of Historic Places. There has historically been no complaints by adjacent property owners such as noise or odor.

6. What are the anticipated beneficial aspects or effects your project will have on adjacent properties and the community?

Currently waste solids generated at the facility are pumped to the Truckee Meadows Water Reclamation Facility (TMWRF). Treatment of solids at STMWRF will not only improve the processing at TMWRF but transportation of solids to TMWRF will no longer be an economical option. The processing of solids will benefit Washoe County economically because Washoe County will no longer pay service fees to TMWRF. It will allow the utility to control all aspects of the treatment process. Solids handling also allows the utility to meet its long-term goal of sustainability and good stewards to the region.

7. What will you do to minimize the anticipated negative impacts or effects your project will have on adjacent properties?

Noise will be contained within buildings. Odor control will be implemented for both the dewatering building and the digesters. Colors will be neutral in order to blend with the natural environment.

8. Please describe operational parameters and/or voluntary conditions of approval to be imposed on the project special use permit to address community impacts:

STMWRF is operated from 7:30am to 4:30pm Monday through Friday and remotely operated after hours. The proposed near-term operational strategy is to dewater solids onsite and haul to the Lockwood Regional Landfill for disposal. Long-term disposal strategies include solids stabilization and land applying biosolids for disposal.

9. How many improved parking spaces, both on-site and off-site, are available or will be provided? (Please indicate on site plan.)

Additional staff will not be required for the operation of the expanded treatment facility. The project will not generate a need for additional parking.

10. What types of landscaping (e.g. shrubs, trees, fencing, painting scheme, etc.) are proposed? (Please indicate location on site plan.)

See site plan and fencing detail, Sheet 8 - Detail 1 of the attached Biosolids Facilities Project Design Sheets.

11. What type of signs and lighting will be provided? On a separate sheet, show a depiction (height, width, construction materials, colors, illumination methods, lighting intensity, base landscaping, etc.) of each sign and the typical lighting standards. (Please indicate location of signs and lights on site plan.)

A sign will be constructed at the entrance and located at the entry way. The sign will be approx. 24" X 36" metal sign mounted on posts. Lighting will be added to buildings and along the driveway. Attached is a detail of the lighting improvements, Sheet 9 - Detail 1 of the Biosolids Facilities Project Design Sheets.

12. Are there any restrictive covenants, recorded conditions, or deed restrictions (CC&Rs) that apply to the area subject to the special use permit request? (If so, please attach a copy.)

☐ Yes	☑ No

13. Community Sewer

☑ Yes	☐ No

Community Water

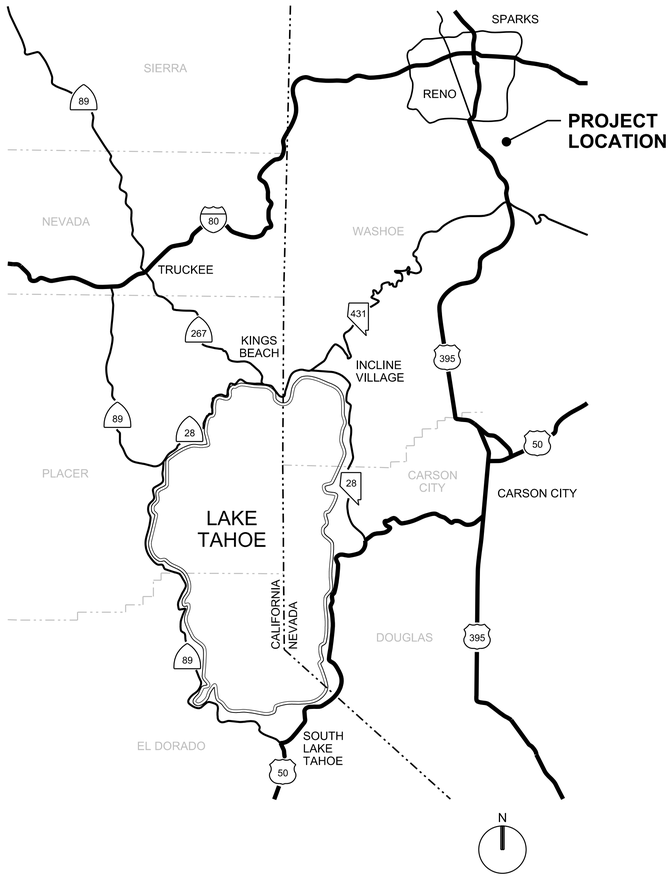
☑ Yes	☐ No

SOUTH TRUCKEE MEADOWS WATER RECLAMATION FACILITY
BIOSOLIDS FACILITIES PROJECT

WASHOE COUNTY COMMUNITY SERVICES DEPARTMENT
WATER RESOURCES

DAVID SOLARO
DIRECTOR

SHEET NUMBER	DRAWING NUMBER	DRAWING TITLE
1	G-1	VICINITY MAP, LOCATION MAP AND INDEX TO DRAWINGS
2	C-1	SITE PLAN
3	C-2	GRADING PLAN
4	A-1	DEWATERING BUILDING ELEVATIONS
5	A-2	DIGESTER FACILITY ELEVATIONS
6	A-3	DIGESTER FACILITY ELEVATIONS
7	E-1	SITE LIGHTING AND ACCESS ROAD LIGHTING PLAN
8	D-1	CHAIN LINK FENCE DETAIL
9	D-2	LUMINAIRE FIXTURE DETAIL



VICINITY MAP

SPECIAL USE PERMIT SUBMITTAL
FEBRUARY 2014

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(775) 329-7300

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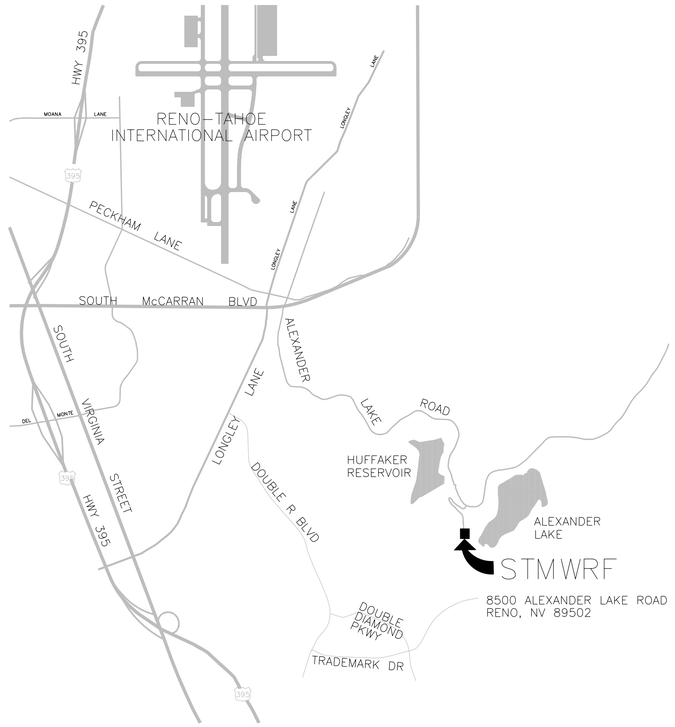
REDDING, CA 96001
(530) 243-5831

811 Know what's **below.** **Call** before you dig.



LOCATION MAP
NTS

NO.	DATE	REVISION	DR	CHK	APVD	BY
			C.MCCOY	CD MacDonald	APVD	

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AREA OFFICE:
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(775) 329-7300

SOUTH TRUCKEE MEADOWS WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

GENERAL
COVER SHEET, VICINITY MAP, LOCATION MAP, AND INDEX TO DRAWINGS

30% DESIGN - NOT FOR CONSTRUCTION

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	G-1
SHEET	1 of 9

NOTE:

1. THIS SITE PLAN IS IN COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF THE WASHOE COUNTY DEVELOPMENT CODE.
2. THE DRIVEWAY DESIGN AND ASSOCIATED CROSS SECTIONS AND DETAILS TO BE PROVIDED BY OTHERS.
3. MAPPING PREPARED BY NORTH AMERICAN MAPPING USING PHOTOGRAMMETRIC METHODS. DATE OF PHOTO, MARCH 21, 2008.
4. POINTS WERE TIED WITH GPS AND ARE NAD '83 GRID ORIGINALLY THEN SCALED BY 1.000197939 (TO GET TO GROUND). VERTICAL DATUM BASED ON NAVD 88.

SURVEY CONTROL POINTS				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP 103	14842186.30	2297385.31	4437.32	PK NAIL
CP 119	14842678.55	2297679.68	4441.32	RBC
CP 120	14842883.31	2297012.34	4440.49	RBC

PROPERTY LINE, TYP
1355.27', N1°9'49"E
800.17', N1°9'49"E
ALEXANDER LAKE ROAD
XX" WAS
PROPOSED DRIVEWAY, DESIGN BY GRAY AND ASSOCIATES
TO ALEXANDER LAKE ROAD
CP 119
EXISTING PLANT ENTRANCE
CONNECT TO EXISTING FENCE
304'
FENCE, TYP
1 / D-1
GATE, SITE ENTRANCE
DIGESTER, COVERED
TO PROPERTY LINE 1570'
24" EFFL
PAVEMENT
94'
TRUCK BAY
DIGESTER EQUIPMENT BUILDING
278'
DEWATERING BUILDING
ODOR CONTROL STACK
GRAVEL SURFACING, TYP
CONNECT TO EXISTING FENCE
EXISTING EFFLUENT PIPE
50%±
CURB AND GUTTER, TYP
VALLEY GUTTER
ODOR CONTROL BIOFILTER (FUTURE)
EXISTING DRAINAGE DITCH
EXISTING POND
CONNECT TO EXISTING FENCE
CP 120
APN 165-011-05 WASHOE COUNTY
1338' TO PROPERTY LINE
60%±
FACE OF DAM
CREST OF DAM
30%±
816.28', S89°30'54"E
XX" WATER
CONTROL BUILDING
EFFLUENT PUMP STATION
CHLORINE CONTACT BASIN
EXPORT PUMP STATION
BLOWER BUILDING
CHEMICAL BUILDING
FILTERS
SECONDARY CLARIFIERS
OXIDATION DITCHES
RAS/WAS PUMP STATION
CP 103
SCREENING BUILDING
HEADWORKS
INFLUENT PUMPS
CONNECT TO EXISTING FENCE
APN 165-011-06 WASHOE COUNTY
168'
806.91, N0°0'0"E
N
0 60 120 180
1"=60'

NO.	DATE	DSGN	DR	CHK	APVD
		T HOWARD	K SILVA		APVD

REVISION BY

DESIGN OFFICE:
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(530) 243-5831

AREA OFFICE:
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BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

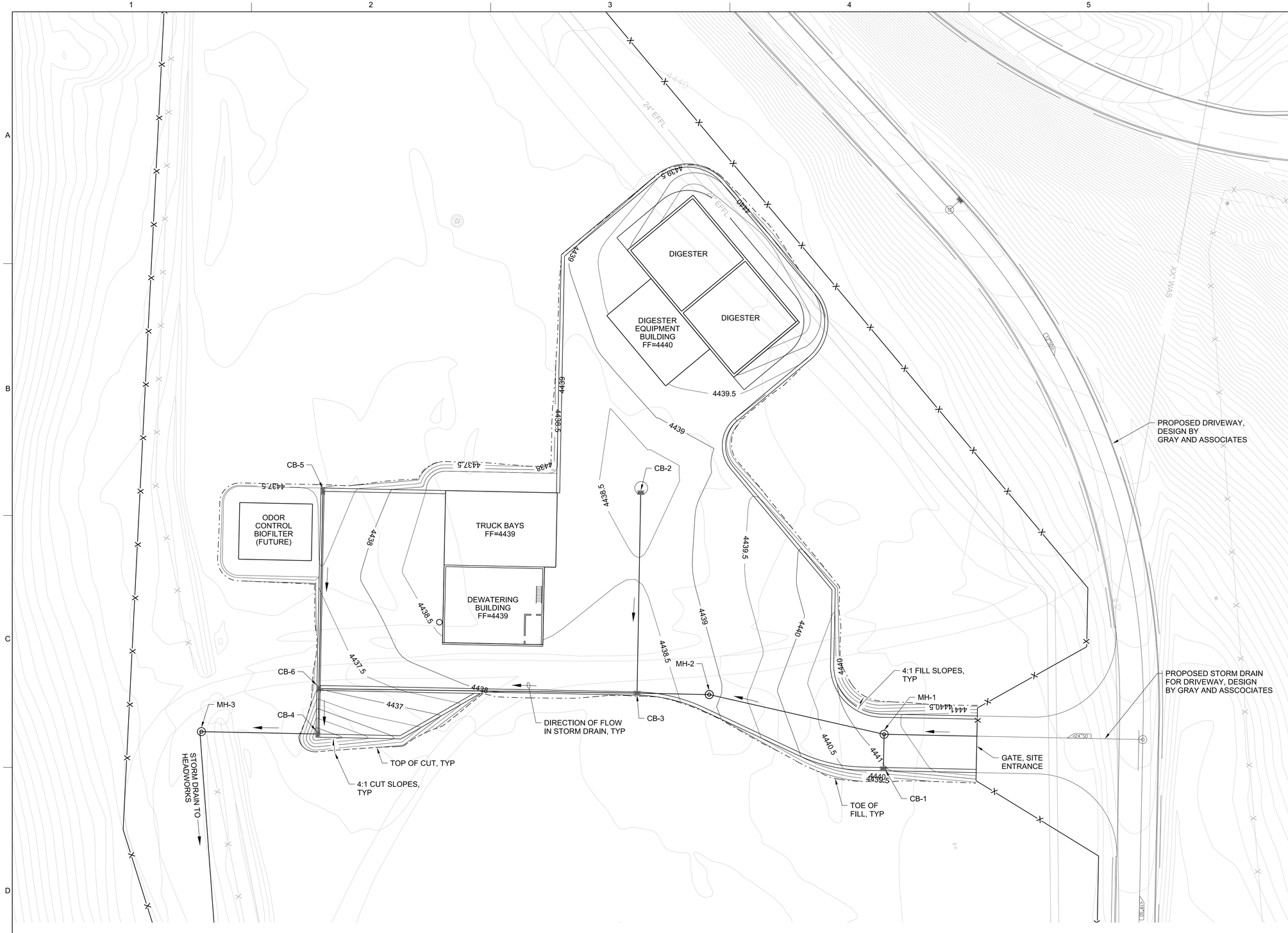
CIVIL

OVERALL SITE PLAN

30% DESIGN - NOT FOR CONSTRUCTION

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	C-1
SHEET	2 of 9



NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
DSGN	T HOWARD		C MCCOY				

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WATER RECLAMATION FACILITY (STMWRF)
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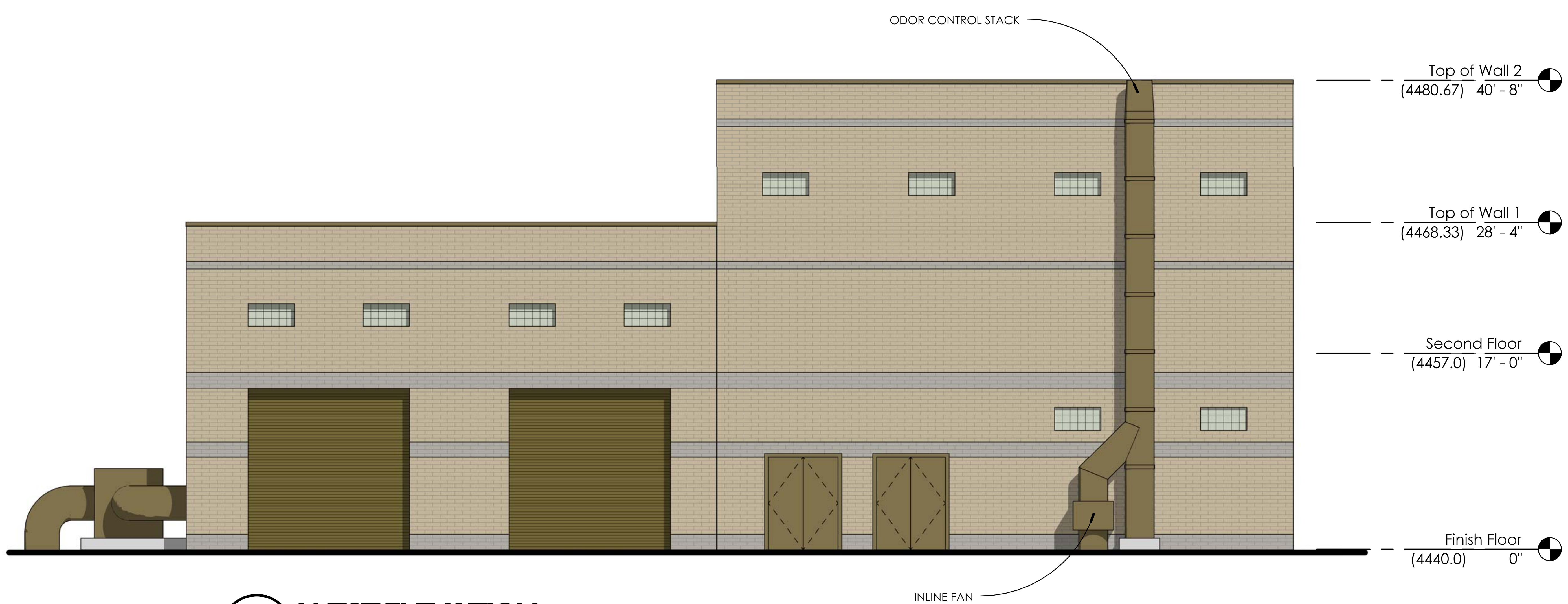
RENO, NEVADA

CIVIL

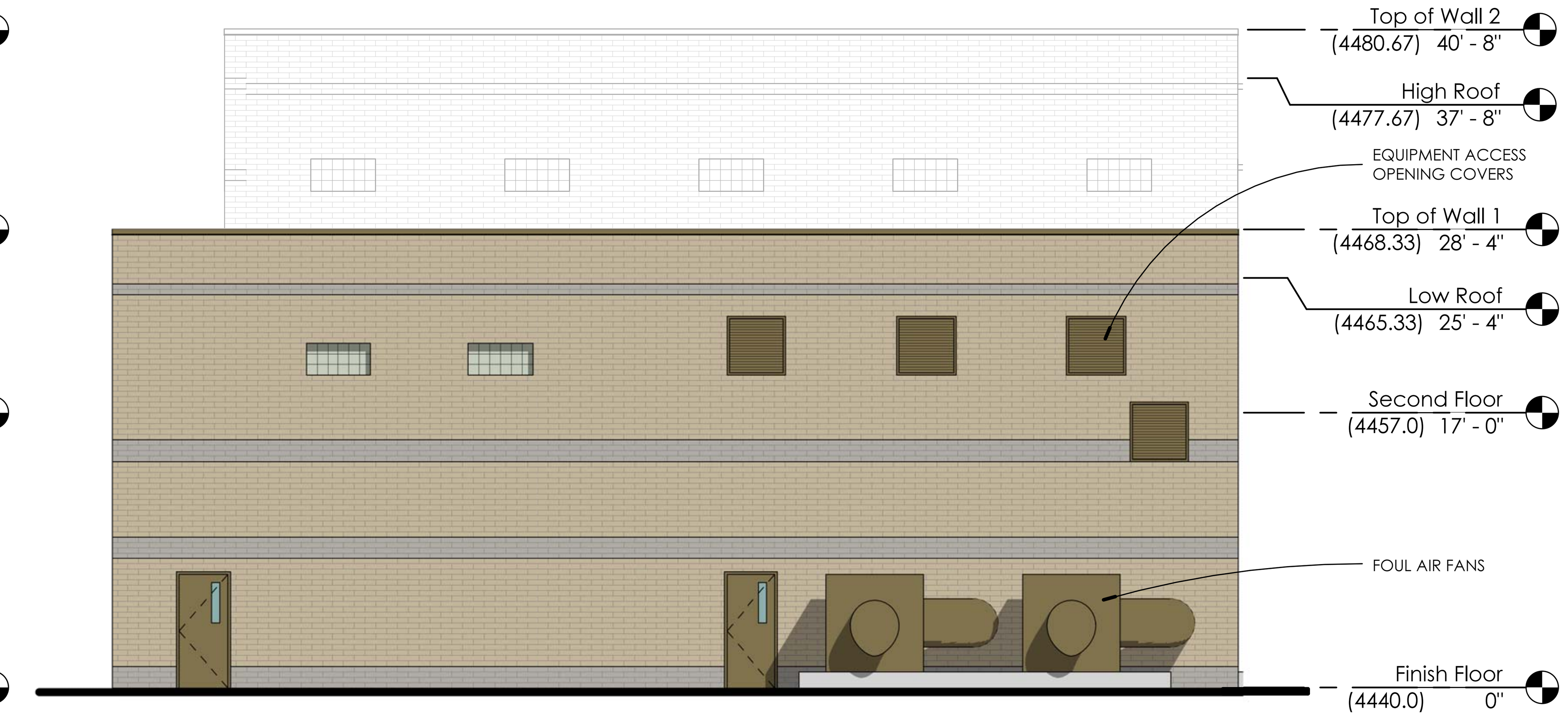
GRADING PLAN

30% DESIGN - NOT FOR CONSTRUCTION

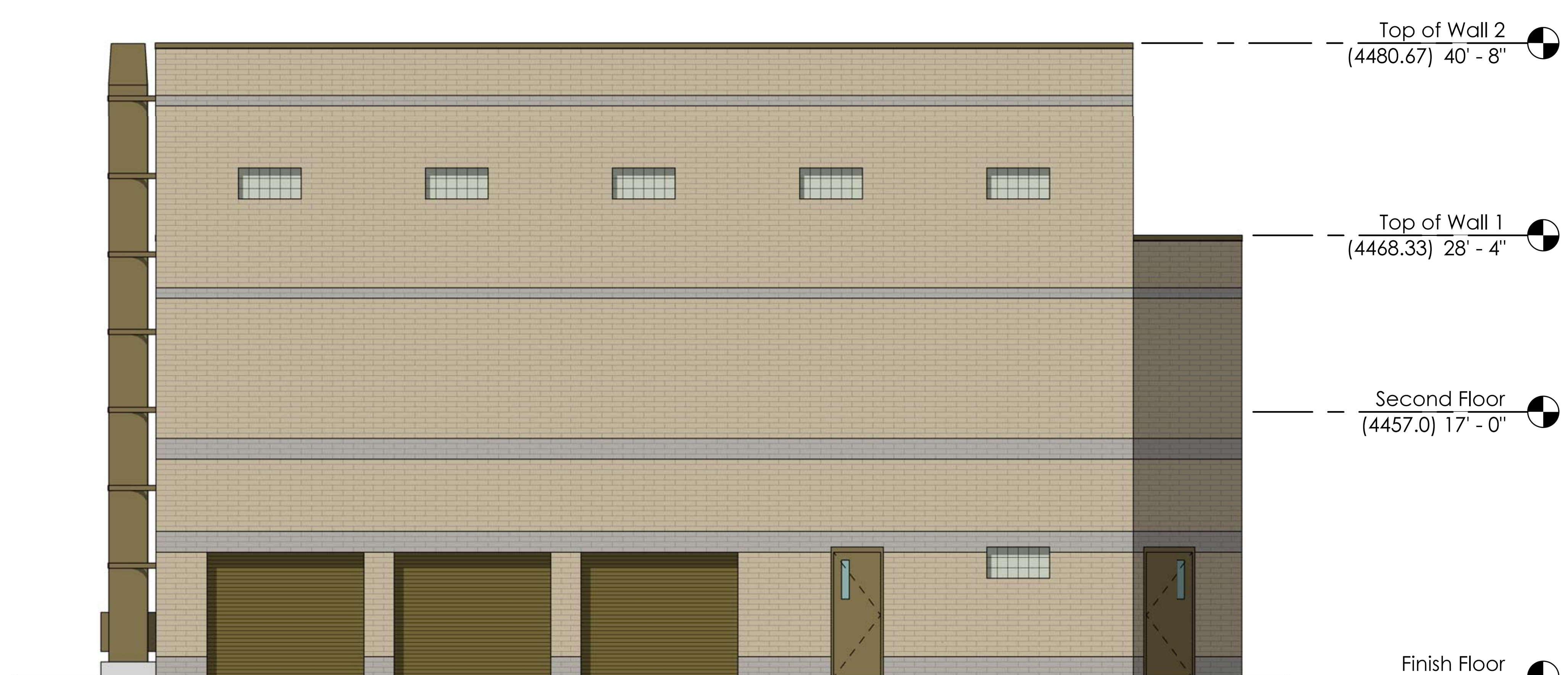
AS SHOWN	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	FEBRUARY 2014
PROJ	481611
DWG	C-2
SHEET	3 of 9



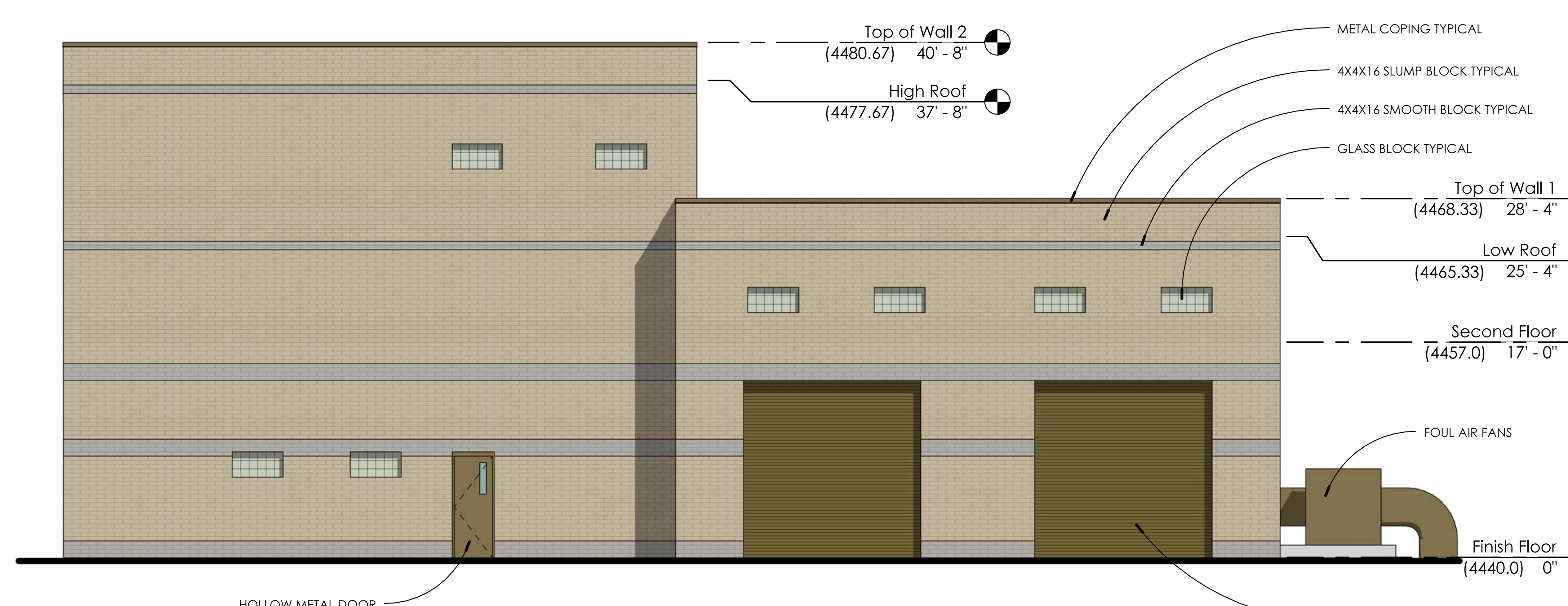
WEST ELEVATION
1/8" = 1'-0"
SEE MATERIAL NOTES AT EAST ELEVATION



NORTH ELEVATION
1/8" = 1'-0"
SEE MATERIAL NOTES AT EAST ELEVATION



SOUTH ELEVATION
1/8" = 1'-0"
SEE MATERIAL NOTES AT EAST ELEVATION



EAST ELEVATION
1/8" = 1'-0"

NO.	DATE	REVISION	BY	CHK	APVD

DSGN B HOOFT | DR B HOOFT | CHK | APVD

DESIGN OFFICE:
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RENO, NEVADA

ARCHITECTURAL

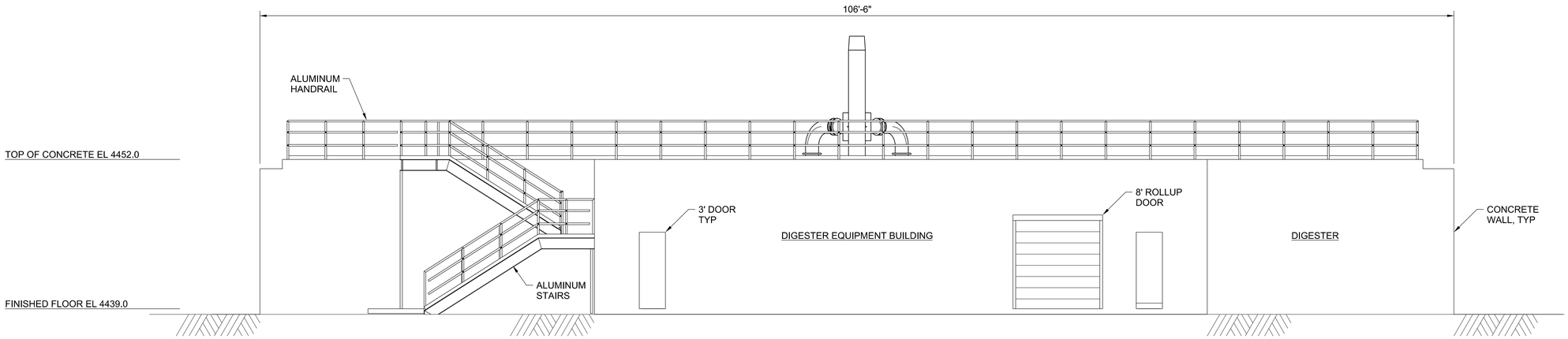
ELEVATIONS

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	A-1
SHEET	4 of 9

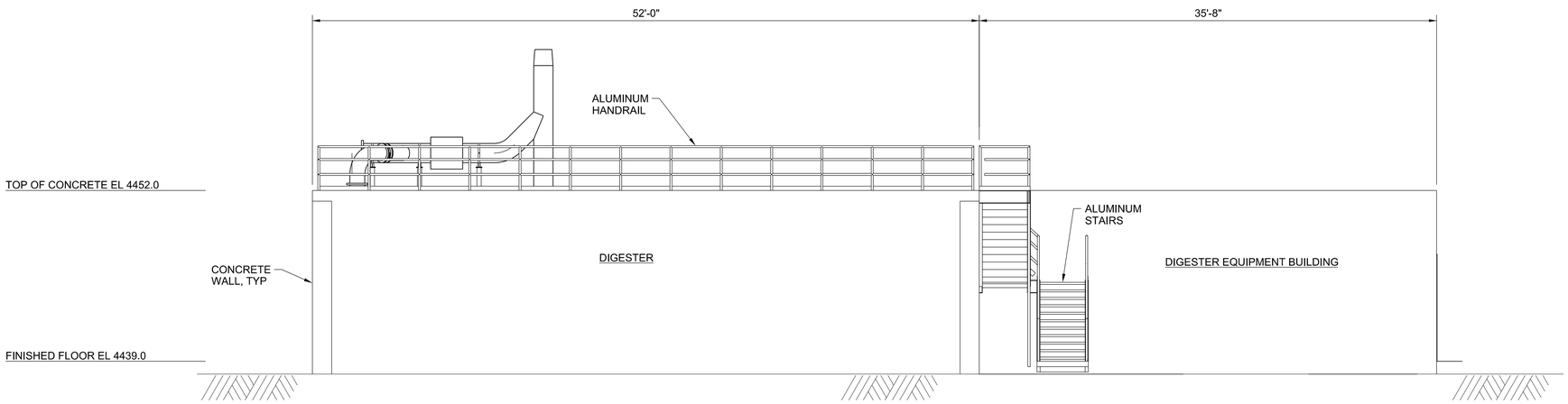
30% DESIGN - NOT FOR CONSTRUCTION

PLOT DATE: 2/12/2014 7:17:30 PM



WEST ELEVATION

3/16"=1'-0"



