Original

TENTATIVE MAP APPLICATION

FOR:

The Autumn Trails Subdivision

Prepared For:

Pinnacle Land Holdings LLC
Attn: Michael Fiore
477 E. 9th Street
Reno, NV 89512

Prepared By:

K2 ENGINEERING AND STRUCTURAL DESIGN
3100 Mill Street, Suite 107
Reno, NV 89502
(775)355.0505 Fax(775)355.0566

September, 2014

Table of Contents

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):
The Autumn Trails Subdivision

Project Description: The project will be a 43 unit residential subdivision.

Project Address: 0 Hayfield Drive

Project Area (acres or square feet): 47.608 acres

Project Location (with point of reference to major cross streets **AND** area locator):
The site is located west of the Pyramid Highway near the end of Sunset Springs Lane

Assessor's Parcel No(s):	Parcel Acreage:	Assessor's Parcel No(s):	Parcel Acreage:
534-420-08	47.608		

Section(s)/Township/Range: Section 25 / T21N / R20E

Indicate any previous Washoe County approvals associated with this application:
Case Nos. TM02-006

Applicant Information (attach additional sheets if necessary)

Property Owner:		**Professional Consultant:**	
Name: Pinnacle Land Holdings LLC (Attn: Michael I		Name: K2 Engineering & Structural Design	
Address: 477 E. 9th Street		Address: 3100 Mill Street #107	
Reno, NV	Zip: 89512	Reno, NV	Zip: 89502
Phone:	Fax:	Phone: 775-355-0505	Fax: 355-0566
Email: mfiore@phdnv.com		Email: jared@k2eng.net	
Cell: 775-842-8066	Other:	Cell:	Other:
Contact Person: Michael Fiore		Contact Person: Jared Krupa	
Applicant/Developer:		**Other Persons to be Contacted:**	
Name: Same as Property Owner		Name: Michael Vicks	
Address:		Address: 2408 Valencia Way	
	Zip:	Sparks, NV	Zip: 89434
Phone:	Fax:	Phone: 775-848-5787	Fax:
Email:		Email: mwvicks@gmail.com	
Cell:	Other:	Cell:	Other:
Contact Person:		Contact Person:	

For Office Use Only

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

Tentative Subdivision Map 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 tentative subdivision maps may be found in Article 608, Tentative Subdivision Maps.

1. What is the location (address or distance and direction from nearest intersection)?

The property is located at 0 Hayfield Drive (APN: 534-420-08) which is located west of Pyramid Highway near the top of Sunset Springs Lane. The subject property is the remainder parces for the previous Sky Ranch 2 development and can be accessed by Hayfield Drive (+/- 180' South to intersection with Split Rail Court), Tranquil Drive (+/- 190' North to intersection with Geraldine Court)and Smoke Wagon Drive (+/- 200' South to intersection with Cordoba Boulevard).

2. What is the subdivision name (proposed name must not duplicate the name of any existing subdivision)?

Autumn Trails

3. Density and lot design:

a. Acreage of project site	47.608
b. Total number of lots	43
c. Dwelling units per acre	0.903
d. Minimum and maximum area of proposed lots	21,451 s.f. / 58,393 s.f.
e. Minimum width of proposed lots	120'
f. Average lot size	31,972 s.f.

4. Utilities:

a. Sewer Service	Washoe County Department of Water Resources
b. Electrical Service	NV Energy
c. Telephone Service	AT&T
d. LPG or Natural Gas Service	NV Energy
e. Solid Waste Disposal Service	Waste Management
f. Cable Television Service	Charter Communications
g. Water Service	Washoe County Department of Water Resources

5. For common open space subdivisions (Article 408), please answer the following:

   a. Acreage of common open space:

   12.374 acres

   b. Development constraints within common open space (slope, wetlands, faults, springs, ridgelines):

   The open space will be utilized to convey storm water through the property and to the existing and proposed detention areas.

   c. Range of lot sizes (include minimum and maximum lot size):

   21,451 s.f. - 58,393 s.f.

   d. Average lot size:

   31,972 s.f.

   e. Proposed yard setbacks if different from standard:

   No Modifications - LDS Standard Setbacks:
   Front: 30'
   Sides: 12'
   Rear: 30'

   f. Justification for setback reduction or increase, if requested:

   N/A

   g. Identify all proposed non-residential uses:

   Open Space

h. Improvements proposed for the common open space:

The common open space will be left natural with the exception of the proposed drainage facilities.

i. Describe or show on the tentative map any public or private trail systems within common open space of the development:

N/A

j. Describe the connectivity of the proposed trail system with existing trails or open space adjacent to or near the property:

N/A

k. If there are ridgelines on the property, how are they protected from development?

N/A

l. Will fencing be allowed on lot lines or restricted? If so, how?

Fencing will be allowed on lot lines.

m. Identify the party responsible for maintenance of the common open space:

The existing Autumn Trails Homeowners Association will be responsible for maintenance of the drainage facilities in the common open space.

6. Is the project adjacent to public lands or impacted by "Presumed Public Roads" as shown on the adopted April 27, 1999 Presumed Public Roads (see Washoe County Public Works website at http://www.washoecounty.us/pubworks/engineering.htm). If so, how is access to those features provided?

No, the project is not adjacent to public lands or impacted by "Presumed Public Roads."

7. Is the parcel within the Truckee Meadows Service Area?

☑ Yes	☐ No

8. Is the parcel within the Cooperative Planning Area as defined by the Regional Plan?

☐ Yes	☑ No	If yes, within what city?

9. Will a special use permit be required for utility improvement? If so, what special use permits are required and are they submitted with the application package?

No, a special use permit will not be required for utility improvements.

10. Has an archeological survey been reviewed and approved by SHPO on the property? If yes, what were the findings?

The SHPO was contacted and it was determined that no archaeological survey would be required for this project.