NORTH ELEVATION

3/16"=1'-0"

NO.	DATE	REVISION	BY	APVD
DSGN	C BURKE	DR	J MINOR	CHK	APVD

DESIGN OFFICE:
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SOUTH TRUCKEE MEADOWS
WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

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ARCHITECTURAL

DIGESTER FACILITY ELEVATIONS

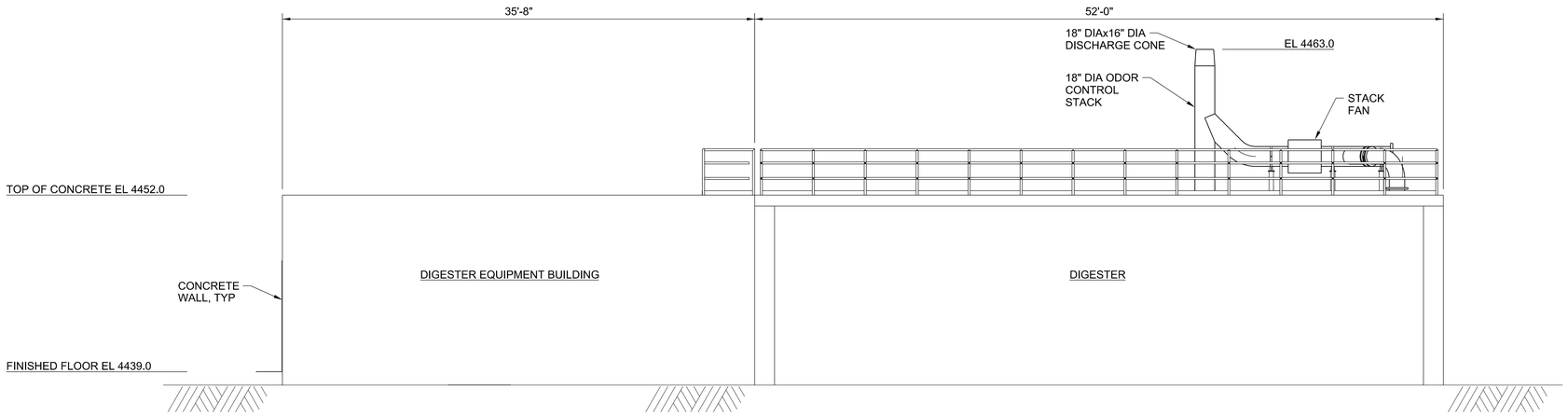
30% DESIGN - NOT FOR CONSTRUCTION

AS SHOWN

VERIFY SCALE

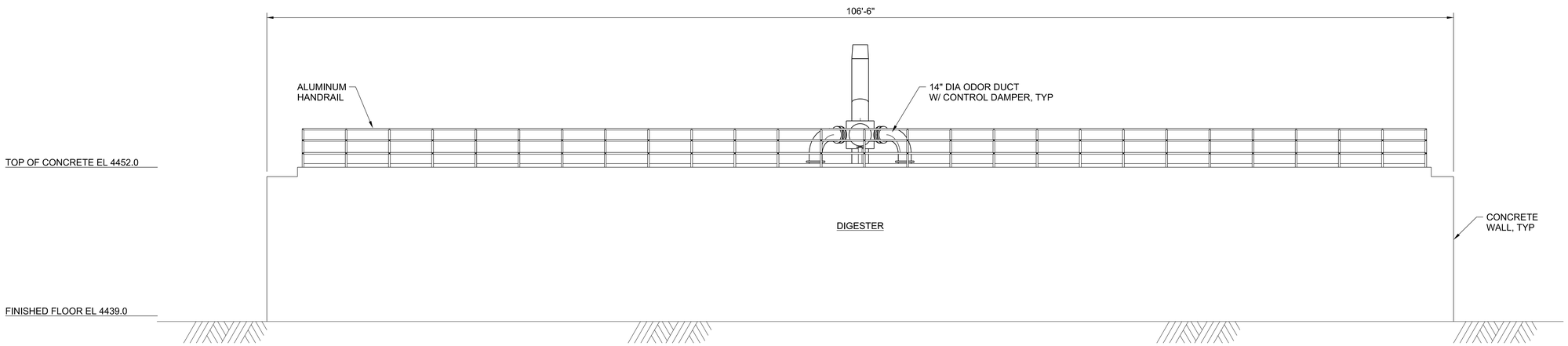
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	A-2
SHEET	5 of 9



SOUTH ELEVATION

3/16"=1'-0"



EAST ELEVATION

3/16"=1'-0"

NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
DSGN	C BURKE		J MINOR				

30% DESIGN - NOT FOR CONSTRUCTION

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SOUTH TRUCKEE MEADOWS
WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

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ARCHITECTURAL

DIGESTER FACILITY
ELEVATIONS

AS SHOWN

VERIFY SCALE

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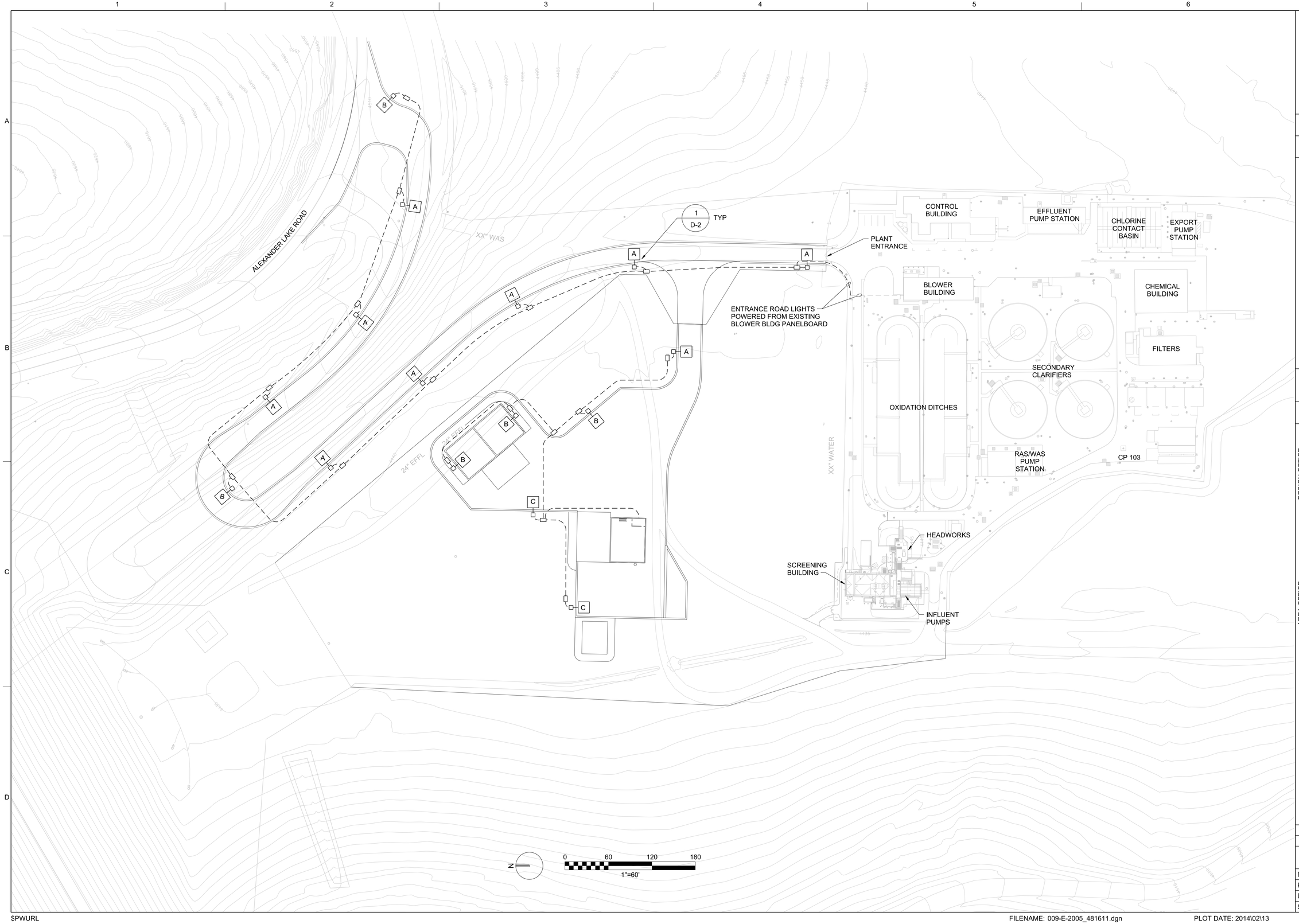
ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	A-3
SHEET	6 of 9



NO.	DATE	BY	APVD
DSGN	J LORING		
DR	J LORING		
CHK			APVD

REVISION

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WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

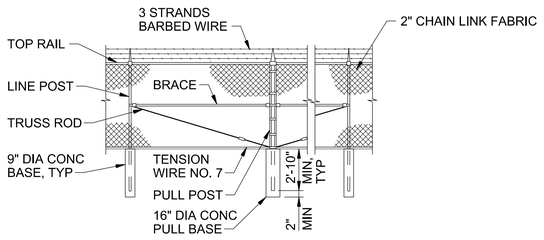
ELECTRICAL

SITE LIGHTING AND ACCESS ROAD LIGHTING PLAN

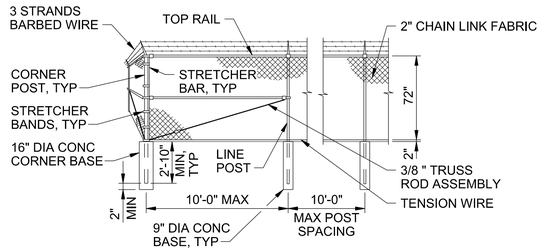
AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	E-1
SHEET	7 of 9

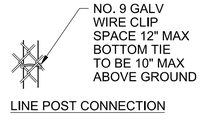
30% DESIGN - NOT FOR CONSTRUCTION



TYPICAL PULL POST



TYPICAL CORNER POST



LINE POST CONNECTION

TOP RAIL CONNECTION

NOTES:

1. BRACE AND TRUSS ROD REQUIRED AT GATES AND SIDE OF ALL CORNER POSTS.
2. FABRIC ATTACHED TO OUTSIDE OF POSTS.

CHAIN LINK FENCE

1 DETAIL
NTS

NO.	DATE	REVISION	DR	CHK	APVD	BY
DSGN	T HOWARD		C MCCOY		APVD	

30% DESIGN - NOT FOR CONSTRUCTION

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(775) 329-7300

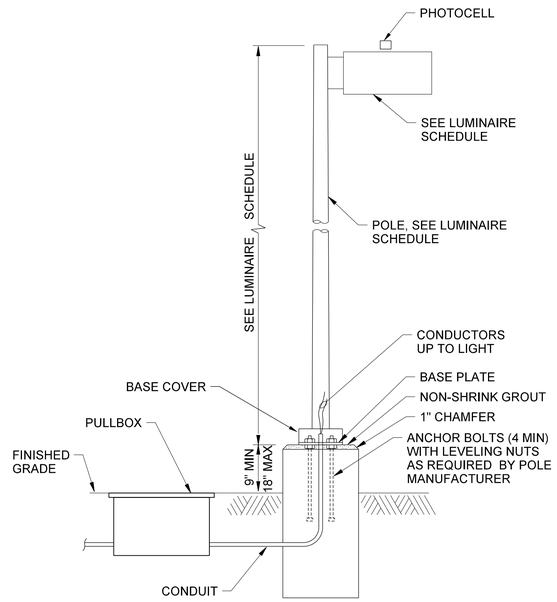
SOUTH TRUCKEE MEADOWS
WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

CIVIL

DETAIL

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	D-1
SHEET	8 of 9



ELEVATION

1 DETAIL
NTS
E-1

TYPE	DESCRIPTION	WATTAGE	IES DISTRIBUTION
A	AREA LIGHT - LED LIGHT SOURCE,CUTOFF OPTICS, ALUMINUM HOUSING, AND 25 FT ALUMINUM POLE.	110	TYPE II
B	AREA LIGHT - LED LIGHT SOURCE,CUTOFF OPTICS, ALUMINUM HOUSING, AND 25 FT ALUMINUM POLE.	110	TYPE III
C	AREA LIGHT - LED LIGHT SOURCE,CUTOFF OPTICS, ALUMINUM HOUSING, AND 25 FT ALUMINUM POLE.	85	TYPE III

LUMINAIRE SCHEDULE

NO.	DATE	REVISION	BY	APVD
DSGN	J LORING	DR J LORING	CHK	APVD

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2525 AIRPARK DR
REDDING, CA 96001
(530) 243-5831

AREA OFFICE:
50 WEST LIBERTY ST, STE 205
RENO, NEVADA 89501
(775) 329-7300

SOUTH TRUCKEE MEADOWS
WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

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ELECTRICAL

LUMINAIRE DETAIL AND SCHEDULE

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VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	D-2
SHEET	9 of 9

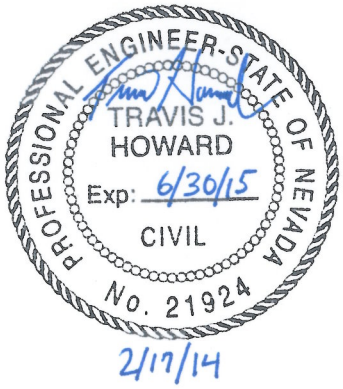
South Truckee Meadows Water Reclamation Facility Biosolids Facility Project Conceptual Drainage Report

PREPARED FOR: Washoe County

PREPARED BY: Travis Howard/CH2M HILL

DATE: February 17, 2014

PROJECT NUMBER: 481611.03.35.10.45



Introduction

The South Truckee Meadows Water Reclamation Facility (STMWRF) Biosolids Facilities Project (BFP) is located in the southeast Reno area immediately southwest of Alexander Lake Road. The project will expand the existing water reclamation facility (WRF). The BFP will involve construction of a new dewatering building, two new digesters, an associated digester equipment building and odor control facilities. Operation of the site will require a semi-trailer truck to access the dewatering building regularly to haul biosolids from the site to the Lockwood Regional Landfill. The site of the proposed work is currently a lightly vegetated, gently sloped open space that is situated directly north of the existing WRF.

The site is accessed via a driveway from Alexander Lake Road (aka Mira Loma Haul Road). The driveway will be reconstructed under a separate project, referred to herein as the Driveway Project. The Driveway Project is being analyzed under a separate drainage report, but because of its relationship with this site various aspects of the Driveway Project's drainage systems will be integrated with the BFP site drainage systems.

Location Information

Owner: Washoe County
APN: 165-011-05
Legal: T18N, R20E, NW Quadrant of Section 4

A location map and drainage plan can be found in Attachment 1.

Previous Studies

No previous studies are readily available for this site.

A Conceptual Drainage Report for the Driveway Project is being prepared in parallel to this report. That report is titled, *Conceptual Drainage Report for South Truckee Meadows Water Reclamation Facility Commercial Access*, Prepared by Gray and Associates, February 2014.

Existing and Proposed Hydrology

Rainfall

The web-based Precipitation Frequency Data Server (PFDS) was used to determine NOAA Atlas 14 point precipitation frequency estimates for the project site for both existing and proposed hydrology. The location of Reno, Nevada, was used in the hydrologic model. The complete table showing the precipitation frequencies used can be found in Attachment 2.

Existing

The existing drainage basin consists of a large open space that is primarily flat. There currently is a paved access road that runs along the far east side of the basin. Water drains from the road to the west, where it travels overland to an existing drainage ditch on the far west side of the basin. Once in the ditch, the runoff travels south and leaves the site through an existing culvert at the southwest corner of the site. An existing basin map can be found in Attachment 2.

Minor (5-year) and major (100-year) storm flow calculations were performed using the rational method. Runoff coefficients were derived from the Truckee Meadows Regional Drainage Manual (TMRDM) Table 701, which can be found in Attachment 2. Values for pavement were used for the road, and values for undeveloped range were used for the balance of the basin. These areas were combined to form a composite runoff coefficient that was used for the entire offsite basin. The time of concentration was calculated based on the methods outlined in Section 702 of the TMRDM.

Under existing conditions, the total runoff is 1.6 and 8.5 cubic feet per second (cfs) for the minor and major storms, respectively. Complete hydrologic calculations can be found in Attachment 2.

Proposed

The proposed drainage basins consist of three primary basins: an offsite basin north of the site, an offsite basin south of the site, and a series of onsite basins that collect all runoff from the site. Onsite flows from the Driveway Project will be combined with onsite runoff from the BFP at the site entrance.

Minor (5-year) and major (100-year) storm flow calculations for the proposed site were performed using the rational method. Runoff coefficients were based off of the TMRDM Table 701, which can be found in Attachment 2. Values for pavement were used for the onsite basins, and values for undeveloped range were used for the offsite basins. Onsite roofed areas were treated as pavement to simplify the calculations. This over estimates storm water runoff slightly. The time of concentration for the offsite basins was calculated using methods outlined in Section 702 of the TMRDM. The minimum time of concentration of 5 minutes was used for all onsite basins. See the proposed basin map in Attachment 2.

Under proposed conditions, the total onsite runoff is 2.7 cfs and 7.0 cfs for the minor and major storms, respectively. The offsite runoff is 1.0 cfs and 6.1 cfs for the minor and major storms. Complete hydrologic calculations can be found in Attachment 2.

Proposed Drainage Facilities

Proposed drainage facilities will consist of a network of catch basins and pipes to collect runoff from impervious surfaces. Onsite runoff from the adjoining Driveway Project, which will be collected in underground storm piping, will be combined with the runoff from the BFP at a manhole near the site entrance. These flows will link to a pipe network that will convey the stormwater back to the headworks of the existing WRF. At the headworks, the stormwater will be combined with the existing WRF influent for treatment.

The drainage system will also serve as the containment facility in the event of a material spill. Operations of the site will involve the delivery and use of various chemicals and the transport of biosolids. Although any sort of spill is highly unlikely, if it were to occur, the site would contain all runoff and route it back to the WRF for treatment.

Filtrate

Filtrate from thickening and dewatering equipment on the site will be piped from the dewatering building directly into the storm drain. Filtrate flows are relatively small (<0.5 cfs) and not constant. Because these flows are minor and because of the extremely low probability that the maximum filtrate flow would occur at

the same time as maximum storm flows, the filtrate flows were not included as part of the hydraulic analysis.

Floodplain

The site is situated above a floodplain. No anticipated modifications to the floodplain will result from this project. The FEMA flood map showing the site location in relation to the floodplain is in Attachment 3.

Future Facilities

The site master plan includes future facilities located both north and south of the BFP. The drainage pipe network will be sized to accommodate runoff from those facilities based on an additional 3 acres of site surface being impervious in the future.

Hydraulics

A complete hydraulic analysis of all inlets, pipes, and ditches will be performed during final design.

Trunk Line Sizing

A preliminary hydraulic analysis of onsite flows was performed to size the storm drain trunk line entering the headworks. The onsite flows from the Driveway Project (Q_5=1.41 cfs and Q_{100}=3.77 cfs) were combined with the total onsite flows from the BFP site (Q_5=2.7 cfs and Q_{100}=7 cfs) to generate a maximum flow of 4.11 cfs and 10.77 cfs for minor and major storm, respectively. Additionally, an assumption was made that an additional 3 acres of the site surface will be impervious in the future. The minor and major storm flows from these future improvements would be 4.8 cfs and 12.4 cfs. When all three sources of flow were combined (Driveway Project flows plus site flows plus future site flows), it was determined that the maximum theoretical flows in the trunk line would be approximately 9 cfs and 23 cfs.

A hydraulic analysis revealed that a 30-inch-diameter reinforced concrete pipe could effectively carry these flows at 0.50 percent grade. Hydraulic calculations can be found in Attachment 2.

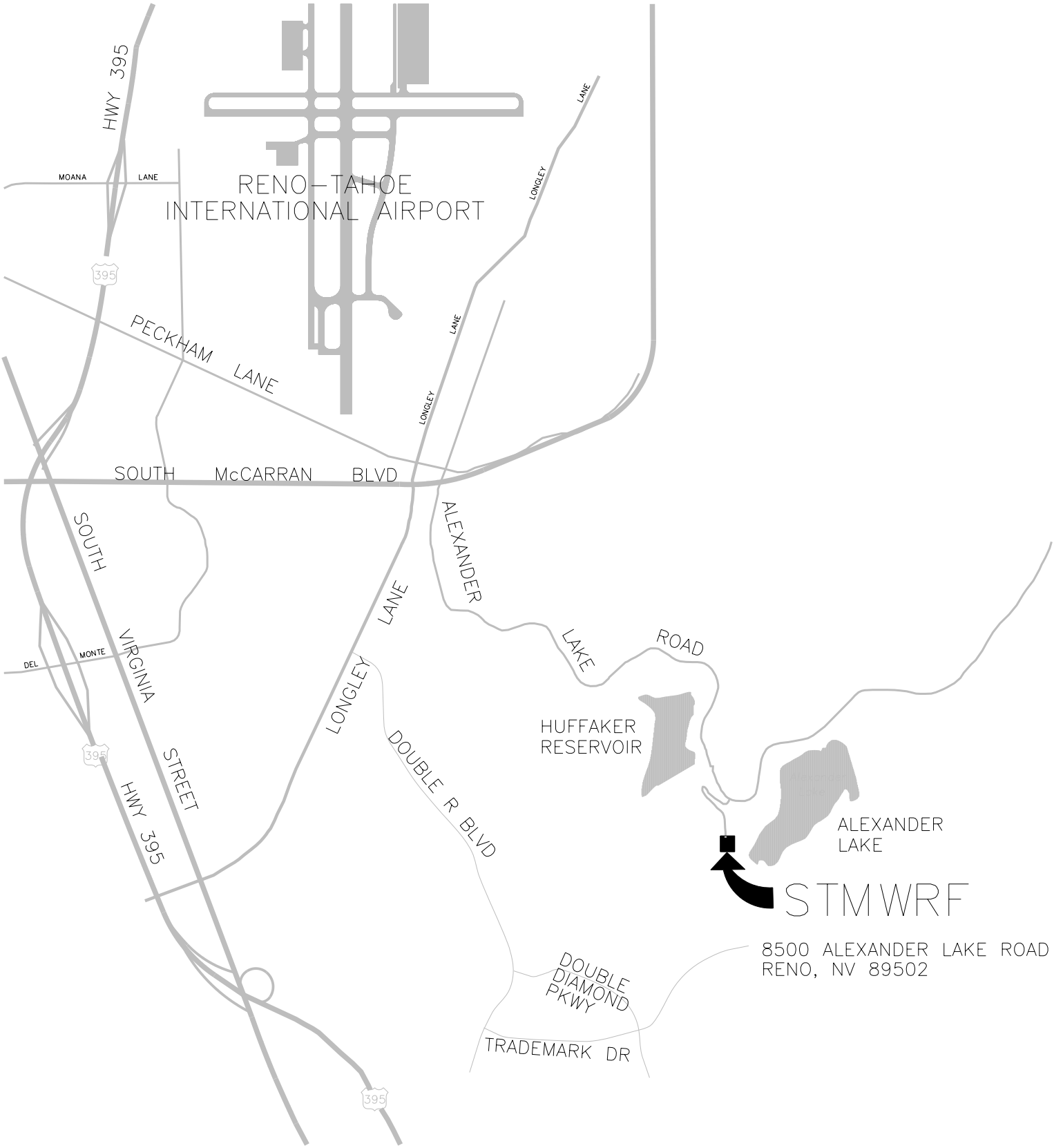
Existing Headworks

An investigation of the as built drawings for the existing headworks revealed that the structure is low enough to handle gravity flows conveyed from the site. Approximate elevations can be found on the drainage plan in Attachment 1.

Conclusions

Drainage patterns do not change significantly from the pre- to post-project condition, and the overall site runoff discharge is not increased as a result of this project. Overall drainage patterns remain the same. The hydrologic and hydraulic analysis performed along with the drainage improvements summarized in this report, satisfy the criteria specified in the Truckee Meadows Drainage Manual and the criteria specific to the Biosolids Facilities Project.

Attachment 1



LOCATION MAP

NTS

N

ABBREVIATIONS
CB CATCH BASIN
MH MANHOLE

LEGEND
DIRECTION OF OVERLAND FLOW
DIRECTION OF PIPE FLOW

ALEXANDER LAKE ROAD
DRIVEWAY PROJECT STORM DRAIN DESIGN BY GRAY AND ASSOCIATES
PAVED DRIVEWAY
PLANT ENTRANCE
CONNECTION TO DRIVEWAY PROJECT DESIGN
OVERLAND FLOWS IN THIS AREA TO BE ROUTED AROUND SITE IN DITCH
PAVED SITE SURFACE
DIGESTER
MH-1
CB-1
MH-2
CB-2
CB-3
LIGHTLY VEGETATED UNDEVELOPED GROUND
DIGESTER EQUIPMENT BUILDING
TRUCK BAYS
DEWATERING BUILDING
LIGHTLY VEGETATED UNDEVELOPED GROUND
CB-5
CB-6
CB-4
ODOR CONTROL BIOFILTER
EXISTING POND
EXISTING DRAINAGE DITCH
MH-3
MH-4
MH-5
DITCH DRAINS TO WETLAND ABOVE ALEXANDER LAKE (DISCHARGE POINT FOR OFFSITE RUNOFF)
APN 165-011-05 WASHOE COUNTY
FACE OF DAM
CREST OF DAM
CONTROL BUILDING
EFFLUENT PUMP STATION
CHLORINE CONTACT BASIN
EXPORT PUMP STATION
BLOWER BUILDING
CHEMICAL BUILDING
FILTERS
SECONDARY CLARIFIERS
OXIDATION DITCHES
RAS/WAS PUMP STATION
HEADWORKS
SCREENING BUILDING
CONNECT TO HEADWORKS, APPROXIMATE INVERT ELEV = 4426 (DISCHARGE POINT FOR ONSITE RUNOFF)
INFLUENT PUMPS
APN 165-011-06 WASHOE COUNTY
24" EFFL
8" WATER

N
0 60 120 180
SCALE IN FEET

NO.	DATE	BY	APVD
DSGN	T HOWARD	DR	K SILVA
	REVISION	CHK	APVD

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2525 AIRPARK DR
REDDING, CA 96001
(530) 243-5831

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RENO, NEVADA 89501
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DRAINAGE PLAN

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VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	DR-1
SHEET	1 of 1

Attachment 2

HYDROLOGY

Rational Method:
Q= C*I*A
Q = Flow (cfs)
C = Runoff Coefficient
I = Intensity (inches/hour)
A = Area (acres)

EXISTING HYDROLOGY - OFFSITE								
			RUNOFF COEFFICIENT		INTENSITY		DISCHARGE	
BASIN ID	AREA (acre)	Tc (min)	C_5	C_{100}	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
E1&E2	9.59	0.7	0.23	0.52	0.7	1.7	1.6	8.5

Composite Runoff Coefficient Calculation					
		RUNOFF COEFFICIENT		C*Area	
BASIN ID	AREA (acre)	C_5	C_{100}	5 year	100 year
E1	9.13	0.2	0.5	1.83	4.57
E2	0.46	0.88	0.93	0.40	0.43
Totals:	9.59			2.23	4.99
Composite Runoff Coefficient (C*Area)/Sum of Total Area				0.23	0.52

PROPOSED HYDROLOGY - ONSITE								
			RUNOFF COEFFICIENT		INTENSITY		DISCHARGE	
BASIN ID	AREA (acre)	Tc (min)	C_5	C_{100}	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
P1	0.13	5	0.88	0.93	1.8	4.43	0.2	0.5
P2	0.70	5	0.88	0.93	1.8	4.43	1.1	2.9
P3	0.40	5	0.88	0.93	1.8	4.43	0.6	1.6
P4	0.05	5	0.88	0.93	1.8	4.43	0.1	0.2
P5	0.10	5	0.88	0.93	1.8	4.43	0.2	0.4
P6	0.32	5	0.88	0.93	1.8	4.43	0.5	1.3
						Totals	2.7	7.0

PROPOSED HYDROLOGY - OFFSITE								
			RUNOFF COEFFICIENT		INTENSITY		DISCHARGE	
BASIN ID	AREA (acre)	Tc (min)	C_5	C_{100}	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
P7	2.77	37	0.2	0.5	0.70	1.70	0.4	2.4
P8	4.48	37	0.2	0.5	0.70	1.70	0.6	3.8
						Totals	1.0	6.2

OFFSITE RUNOFF SUMMARY					
Pre-Construcion (cfs)		Post-Construction (cfs)		Delta (cfs)	
5 year	100 year	5 year	100 year	5 year	100 year
1.6	8.5	1.02	6.16	-0.55	-2.33

HYDROLOGY - FUTURE ONSITE								
			RUNOFF COEFFICIENT		INTENSITY		DISCHARGE	
BASIN ID	AREA (acre)	Tc (min)	C_5	C_{100}	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
FUTURE	3.00	5	0.88	0.93	1.8	4.43	4.8	12.4

TIME OF CONCENTRATION

$$t_c = t_i + t_t$$

t_c = time of concentration (minutes)
t_i = initial, inlet, or overland flow time (minutes)
t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (minutes)

TIME OF CONCENTRATION (OVERLAND)					
BASIN ID	R*	AREA (acre)	LENGTH (FT)	SLOPE** (%)	Time of Concentration (minutes)
Existing (E1&E2)	0.23	9.59	500	1.0	35
P7	0.20	2.77	500	1.0	36
P8	0.20	4.48	500	1.0	36

*The 5-year runoff coefficient (C_5) used with the rational method is used for R
**It was assumed all 500 FT of overland flow occurred on the relatively flat portion of the basin.

$$t_i = \frac{1.8\,(1.1 - R)\,L_o^{1/2}}{S^{1/3}}$$

t_i = initial or overland flow time (minutes)
R = flow runoff coefficient
L_o = length of overland flow (feet, 500 feet maximum)
S = average overland basin slope (percent)

TIME OF CONCENTRATION (CHANNEL)			
BASIN ID	Velocity* (FT/S)	LENGTH of CHANNEL FLOW (FT)	Time of Concentration (minutes)
Existing (E1&E2)	4.80	450	2
P7	4.80	100	0
P8	4.80	200	1

*Based on a channel with properties that are reflective of the channel on the west side of the basin flowing with 18" of water. Hydraulic analysis attached.

TIME OF CONCENTRATION				Interpolated Intensities	
BASIN ID	t_i (minutes)	t_t (minutes)	TotalTime of Concentration (minutes)	I_5 (in/hr)	I_{100} (in/hr)
Existing (E1&E2)	35.0	1.6	37	0.7	1.7
P7	36.2	0.3	37	0.7	1.7
P8	36.2	0.7	37	0.7	1.7

RATIONAL FORMULA METHOD
RUNOFF COEFFICIENTS

Land Use or Surface Characteristics	Aver. % Impervious Area	Runoff Coefficients 5-Year (C_5)	Runoff Coefficients 100-Year (C_{100})
Business/Commercial:			
Downtown Areas	85	.82	.85
Neighborhood Areas	70	.65	.80
Residential:			
(Average Lot Size)			
⅛ Acre or Less (Multi-Unit)	65	.60	.78
¼ Acre	38	.50	.65
⅛ Acre	30	.45	.60
½ Acre	25	.40	.55
1 Acre	20	.35	.50
Industrial:	72	.68	.82
Open Space:			
(Lawns, Parks, Golf Courses)	5	.05	.30
Undeveloped Areas:			
Range	0	.20	.50
Forest	0	.05	.30
Streets/Roads:			
Paved	100	.88	.93
Gravel	20	.25	.50
Drives/Walks:	95	.87	.90
Roof:	90	.85	.87

Notes:

1. Composite runoff coefficients shown for Residential, Industrial, and Business/Commercial Areas assume irrigated grass landscaping for all pervious areas. For development with landscaping other than irrigated grass, the designer must develop project specific composite runoff coefficients from the surface characteristics presented in this table.

VERSION: April 30, 2009	REFERENCE:	TABLE
WRC ENGINEERING, INC.	USDCM, DROCOG, 1969 (with modifications)	701

NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, US*
Coordinates: 39.4597, -119.7442
Elevation: 4436ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.07 (0.924–1.26)	1.33 (1.14–1.57)	1.80 (1.52–2.12)	2.23 (1.88–2.65)	2.95 (2.42–3.56)	3.64 (2.87–4.42)	4.43 (3.38–5.45)	5.39 (3.95–6.78)	6.95 (4.78–9.04)	8.35 (5.48–11.1)
10-min	0.816 (0.702–0.954)	1.01 (0.864–1.20)	1.37 (1.16–1.62)	1.70 (1.43–2.02)	2.25 (1.85–2.71)	2.77 (2.18–3.36)	3.37 (2.58–4.15)	4.10 (3.01–5.16)	5.29 (3.63–6.88)	6.36 (4.17–8.47)
15-min	0.676 (0.576–0.788)	0.840 (0.712–0.992)	1.13 (0.960–1.34)	1.40 (1.18–1.67)	1.86 (1.52–2.24)	2.28 (1.80–2.78)	2.78 (2.13–3.43)	3.39 (2.48–4.26)	4.37 (3.00–5.68)	5.25 (3.45–7.00)
30-min	0.454 (0.388–0.530)	0.564 (0.480–0.668)	0.762 (0.646–0.902)	0.944 (0.796–1.12)	1.25 (1.03–1.51)	1.54 (1.21–1.87)	1.88 (1.43–2.31)	2.28 (1.67–2.87)	2.94 (2.02–3.83)	3.54 (2.32–4.71)
60-min	0.281 (0.241–0.328)	0.350 (0.297–0.413)	0.471 (0.400–0.558)	0.584 (0.493–0.695)	0.775 (0.636–0.932)	0.952 (0.752–1.16)	1.16 (0.887–1.43)	1.41 (1.04–1.78)	1.82 (1.25–2.37)	2.19 (1.44–2.91)
2-hr	0.187 (0.164–0.216)	0.232 (0.206–0.269)	0.300 (0.260–0.346)	0.356 (0.306–0.412)	0.444 (0.370–0.518)	0.522 (0.424–0.618)	0.610 (0.482–0.735)	0.720 (0.550–0.898)	0.924 (0.672–1.20)	1.12 (0.780–1.47)
3-hr	0.147 (0.131–0.167)	0.183 (0.165–0.210)	0.231 (0.206–0.263)	0.269 (0.237–0.307)	0.322 (0.278–0.370)	0.368 (0.312–0.429)	0.423 (0.351–0.500)	0.495 (0.401–0.604)	0.625 (0.491–0.805)	0.752 (0.569–0.990)
6-hr	0.102 (0.091–0.115)	0.128 (0.115–0.145)	0.159 (0.142–0.180)	0.183 (0.162–0.207)	0.215 (0.187–0.244)	0.238 (0.205–0.273)	0.263 (0.222–0.305)	0.291 (0.241–0.342)	0.337 (0.271–0.407)	0.389 (0.307–0.502)
12-hr	0.065 (0.059–0.073)	0.082 (0.074–0.092)	0.104 (0.093–0.117)	0.121 (0.107–0.136)	0.143 (0.125–0.162)	0.160 (0.138–0.183)	0.177 (0.150–0.206)	0.194 (0.161–0.228)	0.217 (0.175–0.261)	0.237 (0.186–0.289)
24-hr	0.040 (0.037–0.045)	0.050 (0.046–0.056)	0.064 (0.058–0.071)	0.074 (0.067–0.082)	0.089 (0.080–0.099)	0.101 (0.090–0.112)	0.113 (0.100–0.126)	0.126 (0.110–0.142)	0.143 (0.123–0.162)	0.156 (0.133–0.180)
2-day	0.024 (0.021–0.027)	0.030 (0.027–0.033)	0.038 (0.034–0.042)	0.044 (0.039–0.049)	0.053 (0.047–0.059)	0.060 (0.053–0.067)	0.067 (0.058–0.076)	0.074 (0.064–0.085)	0.085 (0.072–0.099)	0.093 (0.077–0.110)
3-day	0.017 (0.015–0.019)	0.022 (0.019–0.024)	0.027 (0.025–0.031)	0.032 (0.029–0.036)	0.039 (0.035–0.044)	0.044 (0.039–0.050)	0.050 (0.044–0.057)	0.056 (0.048–0.064)	0.064 (0.054–0.074)	0.071 (0.059–0.083)
4-day	0.014 (0.013–0.016)	0.017 (0.016–0.020)	0.022 (0.020–0.025)	0.026 (0.024–0.029)	0.032 (0.029–0.036)	0.037 (0.032–0.041)	0.041 (0.036–0.047)	0.047 (0.040–0.053)	0.054 (0.045–0.062)	0.060 (0.050–0.070)
7-day	0.009 (0.008–0.010)	0.012 (0.010–0.013)	0.015 (0.014–0.017)	0.018 (0.016–0.020)	0.022 (0.019–0.024)	0.025 (0.022–0.028)	0.028 (0.024–0.032)	0.031 (0.027–0.036)	0.036 (0.030–0.042)	0.040 (0.033–0.047)
10-day	0.007 (0.006–0.008)	0.009 (0.008–0.010)	0.012 (0.011–0.013)	0.014 (0.012–0.016)	0.017 (0.015–0.019)	0.019 (0.017–0.022)	0.022 (0.019–0.025)	0.024 (0.021–0.028)	0.027 (0.023–0.032)	0.030 (0.025–0.035)
20-day	0.004 (0.004–0.005)	0.005 (0.005–0.006)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.010 (0.009–0.011)	0.011 (0.010–0.013)	0.013 (0.011–0.014)	0.014 (0.012–0.016)	0.016 (0.013–0.018)	0.017 (0.014–0.020)
30-day	0.003 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.005–0.006)	0.006 (0.006–0.007)	0.008 (0.007–0.008)	0.008 (0.007–0.010)	0.009 (0.008–0.011)	0.010 (0.009–0.012)	0.012 (0.010–0.013)	0.013 (0.011–0.015)
45-day	0.003 (0.002–0.003)	0.003 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.006 (0.005–0.006)	0.007 (0.006–0.007)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.009 (0.007–0.010)	0.009 (0.008–0.010)
60-day	0.002 (0.002–0.002)	0.003 (0.003–0.003)	0.004 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.005 (0.005–0.006)	0.006 (0.005–0.007)	0.006 (0.006–0.007)	0.007 (0.006–0.008)	0.007 (0.006–0.008)

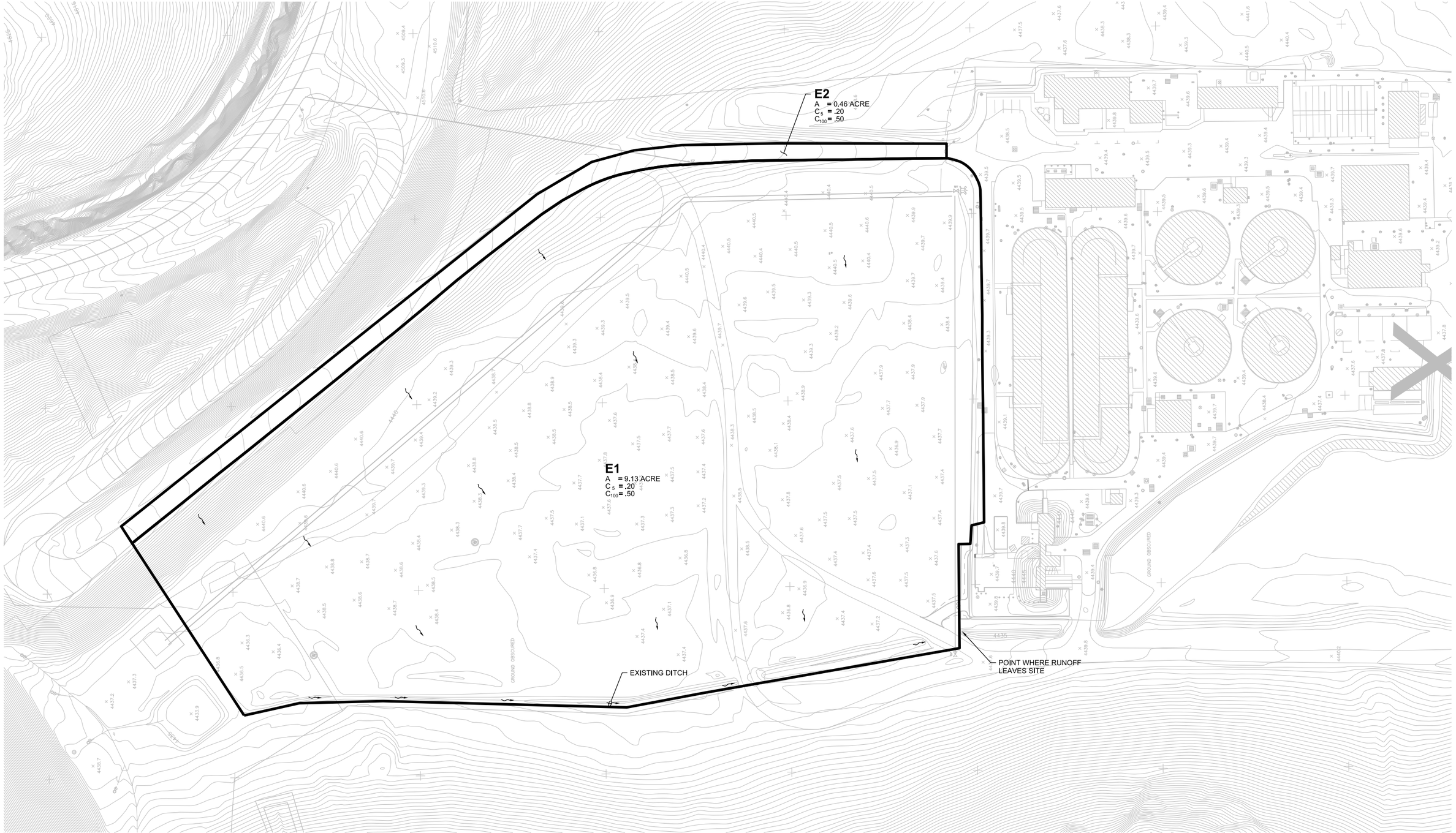
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



EXISTING BASIN SUMMARY

TOTAL AREA = 9.59 ACRES
COMPOSITE RUNOFF COEFFICIENT (5 YEAR) = 0.23
COMPOSITE RUNOFF COEFFICIENT (100 YEAR) = 0.52
ELEVATION HIGH = 4468 FT
ELEVATION LOW = 4437 FT
L_O = 500 FT
$L_{CHANNEL}$ = 450 FT

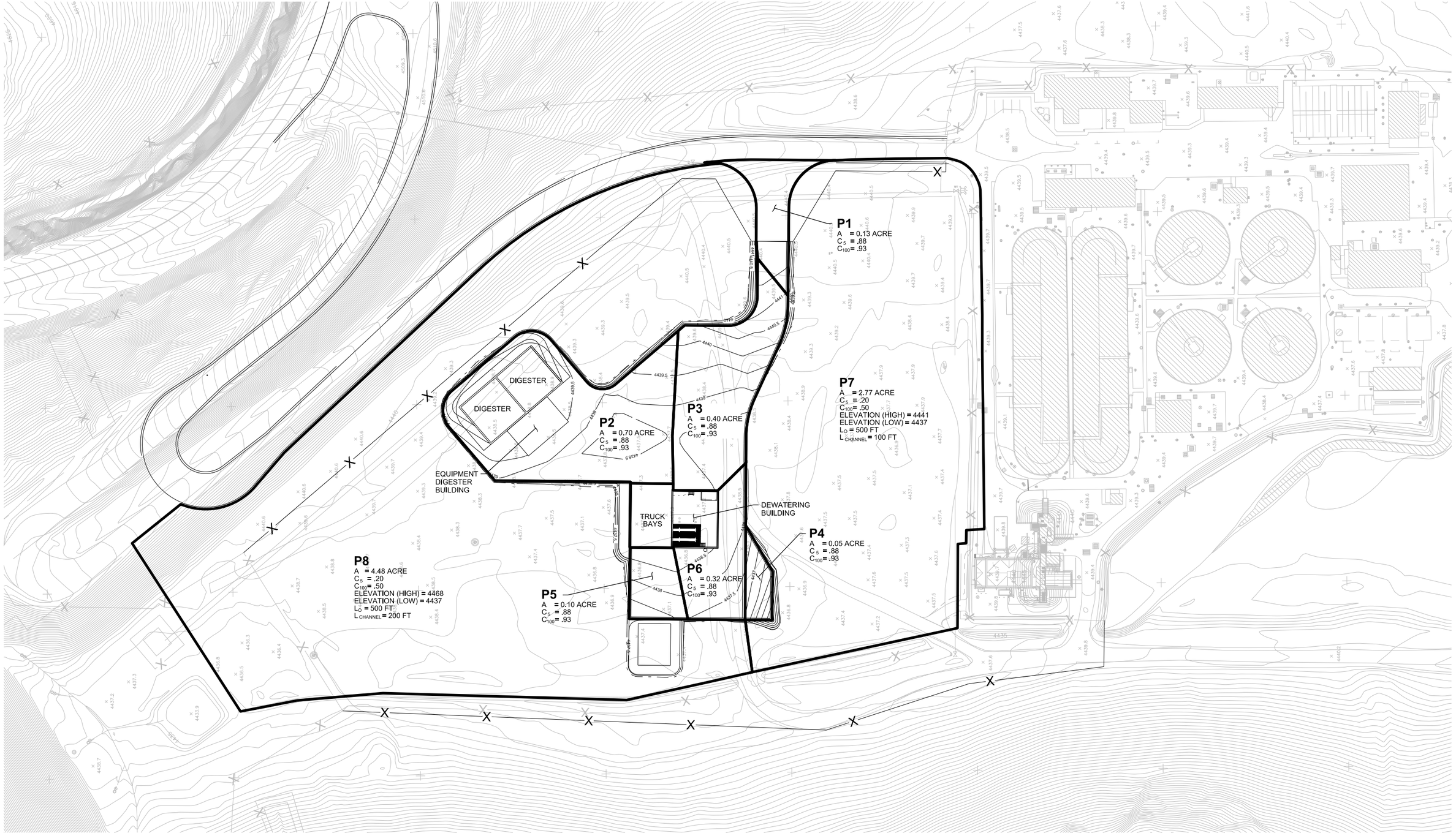
N

0 50 100 150
SCALE IN FEET

EXISTING BASIN BOUNDARIES
SOUTH TRUCKEE MEADOWS WATER RECLAMATION FACILITY

481611

CH2MHILL®



PROPOSED BASIN BOUNDARIES
SOUTH TRUCKEE MEADOWS WATER RECLAMATION FACILITY

481611

CH2MHILL®

Analyzer Report

CHANNEL HYDRAULICS

==========

Drainage Structure Analyzer

Channel Hydraulic Analysis

Date: Saturday, February 15, 2014 10:41:08 AM

==========

Input Data

Shape	Trapezoidal
Material	Bare Soil
Roughness	0.020000 = n
Bottom Width	2.00 ft
Left Slope	50.000%
Right Slope	50.000%
Bed Slope	0.500% = S_o
Depth	1.50 ft

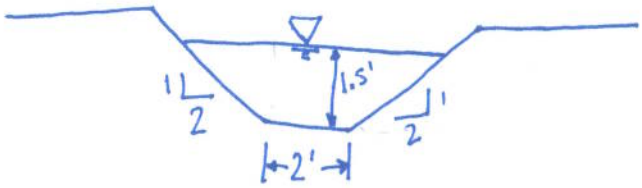
Output Results

Flow Rate	35.7 cfs
Depth	1.50 ft
Velocity	4.76 ft/s
Top Width	8.00 ft
Critical Depth	1.40 ft

Subcritical

$$V = \frac{1.486}{n} R_h^{2/3} S_o^{1/2} = \frac{1.486}{.02} (0.86)^{2/3} (0.005)^{0.5} = 4.8 \text{ FT/S}$$

$$R_h = \frac{A}{P_w} = \frac{(1.5)(5)}{(\sqrt{1.5^2 + 3^2})2 + 2} = \frac{7.5}{8.71} = 0.86$$



Analyzer Report

TRUNK LINE SIZING

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Saturday, February 15, 2014 12:47:43 PM

Input Data

Shape	Circular
Material	Concrete
Roughness	0.013000
Method	Manning
Flow Rate	23.0 cfs
Slope	0.500%
Size (W x T):	30.00 x 2.7500

Output Results

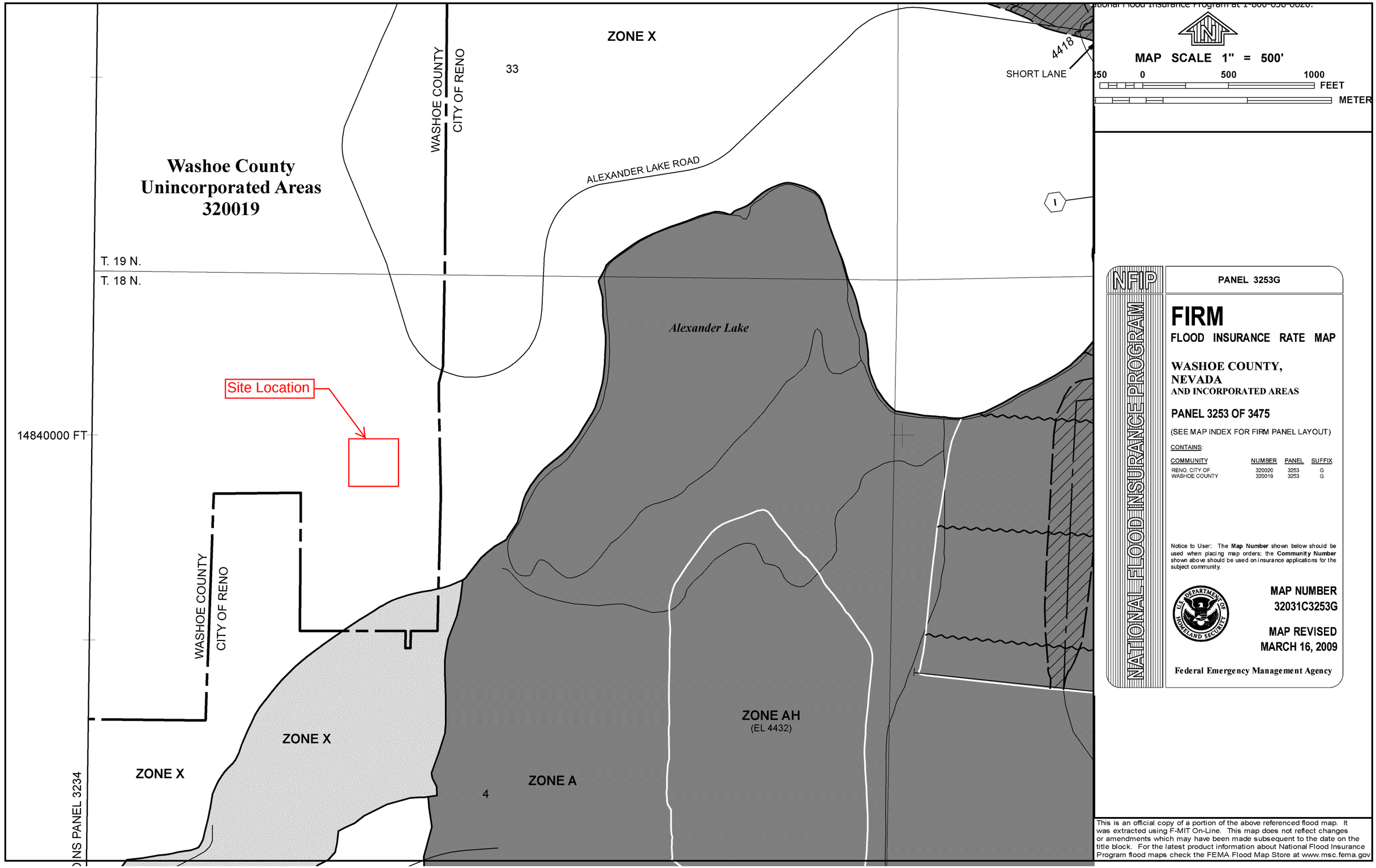
Flow Rate	23.0 cfs
Slope	0.500%
d/D	0.67
Capacity	29.0 cfs
Velocity	6.56 ft/s
Depth	1.68 ft
Critical Depth	1.63 ft
Size (W x T):	30.00 x 2.7500

CAPACITY > FLOW ✓ ok

Successful completion

$$Q = \frac{1.486}{n} A R_h^{2/3} S_o^{1/2}$$

Attachment 3



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

PANEL 3253G

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY,
NEVADA
AND INCORPORATED AREAS

PANEL 3253 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RENO, CITY OF	320020	3253	G
WASHOE COUNTY	320019	3253	G

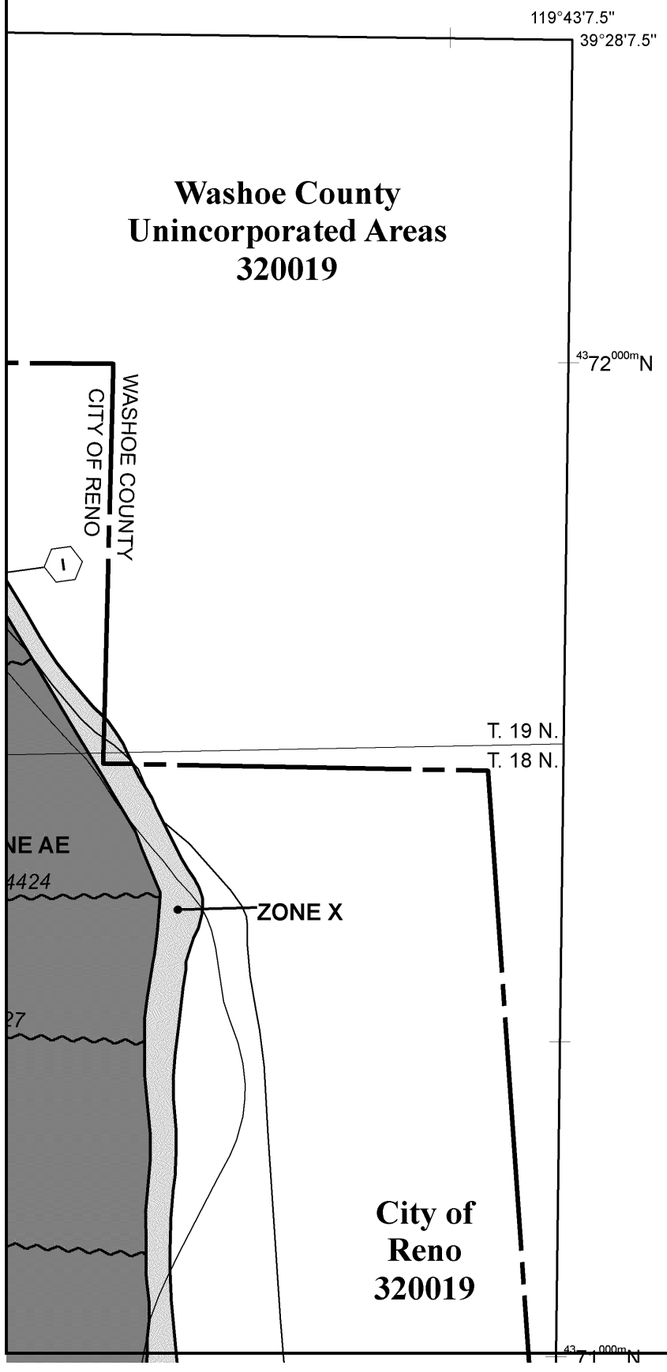
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32031C3253G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3253G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 3253 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RENO, CITY OF	320020	3253	G
WASHOE COUNTY	320019	3253	G

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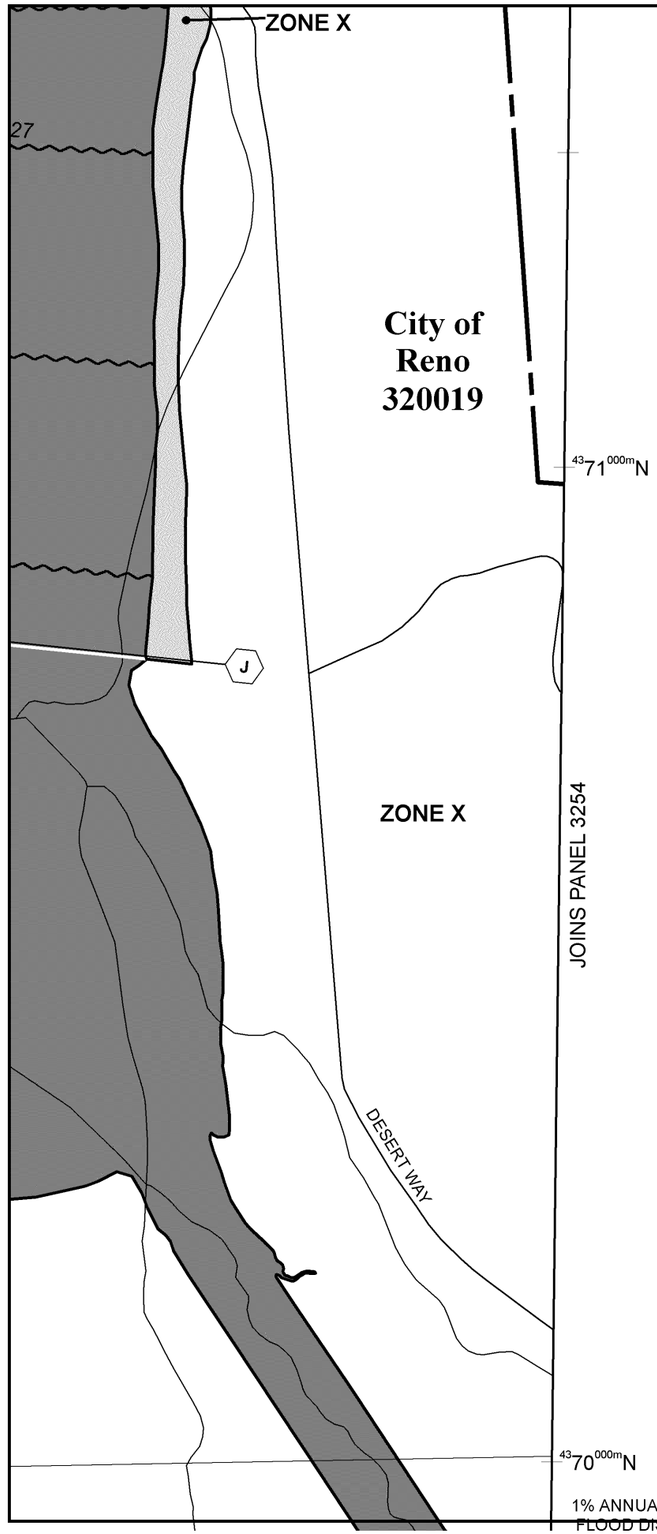
MAP NUMBER
32031C3253G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency



OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A — Cross section Line

23 — 23 — Transect line

87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

24 76 000m N — 1000-meter Universal Transverse Mercator grid values, zone 11

600000 FT — 5000-foot grid ticks: Nevada State Plane coordinate system, West zone (FIPSZONE 2703), Transverse Mercator projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 30, 1994

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 16, 2009 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3253G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 3253 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
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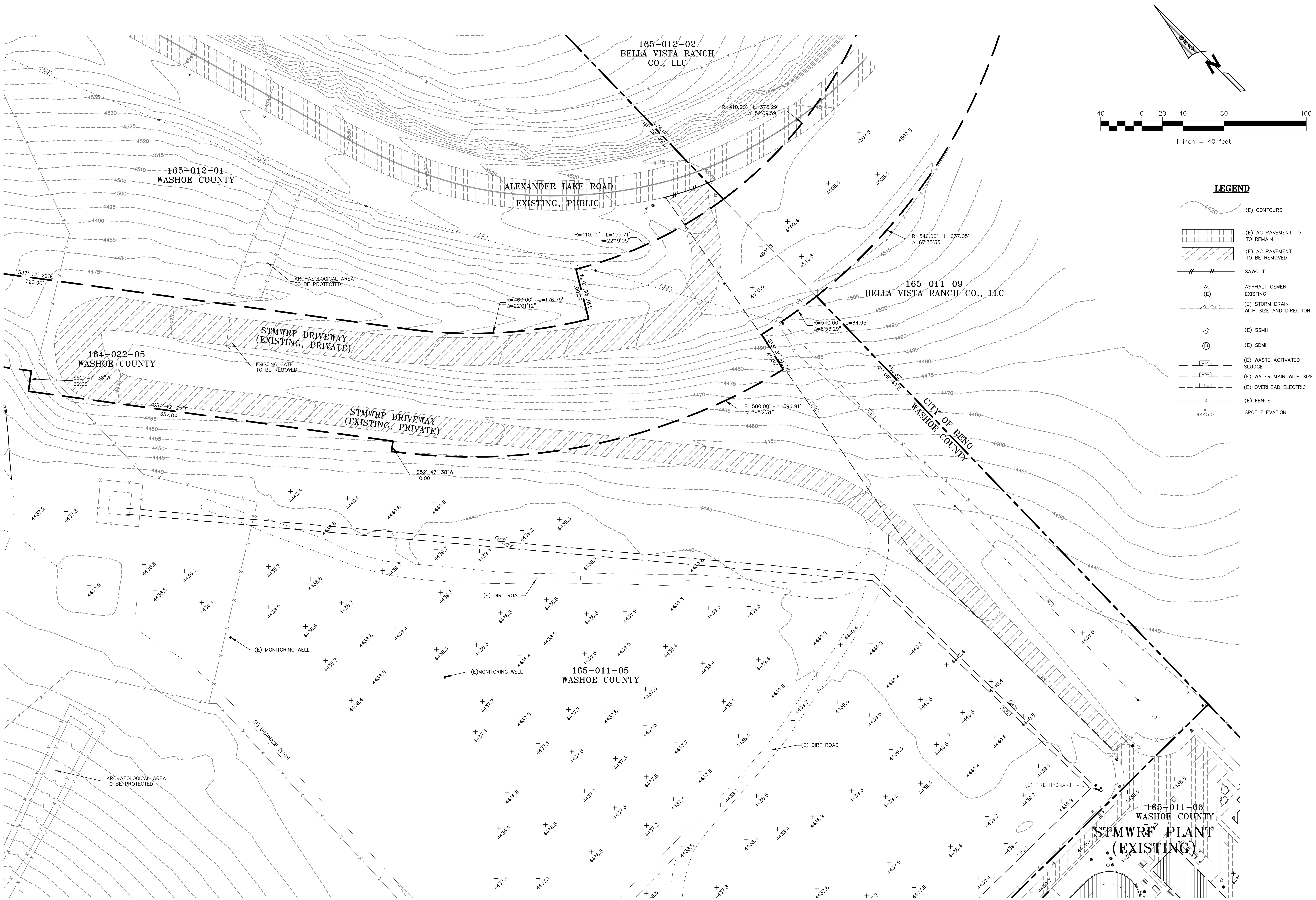
32031C3253G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency



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PROFESSIONAL ENGINEER — STATE OF NEVADA
EDWARD C. THOMAS
CIVIL
No. 9740
EXP. 6/30/14

WASHOE CO. COMM. SERVICES DEPT.- WATER RESOURCES

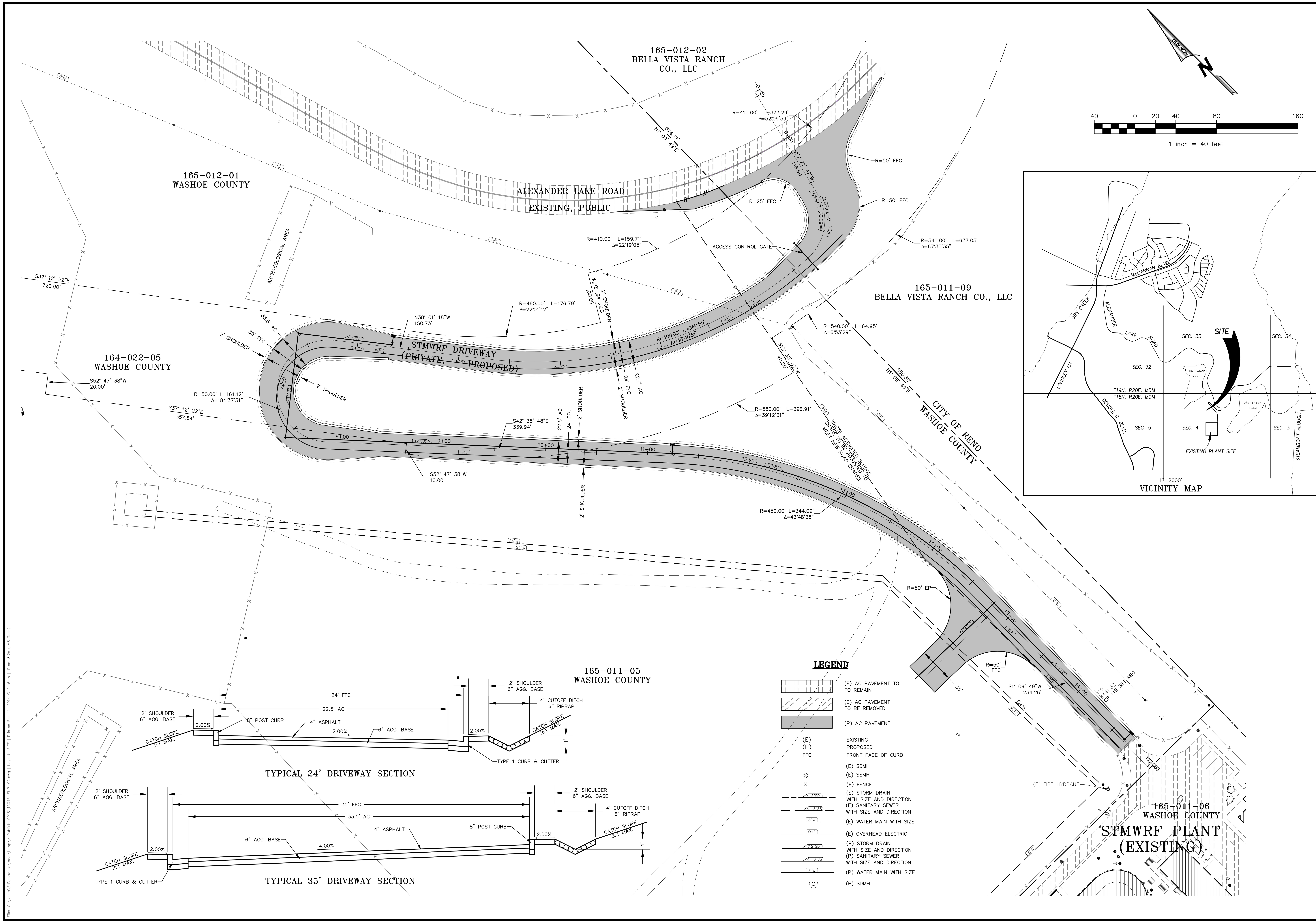
STMWRF ACCESS DRIVEWAY
EXISTING CONDITIONS

WASHOE COUNTY - NEVADA

BY	REVISIONS	DATE

CLIENT No.: W923
JOB No.: 13046
DRAWN BY: ECT
CHECKED BY:
DATE: 2-11-14

SHEET No.
C1
OF FIVE



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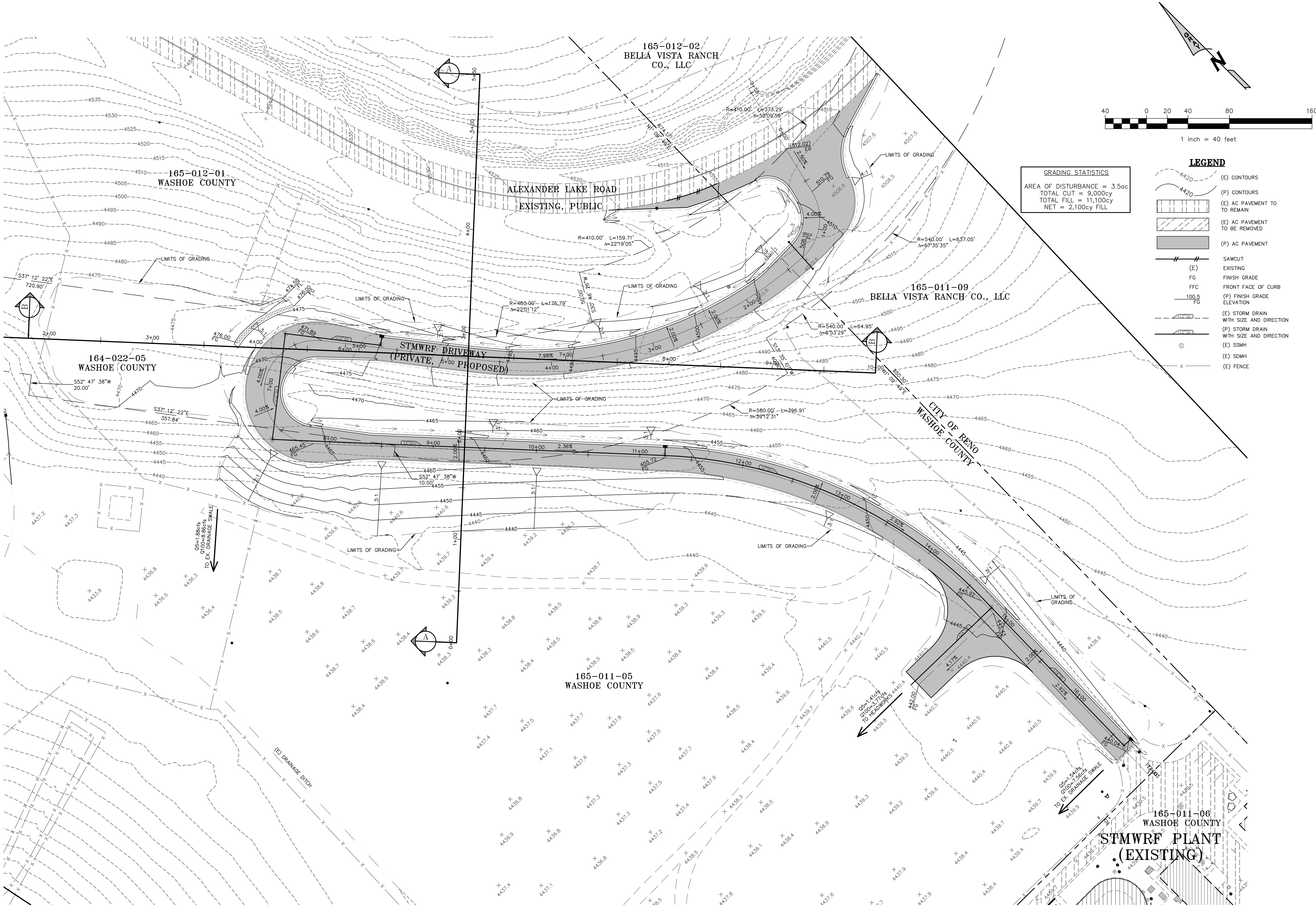
PROFESSIONAL ENGINEER - STATE OF NEVADA
EDWARD C. THOMAS
CIVIL
No. 9740
EXP. 6/30/14

WASHOE CO. COMM. SERVICES DEPT.- WATER RESOURCES
STMWRF ACCESS DRIVEWAY
PRELIM. SITE AND UTILITY PLAN
WASHOE COUNTY - NEVADA

BY	REVISIONS	DATE

CLIENT No.: W923
JOB No.: 13046
DRAWN BY: ECT
CHECKED BY:
DATE: 2-11-14

SHEET No.
C2
OF FIVE



GRADING STATISTICS

AREA OF DISTURBANCE = 3.5ac
TOTAL CUT = 9,000cy
TOTAL FILL = 11,100cy
NET = 2,100cy FILL

LEGEND

4420	(E) CONTOURS
4420	(P) CONTOURS
	(E) AC PAVEMENT TO TO REMAIN
	(E) AC PAVEMENT TO BE REMOVED
	(P) AC PAVEMENT
	SAWCUT
(E)	EXISTING
FG	FINISH GRADE
FFC	FRONT FACE OF CURB
100.5 FG	(P) FINISH GRADE ELEVATION
	(E) STORM DRAIN WITH SIZE AND DIRECTION
	(P) STORM DRAIN WITH SIZE AND DIRECTION
S	(E) SSMH
	(E) SDMH
x	(E) FENCE

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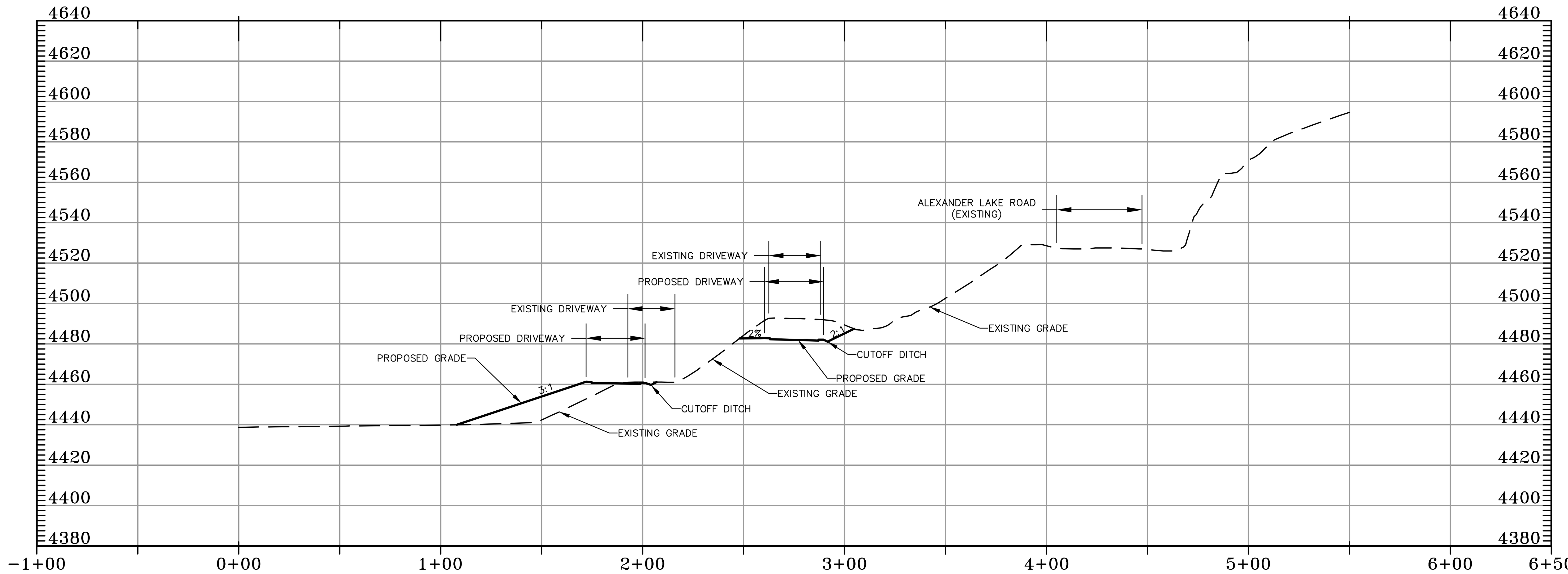
PROFESSIONAL ENGINEER – STATE OF NEVADA
EDWARD C. THOMAS
CIVIL
No. 9740
EXP. 6/30/14

WASHOE CO. COMM. SERVICES DEPT.– WATER RESOURCES
STMWRF ACCESS DRIVEWAY PRELIMINARY GRADING PLAN
WASHOE COUNTY – NEVADA

DATE	REVISIONS	BY

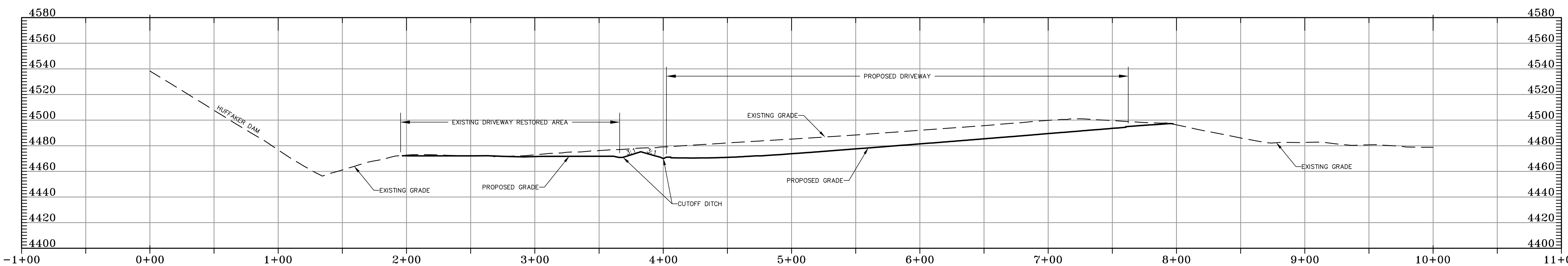
CLIENT No.: W923
JOB No.: 13046
DRAWN BY: ECT
CHECKED BY:
DATE: 2-11-14

SHEET No.
C3
OF FIVE



GRADING SECTION A-A

HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 40'



GRADING SECTION B-B

HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 40'

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PROFESSIONAL ENGINEER STATE OF NEVADA
EDWARD C. THOMAS
CIVIL
No.9740
EXP. 6/30/14

WASHOE CO. COMM. SERVICES DEPT.- WATER RESOURCES

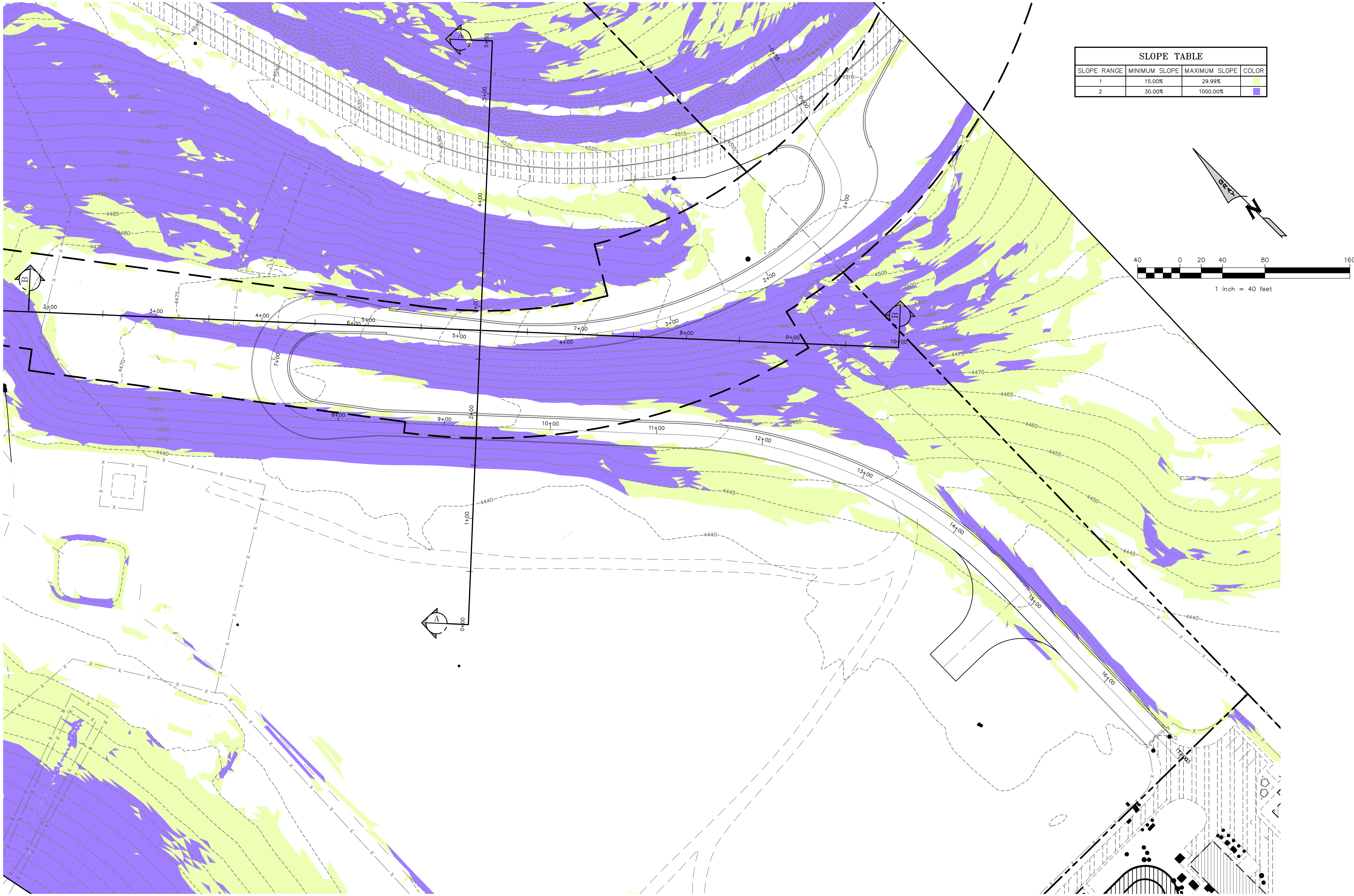
STMWRF ACCESS DRIVEWAY
GRADING CROSS SECTIONS

WASHOE COUNTY - NEVADA

BY	REVISIONS	DATE

CLIENT No.: W923
JOB No.: 13046
DRAWN BY: ECT
CHECKED BY:
DATE: 2-11-14

SHEET No.
C4
OF FIVE



SLOPE TABLE

SLOPE RANGE	MINIMUM SLOPE	MAXIMUM SLOPE	COLOR
1	15.00%	29.99%	
2	30.00%	1000.00%	

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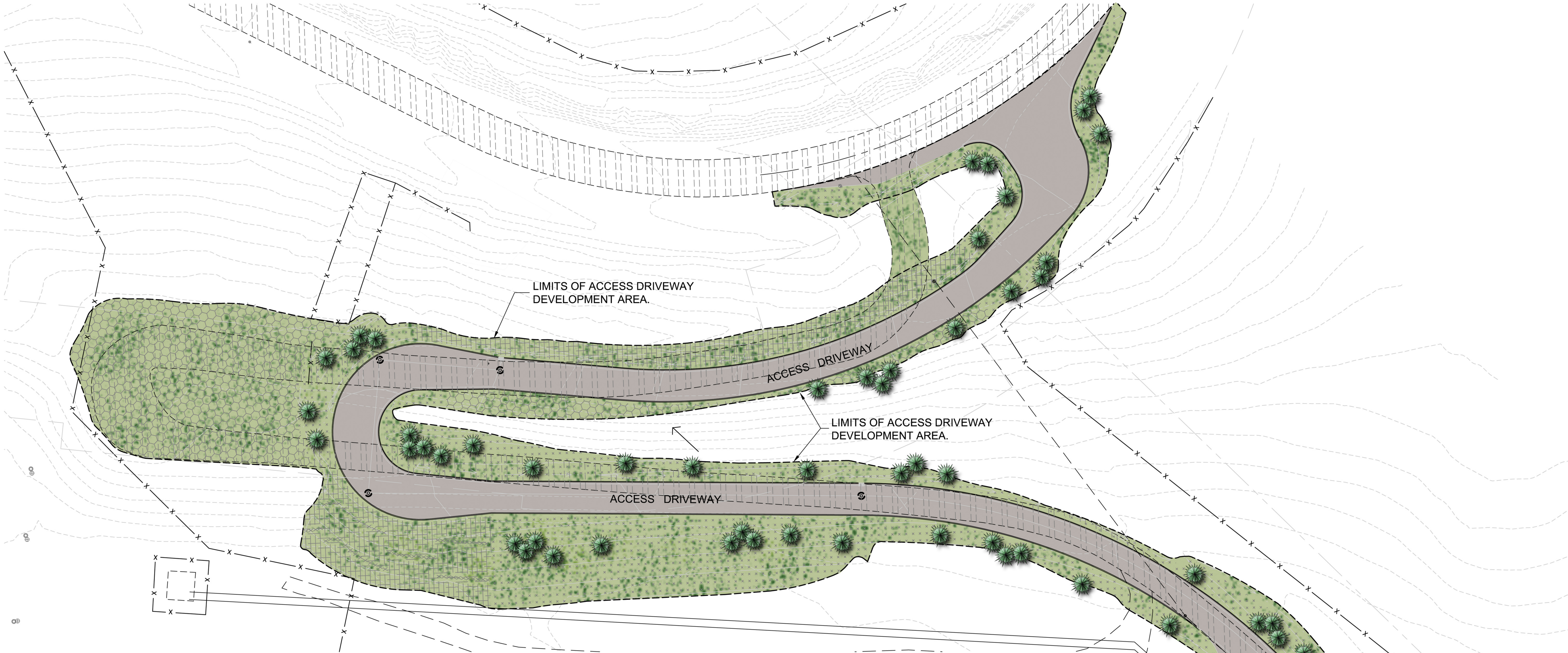
EDWARD C. THOMAS
CIVIL
No. 9740
EXP. 6/30/14

WASHOE CO. COMM. SERVICES DEPT.– WATER RESOURCES
STMWRF ACCESS DRIVEWAY
SLOPE ANALYSIS MAP
WASHOE COUNTY – NEVADA

BY	REVISIONS	DATE

CLIENT No.: W923
JOB No.: 13046
DRAWN BY: ECT
CHECKED BY:
DATE: 2-11-14

SHEET No.
C5
OF FIVE



LANDSCAPE DATA

TOTAL ACCESS DRIVEWAY DEVELOPED AREA = 3.3 ACRES

- ACCESS DRIVEWAY INCLUDING 2' SOFT SHOULDER = 56,245 SQ FT (1.29 ACRES)
- 3:1 SLOPES = 44,420 SQ FT (1.03 ACRES)
- 2:1 SLOPES = 16,100 SQ FT (0.37 ACRES)
- RESTORATION OF HAIRPIN TURN AT N. END OF EXISTING ACCESS ROAD = 22,245 SQ FT (0.51 ACRES)
- RESTORARTION OF EXISTING ACCESS ROAD INTERSECTION AT ALEXANDER LK RD = 4,175 SQ FT (0.10 ACRE)

ZONING: PSP & GR

Article 412 Landscaping (Section 110.412.00) Purpose:

a) Increase compatibility between residential, commercial and industrial land uses.
- *NOT APPLICABLE TO THIS PROJECT*

b) Enhancing the economic viability of the county and the quality of living forresidents and visitors by creating an attractive appearance of development along streets and highways.
- *NOT APPLICABLE TO THIS PROJECT*

c) Reducing heat, glare, noise, erosion, pollutants and dust by increasing the amount of vegetation.
- *THIS PROJECT IS REDUCING EROSION, POLLUTANTS AND DUST THROUGH THE RESTORATION OF THE NATIVE LANDSCAPE PALETTE.*

d) Preserving significant ecological communities, and desireable existing trees and vegetation bes suited for the local micro-climate.
- *NO TREES EXIST ON SITE. THE NATURAL CONDITIONS SUPPORT A NATIVE SHRUB AND HERBACOUS COMMUNITY. BASED ON THE LOCAL MICRO-CLIMATE, THIS PROJECT GOAL IS TO RESTORE ALL DISTURBED AREAS WITH A NATIVE PLANT COMMUNITY CONSISTENT WITH THE EXISTING VEGETATIVE COVER.*

e) Maximizing water conservation through established conservation principles and practices, and through proper landscape and irrigation planning, design, and management.
- *THIS PROJECT ACHIEVES MAXIMUM WATER CONSERVATION THROUGH PLANTING AND RESTORATION OF THE NATIVE SHRUB/HERBACEOUS COMMUNITY AND THE ADDITION OF A LIMITED NUMBER TREES. ALL NEW TREES AND SHRUBS WILL BE DRIP IRRIGATED.*

REQUIRED LANDSCAPE AREA = 20% OF TOTAL DEVELOPED AREA

LANDSCAPE AREA PROVIDED = 2.01 ACRES (61% OF TOTAL DRIVEWAY ACCESS DEVELOPED AREA)

(Section 110.412.25 Existing Vegetation) - "shall be preserved as set forth in this section and may contribute toward all landscaping required in this article.

TREES REQUIRED = 0
(Trees are required based on "required yards adjoining streets" and "adjacency to residential use". These requirements are not applicable to this project).

TREES PROVIDED = 60+/-

LANDSCAPE LEGEND

NATIVE/NATURALIZED JUNIPERUS TREES

DISTURBED SLOPES/AREAS TO BE REVEGETATED WITH NATIVE SEED BLEND AND RANDOMLY PLACED NATIVE SHRUB PLUGS.

5:1 REVEGETATED AREA

3:1 REVEGETATED SLOPE

2:1 REVEGETATED SLOPE

PLANTING & IRRIGATION NOTES

1) ALL PLANTING AND IRRIGATION SHALL BE INSTALLED PER LOCAL GOVERNING CODES.

2) FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL, AND WATER REGIMES. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-1990).

3) SEEDED AREAS WILL BE TEMPORARILY IRRIGATED TO INSURE ESTABLISHMENT.. CONTAINER PLANTINGS WILL BE DRIP IRRIGATED BASED ON THE SPECIFIC HORTICULTURAL REQUIREMENTS OF EACH SPECIES.

0' 40' 80' 120'

Scale in Feet

LA Studio
the landscape architecture studio
1552 C Street Sparks, NV 89431 (775) 322-6674 NV RLA #440
www.lastudioreno.com

WASHOE CO. COMM. SERVICES - WATER RESOURCES

STMWRF ACCESS DRIVEWAY

PRELIMINARY LANDSCAPE PLAN

Reno Washoe Co. Nevada

No.	Revision Date

LA No:	025-504-01-14
Designed:	RWH
Drawn:	RWH
Checked:	RWH
CAD File:	L1-025-504
Date:	2/13/14

Sheet **L1** of 1

Conceptual Drainage Report

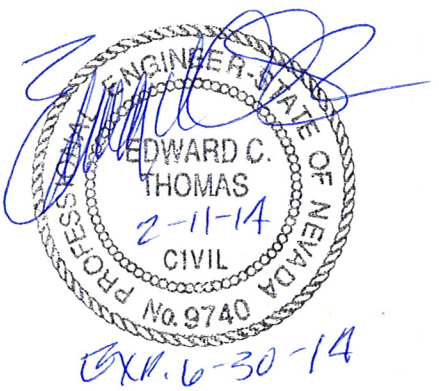
for

South Truckee Meadows Water Reclamation Facility Commercial Access

Washoe County, Nevada

Prepared for:

Washoe County Community Services Department
Water Resources
4930 Energy Way
Reno, NV 89502
(775) 954-4600



Prepared by:

Edward C. Thomas, P.E.
Gray & Associates
130 Vine St.
Reno, NV 89503
(775) 329-2911

February 8, 2014

W923-13046

INTRODUCTION

This report presents hydrologic and hydraulic calculations for the South Truckee Meadows Water Reclamation Facility (STMWRF) Commercial Access project. Station 36 is located is located in the northeastern 1/4 of the northwestern 1/4 of Section 4, T.18N, R.20E., M.D.M. in Washoe County, Nevada (8500 Alexander Lake Road, APNs 165-011-05, 165-012-01, and 164-022-05). The purpose of this study is to compute the 5-year and 100-year peak runoff for the undeveloped and improved condition and to provide supporting computations for the calculated peak runoff.

SITE DESCRIPTION

STMWRF is located in a small valley between Huffaker Hills and Rattlesnake Mountain in an unincorporated portion of Washoe County in southeast Reno, Nevada. STMWRF is located to the south of and below the Huffaker Dam, which impounds a Huffaker Reservoir. (See Vicinity Map, Appendix A). Alexander Lake is located to the southeast. Land immediately to the south is marsh Industrial properties lie to the south of the marsh. Neighboring property is undeveloped. The existing SMTWRF occupies the southern-most portion of the valley below the dam. Flat lands between the existing STMWRF and the dam are currently undeveloped. The existing facility is currently accessed from Alexander Lake Road via an existing paved commercial access driveway.

STMWRF treats domestic, commercial, and industrial wastewater in the South Truckee Meadows and distributes the reclaimed water for irrigation.

The currently proposed project is re-construction of the existing commercial access driveway. The purpose for re-constructing the driveway is to meet current emergency access standards and to accommodate an anticipated increase in truck traffic as STMWRF expands service.

Slopes of the existing hillsides to the north, west, and east of STMWRF are extremely steep; often in excess of 67%. The valley between STMWRF and Huffaker Dam is extremely flat. The existing and proposed commercial access driveway traverses an existing 1.5:1 slope down from Alexander Lake Road. Groundcover in the hillsides consists mainly of strong stands of native shrubs and grasses. The flatland between STMWRF and the Huffaker Dam has similar species of groundcover, but in less dense growth. The surrounding hillsides drain directly to the flat

lands. Existing drainage channels carry runoff into the marshy area and ultimately into Alexander Lake.