11. Indicate the type and quantity of water rights the application has or proposes to have available:

a. Permit #		acre-feet per year	
b. Certificate #		acre-feet per year	
c. Surface Claim #		acre-feet per year	
d. Other #		acre-feet per year	

e. Title of those rights (as filed with the State Engineer in the Division of Water Resources of the Department of Conservation and Natural Resources):

To be determined at Final Map stage of development.

12. Describe the aspects of the tentative subdivision that contribute to energy conservation:

The proposed subdivision homes will be built to the current ICC's IECC energy codes standard. Aspects of the current energy codes to include proper insulation, energy efficient appliances, energy efficient windows, and water efficient shower heads, faucets, and toilets. The proposed large lot sizes and building foot prints will allow for the placement of the homes on the lots to take advantage solar heating.

13. Is the subject property in an area identified by the Department of Community Development as potentially containing rare or endangered plants and/or animals, critical breeding habitat, migration routes or winter range? If so, please list the species and describe what mitigation measures will be taken to prevent adverse impacts to the species:

No, the subject property is not in an area identified by the Department of Community Development as potentially containing rare or endangered plants and/or animals, critical breeding habitat, migration routes or winter range.

14. If private roads are proposed, will the community be gated? If so, is a public trail system easement provided through the subdivision?

N/A - All proposed streets will be public.

15. Is the subject property located adjacent to an existing residential subdivision? If so, describe how the tentative map complies with each additional adopted policy and code requirement of Article 434, Regional Development Standards within Cooperative Planning Areas and all of Washoe County, in particular, grading within 50 and 200 feet of the adjacent developed properties under 5 acres and parcel matching criteria:

Yes, this site is located adjacent to the Bridal Path Subdivision and the previous phases of this subdivision (Sky Ranch North Phase 2). Both the Bridal Path Subdivision and the Sky Ranch North Phase 2 Subdivision are zoned LDS and the proposed zoning for this subdivision is LDS. All lot size requirements will conform to LDS requirements and will be of similar size to the adjacent subdivisions.

16. Are there any applicable policies of the adopted area plan in which the project is located that require compliance? If so, which policies and how does the project comply?

The proposed subdivision will comply with all applicable policies of the Spanish Springs Area Plan.

17. Are there any applicable area plan modifiers in the Development Code in which the project is located that require compliance? If so, which modifiers and how does the project comply?

No, there are no area plan modifiers for this location.

18. Will the project be completed in one phase or is phasing planned? If so, please provide that phasing plan:

The project will be completed in two phases which are depicted on the phasing plan included with this application.

19. Is the project subject to Article 424, Hillside Development? If yes, please address all requirements of the Hillside Ordinance in a separate set of attachments and maps.

❑ Yes	☑ No	If yes, include a separate set of attachments and maps.

20. Is the project subject to Article 418, Significant Hydrologic Resources? If yes, please address Special Review Considerations within Section 110.418.30 in a separate attachment.

❑ Yes	☑ No	If yes, include separate attachments.

Grading

Please complete the following additional questions if the project anticipates grading that involves: (1) Disturbed area exceeding twenty-five thousand (25,000) square feet not covered by streets, buildings and landscaping; (2) More than one thousand (1,000) cubic yards of earth to be imported and placed as fill in a special flood hazard area; (3) More than five thousand (5,000) cubic yards of earth to be imported and placed as fill; (4) More than one thousand (1,000) cubic yards to be excavated, whether or not the earth will be exported from the property; or (5) If a permanent earthen structure will be established over four and one-half (4.5) feet high:

21. How many cubic yards of material are you proposing to excavate on site?

108,800 CUBIC YARDS CUT & FILL

22. How many cubic yards of material are you exporting or importing? If exporting of material is anticipated, where will the material be sent? If the disposal site is within unincorporated Washoe County, what measures will be taken for erosion control and revegetation at the site? If none, how are you balancing the work on-site?

The grading will be balanced on-site. Should over excevation be required in order to provide structural stability for the building pads, structural fill may be imported.

23. Can the disturbed area be seen from off-site? If yes, from which directions, and which properties or roadways? What measures will be taken to mitigate their impacts?

Once the development is complete the disturbed areas will most likely not be visible from off-site. The construction of the houses and lot line fences will obstruct the view of any disturbance.

24. What is the slope (Horizontal:Vertical) of the cut and fill areas proposed to be? What methods will be used to prevent erosion until the revegetation is established?

The maximum proposed slope of cut and fill areas on the site is 3H:1V. The grading will be limited to the single family residential lots, streets and drainage areas. The drainage areas will be landscaped and therefore no revegetation is expected.

25. Are you planning any berms and, if so, how tall is the berm at its highest? How will it be stabilized and/or revegetated?

No.

26. Are retaining walls going to be required? If so, how high will the walls be, will there be multiple walls with intervening terracing, and what is the wall construction (i.e. rockery, concrete, timber, manufactured block)? How will the visual impacts be mitigated?

No retaining walls anticipated.

27. Will the grading proposed require removal of any trees? If so, what species, how many, and of what size?

No trees exist on the subject property.

28. What type of revegetation seed mix are you planning to use and how many pounds per acre do you intend to broadcast? Will you use mulch and, if so, what type?

No revegetation is anticipated but if it is required the mix will be comprised of a native seed mix including grasses and bushes in conformance with Washoe County requirements.

29. How are you providing temporary irrigation to the disturbed area?

If required, temporary sprinkler irrigation will be provided.

30. Have you reviewed the revegetation plan with the Washoe Storey Conservation District? If yes, have you incorporated their suggestions?

N/A

Tahoe Basin

Please complete the following additional questions if the project is within the Tahoe Basin:

31. Who is the Tahoe Regional Planning Agency (TRPA) project planner and what is his/her TRPA extension?

N/A

32. Is the project within a Community Plan (CP) area?

❑ Yes	☑ No	If yes, which CP?