FLOOD ZONE

Based on a review of the Flood Insurance Rate Map Number 32031C3253 G, effective date March 16, 2009 prepared by the Federal Emergency Management Agency (F.E.M.A.) the project site is identified as existing within Flood Hazard Zone X (unshaded), which is defined as areas determined to be outside the 500-year floodplain. The FEMA FIRM can be found in Appendix B.

PROJECT DESCRIPTION

The STMWRF Commercial Access project will involve the re-construction of the existing access driveway that connects the existing STMWRF operations to Alexander Lake Road. The proposed driveway will be roughly 1,700 feet in length. Driveway width will vary between 24 and 35 feet, and will have a maximum grade of 8%. It will be asphalt-paved and will be constructed with curb and gutter to contain runoff originating on the roadway. Catch slopes will vary between 3:1 and 2:1. Runoff originating on unpaved areas will be collected in cutoff ditches and not allowed to enter the driveway. Construction of the new access driveway will disturb roughly 3.5 acres. Unpaved areas will be revegetated with native shrubs and grasses. Revegetated areas will be temporarily irrigated using reclaimed water from STMWRF until vegetation establishes to the point that coverage reaches 70% of pre-development coverage as recommended by the Environmental Protection Agency (EPA).

Runoff originating on unpaved areas will be kept separate from runoff originating on paved areas. The access driveway will be used by large dump trucks which will carry sludge from STMWRF to the Lockwood landfill. There is a remote possibility that these vehicles could leak sludge onto the roadway. Runoff collected on the paved roadway (as well as its two-foot-wide unpaved shoulders) will be collected in catch basins and piped to the STMWRF headworks so that it can be treated. Runoff originating on unpaved areas will be collected in cutoff ditches and routed to the existing drainage channel located to the west of STMWRF. The existing drainage channel drains into the existing marshy area to the south of STMWRF and ultimately into Alexander Lake. Since all runoff drains to Alexander Lake, a large reservoir, no stormwater detention will be provided.

METHODOLOGY

Peak rate of runoff is computed using the Rational Method. The Rational Method determines peak runoff by expressing the ground cover, site gradient, and soil type as a ratio relative to a completely impervious site. Rainfall intensity is derived from the NOAA Atlas 14 for 24-hour duration storms (See Appendix B). The Rational Method uses the following equations to compute peak runoff:

$$Q = CiA$$

Where, Q = Peak Runoff (cfs)
C = Runoff Coefficient (unitless)
i = Rainfall Intensity (in/hr)
A = Area of Drainage Basin (ac)

Runoff coefficients for a variety of surface conditions are defined by the Truckee Meadows Regional Drainage Manual ("T-M Drainage")

Rainfall intensity is a function of rainfall duration and was computed using NOAA's Point Precipitation Frequency Estimates function available on the NOAA website. NOAA's system allows for pinpoint precipitation estimates by allowing the user to input the exact coordinates of the project site. The highest rainfall intensity occurs when the rainfall duration is equal to the time of concentration for runoff.

In hydrograph theory, time of concentration is defined as the time from the end of excessive rainfall to the end of direct runoff. In practical calculations, time of concentration is the flow time from the most hydraulically remote point in a drainage basin to the point of discharge. Concentration time is therefore a combination of two related factors: initial overland flow time and concentrated flow time. The initial time is based on the distance travelled over the ground surface prior to concentrating into organized channels (sheet flow). The minimum time of concentration is defined by T-M Drainage as 10 minutes.

The initial overland flow time is computed using the following equation:

$$t_i = \left[\frac{1.8(1.1 - R)L_0^{\frac{1}{2}}}{S^{\frac{1}{3}}}\right]$$

Where, t_i = Initial overland flow time (min)
R = 5- year Runoff Coefficient (unitless)
L_0 = Length of overland runoff (ft); 500 ft maximum
S = Overland slope (%)

Time of concentrated flow is computed using the following equation:

$$t_n = \frac{L_n}{v_n(60\frac{min}{in})}$$

Where, t_n = Concentrated flow time for segment n (min)
L_n = Length of concentrated flow segment n (unitless)
v_n = Velocity of concentrated flow in segment n (ft)

Time of concentration (t_c) is therefore computed using the following equation:

$$t_c = t_i + \sum_{n=1}^{n} t_n$$

According to T-M Drainage, the peak rate of runoff may not be increased as a result of development. In this project, runoff originating on the roadway will be piped directly to the STMWRF headworks where it will be treated and pumped out for use as irrigation water. Consequently, runoff originating on the road surface will be effectively removed from the system and not contribute to overall site runoff. The amount of runoff removed from the system is larger than the increase in runoff due to the increase in impervious area, so there is no net increase in runoff resulting from development of the access road.

According to T-M Drainage, for flow-based facilities, runoff from the 2-year return frequency storm must be treated to remove pollutants. As mentioned above, runoff originating on unpaved surfaces will be kept separate from runoff originating on paved surfaces. Unpaved surfaces will be revegetated using native shrubs and grasses and irrigated until the revegetation is established.

The simplest way to remove pollutants from stormwater is to allow it to run through a vegetated buffer strip. The entire unpaved area at STMWRF is effectively a large buffer strip. Consequently, no additional treatment is required to meet the treatment standards set by T-M Drainage.

All runoff originating on the paved surfaces will be routed to the STMWRF headworks and treated within the facility for use as reclaimed water. Consequently, 100% of runoff originating on the driveway surface will be treated, and therefore no extra treatment is required.

The result is that 100% of runoff originating on the project site will be treated for pollutant removal, and no extra treatment structures are necessary to meet the standards set in T-M Drainage.

EXISTING RUNOFF ANALYSIS

For purposes of this report, the project site will be considered the area that will be disturbed in the re-construction of the STMWRF commercial access driveway.

The existing site drains predominantly from east to west. Alexander Lake Road acts as a barrier to upstream runoff and routes runoff originating on the hillside above away from the project site. There are two existing cutoff ditches which collect runoff originating on the hillside above the existing driveway and route it to the drainage channel located on the west side of the small valley north of STMWRF. The drainage channel in the valley conveys runoff south to the existing marshy area to the south of STMWRF. The marshy area ultimately drains into Alexander Lake.

The existing access driveway intersects Alexander Lake Road at a point north of STMWRF. It then traverses down the slope in a northward direction toward the Huffaker Dam. At a point near the base of the dam, it reverses direction and traverses down the slope in a southward direction until it reaches the bottom of the valley.

One existing cutoff ditch collects runoff from the slope above the northbound leg of the driveway and carries it to the foot of Huffaker Dam. There is no defined channel beyond this point, but the grade of the land will carry runoff across the bottom of the valley and into the

existing drainage channel along the west edge of the valley. The second cutoff ditch collects runoff originating on the slope between the northbound and southbound legs of the driveway and routes it to the northeast corner of STMWRF where it is collected in an existing 12-inch diameter culvert and routed to the existing drainage channel along the west edge of the valley.

Runoff originating on the north half existing paved driveway surface is collected in adjacent cutoff ditches. Runoff originating on the south half of the northbound leg of the driveway drains onto the slope below and is ultimately collected in the cutoff ditch adjacent to the southbound leg of the driveway. Runoff originating on the south half of the southbound leg of the driveway drains down the slope below and ultimately reaches the existing drainage channel along the west edge of the valley.

The existing site currently drains to one location: the existing drainage channel on the west edge of the valley. For computational purposes, the drainage area has been broken into three subareas.

Subarea E-1 represents the area draining into the cutoff ditch located on the north side of the northbound leg of the driveway. Subarea E-2 represents the area draining into the cutoff ditch located on the north side of the southbound leg of the driveway. Subarea E-3 represents the area draining directly to the valley floor (See Figure 1, Appendix D).

Table 1 represents the hydrologic characteristics of the existing site.

Table 1. Existing Conditions: Peak Runoff

Subarea	Area (ac)	C_5	C_{100}	t_c (min)	i_5 (in/hr)	i_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
E-1	4.16	0.36	0.63	10	1.37	3.37	2.07	8.90
E-2	4.23	0.33	0.61	10	1.37	3.37	1.89	8.76
E-3	1.89	0.44	0.68	10	1.37	3.37	1.15	4.35
Overall Project Site	10.28	0.36	0.64	10	1.37	3.37	5.11	22.01

All calculations were performed by hand and can be found in Appendix C.

PROPOSED RUNOFF ANALYSIS

Proposed drainage patterns will essentially follow the same patterns as the existing site. The primary difference will be that any runoff originating on the paved surfaces will be routed to the STMWRF headworks where it will be collected and treated. Runoff originating on the paved surfaces is not included in the overall runoff calculation because it does not contribute to the runoff leaving the site.

Proposed Subareas P-1 through P-3 correspond to Subareas E-1 through E-3, respectively. Subarea P-4 represents the paved driveway surface as well as the unpaved road shoulders. (See Figure 2, Appendix D)

Tables 2 and 3 represent the hydrologic characteristics of the developed site.

Table 2. Developed Conditions: Peak Runoff Leaving Site

Subarea	Area (ac)	C_5	C_{100}	t_c (min)	i_5 (in/hr)	i_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
P-1	4.30	0.32	0.61	10	1.37	3.37	1.88	8.86
P-2	3.74	0.30	0.60	10	1.37	3.37	1.54	7.56
P-3	1.37	0.37	0.67	10	1.37	3.37	0.51	0.92
Overall Project Site	9.41	0.32	0.62	10	1.37	3.37	3.93	17.34

Table 3. Developed Conditions: Peak Runoff Routed to STMWRF Headworks

Subarea	Area (ac)	C_5	C_{100}	t_c (min)	i_5 (in/hr)	i_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
P-4	1.29	0.80	0.87	10	1.37	3.37	1.41	3.77

All calculations were performed by hand and can be found in Appendix C.

As can be seen by comparing Table 1 and Table 2, peak developed runoff leaving the site and draining into Alexander Lake has been reduced below existing conditions. This is due partly to the fact that there is only a minimal net change in the amount of impervious ground cover. The primary reason that peak runoff leaving the project site is reduced below existing levels is that all runoff originating on the driveway surface is routed to the STMWRF headworks where it is treated and effectively removed from the storm drainage system.

CONCLUSION

A new commercial access driveway to serve STMWRF will be constructed to replace the existing driveway. The new driveway will be paved and will follow a similar route to the old driveway. Construction of the new driveway will result in a small increase in the amount of impervious ground cover. Runoff originating on the new driveway surface will be collected in a storm drain piping system which will remain separate from the storm drain system that will collect runoff from re-vegetated and non-paved areas. Runoff originating on unpaved surfaces will be routed to the existing drainage channel which runs from north to south along the west

edge of the small valley below the Huffaker Dam. This existing drainage channel carries runoff to the marshy area located to the south of STMWRF and ultimately to Alexander Lake. Runoff originating on the driveway surface will be routed to the STMWRF headworks where it will be treated and re-used for irrigation. Peak runoff leaving the site via the existing drainage ditch along the west side of the valley will not be increased as a result of construction of the STMWRF commercial access driveway.

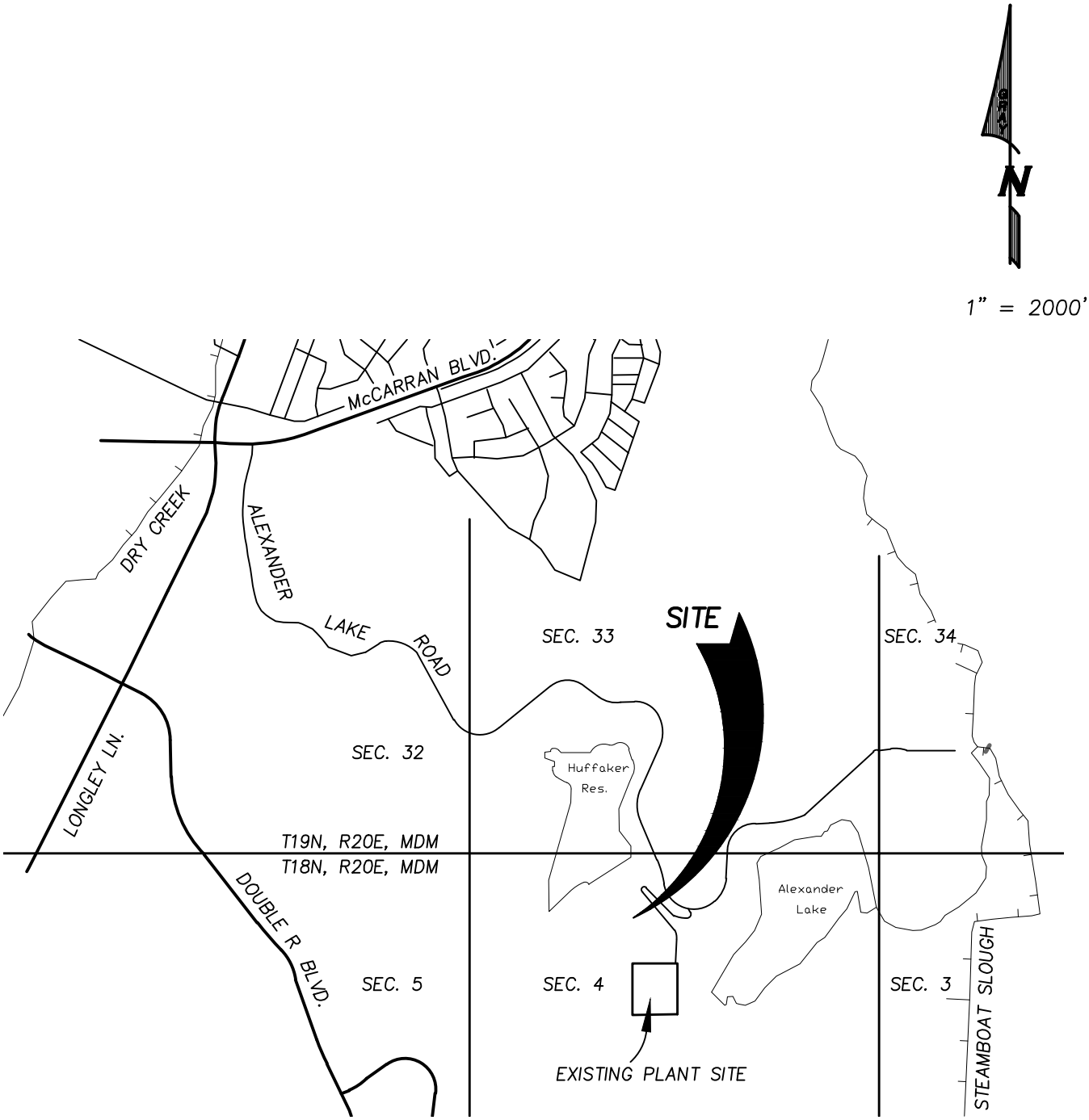
All disturbed ground surfaces which are not paved will be re-vegetated using native shrubs and grasses. Revegetated areas will be irrigated using treated effluent from STMWRF until revegetation is established to the point that coverage is at least 70% of existing coverage density. By revegetating disturbed slopes and by lining cutoff ditches with rip-rap, erosion and sedimentation can be minimized.

Runoff originating on paved surfaces will be collected in a separate storm drainage system and piped to the STMWRF headworks where it can be treated prior to discharge into the reclaimed water system.

Washoe County Code requires that the 5-year and 100-year peak runoff leaving a developed site not exceed the peak runoff leaving the site in its undeveloped state. Washoe County policy requires that runoff be treated to remove pollutants from 90% of storms prior to discharge from the site. The proposed improvements are expected to meet both of these standards.

APPENDIX A

VICINITY MAP



STMWRF DRIVEWAY

VICINITY MAP

WASHOE CO. WATER RES.

WASHOE CO., NEVADA

SCALE: 1" = 2000'
DRAWN BY: JAM
DATE: 2-6-14
JOB NO.: 13046

Gray & Associates INC.

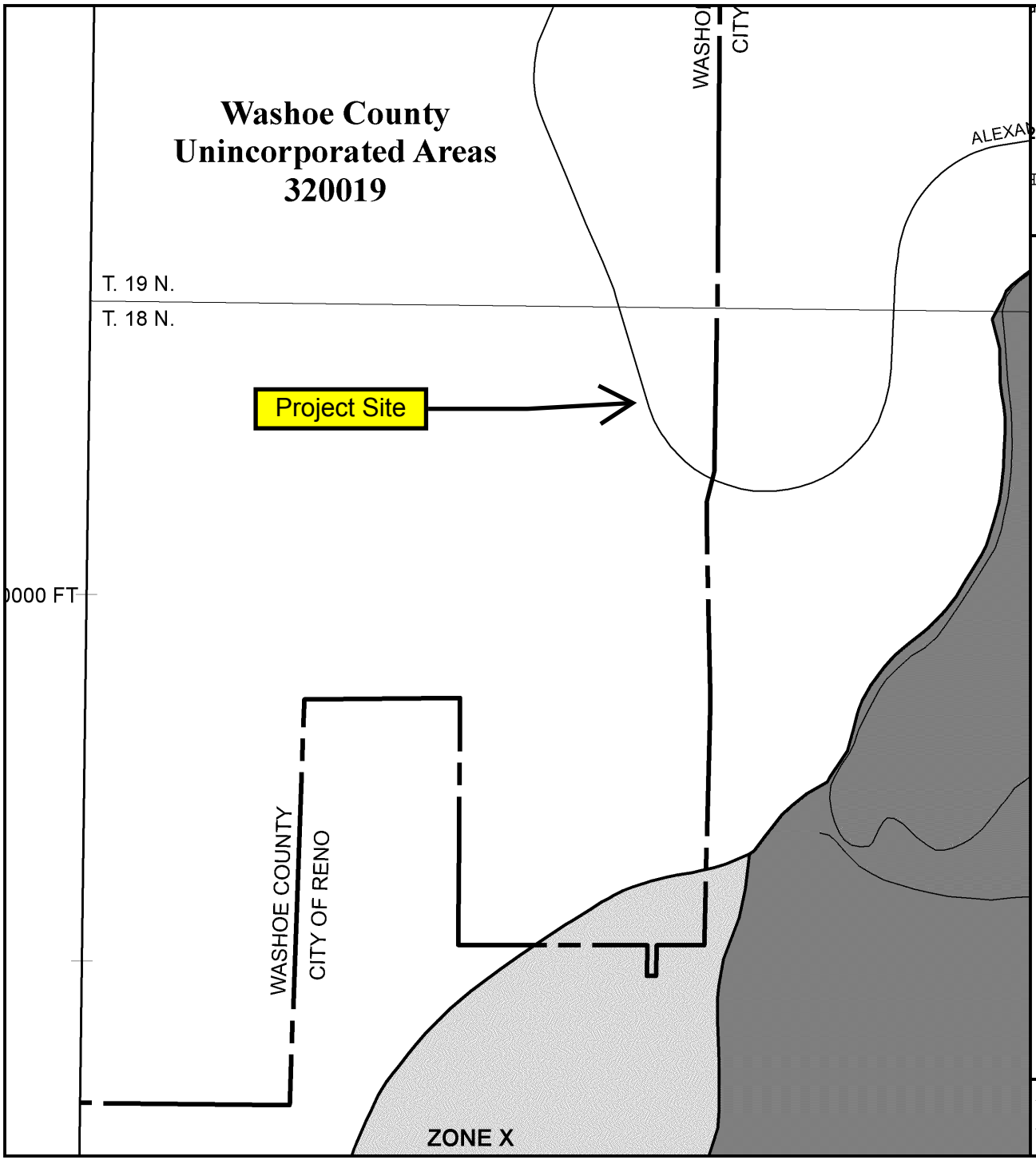
CIVIL ENGINEERS * PLANNERS * SURVEYORS

130 Vine Street Reno, Nevada 89503

(775) 329-2911 * (775) 329-6469 Fax * admin@grayassociates.net

APPENDIX B

FEMA FIRM and I-D-F CURVES



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3253G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 3253 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RENO, CITY OF	320020	3253	G
WASHOE COUNTY	320019	3253	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32031C3253G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency

NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, US*
Coordinates: 39.4598, -119.7431
Elevation: 4463 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.07** (0.924–1.26)	**1.33** (1.14–1.57)	**1.80** (1.52–2.12)	**2.23** (1.88–2.65)	**2.95** (2.42–3.56)	**3.64** (2.87–4.42)	**4.43** (3.38–5.45)	**5.39** (3.95–6.78)	**6.95** (4.78–9.04)	**8.35** (5.48–11.1)
10-min	**0.816** (0.702–0.954)	**1.01** (0.864–1.20)	**1.37** (1.16–1.62)	**1.70** (1.43–2.02)	**2.25** (1.85–2.71)	**2.77** (2.18–3.36)	**3.37** (2.58–4.15)	**4.10** (3.01–5.16)	**5.29** (3.63–6.88)	**6.36** (4.17–8.47)
15-min	**0.676** (0.576–0.788)	**0.840** (0.712–0.992)	**1.13** (0.960–1.34)	**1.40** (1.18–1.67)	**1.86** (1.52–2.24)	**2.28** (1.80–2.78)	**2.78** (2.13–3.43)	**3.39** (2.48–4.26)	**4.37** (3.00–5.68)	**5.25** (3.45–7.00)
30-min	**0.454** (0.388–0.530)	**0.564** (0.480–0.668)	**0.762** (0.646–0.902)	**0.944** (0.796–1.12)	**1.25** (1.03–1.51)	**1.54** (1.21–1.87)	**1.88** (1.43–2.31)	**2.28** (1.67–2.87)	**2.94** (2.02–3.83)	**3.54** (2.32–4.71)
60-min	**0.281** (0.241–0.328)	**0.350** (0.297–0.413)	**0.471** (0.400–0.558)	**0.584** (0.493–0.695)	**0.775** (0.636–0.932)	**0.952** (0.752–1.16)	**1.16** (0.887–1.43)	**1.41** (1.04–1.78)	**1.82** (1.25–2.37)	**2.19** (1.44–2.91)
2-hr	**0.187** (0.164–0.216)	**0.232** (0.206–0.269)	**0.300** (0.260–0.346)	**0.356** (0.306–0.412)	**0.444** (0.370–0.518)	**0.522** (0.424–0.618)	**0.610** (0.482–0.735)	**0.720** (0.550–0.898)	**0.924** (0.672–1.20)	**1.12** (0.780–1.47)
3-hr	**0.147** (0.131–0.167)	**0.183** (0.165–0.210)	**0.231** (0.206–0.263)	**0.269** (0.237–0.307)	**0.322** (0.278–0.370)	**0.368** (0.312–0.429)	**0.423** (0.351–0.500)	**0.495** (0.401–0.604)	**0.625** (0.491–0.805)	**0.752** (0.569–0.990)
6-hr	**0.102** (0.091–0.115)	**0.128** (0.115–0.145)	**0.159** (0.142–0.180)	**0.183** (0.162–0.207)	**0.215** (0.187–0.244)	**0.238** (0.205–0.273)	**0.263** (0.222–0.305)	**0.291** (0.241–0.342)	**0.337** (0.271–0.407)	**0.389** (0.307–0.502)
12-hr	**0.065** (0.059–0.073)	**0.082** (0.074–0.092)	**0.104** (0.093–0.117)	**0.121** (0.107–0.136)	**0.143** (0.125–0.162)	**0.160** (0.138–0.183)	**0.177** (0.150–0.206)	**0.194** (0.161–0.228)	**0.217** (0.175–0.261)	**0.237** (0.186–0.289)
24-hr	**0.040** (0.037–0.045)	**0.050** (0.046–0.056)	**0.064** (0.058–0.071)	**0.074** (0.067–0.082)	**0.089** (0.080–0.099)	**0.101** (0.090–0.112)	**0.113** (0.100–0.126)	**0.126** (0.110–0.142)	**0.143** (0.123–0.162)	**0.156** (0.133–0.180)
2-day	**0.024** (0.021–0.027)	**0.030** (0.027–0.033)	**0.038** (0.034–0.042)	**0.044** (0.039–0.049)	**0.053** (0.047–0.059)	**0.060** (0.053–0.067)	**0.067** (0.058–0.076)	**0.074** (0.064–0.085)	**0.085** (0.072–0.099)	**0.093** (0.077–0.110)
3-day	**0.017** (0.015–0.019)	**0.022** (0.019–0.024)	**0.027** (0.025–0.031)	**0.032** (0.029–0.036)	**0.039** (0.035–0.044)	**0.044** (0.039–0.050)	**0.050** (0.044–0.057)	**0.056** (0.048–0.064)	**0.064** (0.054–0.074)	**0.071** (0.059–0.083)
4-day	**0.014** (0.013–0.016)	**0.017** (0.016–0.020)	**0.022** (0.020–0.025)	**0.026** (0.024–0.029)	**0.032** (0.029–0.036)	**0.037** (0.032–0.041)	**0.041** (0.036–0.047)	**0.047** (0.040–0.053)	**0.054** (0.045–0.062)	**0.060** (0.050–0.070)
7-day	**0.009** (0.008–0.010)	**0.012** (0.010–0.013)	**0.015** (0.014–0.017)	**0.018** (0.016–0.020)	**0.022** (0.019–0.024)	**0.025** (0.022–0.028)	**0.028** (0.024–0.032)	**0.031** (0.027–0.036)	**0.036** (0.030–0.042)	**0.040** (0.033–0.047)
10-day	**0.007** (0.006–0.008)	**0.009** (0.008–0.010)	**0.012** (0.011–0.013)	**0.014** (0.012–0.016)	**0.017** (0.015–0.019)	**0.019** (0.017–0.022)	**0.022** (0.019–0.025)	**0.024** (0.021–0.028)	**0.027** (0.023–0.032)	**0.030** (0.025–0.035)
20-day	**0.004** (0.004–0.005)	**0.005** (0.005–0.006)	**0.007** (0.006–0.008)	**0.008** (0.007–0.009)	**0.010** (0.009–0.011)	**0.011** (0.010–0.013)	**0.013** (0.011–0.014)	**0.014** (0.012–0.016)	**0.016** (0.013–0.018)	**0.017** (0.014–0.020)
30-day	**0.003** (0.003–0.004)	**0.004** (0.004–0.005)	**0.005** (0.005–0.006)	**0.006** (0.006–0.007)	**0.008** (0.007–0.008)	**0.008** (0.007–0.010)	**0.009** (0.008–0.011)	**0.010** (0.009–0.012)	**0.012** (0.010–0.013)	**0.013** (0.011–0.015)
45-day	**0.003** (0.002–0.003)	**0.003** (0.003–0.004)	**0.004** (0.004–0.005)	**0.005** (0.004–0.005)	**0.006** (0.005–0.006)	**0.007** (0.006–0.007)	**0.007** (0.006–0.008)	**0.008** (0.007–0.009)	**0.009** (0.007–0.010)	**0.009** (0.008–0.010)
60-day	**0.002** (0.002–0.002)	**0.003** (0.003–0.003)	**0.004** (0.003–0.004)	**0.004** (0.004–0.005)	**0.005** (0.004–0.005)	**0.005** (0.005–0.006)	**0.006** (0.005–0.007)	**0.006** (0.006–0.007)	**0.007** (0.006–0.008)	**0.007** (0.006–0.008)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

curve plots

APPENDIX C

SUPPORTING CALCULATIONS

STMWRF Commercial Access

Conceptual Hydrology Calculations

Existing Conditions

Area E-1: Area draining to cutoff ditch on north log of existing access driveway

A = 181,380 SF ≈ 4.16 ac

Paved Area = 13,388 SF + 6,286 SF = 19,674 SF = 0.45 ac

Unpaved Area = 4.16 ac − 0.45 ac = 3.71 ac

From Truckee Meadows Regional Drainage Manual ("TM-Hydro") Table 701

For undeveloped range, $C_5 = 0.20$, $C_{100} = 0.50$

But slopes are very steep, so use $C_5 = 0.30$, $C_{100} = 0.60$

For pavement: $C_5 = 0.88$, $C_{100} = 0.93$

The majority of runoff travels as sheet flow from adjacent lake road to the access driveway cutoff ditch.

From TM-Hydro Equation 702,

$$t_i = \frac{1.8(1.1 - R)L_o^{1/2}}{S^{1/3}}$$

Where t_i = Initial Overland Flow Time (min.)

R = 5-year runoff coefficient

L_o = Length of overland flow (ft, 500' max)

S = Average overland slope (%)

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BY OBSERVATION CUMULATIVE CONCENTRATION TIME WILL NOT EXCEED THE SPECIFIED MINIMUM CONCENTRATION TIME OF 10 MIN

$\Rightarrow T_c = 10$ MIN.

FROM NOAA POINT PRECIPITATION FREQUENCY ESTIMATES:

$i_5 = 1.37$ IN/HR

$i_{100} = 3.37$ IN/HR

RATIONAL METHOD HYDROLOGY: $Q = CiA$

WHERE, Q = RUNOFF RATE (CFS)

C = RUNOFF COEFFICIENT

i = RAINFALL INTENSITY (IN/HR)

A = AREA OF BASIN (AC)

$\Sigma CA_c = (0.30)(3.71\text{ac}) + (0.88)(0.45\text{ac}) = 1.51\text{ac}$

$\Sigma CA_{100} = (0.60)(3.71\text{ac}) + (0.93)(0.45\text{ac}) = 2.64\text{ac}$

$Q_5 = (1.51\text{ac})(1.37\text{ IN/HR}) = 2.07\text{CFS}$

$Q_{100} = (2.64\text{ac})(3.37\text{ IN/HR}) = 8.90\text{CFS}$

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NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, US*
Coordinates: 39.4598, -119.7431
Elevation: 4463 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.07 (0.924–1.26)	1.33 (1.14–1.57)	1.80 (1.52–2.12)	2.23 (1.88–2.65)	2.95 (2.42–3.56)	3.64 (2.87–4.42)	4.43 (3.38–5.45)	5.39 (3.95–6.78)	6.95 (4.78–9.04)	8.35 (5.48–11.1)
10-min	0.816 (0.702–0.954)	1.01 (0.864–1.20)	1.37 (1.16–1.62)	1.70 (1.43–2.02)	2.25 (1.85–2.71)	2.77 (2.18–3.36)	3.37 (2.58–4.15)	4.10 (3.01–5.16)	5.29 (3.63–6.88)	6.36 (4.17–8.47)
15-min	0.676 (0.576–0.788)	0.840 (0.712–0.992)	1.13 (0.960–1.34)	1.40 (1.18–1.67)	1.86 (1.52–2.24)	2.28 (1.80–2.78)	2.78 (2.13–3.43)	3.39 (2.48–4.26)	4.37 (3.00–5.68)	5.25 (3.45–7.00)
30-min	0.454 (0.388–0.530)	0.564 (0.480–0.668)	0.762 (0.646–0.902)	0.944 (0.796–1.12)	1.25 (1.03–1.51)	1.54 (1.21–1.87)	1.88 (1.43–2.31)	2.28 (1.67–2.87)	2.94 (2.02–3.83)	3.54 (2.32–4.71)
60-min	0.281 (0.241–0.328)	0.350 (0.297–0.413)	0.471 (0.400–0.558)	0.584 (0.493–0.695)	0.775 (0.636–0.932)	0.952 (0.752–1.16)	1.16 (0.887–1.43)	1.41 (1.04–1.78)	1.82 (1.25–2.37)	2.19 (1.44–2.91)
2-hr	0.187 (0.164–0.216)	0.232 (0.206–0.269)	0.300 (0.260–0.346)	0.356 (0.306–0.412)	0.444 (0.370–0.518)	0.522 (0.424–0.618)	0.610 (0.482–0.735)	0.720 (0.550–0.898)	0.924 (0.672–1.20)	1.12 (0.780–1.47)
3-hr	0.147 (0.131–0.167)	0.183 (0.165–0.210)	0.231 (0.206–0.263)	0.269 (0.237–0.307)	0.322 (0.278–0.370)	0.368 (0.312–0.429)	0.423 (0.351–0.500)	0.495 (0.401–0.604)	0.625 (0.491–0.805)	0.752 (0.569–0.990)
6-hr	0.102 (0.091–0.115)	0.128 (0.115–0.145)	0.159 (0.142–0.180)	0.183 (0.162–0.207)	0.215 (0.187–0.244)	0.238 (0.205–0.273)	0.263 (0.222–0.305)	0.291 (0.241–0.342)	0.337 (0.271–0.407)	0.389 (0.307–0.502)
12-hr	0.065 (0.059–0.073)	0.082 (0.074–0.092)	0.104 (0.093–0.117)	0.121 (0.107–0.136)	0.143 (0.125–0.162)	0.160 (0.138–0.183)	0.177 (0.150–0.206)	0.194 (0.161–0.228)	0.217 (0.175–0.261)	0.237 (0.186–0.289)
24-hr	0.040 (0.037–0.045)	0.050 (0.046–0.056)	0.064 (0.058–0.071)	0.074 (0.067–0.082)	0.089 (0.080–0.099)	0.101 (0.090–0.112)	0.113 (0.100–0.126)	0.126 (0.110–0.142)	0.143 (0.123–0.162)	0.156 (0.133–0.180)
2-day	0.024 (0.021–0.027)	0.030 (0.027–0.033)	0.038 (0.034–0.042)	0.044 (0.039–0.049)	0.053 (0.047–0.059)	0.060 (0.053–0.067)	0.067 (0.058–0.076)	0.074 (0.064–0.085)	0.085 (0.072–0.099)	0.093 (0.077–0.110)
3-day	0.017 (0.015–0.019)	0.022 (0.019–0.024)	0.027 (0.025–0.031)	0.032 (0.029–0.036)	0.039 (0.035–0.044)	0.044 (0.039–0.050)	0.050 (0.044–0.057)	0.056 (0.048–0.064)	0.064 (0.054–0.074)	0.071 (0.059–0.083)
4-day	0.014 (0.013–0.016)	0.017 (0.016–0.020)	0.022 (0.020–0.025)	0.026 (0.024–0.029)	0.032 (0.029–0.036)	0.037 (0.032–0.041)	0.041 (0.036–0.047)	0.047 (0.040–0.053)	0.054 (0.045–0.062)	0.060 (0.050–0.070)
7-day	0.009 (0.008–0.010)	0.012 (0.010–0.013)	0.015 (0.014–0.017)	0.018 (0.016–0.020)	0.022 (0.019–0.024)	0.025 (0.022–0.028)	0.028 (0.024–0.032)	0.031 (0.027–0.036)	0.036 (0.030–0.042)	0.040 (0.033–0.047)
10-day	0.007 (0.006–0.008)	0.009 (0.008–0.010)	0.012 (0.011–0.013)	0.014 (0.012–0.016)	0.017 (0.015–0.019)	0.019 (0.017–0.022)	0.022 (0.019–0.025)	0.024 (0.021–0.028)	0.027 (0.023–0.032)	0.030 (0.025–0.035)
20-day	0.004 (0.004–0.005)	0.005 (0.005–0.006)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.010 (0.009–0.011)	0.011 (0.010–0.013)	0.013 (0.011–0.014)	0.014 (0.012–0.016)	0.016 (0.013–0.018)	0.017 (0.014–0.020)
30-day	0.003 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.005–0.006)	0.006 (0.006–0.007)	0.008 (0.007–0.008)	0.008 (0.007–0.010)	0.009 (0.008–0.011)	0.010 (0.009–0.012)	0.012 (0.010–0.013)	0.013 (0.011–0.015)
45-day	0.003 (0.002–0.003)	0.003 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.006 (0.005–0.006)	0.007 (0.006–0.007)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.009 (0.007–0.010)	0.009 (0.008–0.010)
60-day	0.002 (0.002–0.002)	0.003 (0.003–0.003)	0.004 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.005 (0.005–0.006)	0.006 (0.005–0.007)	0.006 (0.006–0.007)	0.007 (0.006–0.008)	0.007 (0.006–0.008)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

curve plots

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AREA E-2: AREA DRAINING TO CUTOFF DITCH ON NORTH SIDE OF SOUTH LEG OF ACCESS DRIVEWAY

AERIAL TOPOGRAPHIC MAPPING PROVIDED FOR PROJECT DOES NOT EXTEND FAR ENOUGH TO EAST TO DEFINE THE ENTIRETY OF THE SOUTHEASTERN-MOST PIECE OF AREA DRAINING TO THIS DITCH. THE UNMAPPED AREA WILL NOT BE DISTURBED WITH DEVELOPMENT. CONSEQUENTLY, THE RUNOFF GENERATED BY THE UNMAPPED AREA WILL NOT CHANGE AS A RESULT OF DEVELOPMENT OF THE STMWRF ACCESS DRIVEWAY.

NOT INCLUDING THIS AREA IN PRELIMINARY RUNOFF COMPUTATIONS WILL HAVE NO BEARING ON THE VALIDITY OF THE CURRENT RUNOFF CALCULATIONS SINCE THIS AREA WILL CONTRIBUTE THE SAME RUNOFF RATE AND QUANTITY AFTER DEVELOPMENT AS IT DOES PRE-DEVELOPMENT.

IT WILL BECOME AN IMPORTANT ISSUE AT FINAL DESIGN SINCE IT WILL BE NECESSARY TO KNOW THE TOTAL RUNOFF THAT WILL REACH PROPOSED DRAINAGE FACILITIES.

$A = 184,355$ SF $= 4.23$ ac

PAVED AREA $= 6,322$ SF $+ 2,152$ SF $= 8,474$ SF $= 0.19$ ac

UNPAVED AREA $= 4.23$ ac $- 0.19$ ac $= 4.04$ ac

BY OBSERVATION: $t_c = 10$ min

$C_5 = 0.30$, $C_{100} = 0.60$

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$\Sigma CA_5 = (0.30)(4.04ac) + (0.88)(0.19ac) = 1.38ac$

$\Sigma CA_{100} = (0.60)(4.04ac) + (0.93)(0.19ac) = 2.60ac$

$Q_5 = (1.38ac)(1.37 IN/HR) = 1.89 cfs$

$Q_{100} = (2.60ac)(3.37 IN/HR) = 8.76 cfs$

AREA E-3: AREA DRAINING DIRECTLY ONTO "FLATS" TO THE WEST OF THE SOUTH LEG OF THE ACCESS DRIVEWAY.

$A = 82,368 SF = 1.89ac$

PAVED AREA $= 20,650 SF \approx 0.47ac$

UNPAVED AREA $= 1.89ac - 0.47ac = 1.42ac$

$\Sigma CA_5 = (0.30)(1.42ac) + (0.88)(0.47ac) = 0.84ac$

$\Sigma CA_{100} = (0.60)(1.42ac) + (0.93)(0.47ac) = 1.29ac$

$Q_5 = (0.84ac)(1.37 IN/HR) = 1.15 cfs$

$Q_{100} = (1.29ac)(3.37ac) = 4.35 cfs$

TOTALS

BECAUSE ALL SUBAREAS HAVE THE SAME CONCENTRATION TIME AND THE CONCENTRATION TIME OF THE AGGREGATED AREAS WOULD NOT BE GREATER THAN THE INDIVIDUAL SUBAREAS, THE FLOWS MAY BE ADDED.

$Q_5 = 2.07 cfs + 1.89 cfs + 1.15 cfs = 5.11 cfs$

$Q_{100} = 8.90 cfs + 8.76 cfs + 4.35 cfs = 22.01 cfs$

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$A = 4.16ac + 4.23ac + 1.89ac = 10.28ac$

$\Sigma CA_5 = 1.51ac + 1.38ac + 0.84ac = 3.73ac$

$\Sigma CA_{100} = 2.64ac + 2.60ac + 1.29ac = 6.53ac$

$C_5 = 3.73/10.28 = 0.36$

$C_{100} = 6.53ac/10.28ac = 0.64ac$

PROJECT STMWRF PRO. # W923-1304-6

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Proposed Conditions

Area P-1: Area Contributing to Cutoff Ditch on North Side of North Leg of New Access Driveway

$A = 187,487 \text{ SF} = 4.30 \text{ ac}$

From Existing Conditions Calculations,

For Open Space: $C_5 = 0.30$, $C_{100} = 0.60$

For Pavement: $C_5 = 0.88$, $C_{100} = 0.93$

The proposed road section also incorporates an unpaved shoulder on either side.

From TM Hydro Table 701, model shoulder as gravel road. $\therefore C_5 = 0.25$, $C_{100} = 0.50$.

Paved Area $= 6,286 \text{ SF} = 0.14 \text{ ac}$

Unpaved Area $= 4.30 \text{ ac} - 0.14 \text{ ac} = 4.16 \text{ ac}$

$\Sigma CA_5 = (0.3)(4.16 \text{ ac}) + (0.88)(0.14 \text{ ac}) = 1.37 \text{ ac}$

$\Sigma CA_{100} = (0.6)(4.16 \text{ ac}) + (0.93)(0.14 \text{ ac}) = 2.63 \text{ ac}$

By observation: $T_c = 10 \text{ min}$

$\Rightarrow i_5 = 1.37 \text{ IN/HR}$

$i_{100} = 3.37 \text{ IN/HR}$

$Q_5 = (1.37 \text{ ac})(1.37 \text{ IN/HR}) = 1.88 \text{ cfs}$

$Q_{100} = (2.63 \text{ ac})(3.37 \text{ IN/HR}) = 8.86 \text{ cfs}$

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AREA P-2: AREA BETWEEN THE TWO LEGS OF THE ACCESS DRIVEWAY. THIS AREA DRAINS TO THE SOUTHERN END OF THE ACCESS DRIVEWAY AND WILL BE ROUTED THROUGH THE TREATMENT FACILITY EXPANSION TO THE EXISTING CHANNEL ON THE WEST SIDE OF THE "FLATS".

AS WITH AREA E-2, APORTION OF THIS AREA IS NOT TOPOGRAPHICALLY MAPPED AT THIS TIME. SEE DISCUSSION FOR AREA E-2.

$A = 162,867\ SF = 3.74\ ac$

$C_5 = 0.30,\ C_{100} = 0.60\ ac$

BY OBSERVATION, $T_c = 10\ min$

$\Rightarrow i_5 = 1.37\ IN/HR$

$i_{100} = 3.37\ IN/HR$

$Q_5 = (0.30)(1.37\ IN/HR)(3.74\ ac) = 1.54\ cfs$

$Q_{100} = (0.60)(3.37\ IN/HR)(3.74\ ac) = 7.56\ cfs$

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AREA P-3: AREA DRAINING DIRECTLY TO "FLATS" TO THE WEST OF THE SOUTH LEG OF THE DRIVEWAY.

$A = 59,476 ac = 1.37 ac$

PAVED AREA $= 4,600 SF = 0.11 ac$

$\Sigma CA_5 = (0.30)(1.37ac) + (0.88)(0.11ac) = 0.51ac$

$\Sigma CA_{100} = (0.60)(1.37ac) + (0.93)(0.11ac) = 0.92ac$

By OBSERVATION: $T_C = 10 min$

$\Rightarrow i_5 = 1.37 IN/HR$

$i_{100} = 3.37 IN/HR$

$Q_5 = (0.51ac)(1.37 IN/HR) = 0.70 cfs$

$Q_{100} = (0.92ac)(3.37 IN/HR) = 3.10 cfs$

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AREA P-4: ACCESS DRIVEWAY PAVED SURFACE AND UNPAVED SHOULDER. RUNOFF ORIGINATING ON ROAD SURFACE WILL BE PIPED TO TNE TREATMENT FACILITY HEADWORKS TO ENSURE TREATMENT OF POTENTIAL SPILLS.

$A = 56,105\ SF = 1.29\ ac$

$SHOULDER\ AREA = (1,681\ FT + 1,724\ FT)(2\ FT) = 6,810\ SF = 0.16\ ac$

$PAVED\ AREA = 1.29\ ac - 0.16\ ac = 1.13\ ac$

$\Sigma CA_5 = (0.25)(0.16\ ac) + (0.88)(1.13\ ac) = 1.03\ ac$

$\Sigma CA_{100} = (0.50)(0.16\ ac) + (0.92)(1.13\ ac) = 1.12\ ac$

$Q_5 = (1.03\ ac)(1.37\ IN/HR) = 1.41\ cfs$

$Q_{100} = (1.12\ ac)(3.37\ IN/HR) = 3.77\ cfs$

TOTALS

$A = 4.30\ ac + 3.74\ ac + 1.37\ ac + 1.29\ ac = 10.70\ ac$

$\Sigma CA_5 = 1.37\ ac + 1.12\ ac + 0.51\ ac + 1.03\ ac = 4.03\ ac$

$\Sigma CA_{100} = 2.63\ ac + 2.24\ ac + 0.92\ ac + 1.12\ ac = 6.91\ ac$

$C_5 = 4.03\ ac / 10.70\ ac = 0.38$

$C_{100} = 6.91\ ac / 10.7\ ac = 0.65$

$Q_5 = 1.88\ cfs + 1.54\ cfs + 0.70\ cfs + 1.41\ cfs = 5.53\ cfs$

$Q_{100} = 8.86\ cfs + 7.56\ cfs + 3.10\ cfs + 3.77\ cfs = 23.29\ cfs$

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STMWRF Commercial Access

Cutoff Ditch Sizing Calculations

Cutoff Ditch C-1 : North Side of Northbound Leg of Driveway

Corresponds to Area P-1

$Q_5 = 1.8$ cfs

$Q_{100} = 8.86$ cfs

Assume: Rip-Rapped V-Ditch w/ 2:1 Sides, S = 8%

$n = 0.035$

$d_5 = 0.46$ ft

$d_{100} = 0.84$ ft < 1 ft OK

Determine Riprap Size:

@ $Q = 8.86$ cfs, $S = 0.08$, $n = 0.035$: $V = 6.24$ fps

From T-M Hydro,

$n = K(D_{90}^{1/6})$ Equation 838

Where n = Manning's Roughness Coefficient

$K = 0.034$ (For Estimating Stone Size)

D_{90} = Riprap Size for which 90% is Smaller

TM Hydro Equation 842 is Incorrect

Actual Equation (Smith & Murray) $$d_{50} = \frac{(0.05)(V^2)(S^{0.34})}{(S_s - 1)^{1.332}}$$

Where: d_{50} = Rock Size for which 50% is Smaller

V = Velocity (fps)

S = Channel Slope ft/ft

S = Rock S.G. (2.50 min)

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$$d_{50} = \frac{(0.05)(6.24\ fps)^2\ (0.08)^{0.34}}{(2.5-1)^{1.332}}$$

$d_{50} = 0.48$ FT $\cong 5.76"$

$\therefore$ USE $d_{50} = 6"$

FROM ORANGE BOOK

$d_{50} = 6" \Longrightarrow$ CLASS 550/700 RIPRAP

FOR CLASS 550/700 RIPRAP, $d_{90} = 10" = 0.83'$

$n = (0.034)(0.83)^{1/6}$

$n = 0.033$

CHECK VELOCITY

$V = 6.54$ fps

$$d_{50} = \frac{(0.05)(6.54)^2(0.08)^{0.34}}{(1.5)^{1.332}}$$

$d_{50} = 0.53$ FT $= 6.33$ IN OK

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BY ELT SHEET 2 OF 3

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CUTOFF DITCH C-2: NORTH SIDE OF SOUTHBOUND LOOP OF DRIVEWAY

CORRESPONDS TO AREA P-2

$Q_5 = 1.54$ cfs

$Q_{100} = 7.56$ cfs

ASSUME: CLASS 550/700 RIPRAP

$d_{90} = 10"$

$\Rightarrow n = 0.033$

MAX. SLOPE = 3.25%

$\Rightarrow V_{100} = 4.15$ fps

$d_{100} = 0.78$ FT < 1 FT OK

$$d_{50} = \frac{(0.105)(4.15\,fps)^2 (0.0325)^{0.54}}{(1.5)^{1.332}}$$

$d_{50} = 0.15$ FT $\cong 1.87$ IN $< 6"$ OK

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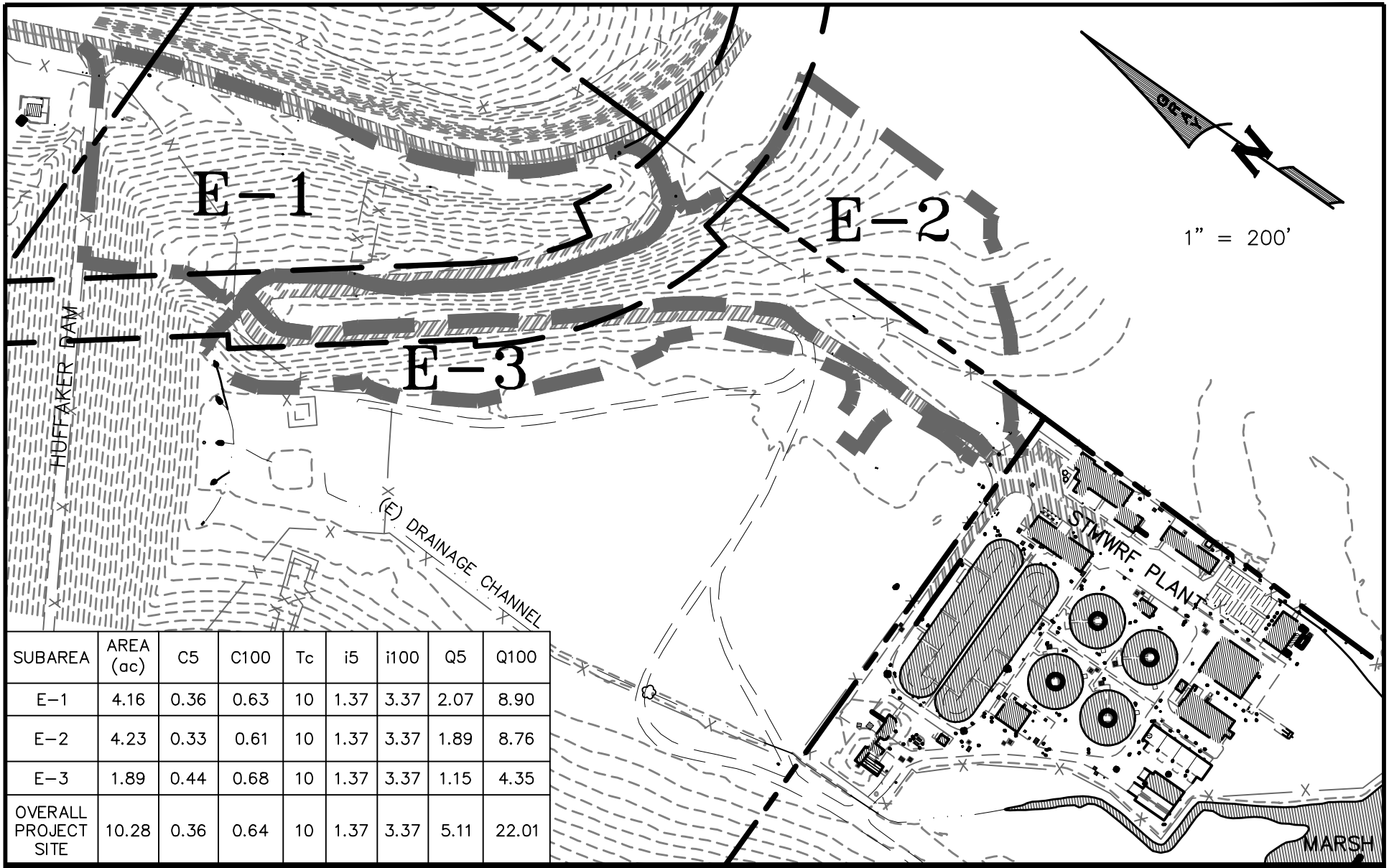
APPENDIX D

FIGURES



SUBAREA	AREA (ac)	C5	C100	Tc	i5	i100	Q5	Q100
E-1	4.16	0.36	0.63	10	1.37	3.37	2.07	8.90
E-2	4.23	0.33	0.61	10	1.37	3.37	1.89	8.76
E-3	1.89	0.44	0.68	10	1.37	3.37	1.15	4.35
OVERALL PROJECT SITE	10.28	0.36	0.64	10	1.37	3.37	5.11	22.01

STMWRF ACCESS DRIVEWAY

FIGURE 1

HYDROLOGY - EXISTING CONDITIONS

WASHOE COUNTY - NEVADA

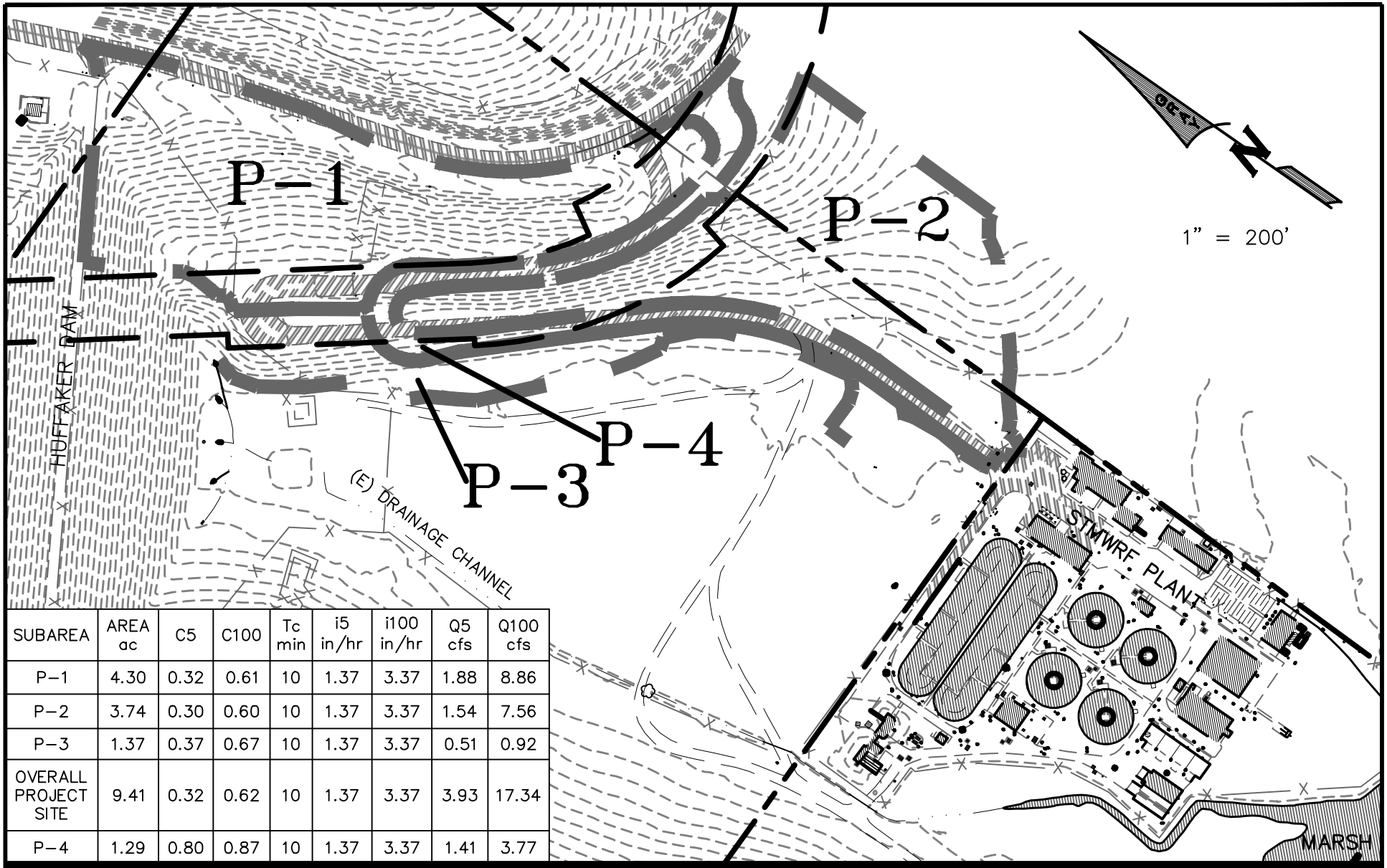
SCALE: 1"=100'

DRAWN BY: ECT

DATE: 2-8-14

JOB NO.: 13046

Gray & Associates INC.
CIVIL ENGINEERS * PLANNERS * SURVEYORS
130 Vine Street Reno, Nevada 89503
(775) 329-2911 * (775) 329-6469 Fax * admin@grayassociates.net



SUBAREA	AREA ac	C5	C100	Tc min	i5 in/hr	i100 in/hr	Q5 cfs	Q100 cfs
P-1	4.30	0.32	0.61	10	1.37	3.37	1.88	8.86
P-2	3.74	0.30	0.60	10	1.37	3.37	1.54	7.56
P-3	1.37	0.37	0.67	10	1.37	3.37	0.51	0.92
OVERALL PROJECT SITE	9.41	0.32	0.62	10	1.37	3.37	3.93	17.34
P-4	1.29	0.80	0.87	10	1.37	3.37	1.41	3.77

STMWRF ACCESS DRIVEWAY

FIGURE 2

HYDROLOGY - PROPOSED CONDITIONS

WASHOE COUNTY - NEVADA

SCALE: 1"=100'

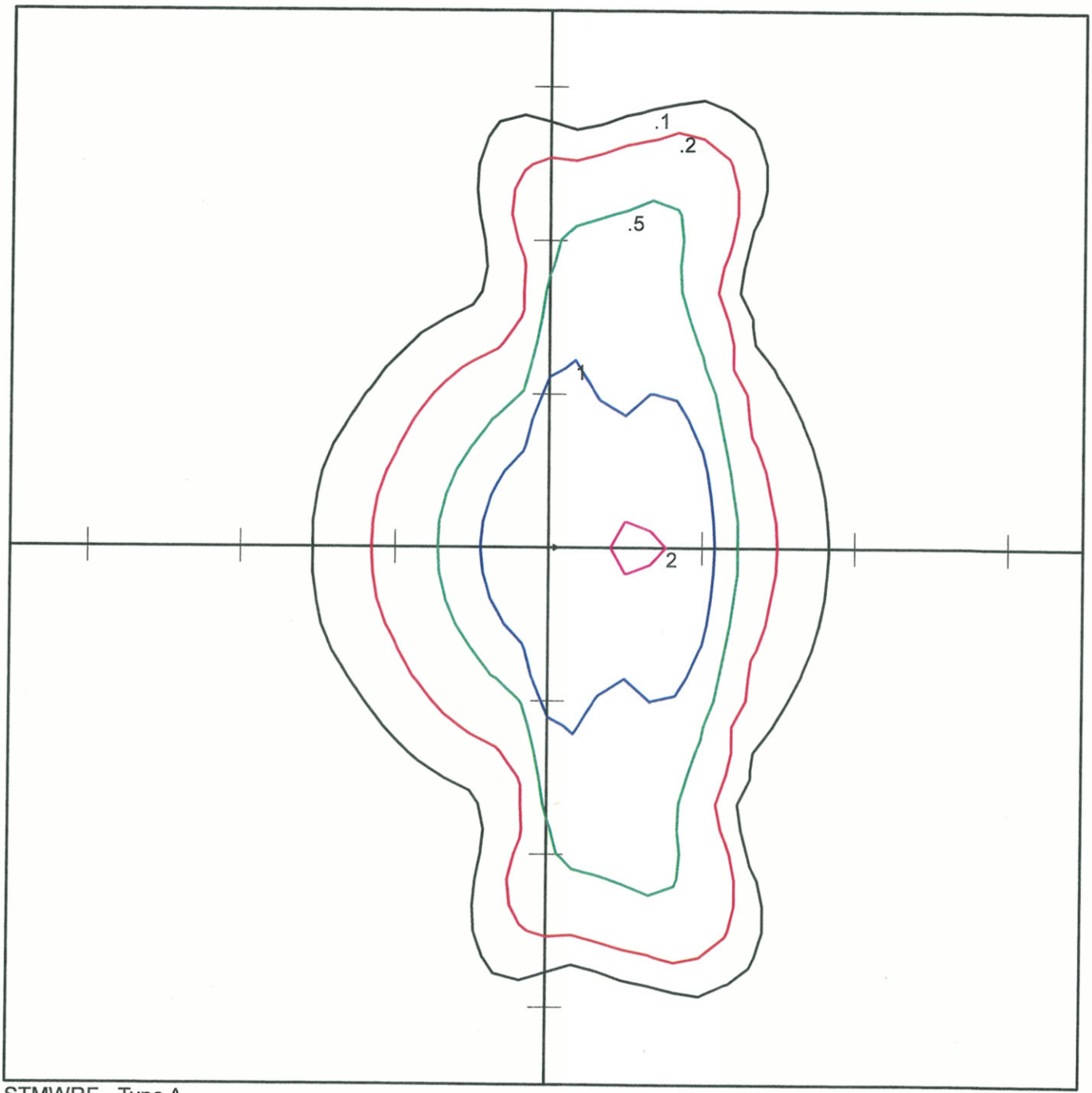
DRAWN BY: ECT

DATE: 2-8-14

JOB NO.: 13046

Gray & Associates INC.
CIVIL ENGINEERS * PLANNERS * SURVEYORS
130 Vine Street Reno, Nevada 89503
(775) 329-2911 * (775) 329-6469 Fax * admin@grayassociates.net