33. State how you are addressing the goals and policies of the Community Plan for each of the following sections:

a. Land Use:

N/A

b. Transportation:

N/A

c. Conservation:

N/A

d. Recreation:

N/A

e. Public Services:

N/A

34. Identify where the development rights for the proposed project will come from:

N/A

35. Will this project remove or replace existing housing?

☐ Yes	☑ No	If yes, how many units?

36. How many residential allocations will the developer request from Washoe County?

N/A

37. Describe how the landscape plans conform to the Incline Village General Improvement District landscaping requirements:

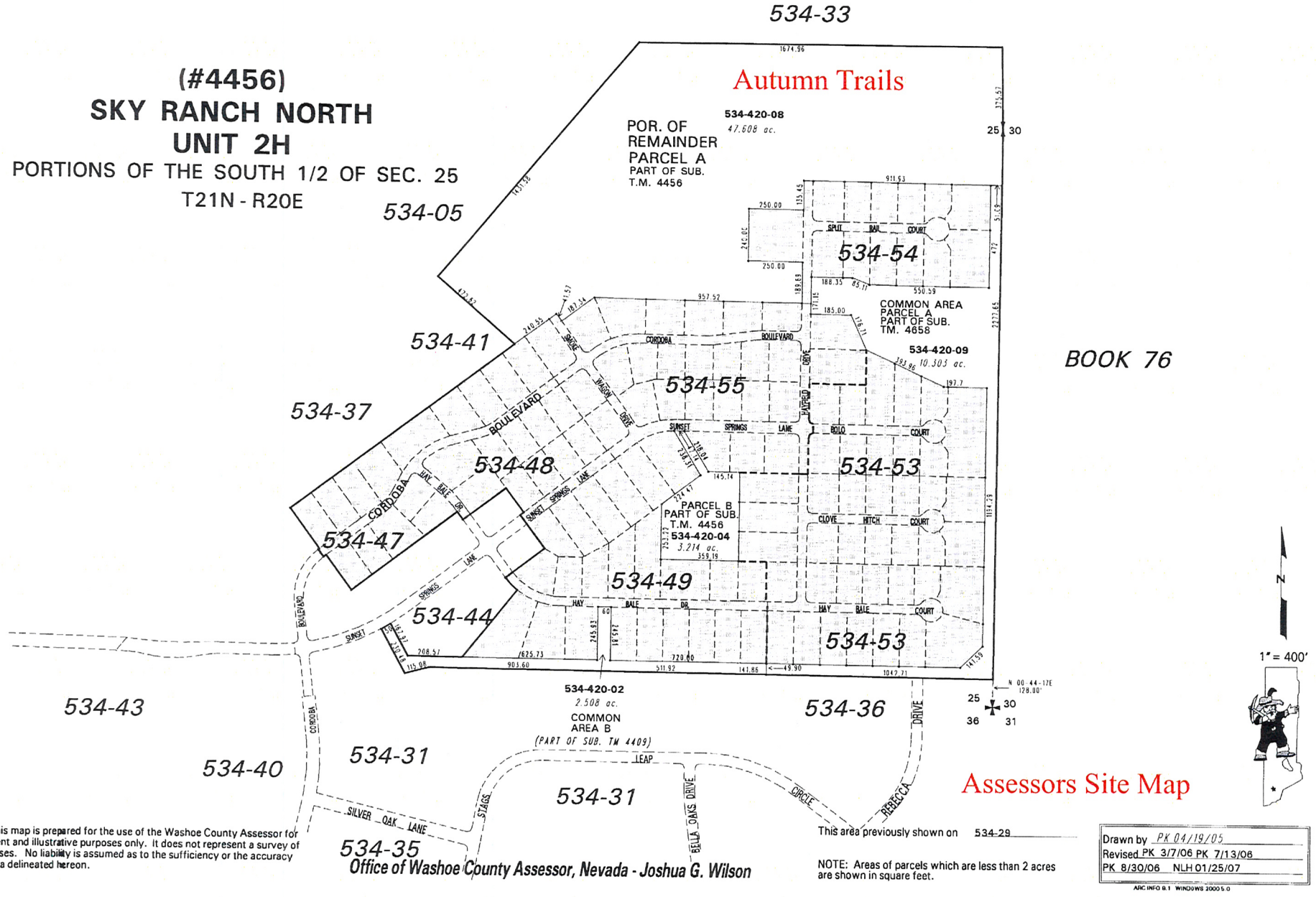
N/A

Application Maps

- Washoe County Assessor's Map
- Vicinity Map
- Phasing Plan
- Title Sheet
- Geometrics Plan
- Grading, Drainage & Erosion Control Plan
- Site Sections

(#4456)
SKY RANCH NORTH
UNIT 2H

PORTIONS OF THE SOUTH 1/2 OF SEC. 25
T21N - R20E



BOOK 76

Assessors Site Map

NOTE: This map is prepared for the use of the Washoe County Assessor for assessment and illustrative purposes only. It does not represent a survey of the premises. No liability is assumed as to the sufficiency or the accuracy of the data delineated hereon.

Office of Washoe County Assessor, Nevada - Joshua G. Wilson

This area previously shown on 534-29

NOTE: Areas of parcels which are less than 2 acres are shown in square feet.

Drawn by PK 04/19/05
Revised PK 3/7/06 PK 7/13/06
PK 8/30/06 NLH 01/25/07

ARC INFO 8.1 WINDOWS 2000 5.0

Tentative Map	Vicinity Map	K2 ENGINEERING AND STRUCTURAL DESIGN
for		3100 Mill Street, # 107
Autumn Trails		Reno, NV 89502
APN: 534-420-08		P: (775) 355-0505 F: (775) 355-0566

Tentative Map	Phasing Plan	K2 ENGINEERING AND STRUCTURAL DESIGN
for		3100 Mill Street, # 107
Autumn Trails		Reno, NV 89502
APN: 534-420-08		P: (775) 355-0505 F: (775) 355-0566

Tentative Map For: Autumn Trails

GENERAL NOTES

1. ALL DIMENSIONS ARE APPROXIMATE.
2. ALL STREETS ARE TO BE PUBLIC UNLESS OTHERWISE NOTED.
9. THIS SITE IS LOCATED IN FEMA FLOOD ZONE X WHICH IS DETERMINED TO BE OUTSIDE OF THE 100 YEAR FLOOD PLAIN.
2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (SSPWC) AND THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION (SDPWC), AS ADOPTED BY THE WASHOE COUNTY, AND SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER. ALL SPECIFICATIONS REFERENCED HEREIN REFER TO THE SSPWC UNLESS INDICATED OTHERWISE.
3. 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.