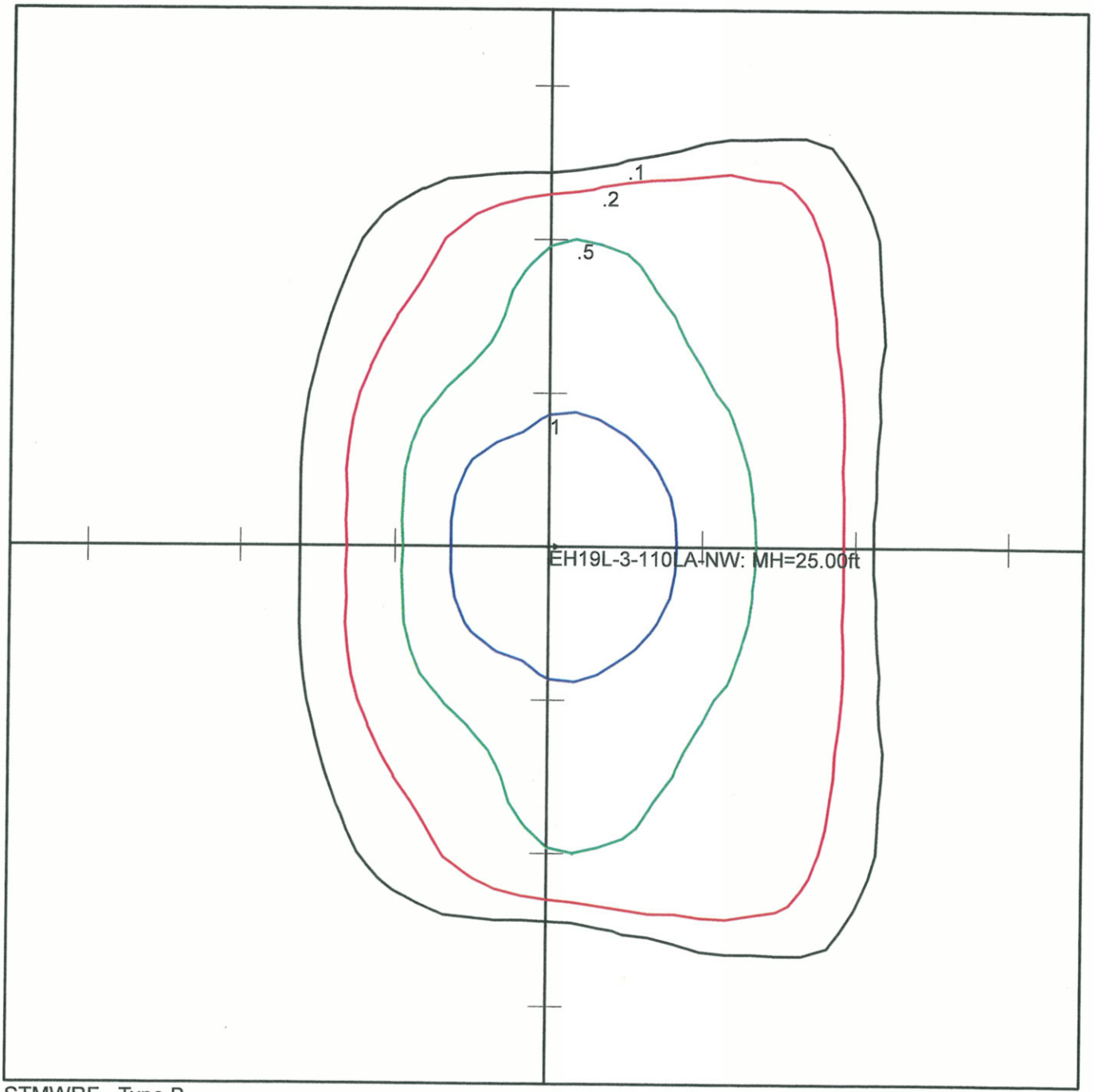
Photometric Toolbox™



STMWRF - Type A
PHILIPS GARDCO
EH19L-2-110LA-NW
FORM TEN SQUARE LED
(2) LIGHT ARRAY OF 48 LEDs DRIVEN AT 350mA

Horizontal Footcandles
Scale: 1 Inch = 30 Ft.
Light Loss Factor = 0.90
Lumens Per Lamp = N.A. (absolute photometry)
Luminaire Lumens = 8911
Mounting Height = 25.00 Ft
Maximum Calculated Value = 2.11 Fc
Arrangement: Single

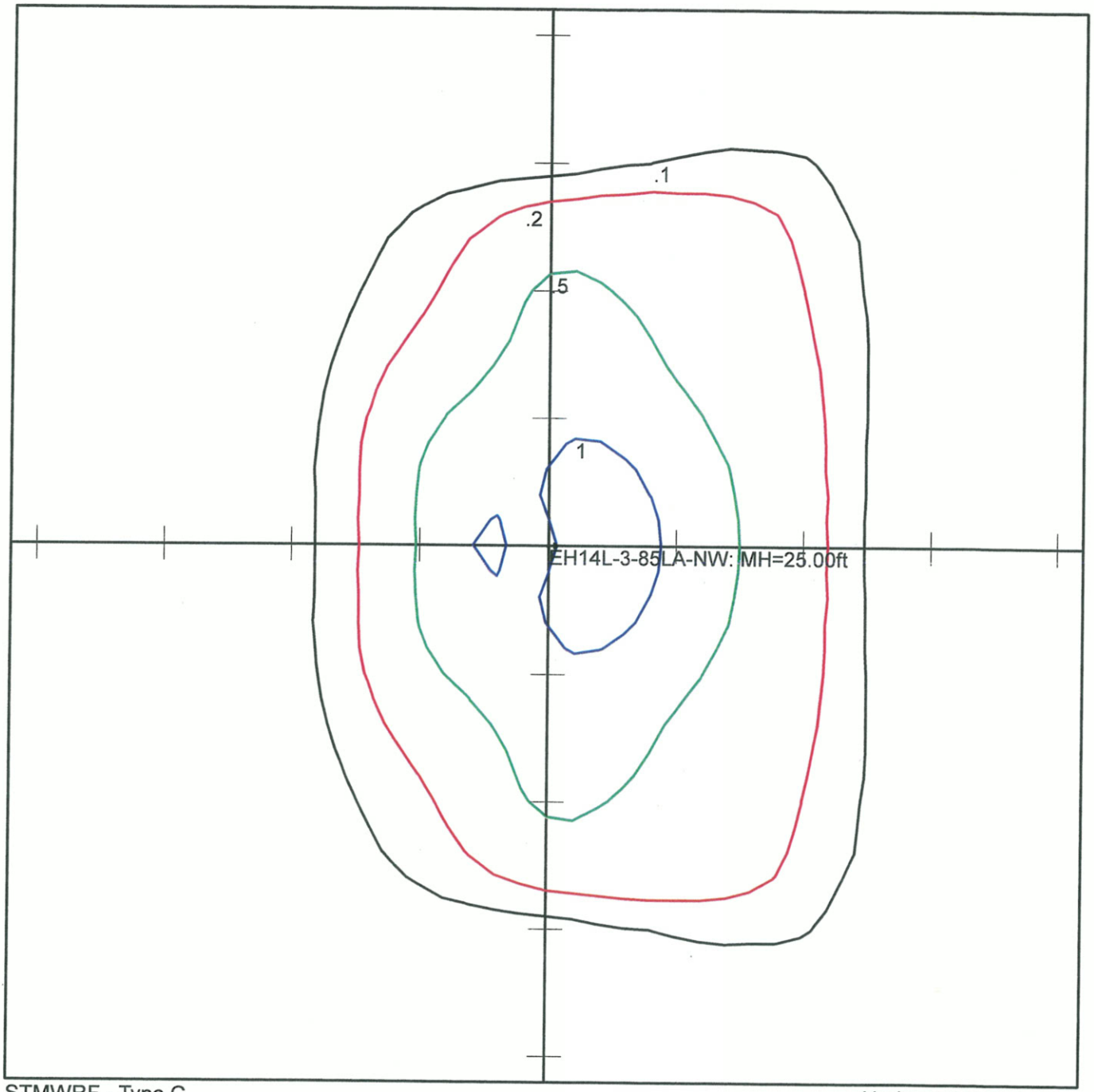
Photometric Toolbox™



STMWRF - Type B
PHILIPS GARDCO
EH19L-3-110LA-NW
FORM TEN SQUARE LED
(2) LIGHT ARRAY OF 48 LEDs DRIVEN AT 350mA

Horizontal Footcandles
Scale: 1 Inch = 30 Ft.
Light Loss Factor = 0.90
Lumens Per Lamp = N.A. (absolute photometry)
Luminaire Lumens = 9260
Mounting Height = 25.00 Ft
Maximum Calculated Value = 1.45 Fc
Arrangement: Single

Photometric Toolbox™



STMWRF - Type C
PHILIPS GARDCO
EH14L-3-85LA-NW
FORM 10 SQUARE LED
(1) LIGHT ARRAY OF 80 LEDs DRIVEN AT 350mA

Horizontal Footcandles
Scale: 1 Inch = 30 Ft.
Light Loss Factor = 0.90
Lumens Per Lamp = N.A. (absolute photometry)
Luminaire Lumens = 7697
Mounting Height = 25.00 Ft
Maximum Calculated Value = 1.31 Fc
Arrangement: Single

Washoe County Community Services Department Water Resources Branch
4930 Energy Way
Reno, NV 89502-4106
Tel: 775-954-4600
Fax: 775-954-4610

February 18, 2014

Community Services Department, Planning & Development Division
1001 E. Ninth Street
Reno NV, 89512

Subject: South Truckee Meadows Water Reclamation Facility Landscaping

To whom it may concern,

The South Truckee Meadows Water Reclamation Facility Solids Management Project is seeking the Director's approval to modify the Washoe County Development Code, Article 412 Landscaping. Based on the landscaping plan the Water Resource Division is requesting this provision be modified for the following reasons:

a) Increase compatibility between residential, commercial and industrial land uses.

   Not applicable to this project.

b) Enhancing the economic viability of the county and the quality of living for residents and visitors by creating an attractive appearance of development along streets and highways.

   Not applicable to this project.

c) Reducing heat, glare, noise, erosion, pollutants and dust by increasing the amount of vegetation.

   This project is reducing erosion, pollutants and dust through the restoration of the native landscape palette.

d) Preserving significant ecological communities, and desirable existing trees and vegetation be suited for the local micro-climate.

   No trees exist on site. The natural conditions support a native shrub and herbaceous community. Based on the local micro-climate, this project goal is to restore all disturbed areas with a native plant community consistent with the existing vegetative cover.

e) Maximizing water conservation through established conservation principles and practices, and through proper landscape and irrigation planning, design, and management.

   This project achieves maximum water conservation through planting and restoration of the native shrub/herbaceous community and the addition of a limited number of trees. All the new trees and shrubs will be drip irrigated.

Sincerely,

Timothy Simpson, EI
Engineering Services Technician

cc: Rick Warner, P.E., Senior Licensed Engineer
Dave Solaro, P.E., Director of Community Services

Washoe County Community Services Department Water Resources Branch
4930 Energy Way
Reno, NV 89502-4106
Tel: 775-954-4600
Fax: 775-954-4610

February 18, 2014

Community Services Department, Planning & Development Division
1001 E. Ninth Street
Reno NV, 89512

Subject: South Truckee Meadows Water Reclamation Facility

To whom it may concern,

The South Truckee Meadows Water Reclamation Facility Solids Management Project will not generate a significant number of trips to require a traffic study. The plant currently operates with between 6 and 10 employees. After the construction of the solids handling, there is anticipated to be about one truck load a day from the facility to Lockwood Landfill.

Sincerely,

Timothy Simpson

Timothy Simpson, EI
Engineering Services Technician

cc: Rick Warner, P.E., Senior Licensed Engineer
Dave Solaro, P.E., Director of Community Services

Washoe County Community Services Department Water Resources Branch
4930 Energy Way
Reno, NV 89502-4106
Tel: 775-954-4600
Fax: 775-954-4610

February 20, 2014

Community Services Department, Planning & Development Division
1001 E. Ninth Street
Reno NV, 89512

Subject: South Truckee Meadows Water Reclamation Facility Grading

To whom it may concern,

The South Truckee Meadows Water Reclamation Facility (STMWRF) Solids Management Project is seeking the Director's approval to modify the Washoe County Development Code, Article 438 Grading Standards.

Based on the grading plan prepared by Gray and Associates, the Water Resources Division is requesting this provision be modified to allow for limited use of 2:1 slopes due to the location of two existing 24 inch ductile iron pipelines south of the access driveway. The relocation of these pipelines would pose a significant economic cost to the County. The STMWRF currently stores its effluent in Huffaker Reservoir by these two 24 inch lines. The water stored in Huffaker Reservoir is used for summer demand for irrigation. It was also necessary to blend cut slopes along the north side of the driveway into the existing grading in order to eliminate excessive cutting. This will minimize the impact to the natural character of the hillside and cause less disturbance of the existing ground.

Due to the limited use of the slopes along the driveway, we do not believe it poses any significant risk to life or property. The limited use of the slopes should not impact the natural character of the hillside. Finally, the revegetation of the slopes should provide the necessary slope stability from erosion.

Sincerely,

Timothy Simpson, EI
Engineering Services Technician

cc: Alan Jones, P.E., Senior Licensed Engineer
Dave Solaro, P.E., Director of Community Services

March 3, 2014

Washoe County Community Services Department Water Resources Branch
4930 Energy Way
Reno, NV 89502-4106
Tel: 775-954-4600
Fax: 775-954-4610

Roger Pelham, MPA
Community Services Department, Planning & Development Division
1001 E. Ninth Street
Reno NV, 89512

Subject: South Truckee Meadows Water Reclamation Facility Supplemental Project Description

Mr. Pelham,

The Washoe County Community Service Department, Water Resource Branch is seeking approval to expand the South Truckee Meadows Water Reclamation Facility (STMWRF). The project will upgrade the existing driveway to meet the current development code. The project will expand the reclamation facility to include the following: digesters, equipment building, dewatering building, fencing, lighting, landscaping, and odor control. The expansion of the facility will allow STMWRF to have a completely autonomous operation on the STMWRF site proper for both liquids and solids handling capabilities while continuing to be good stewards of the surrounding development. The plans for the expansion require modifications to the Washoe County Development Code.

The Water Resource Branch is seeking a modification to the Development Code for Section 438, Grading, and waive the 3:1 slope requirements. The existing driveway that currently accesses STMWRF traverses an extremely steep slope and does not meet emergency access standards. The proposed design will improve the access driveway while taking into consideration several additional design aspects. Construction will require the limited use of 2:1 slopes along the driveway. Please see the enclosed analysis prepared by Grey & Associates, Inc. for a detailed explanation for the proposed modifications.

The Water Resource Branch is also seeking a modification to the Development Code for Section 412, Landscaping, to waive the twenty percent requirement while still providing the necessary landscaping to meet the purposes of the section. Permanent landscaping will be planted along the south fence line to mitigate visual impacts to the adjacent properties as well as along the driveway to provide an attractive appearance of the development. The project will also preserve any significant ecological communities within the developed area. These measures will help allow for the needed acreage for future expansion of the facility. Please reference the supplemental landscaping plans prepared by LA Studio for the details of the proposed landscaping.

Sincerely,

Timothy Simpson

Timothy Simpson, EI
Engineering Services Technician

Enclosures (2)

cc: Alan Jones, P.E., Senior Licensed Engineer
Dave Solaro, P.E., Director of Community Services

Allen Gray & Associates INC.
CIVIL ENGINEERS • PROJECT & FACILITY DEVELOPMENT • CONSTRUCTION MANAGEMENT • SURVEY

February 26, 2014

Alan Jones
Washoe County Water Resources
4930 Energy Way
Reno, NV 89502
Phone: (775) 954-4651
Email: AJones@washoecounty.us

Re: Analysis of Washoe County Development Code – Section 438
South Truckee Meadows Water Reclamation Facility – Access Driveway

Dear Mr. Jones:

As requested the following is a subsection-by subsection analysis of Section 438 of the Washoe County Development Code with respect to the reconstruction of the access driveway for the South Truckee Meadows Water Reclamation Facility (STMWRF).

Section 110.438.00 Purpose. *The purpose of this article is to safeguard life, limb, property and the public welfare as well as set standards that conserve the natural character of our hillsides and minimize disruption of the natural landscape, by regulating grading on private and public property.*

STMWRF is an existing facility. The driveway that currently accesses STMWRF traverses an extremely steep slope. The site currently exists as a disturbed site. The resultant slopes are much steeper than 2:1. In places the existing slopes exceed 1.5:1.

Reconstruction of the existing driveway will serve two purposes. The existing driveway does not meet emergency access standards. The new driveway will be constructed in a manner that will meet emergency access standards. Life and limb will therefore be safeguarded by improving the ability of emergency service providers to access STMWRF.

The existing driveway is difficult to navigate for the large vehicles which serve STMWRF. The number of large vehicles is set to increase with the expansion of the facility. The new driveway will be constructed in a manner which is much safer for the operators of the large vehicles. Life and limb will therefore be safeguarded by making the driveway safer for the operation of the vehicles that it is intended to serve.

STMWRF is an existing facility. The access driveway for STMWRF is existing. There is no residential property adjacent to the STMWRF property. The only developed property adjacent to the STMWRF property is industrial. Re-construction of the access driveway will not change the nature of the site and therefore will not change the value of surrounding properties. It could be argued that since the land disturbed by the reconstruction of the access driveway will be

completely revegetated, the view of the access road will actually be improved over existing conditions.

There is currently no formal drainage system affiliated with the existing driveway. A complex drainage system is proposed for the new access driveway. Runoff originating in the disturbed areas will be collected before it is allowed to run onto the paved portion of the driveway and will be routed in armored drainage channels to the existing drainage ditch for the site. All disturbed areas will be revegetated and irrigated until vegetation is established. This will improve the quality of runoff that leaves the site. Public welfare will benefit from the reduction of sediment from the site.

The existing driveway has no curb and gutter. Any runoff originating on the roadway is routed directly into the existing drainage ditch. The proposed driveway will be constructed with curb and gutter and a dedicated storm drainage system. Any potential spill of sludge from STMWRF will therefore be collected in the storm drainage system. Runoff collected in the dedicated storm drainage system will be routed back to the headworks of STMWRF and treated. Public welfare will benefit from the ability to contain the spillage of contaminants.

The hillside area of construction for the STMWRF access driveway is currently not in a natural state. Reconstruction of the of the access driveway will not increase the disruption of the natural hillside. Existing slopes (mostly the result of the original –approved- construction of the access driveway) exceed 2:1. No proposed slopes will exceed 2:1. Reconstruction of the access driveway will reduce the slope of large portions of the already very steep hillside.

A 2:1 slope is not an unsafe slope simply because it is steep. A slope is unsafe if it is constructed from unstable material or if it is not protected from erosion. All disturbed areas – including 2:1 slopes - will be revegetated and an irrigated until vegetation establishes in accordance with the EPA's 70% rule. The 70% rule states that revegetation shall establish until it reaches a coverage that is equal to at least 70% of the coverage (by area) of pre-development coverage. This will control erosion of the constructed slopes. Runoff will be collected in ditches which will be lined with rock riprap to control erosion. Public welfare will benefit from proper design, construction, and protection of 2:1 slopes.

Section 110.438.10 Permits Required. *Except as specified in Section 110.438.20, no person shall do any grading in excess of fifty (50) cubic yards of material or 10,000 square feet of grading without first having obtained a grading permit from the Building Official as enforceable under the powers of Chapter 100 and from the Department of Community Development and the County Engineer as enforceable under the powers of Chapter 110. A separate permit shall be obtained for each site, and may cover both excavations and fills.*

The STMWRF access driveway will disturb more than 10,000 square feet of area and will exceed 50 cubic yards of earthwork. A grading permit will therefore be required for reconstruction of the driveway. Washoe County Water Resources intends to obtain a grading permit prior to reconstruction of the driveway.

Section 110.438.35 Major Grading Permit Thresholds.

(a) Major Grading Permits (Grading Requiring a Special Use Permit). A special use permit, pursuant to Article 810, is required for all major grading. Major grading is any clearing, excavating, cutting, filling, grading, earthwork construction, earthen structures and storage of earth, including fills and embankments that meet or exceed any one (1) or more of the following thresholds (for the purposes of this section the County Engineer shall determine the slope of the project area):

(1) Grading on slopes of less than (flatter than) fifteen (15) percent:

(i) Area:

(A) Grading of an area of one (1) acre (43,560 square feet) or more on parcels less than six (6) acres in size; or

(B) Grading of twenty (20) percent or more (up to a maximum of four (4) acres) of the area of the parcel on parcels six (6) acres or greater in size; or

(C) Grading of and area of more than four (4) acres on a parcel of any size; or

(ii) Volume:

(A) Excavation of five thousand (5,000) cubic yards or more whether the material is intended to be permanently located on the project site or temporarily stored on a site for relocation to another, final site, or;

(B) Importation of five thousand (5,000) cubic yards or more whether the material is intended to be permanently located on the project site or temporarily stored on a site for relocation to another, final site; or

(2) Grading on slopes of fifteen (15) percent or greater (steeper):

(i) Area:

(A) Grading of one-half (0.5) acre (21,780 square feet) or more on parcels less than six (6) acres in size; or

(B) Grading of ten (10) percent or more of the area of the parcel on parcels six (6) acres or greater in size; or

(C) Grading of more than two (2) acres on any size parcel; or

(ii) Volume:

(A) Excavation of one thousand (1,000) cubic yards or more whether the material is intended to be permanently located on the project site or temporarily stored on a site for relocation to another, final site, or;

(B) Importation of one thousand (1,000) cubic yards or more whether the material is intended to be permanently located on the project site or temporarily stored on a site for relocation to another, final site; or

(3) Any driveway or road that traverses any slope of thirty (30) percent or greater (steeper); or

(4) Grading to construct a permanent earthen structure greater than four and one-half (4.5) feet in height within the required front yard setback, or greater than six (6) feet in

height on the remainder of the property. The height of an earthen structure is measured from existing grade at the time of permit issuance; or

(5) Grading within a special flood hazard area that results in importation and placement of more than one thousand (1,000) cubic yards of fill material; or

(6) The creation of a dam structure that holds (retains) more than twenty-five thousand (25,000) cubic feet of water; or

(7) Any grading in the Critical Stream Zone Buffer Area (CSZBA) of any Significant Hydrologic Resource (SHR) as defined by Article 418, Significant Hydrologic Resources.

(b) A special use permit is not required for:

(1) Earthwork performed by the subdivider or developer of an approved subdivision, or other projects that has completed a hearing process and review pursuant to which mitigation conditions could have been attached in the same manner as in the special use permit process.

(2) Public utilities within the public right-of-way or a public utility easement.

(3) The area under a building footprint, paved roadway or paved parking lot on natural slopes less than (flatter than) thirty (30) percent.

(4) The area and volume of excavation required for landscaped areas devoted to and maintained with a mixture of new native and ornamental plants such as turf, groundcover, shrubs, flowers, vines and trees, as well as additional complementary decorative features such as rocks, decorative pavement, fountains, pools, sculpture and decorative walls, as shown on approved grading plans, that include landscaping in accordance with standards for commercial uses pursuant to Article 412, Landscaping.

(5) Areas disturbed by animal production, crop production, and the growing and harvesting of forest products that does not result in a change in elevation greater than three (3) feet.

(6) The area and volume of excavation required for the traveled way of driveways to single-family residences, on slopes less than fifteen (15) percent. Where native soil provides inadequate stabilization, the driveway shall be stabilized with a surfacing material and method satisfactory to the County Engineer. This does not exempt the area and volume of any adjacent cut and fill slopes.

(7) Grading for stabilization and restoration of areas damaged by natural disaster such as wildfire or flooding. Plans must include detailed stabilization specifications to the satisfaction of the County Engineer.

There will be grading in excess of one acre on slopes less than 15%. There will be excavation in excess of 5,000 cubic yards. There will be grading of more than 2 acres on slopes greater than 15%. There will be grading in excess of 1,000 cubic yards on slopes in excess of 15%. There will be a driveway which traverses slopes in excess of 30%.

All of the above criteria constitute major grading permits and require the approval of a special use permit prior to approval of a grading permit. Washoe County Water Resources has applied for a Special Use Permit.

Section 110.438.45 Grading of Slopes. *The standards in this section shall apply to all grading for subdivision improvements, special use permits, or other discretionary permits. The standards in this section shall also apply to all grading for building and grading permits upon or adjacent to lots less than or equal to five (5) acres in size, and to all grading within one hundred (100) feet of all property lines on parcels greater than five (5) acres in size.*

(a) Grading shall not result in slopes in excess of, or steeper than, three horizontal to one vertical (3:1) except as provided below:

(1) Storm drainage improvements.

(2) Cut and fill slopes less than thirty (30) inches in height.

(3) Cut slopes proposed to be located behind civic, commercial and industrial buildings, when the cut slope is shorter than and substantially screened by the proposed building. Such slopes are subject to approval of a Director's Modification of Standards by the Director of Community Development.

(4) The County Engineer may waive this requirement for up to fifteen (15) percent of the length of the cut and/or fill where the presence of rock or, in his determination, other practical hardships exists.

(b) Within the required yard setbacks fills shall not differ from the natural or existing grade by more than forty-eight (48) inches (see Figure 110.438.45.1).

(c) Finish grading shall not vary from the natural slope by more than ten (10) feet in elevation. Exposed finish grade slopes greater than ten (10) feet in height may be allowed upon the approval of a director's modification of standards by the Director of Community Development upon recommendation by the County Engineer.

(1) Approval of a director's modification of standards requires a determination that:

(i) The proposed cut and/or fill slopes include stepped-back structural containment (retaining walls) that form terraces, and;

(ii) The proposed terraces include landscaping, are a minimum of six (6) feet in width, and have a slope flatter than three horizontal to one vertical (3:1).

(iii) Retaining walls used to create terraces are limited to a maximum vertical height of ten (10) feet, when located outside any required yard setback.

(iv) Terrace widths shall be at least sixty (60) percent of the height of the higher of the two (2) adjacent retaining walls.

(v) Bench widths shall be at least four (4) feet.

(2) An exception to the terrace width may be allowed subject to the approval of a director's modification of standards by the Director of Community Development, upon recommendation by the County Engineer for cuts into stable rock, supported by a geotechnical report.

(d) Within the front yard setback area of any parcel with a residential use or zoned for residential use, retaining walls are limited to a maximum height of four and one-half (4.5) feet.

(e) Within the side and rear yard setback areas of any parcel with a residential use or zoned for residential use, as well as the front yard setback of any parcel zoned for commercial or industrial use, retaining walls are limited to a maximum height of six (6) feet.

(f) Within the side and rear yard setback areas of any parcel zoned for commercial or industrial use, retaining walls are limited to a maximum height of eight (8) feet.

(g) Utilize a gradual transition or "rounding or contouring" of the manufactured slope at the intersection of a manufactured cut or fill slope and a natural slope. Engineered slopes shall not intersect natural slopes at an angle greater than forty-five (45) degrees (see Figure 110.438.45.2).

(h) Visually integrate all slope faces (cut or fill) into the natural terrain by a gradual transition or "contouring/rounding" of the manmade landforms into the natural terrain. To the extent practicable ensure that hillside grading results in undulating naturalistic appearance, consistent with the surrounding undisturbed terrain (see Figure 110.438.45.3).

(i) Cut and/or fill slopes adjacent to roadways shall be flatter than three horizontal to one vertical (3:1) for the distance of the required American Associates of State Highway Transportation Officials (AASHTO) clear zone.

(j) Ensure that when any cut is made for a structure pad, the exposed cut shall not exceed the height of the structure. The area of the cut that will be screened at buildout (by natural landscape, required landscaping and the structure shall not be less than ninety (90) percent of the total area of the cut.

(k) Proposed storm drainage improvements may include riprap and may include slopes steeper than three horizontal to one vertical (3:1) as approved by the County Engineer.

Section (a): Grading does result in slopes in excess of 3:1 out of necessity. The existing catch slopes which were approved with the construction of the existing access driveway are much steeper than 2:1. Even with this challenge, much of the reconstruction of the access driveway was accomplished using catch slopes of 3:1 or flatter. There are certain areas where this is impossible due to existing grades. Where it was impossible to catch using 3:1 slopes, it was possible to catch using 2:1 slopes. These areas are limited to the cut slope on the uphill side of

the access driveway between stations 1+75 and 6+25. If a 3:1 slope were used in this section, it would not catch until it intersected Alexander Lake Road. The use of a retaining wall was considered but disregarded because the wall would average over nine feet in height due to the thickness of the wall and the steepness of the existing slopes.

A 2:1 slope was utilized for the fill slope on the downhill side of the access driveway between stations 7+25 and 8+25. There are two 24-inch diameter water mains in the bottom of the valley below this section of the driveway. These pipes cannot be relocated, and they cannot have additional fill placed over top of them. By constructing this short portion of the fill slope at 2:1 instead of 3:1, Washoe County Water Resources can avoid adding fill over these two water mains.

Section 110.438.45(a)(4) indicates that the County Engineer may waive this requirement for up to 15% of the length of the cut and fill slopes where other practical hardship exists. There is roughly 3,600 lineal feet of cut and fill slopes associated with the reconstruction of the access driveway. Washoe County Water Resources is requesting a waiver for roughly 550 lineal feet of cut and fill slope. This represents slightly more than 15% of the total length of cut and fill slope. The hardships include the extremely steep nature of the existing slopes and the engineering requirements associated with the existing 24-inch diameter water mains.

It should be noted that none of the 2;1 slopes are intended to be stabilized with riprap. They are intended to be stabilized using geosynthetic fabric, planted with native species and irrigated until vegetation establishes.

Section (b): Does not apply.
Section (c): Does not apply.
Section (d): Does not apply.
Section (e): Does not apply.
Section (f): Does not apply.
Section (g): Does not apply.
Section (h): Does not apply.
Section (i): Does not apply. This is not a roadway.
Section (j): Does not apply.
Section (k): Cutoff ditches have 2:1 sides and are riprapped as allowed in this subsection.

Section 110.438.50 Cuts. *In addition to the requirements in Section 110.438.45, cut slope design and construction will also be based on a geotechnical report as required by Section 110.438.36 unless not required by the County Engineer.*

(a) The use of riprap and gabions as a mechanical stabilization for cut slopes is prohibited, except where essential for safe access, for passage within the rightsof-way of public roads, and for storm drainage control device(s).

(b) Unless covered by soil and revegetated, all cuts into stable rock, greater than four (4) feet in height, and all riprap slopes constructed for roadways and utilities shall be

treated with a permanent rock stain product to match the color of the adjacent undisturbed geology to the greatest extent practicable.

(c) All cuts into stable rock, that are proposed to remain at the end of construction, shall be treated with a permanent rock stain product to match the color of the adjacent undisturbed geology to the greatest practical extent.

(d) Modification or elimination of the standards in (b) and (c) above, may be allowed subject to the approval of a directors modification of standards upon his/her determination that the cut will be in the character of the adjacent, undisturbed land.

Section (a): No riprap is proposed for slope stabilization. All slopes will be stabilized using native vegetation which will be irrigated until it establishes in accordance with the EPA's 70% rule.
Section (b): Does not apply.
Section (c): Does not apply.
Section (d): Does not apply .

Section 110.438.55 Fills. *Fills shall be constructed in accordance with Section 110.438.45. Fill slope design and construction will also be based on a geotechnical report as in Section 110.438.36(a)(6) and (7) unless determined not required by the Building Official or the County Engineer and, as applicable, the following general specifications:*

(a) Preparation of Ground. Fill slopes shall not be constructed on natural slopes steeper than two units horizontal to one unit vertical (2:1) (50 percent slope). The ground surface shall be prepared to receive fill by:
(1) Removing vegetation.
(2) Removing fill deemed unsuitable by the County Engineer.
(3) Removing topsoil and other unsuitable materials.
(4) By scarifying to provide bond with the new fill.
(5) Where slopes are steeper than five units horizontal to one unit vertical (5:1) (20 percent slope) and the height is greater than five (5) feet, by benching into sound bedrock or other competent material as determined by the soils engineer.
(6) Drainage facilities shall be provided at the toe of fills in accordance with Section 110.438.65.
(7) When fill is to be placed over a cut or bench, the cut or bench shall be accepted by the soils engineer or engineering geologist as a suitable foundation for fill prior to fill placement.

(b) Fill Material. Detrimental amounts of organic material, as determined by the geotechnical engineer, shall not be permitted in fills. Except as permitted by the Building Official or County Engineer, no rock or similar irreducible material with a maximum dimension greater then twelve (12) inches shall be buried or placed in fills. Exception: The Building Official or County Engineer may permit placement of larger rock when the soils engineer properly devises a method of placement, and continuously inspects its placement and approves the fill stability. The following conditions shall also apply:

(1) Prior to issuance of the grading permit, potential rock disposal areas shall be delineated on the grading plan.
(2) Rock sizes greater than twelve (12) inches in maximum dimension shall be ten (10) feet or more below grade, measured vertically.
(3) Rocks shall be placed so as to ensure filling of all voids with well-graded soil.

(c) Compaction. All fills shall be compacted to a minimum of ninety (90) percent of maximum dry density and in accordance with the project soils report.