EROSION CONTROL NOTES

1. THE TEMPORARY EROSION CONTROL MEASURES AS SHOWN ARE MINIMUM REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE ENGINEER TO PROVIDE ADDITIONAL MEASURES AS MAY BE NECESSARY DUE TO CONSTRUCTION PHASING AND TO COMPLY WITH STATE AND LOCAL REGULATIONS INCLUDING BEST MANAGEMENT PRACTICES. THE CONTRACTOR/ENGINEER SHALL SUBMIT A CONSTRUCTION PHASING PLAN FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
2. REFER TO STATE OF NEVADA CONSTRUCTION SITE BEST MANAGEMENT PRACTICES HANDBOOK FOR ALL BEST MANAGEMENT PRACTICES (BMP'S) TO BE UTILIZED DURING CONSTRUCTION.
3. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMP's WEEKLY, PRIOR TO A FORECASTED RAIN EVENT AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PLAN AS NECESSARY. REFER TO STORMWATER GENERAL PERMIT NVR100000, SECTION 1.B.1.b.(2).
4. THE DEVELOPER/OWNER SHALL MAINTAIN AND CLEAN ALL PRIVATE PERMANENT SEDIMENT CONTROL DEVICES AND DRAINAGE FACILITIES INCLUDING CATCH BASINS, SEDIMENT BASINS, DETENTION BASINS, DITCHES, SWALES, AND PIPING. THE DEVELOPER/OWNER SHALL INSPECT AND CLEAN DEVICES EVERY 6 MONTHS OR AFTER EACH STORM RUNOFF EVENT, WHICHEVER OCCURS FIRST.
5. ACCUMULATED SEDIMENT IN BMP's SHALL BE REMOVED AT REGULAR INTERVALS, WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT, AND PRIOR TO THE NEXT FORECASTED STORM EVENT. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.
6. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHT-OF-WAY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FORM ENTERING THE STORM WATER SYSTEM.
7. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND THEIR AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE STATE OF NEVADA CONSTRUCTION SITE BEST MANAGEMENT PRACTICES HANDBOOK.
8. ALL DRAINAGE SWALES WHERE RIPRAP IS NOT REQUIRED SHALL BE REVEGETATED WITH SEED MIXTURE AS SHOWN IN THE REVEGETATION NOTES.
9. MECHANICAL SLOPE STABILIZATION FOR SLOPES: UNLESS NOTED OTHERWISE, SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH RIPRAP. SWALES AND V-DITCHES SHALL BE RIP RAPPED AS SPECIFIED ON PLANS. THE ROCK SHALL CONTAIN A MINIMUM OF FOUR FRACTURED FACES AND BE PLACED TO A MINIMUM DEPTH OF 12 INCHES. A MINIMUM OF 75% OF THE RIPRAP SHALL BE THE SPECIFIED ROCK DIAMETER OR GREATER.
10. STABILIZE CONSTRUCTION ENTRANCES AND EQUIPMENT PARKING AREAS WITH GRAVEL PRIOR TO GRADING.
11. INSTALL PRINCIPAL BASINS AND SEDIMENT BARRIERS BEFORE GRADING OCCURS. AFTER CONSTRUCTION, REMOVE ACCUMULATED DEBRIS IN THE SEDIMENT BARRIERS TO PREVENT EROSION.
12. BEFORE CONSTRUCTION BEGINS, INSTALL SILT CONTROL DEVICES AT STORM DRAIN INLETS RECEIVING RUNOFF FROM THE SITE AND MAINTAIN THEM DURING CONSTRUCTION.
13. WHEN THE WORK, INCLUDING REVEGETATION, HAS BEEN COMPLETED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED.

REVEGETATION NOTES

1. REVEGETATION: ALL AREAS DISTURBED AND LEFT UNDEVELOPED FOR A PERIOD OF MORE THAN THIRTY (30) DAYS SHALL BE STABILIZED BY THE APPLICATION OF DUST PALLIATIVE AND, IF LEFT MORE THAN NINETY (90) DAYS, PLANTED AS FOLLOWS:

A. DISTURBED AREAS AND SLOPES 3:1 AND FLATTER SHALL BE REVEGETATED BY EITHER HYDROSEEDING/HYDROMULCHING (TWO STEP PROCESS) OR BROADCAST SEEDING AND HYDROMULCHING (AT CONTRACTORS OPTION, IN LIEU OF HYDROMULCHING, STRAW, IN COMBINATION WITH TACKIFIER, MAY BE USED).

B. THE TOP 6 INCHES OF TOPSOIL AND PLANT MATERIAL DISTURBED DURING GRADING OPERATIONS SHALL BE SALVAGED AND STOCKPILED ONSITE. THE CONTRACTOR SHALL PROTECT THE STOCKPILE UNTIL RE-APPLICATION, INCLUDING WATERING AND/OR APPLICATION OF MULCH OR TACKIFIERS.

C. THE SEED BED SHALL BE LOOSENED TO A DEPTH OF 6 INCHES AND THE SALVAGED TOPSOIL RE-APPLIED AFTER SLOPES ARE FORMED. INCORPORATE THE TOPSOIL BY TILLING TWO LONGITUDINAL AND TWO PERPENDICULAR PASSES. PRIOR TO SEEDING, RUN A SPRING-TOOTHED HARROW PARALLEL TO THE SLOPE OR IN BOTH DIRECTIONS ON FLAT AREAS. MIX THE SEED WITH ONE THIRD OF HYDROMULCH MATERIAL AND APPLY PER THE LISTED RATES, FOLLOWED BY THE APPLICATION OF THE REMAINING TWO-THIRDS OF THE HYDROMULCH. INCORPORATE A SLOW RELEASE 16-20-0 FERTILIZER INTO THE HYDROMULCH AT A RATE OF 300 POUNDS PER ACRE.

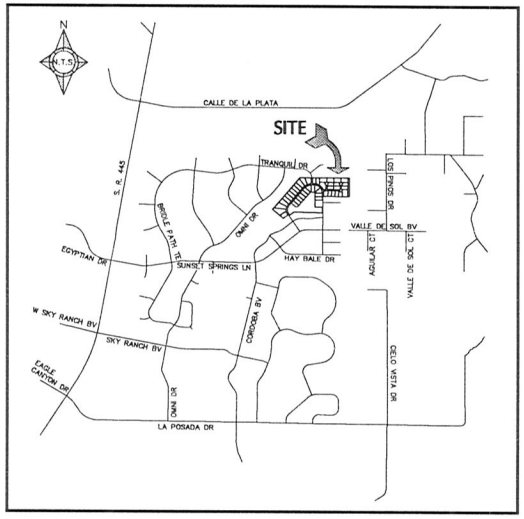
D. ON TOP OF THE HYDROMULCH APPLY A TACKIFIER AT 130 POUNDS PER ACRE. THE MATERIAL SHALL BE AN ORGANIC, PLANT-DERIVED SUBSTANCE CONTAINING PSYLLIUM OR GUARGUM. THE MATERIAL SHALL FORM A TRANSPARENT FILM LIKE CRUST AND SHALL NOT BE DISTURBED WITH ANY TRAFFIC. AT THE CONTRACTOR'S OPTION, HE CAN USE A STRAW MULCH AND TACKIFIER INSTEAD OF HYDROMULCH. THE STRAW SHALL BE FREE FROM NOXIOUS WEEDS AND BE CLEAN BALES OF WHEAT, BARLEY, OAT, OR RICE. THE STRAW SHALL BE PUNCHED INTO THE SOIL MECHANICALLY AFTER AN APPLICATION RATE OF 2 TONS/ACRE WITH A STRAW BLOWER.

E. THE SEED SHALL BE LISTED WITH A PURE LIVE SEED CONTENT WITH WEED SEEDS NOT EXCEEDING 0.5 PERCENT OF THE PURE LIVE SEED AND INERT MATERIAL.

F. SEED MIX:

PLS POUNDS PER ACRE	SEED TYPE
5 LBS	INTERMEDIATE WHEATGRASS – AGROPYRON INTERMEDIUM
5 LBS	CRESTED WHEATGRASS – AGROPYRON CRISTATUM
2 LBS	BITTERBRUSH – PURSHIA TRIDENTATA
2 LBS	BIG SAGE – ARTEMESIA TRIDENTATA
1 LB	FOUR WING SALTBRUSH – ATRIPLEX CANESCENS
1 LB	RABBITBRUSH – CHRYSOTHAMNUS NAUSEOSUS
1 LB	YARROW – ACHILLEA MILLIFOLIUM
2 LBS	CALIFORNIA POPPY – ESHSCHOLTZIA CALIFORNICA
5 LBS	INDIAN RICEGRASS – ORYZOPSIS HYMENOIDES
24 LBS	TOTAL POUNDS PER ACRE, PLS

22. THE CONTRACTOR OR DEVELOPER SHALL SUPPLEMENT RAINFALL, IF NECESSARY, WITH ADEQUATE TEMPORARY IRRIGATION OF RESEEDED AREAS UNTIL PLANTING HAS GERMINATED AND IS THRIVING TO A MINIMUM HEIGHT OF 4 INCHES. ANY AREAS THAT DO NOT SUCCESSFULLY GERMINATE IN THE OPINION OF THE ENGINEER OR THE COUNTY, ARE TO BE RESEEDED AND IRRIGATED UNTIL COVERED WITH VEGETATION. NO WATER TRUCKS WILL BE ALLOWED TO SPRAY THE SLOPES FOR IRRIGATION. A TEMPORARY IRRIGATION PLAN SHALL BE SUBMITTED FOR APPROVAL 30 DAYS PRIOR TO IMPLEMENTATION.



Vicinity Map

SCALE: N.T.S.

Development Statistics

PARCEL AREA = 47.608 AC
ZONING = LDS (COMMON OPEN SPACE DEVELOPMENT)
PROPOSED DENSITY = 0.90 DU/AC (43 UNITS)
SINGLE FAMILY RESIDENTIAL = 31.56 AC
RIGHT-OF-WAY = 3.68 AC
COMMON AREA = 12.37 AC
AVERAGE LOT SIZE = 31,971 S.F.
LARGEST LOT = 58,393 S.F.
SMALLEST LOT = 21,451 S.F.

Grading Statistics

DISTURBED AREA = 37.82 AC
PROPOSED CUT = 108,800 YDS^3
PROPOSED FILL = 108,800 YDS^3
NET EARTHWORK = BALANCED
MAXIMUM SLOPE = 3H:1V

Sheet Index

Owner

PINNACLE LAND HOLDINGS LLC
ATTN: MICHAEL FIORE
477 E 9TH ST
RENO, NV 89512
(775)682-4388

Civil Engineer

K2 ENGINEERING AND STRUCTURAL DESIGN
3100 MILL STREET, SUITE 107
RENO, NEVADA 89502
(775)355-0505

Basis of Bearing

NAD83/94, NEVADA STATE
PLANE COORDINATE SYSTEM
WEST ZONE GRID

Basis of Elevation

NAVD 1988 WITH THE P.I. MONUMENT OF
TRANQUIL DRIVE AND GEALDINE COURT
TAKEN AS 4646.02' ABOVE MEAN SEA LEVEL

Utilities

WATER – WASHOE COUNTY DWR
SEWER – WASHOE COUNTY DWR
NATURAL GAS – NV ENERGY
ELECTRIC – NV ENERGY
TELEPHONE – AT&T
CABLE TELEVISION – CHARTER COMMUNICATIONS
SOLID WASTE – WASTE MANAGEMENT

Engineer's Statement

I, BRANDT T. KENNEDY, DO HERE BY CERTIFY THAT THESE IMPROVEMENT PLANS HAVE BEEN COMPLETED BY ME, OR UNDER MY SUPERVISION AND ARE IN COMPLIANCE WITH ALL APPLICABLE PROVISIONS SET FORTH BY THE WASHOE COUNTY DEVELOPMENT CODE AND THE STATE OF NEVADA REVISED STATUTES.