All of the above sections shall be met as written except for Section (a). As described above roughly 100 feet of fill slope will be constructed at a slope of 2:1 to avoid conflict with two existing 24-inch diameter water mains which cannot be relocated and which cannot be covered with additional fill.

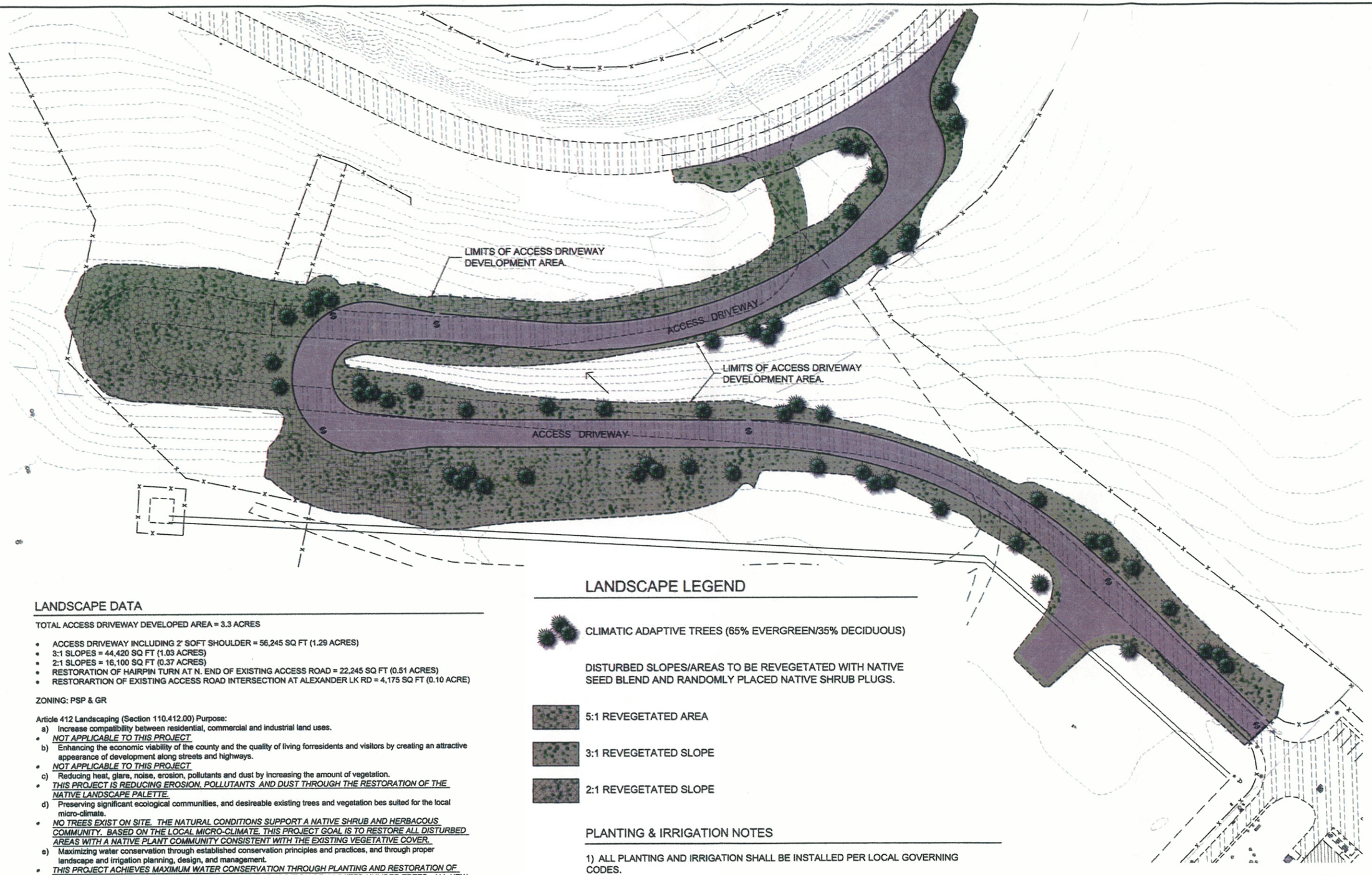
Section 110.438.70 Erosion Control. *Except in the case where bedrock is exposed, the faces of cut and fill slopes shall be prepared and maintained with landscaping and/or revegetation to control against erosion. This control may consist of plantings such as native grasses, and drought-resistant trees, shrubs, and ground covers, which shall be planted in random groupings to reduce the constructed character of manufactured slopes. Bark mulches and stone cobble may be allowed to cover fifty (50) percent of exposed bare ground. The landscaping protection for the slopes shall be installed as soon as practicable. However, the slopes shall be treated with a dust palliative if left undeveloped for more than thirty (30) days and shall be revegetated if left undeveloped for more than ninety (90) days. Where necessary, check dams, cribbing, or other devices or methods shall be employed to control erosion and provide safety. Any grading operation which will disturb an area of one (1) acre or more also requires a Nevada Department of Environmental Protection (NDEP) permit as per Section 110.438.100 and a dust control permit issued by the Washoe County Health Department, Air Quality Management Division.*

All exposed slopes will be revegetated with native species and irrigated until the vegetation is established in accordance with the EPA's 70% rule.

Please feel free to call if you have any questions.

Sincerely,
Gray & Associates

Edward C. Thomas, P.E., LEED AP
Engineering Manager



LANDSCAPE DATA

TOTAL ACCESS DRIVEWAY DEVELOPED AREA = 3.3 ACRES

- ACCESS DRIVEWAY INCLUDING 2' SOFT SHOULDER = 56,245 SQ FT (1.29 ACRES)
- 3:1 SLOPES = 44,420 SQ FT (1.03 ACRES)
- 2:1 SLOPES = 16,100 SQ FT (0.37 ACRES)
- RESTORATION OF HAIRPIN TURN AT N. END OF EXISTING ACCESS ROAD = 22,245 SQ FT (0.51 ACRES)
- RESTORARTION OF EXISTING ACCESS ROAD INTERSECTION AT ALEXANDER LK RD = 4,175 SQ FT (0.10 ACRE)

ZONING: PSP & GR

Article 412 Landscaping (Section 110.412.00) Purpose:

a) Increase compatibility between residential, commercial and industrial land uses.
- *NOT APPLICABLE TO THIS PROJECT*

b) Enhancing the economic viability of the county and the quality of living forresidents and visitors by creating an attractive appearance of development along streets and highways.
- *NOT APPLICABLE TO THIS PROJECT*

c) Reducing heat, glare, noise, erosion, pollutants and dust by increasing the amount of vegetation.
- *THIS PROJECT IS REDUCING EROSION, POLLUTANTS AND DUST THROUGH THE RESTORATION OF THE NATIVE LANDSCAPE PALETTE.*

d) Preserving significant ecological communities, and desireable existing trees and vegetation bes suited for the local micro-climate.
- *NO TREES EXIST ON SITE. THE NATURAL CONDITIONS SUPPORT A NATIVE SHRUB AND HERBACOUS COMMUNITY. BASED ON THE LOCAL MICRO-CLIMATE. THIS PROJECT GOAL IS TO RESTORE ALL DISTURBED AREAS WITH A NATIVE PLANT COMMUNITY CONSISTENT WITH THE EXISTING VEGETATIVE COVER.*

e) Maximizing water conservation through established conservation principles and practices, and through proper landscape and irrigation planning, design, and management.
- *THIS PROJECT ACHIEVES MAXIMUM WATER CONSERVATION THROUGH PLANTING AND RESTORATION OF THE NATIVE SHRUB/HERBACEOUS COMMUNITY AND THE ADDITION OF A LIMITED NUMBER TREES. ALL NEW TREES AND SHRUBS WILL BE DRIP IRRIGATED.*

REQUIRED LANDSCAPE AREA = 20% OF TOTAL DEVELOPED AREA

TREES PROVIDED = 137

- TREES ALONG NEW ACCESS DRIVEWAY = 60
- TREES ALONG EAST AND WEST PROPERTY LINE AT 50' O.C. AVERAGE DENSITY = 32
- TREES ALONG SOUTH PROPERTY LINE AT 20' O.C. AVERAGE DENSITY = 45

LANDSCAPE LEGEND

CLIMATIC ADAPTIVE TREES (65% EVERGREEN/35% DECIDUOUS)

DISTURBED SLOPES/AREAS TO BE REVEGETATED WITH NATIVE SEED BLEND AND RANDOMLY PLACED NATIVE SHRUB PLUGS.

5:1 REVEGETATED AREA

3:1 REVEGETATED SLOPE

2:1 REVEGETATED SLOPE

PLANTING & IRRIGATION NOTES

1) ALL PLANTING AND IRRIGATION SHALL BE INSTALLED PER LOCAL GOVERNING CODES.

2) FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL, AND WATER REGIMES. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-1990).

3) SEEDED AREAS WILL BE TEMPORARILY IRRIGATED TO INSURE ESTABLISHMENT.. CONTAINER PLANTINGS WILL BE DRIP IRRIGATED BASED ON THE SPECIFIC HORTICULTURAL REQUIREMENTS OF EACH SPECIES.

LA Studio
the landscape architecture studio
1552 C Street Sparks, NV 89431 (775) 322-6674 NV RLA #440
www.lastudionevada.com

WASHOE CO. COMM. SERVICES - WATER RESOURCES
STMWRF ACCESS DRIVEWAY
PRELIMINARY LANDSCAPE PLAN
Washoe Co. Nevada
Reno

No.	Revision Date

LA No: 025-504-01-14
Designed: RHH
Drawn: RHH
Checked: RHH
CAD File: LI-025-504
Date: 3/5/14

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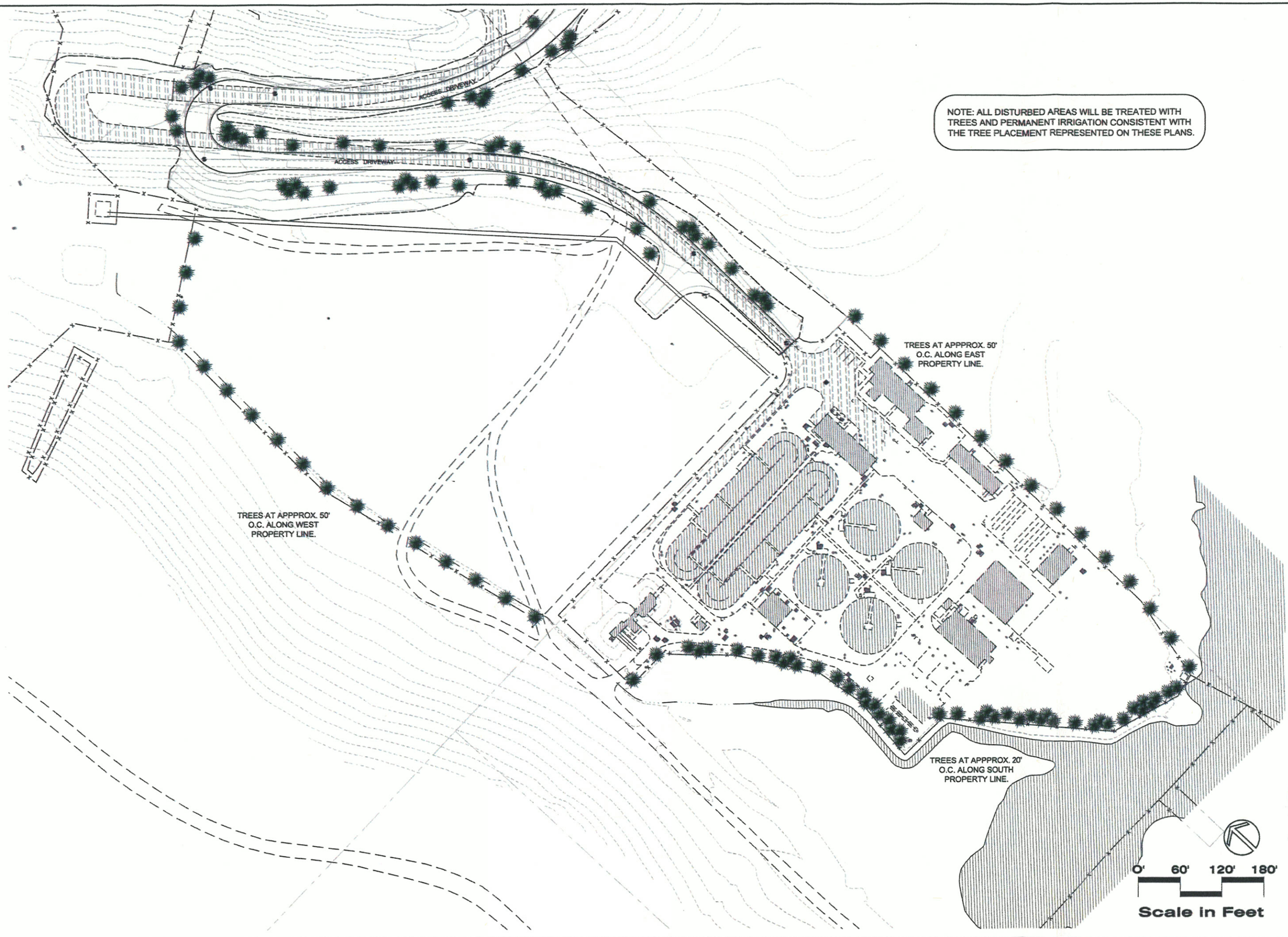
of
2



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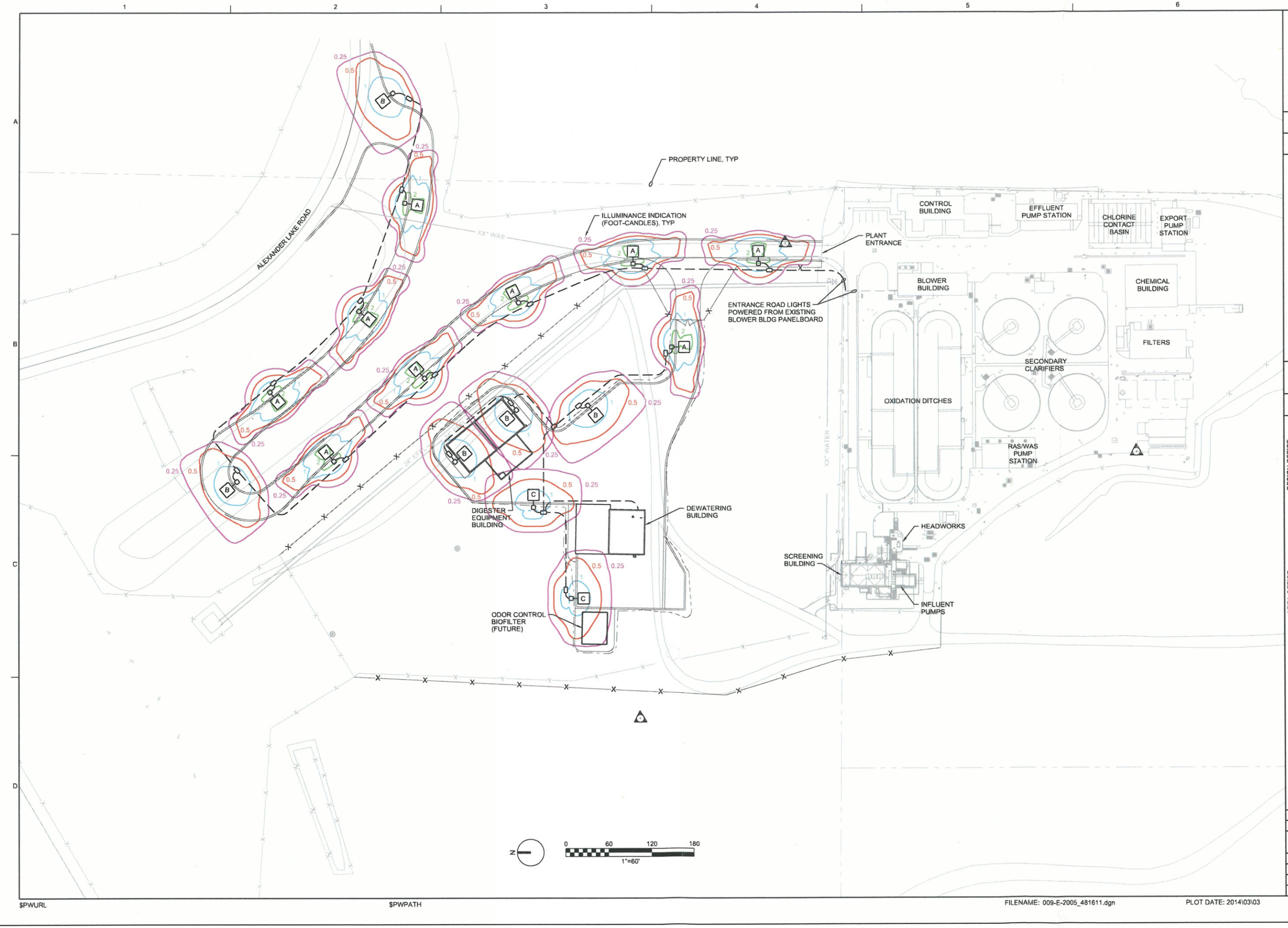


NO.	DATE	REVISION	BY	APVD
DSGN	J LORING	DR J LORING	CHK	APVD

DESIGN OFFICE:
2525 AIRPARK DR
REDDING, CA 96001
(530) 246-5831

AREA OFFICE:
50 WEST LIBERTY ST, STE 205
RENO, NEVADA 89501
(775) 328-7300

SOUTH TRUCKEE MEADOWS
WATER RECLAMATION FACILITY (STMWRF)
BIOSOLIDS FACILITIES PROJECT
RENO, NEVADA

ELECTRICAL

SITE LIGHTING AND ACCESS ROAD LIGHTING PLAN

AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2014
PROJ	481611
DWG	E-5
SHEET	of

30% DESIGN - NOT FOR CONSTRUCTION

South Truckee Meadows/Washoe Valley Citizen Advisory Board

MEMORANDUM

Exhibit H

To: Roger Pelham, Staff Representative
Re: South Truckee Meadows/Washoe Valley CAB Election of Officers
From: Allayne Donnelly-Everett, Administrative Recorder
Date: March 19, 2014

Special Use Permit SB14-004 (Water Reclamation Facility) – Tim Simpson, Washoe County Community Services Water Resources presented the request to expand a wastewater treatment facility greater than 50%, the size of the existing facility to allow Major Grading for improvement of the driveway access, to allow final slopes greater than 3 horizontal to 1 vertical, and to eliminate required landscaping for the project located south of Alexander Lake Road, approximately two miles southeast of its intersection with South McCarran Blvd. Rick Warner, P.E. Washoe County Community Services was available to present information and address questions and concerns. Applicant: Washoe County Community Services Department, Water Resources Branch. Contact Roger Pelham, Staff Representative at 775-328-3622 rpelham@washoecounty.us **MOTION:** Tom Daly moved to recommend approval of SB14-004, Water Reclamation Facility, as presented. Malachy Horan seconded the motion. The motion carried with Patricia Phillips opposed and Brad Stanley abstained.

Comments and Concerns

- In response to questions raised, Mr. Simpson stated that the South East Corridor will align northeast of this project and there are wild horses in the area.
- In response to questions raised, Mr. Simpson stated that landscape would be minimal along the driveway and landscape in the area to minimize negative visual impacts. There is industrial only near the facility.
- Concerns were raised regarding containing any negative odors from this site.
- Patricia Phillips stated concern that the adjacent ridge area is publicly used for hiking and other outdoor recreational uses and can Washoe County guarantee that any negative odors would be contained.
- Concerns were raised that the adjacent areas have planned residential development in the future.
- Rick Warner stated that a condition of the facility that there will be odor controls installed if necessary and no detectable odors would go beyond the property lines. Washoe County can require stricter standards than what the state requires. Mr. Warner stated that they have never had an odor complaint for that facility. Mr. Warner stated that it is approximately one half mile to the nearest residence. Should there be any complaints, Washoe County would increase measures to odor controls.
- In response to questions raised, Mr. Warner discussed processes and costs for operating the facility.
- Mr. Simpson stated that they will be working with Washoe County Health Department and other regulatory agencies to maintain odor controls.
- In response to questions raised, Mr. Simpson stated that the reason for the expansion is to address the planned development in the southwest.
- Brad Stanley stated that he lives within line of site of the facility and asked that if there is an odor problem, that Washoe County will take care of the issue.
- In response to questions raised, Mr. Warner stated that this facility is planned to serve the south valleys area. Questions were raised whether capacity would address the Sunnyhills proposed development.

cc: Commissioner David Humke
Tom Judy, Acting Chair
Sarah Tone, County Liaison
Nancy Leuenhagen, Community Relations Manager
Andrea Tavener, Program Assistant

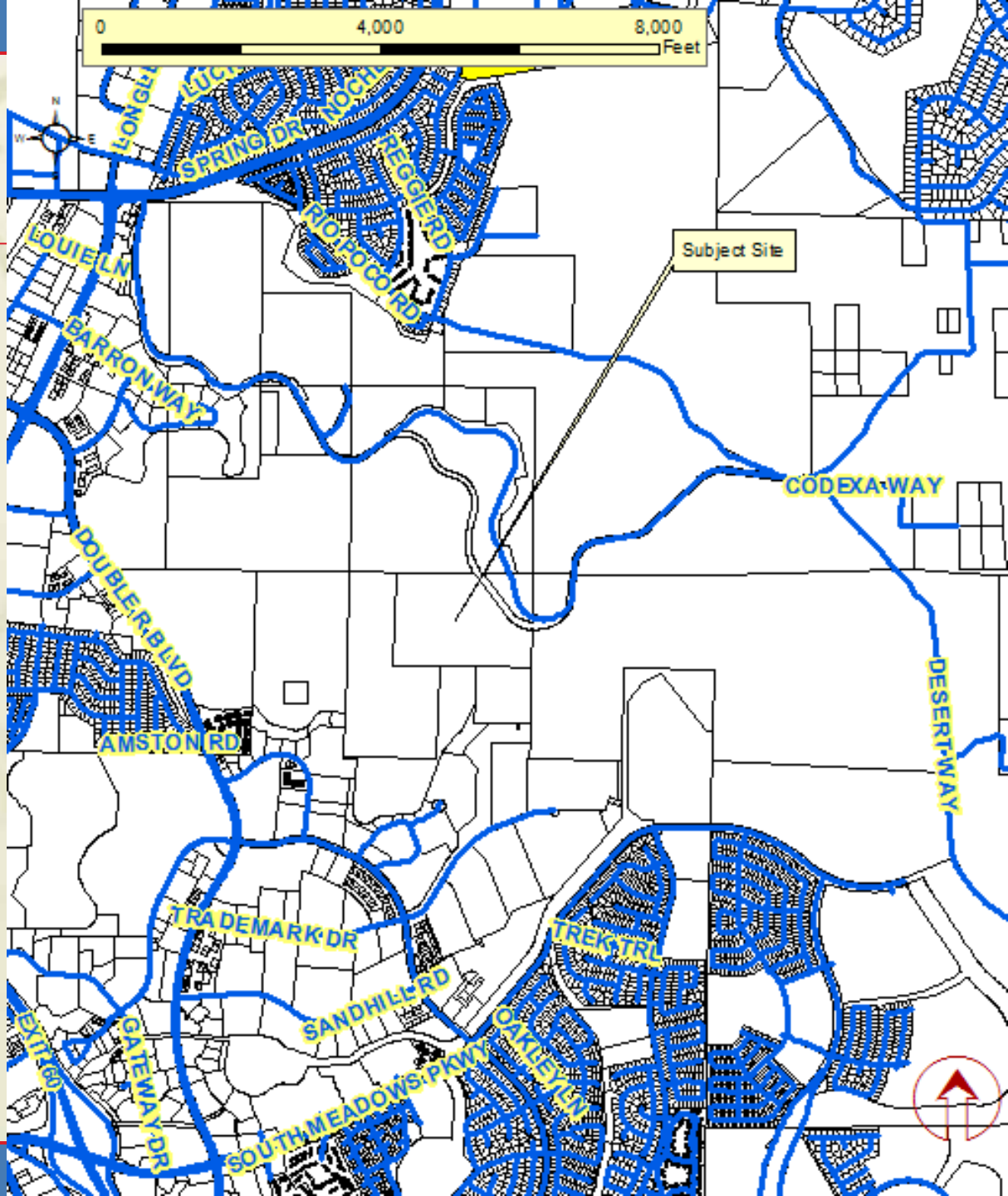
Washoe County
Board of Adjustment
April 3, 2014

Special Use Permit

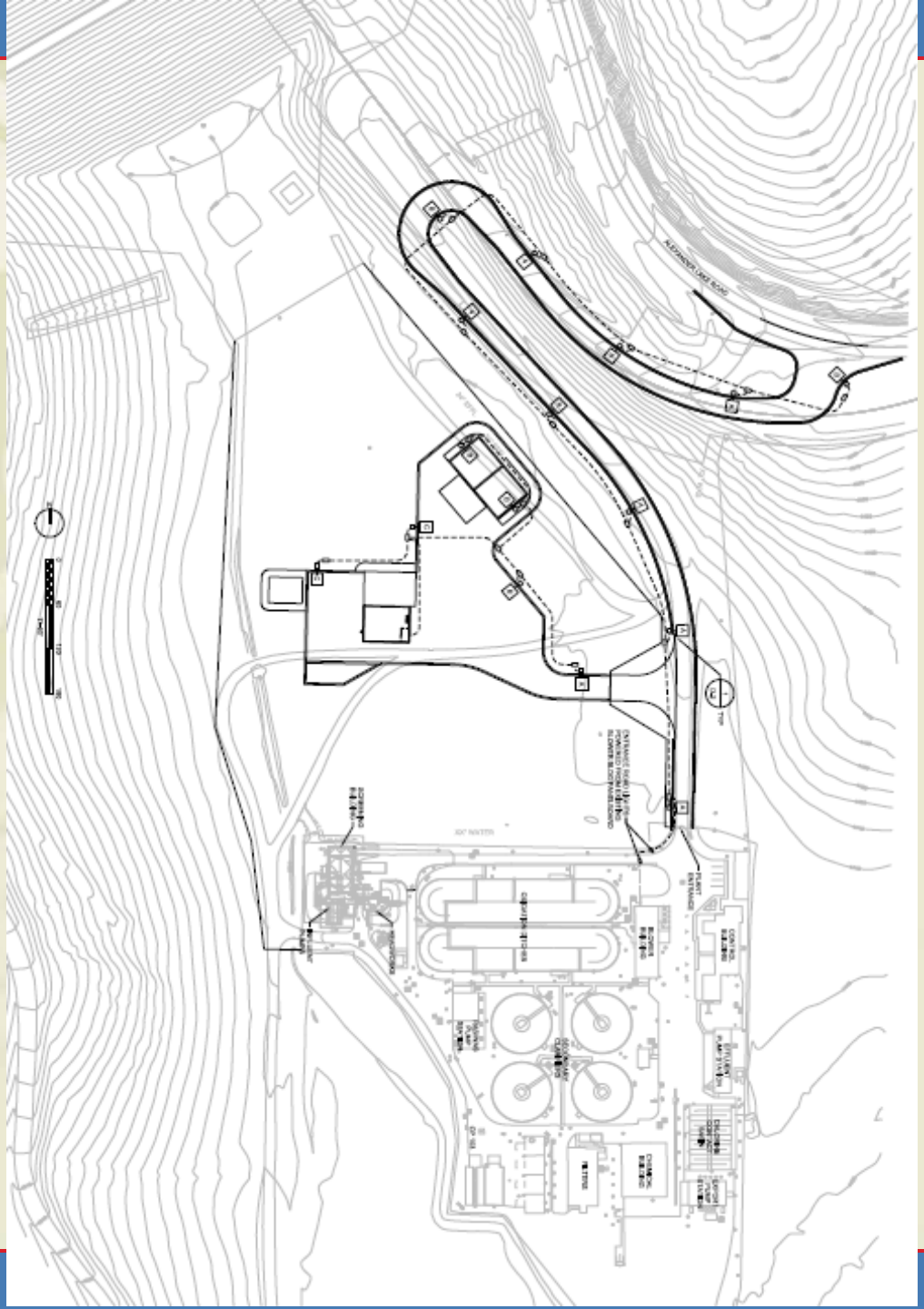
Case No. SB14-004

South Truckee Meadows Water Reclamation Facility

Vicinity Map



Site Plan



Background

- County Community seeks to double the size and capacity of the South Truckee Meadows Water Reclamation Facility (STMWRF)
- Expansion will include several buildings and extensive grading to the driveway access to accommodate large trucks that will be used to haul solid waste
- Topography of the site is steep from Alexander Lake Road to the project site, which is on level ground
- Applicant is requesting that the Board of Adjustment approve several modifications to grading and landscaping standards

Analysis

- Relocate trees, add trees adjacent to proposed driveway
- Modify landscape standards to eliminate required groundcover
- Install covers on all exterior lighting
- All exterior storage in one area and screened
- Seeking slopes steeper than 3:1
  - Stringent re-vegetation conditions included

Analysis

the Board has the authority at Section 810.20(e) to "…vary standards of the Development Code as part of the approval of a special use permit application"

staff recommends that the Board vary the allowable slope to steeper than 3:1 due to extensive previous grading and steep natural topography

Reviewing Agencies

- No adverse comments or conditions were provided by the Citizen Advisory Board or any of the reviewing agencies.
- Comments are included with the staff report.

Conditions of Approval

- No unique or extraordinary conditions of approval have been included.
- All conditions relate to the impacts identified in association with the proposed expansion of the facility and the related grading.

Special Use Permit Findings

1. Consistency. That the proposed use is consistent with the action programs, policies, standards and maps of the Master Plan and the Southeast Truckee Meadows Area Plan.

   Staff Comment: The facility is in existence at this time, it is being expanded into an area that is already substantially disturbed and will be stabilized in accordance with the conditions of approval.

2. Improvements. That adequate utilities, roadway improvements, sanitation, water supply, drainage, and other necessary facilities have been provided, the proposed improvements are properly related to existing and proposed roadways, and an adequate public facilities determination has been made in accordance with Division Seven.

   Staff Comment: The facility is in existence at this time, and is being expanded.

Special Use Permit Findings

3. Site Suitability. That the site is physically suitable for a water reclamation facility, and for the intensity of such a development.

   Staff Comment: The facility is in existence at this time, and is being expanded.

4. Issuance Not Detrimental. That issuance of the permit will not be significantly detrimental to the public health, safety or welfare; injurious to the property or improvements of adjacent properties; or detrimental to the character of the surrounding area.

   Staff Comment: Additional mitigation in the form of trees and screening fencing as well as slope stabilization will mitigate any significant detriment to the public health, safety or welfare and will not be injurious to the improvements of adjacent properties. As the facility is in existence at this time, expansion will not be detrimental to the character of the surrounding area.

Special Use Permit Findings

5. Effect on a Military Installation. Issuance of the permit will not have a detrimental effect on the location, purpose or mission of the military installation.

   Staff Comment: There is no military installation in the vicinity of the project.

Recommendation

Staff recommends approval, subject to the findings & conditions listed in the staff report.

Possible Motion

I move that after giving reasoned consideration to the information contained in the staff report and information received during the public hearing, the Washoe County Board of Adjustment approve with conditions Special Use Permit Case No. SB14-004 for the Washoe County Community Services Department, Water Resources, having made all five findings in accordance with Washoe County Development Code Section 110.810.30.