BRANDT T. KENNEDY P.E. #16879

K2 ENGINEERING AND STRUCTURAL DESIGN
3100 Mill Street, # 107
Reno, NV 89502
P: (775) 355-0505
F: (775) 355-0566
www.K2eng.net

Autumn Trails Tentative Map
Washoe County, Nevada
0 Hayfield Drive
APN: 534-420-08

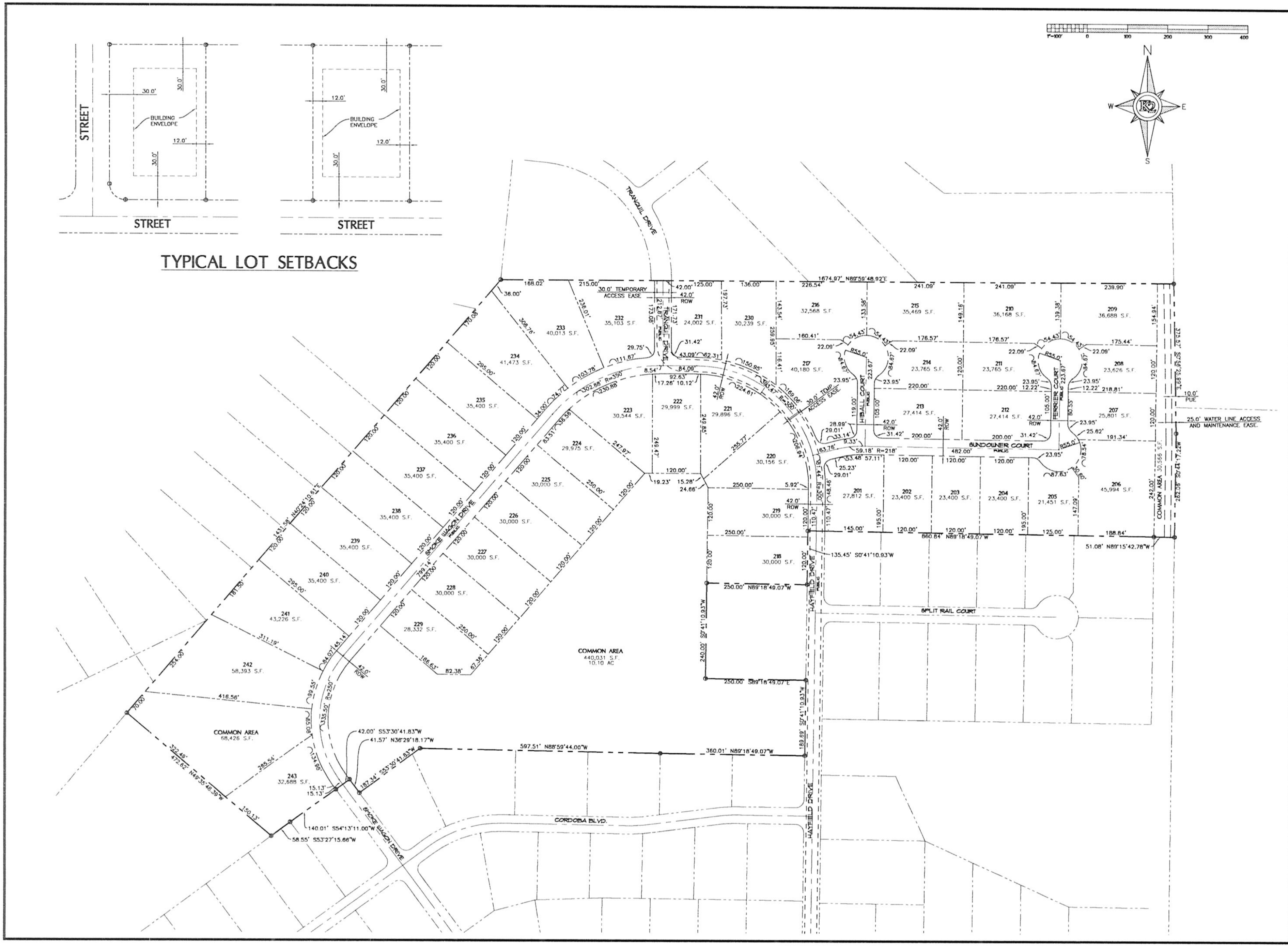
Brandt T. Kennedy, P.E.
Jared A. Krupa, P.E.

Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Title Sheet

C-1



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3100 Mill Street, # 107
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www.K2eng.net

Autumn Trails Tentative Map

Washoe County, Nevada

0 Hayfield Drive
APN: 534-420-08

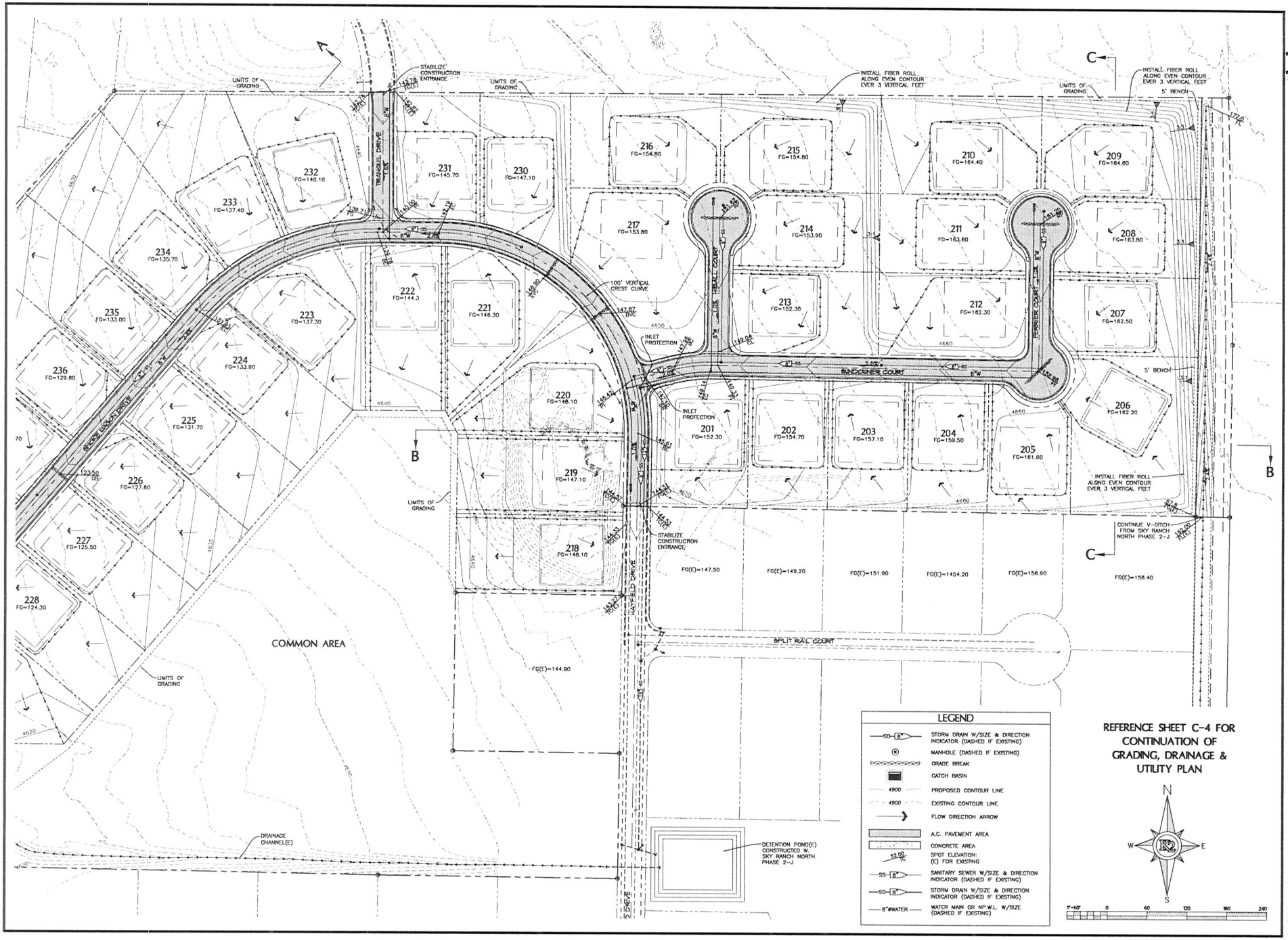
Brandt T. Kennedy, P.E.
Jared A. Krupa, P.E.

Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Site Geometric Plan

C-2



K2 ENGINEERING AND STRUCTURAL DESIGN
3100 Mill Street, # 107
Reno, NV 89502
P: (775) 355-0505
F: (775) 355-0566
www.K2eng.net

Autumn Trails Tentative Map

Washoe County, Nevada

0 Hayfield Drive
APN: 534-420-08

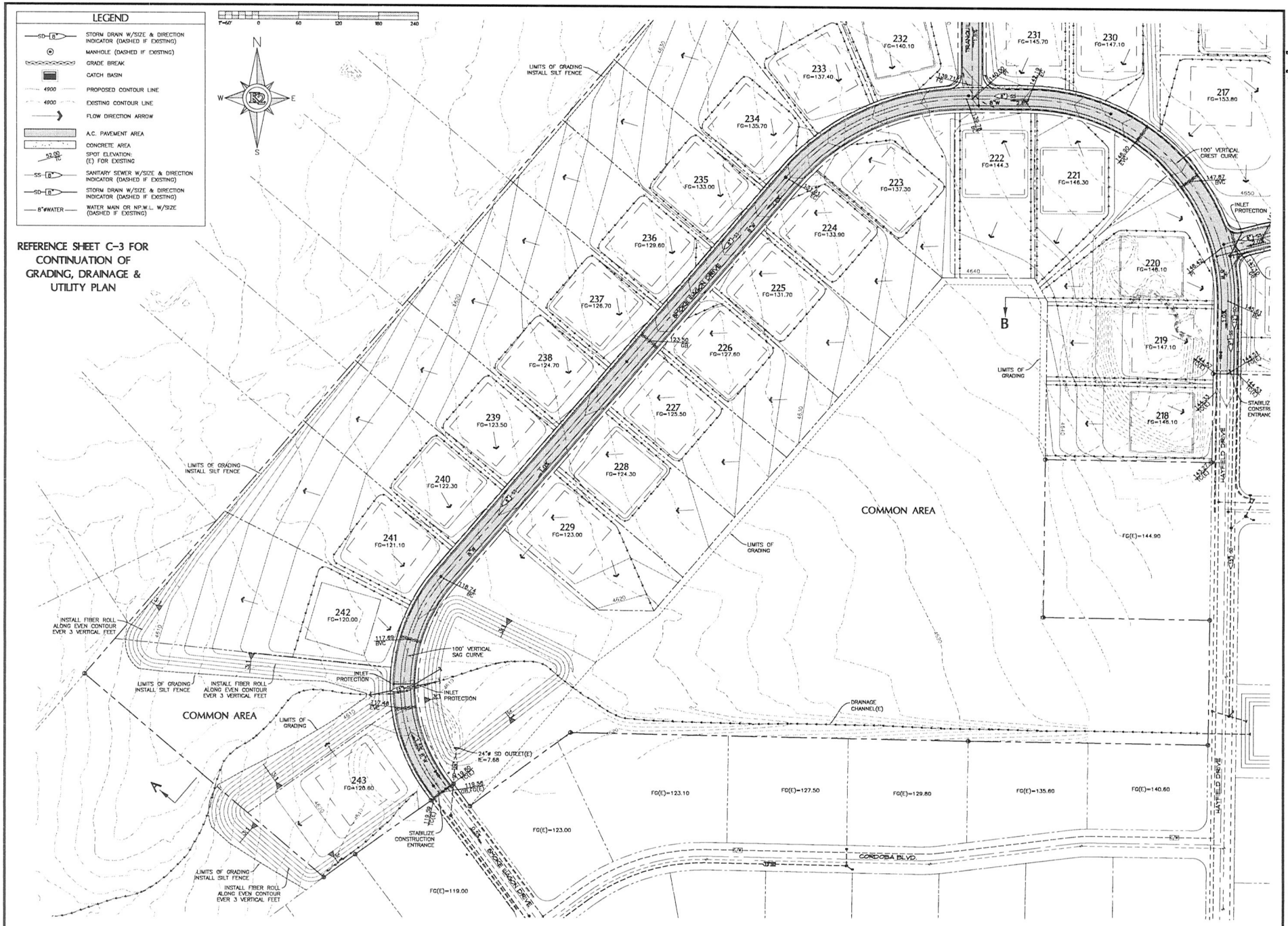
Brandt T. Kennedy, P.E.
Jared A. Krupa, P.E.

Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Site Grading Drainage & Utility Plan

C-3



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Autumn Trails Tentative Map

Washoe County, Nevada

0 Hayfield Drive
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Jared A. Krupa, P.E.

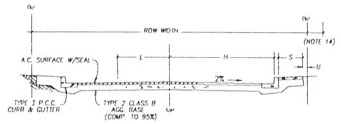
Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Site Grading, Drainage & Utility Plan

C-4

SECTION 110.436.25-2: ROADWAY SECTIONS - B
GENERAL APPLICATIONS: URBAN AREAS, SUBURBAN AREAS, LOT SIZES LESS THAN 0.5 AC.



ROW	H	S	U	L	B	PL	ADT MAX PER 2 TRAVEL LANES	REMARKS
52	20	5	0.5	12	4	0	7300	COLLECTOR
42	16	4	0.5	11	0	2	1000	LOCAL

NOTES

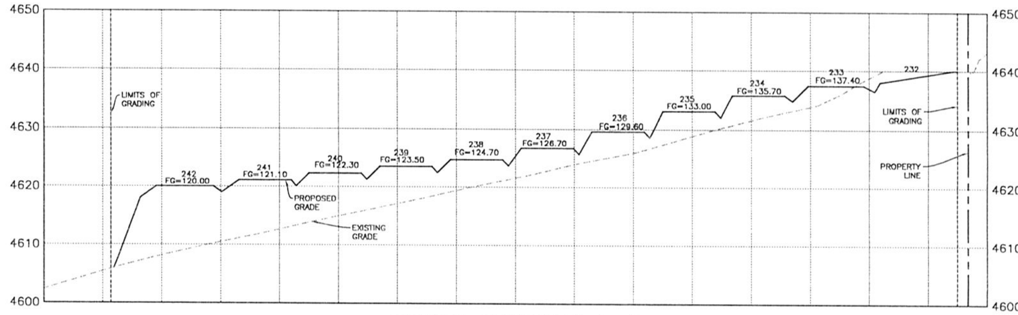
1. ALL WIDTHS ARE IN FEET.
2. H IS MEASURED TO THE FRONT FACE OF CURB.
3. L IS TRAVEL LANE; S IS SIDEWALK; B IS BICYCLE LANE; PL IS MAX. NUMBER OF PARKING LANES ALLOWED; ROW IS RIGHT OF WAY; ADT IS AVERAGE DAILY TRAFFIC.
4. ADT REPRESENTS THE DESIGN VOLUME FOR A TWO LANE FACILITY.
5. BICYCLE LANE SHALL BE PROVIDED IN ACCORDANCE W/THE BICYCLE AND PEDESTRIAN ELEMENT OF THE REGIONAL TRANSPORTATION PLAN AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
6. STRUCTURAL SECTIONS SHALL BE DETERMINED BY GEOTECHNICAL ENGINEERING DESIGN BUT IN NO CASE SHALL BE LESS THAN 4" A.C. OVER 6" GRAVEL BASE FOR COLLECTOR STREETS AND 3" A.C. OVER 6" GRAVEL BASE FOR LOCAL STREETS.
7. ALL CURB AND GUTTER IS MONOLITHIC CONC. AND L SHAPED PER STANDARD DETAIL.
8. SIDEWALK AREA IS CONC. BOTH SIDES FOR COLLECTORS, ONE SIDE FOR LOCALS. ALTERNATE SIDEWALK LOCATIONS/CONFIGURATIONS MUST BE APPROVED BY THE COUNTY ENGINEER.
9. ALL A.C. SURFACES SHALL BE SEALED IN ACCORDANCE WITH WASHOE CO. STANDARDS.
10. RESIDENTIAL DRIVEWAY ACCESS NOT ALLOWED TO STREETS ON WHICH 10YR. DESIGN ADT EXCEEDS 2000.
11. DESIGN OF IMPROVEMENTS TO BE DONE IN ACCORDANCE WITH ARTICLES 420 & 436 OF WASHOE COUNTY DEVELOPMENT STANDARDS AND DESIGN GUIDELINES.
12. ALL CONSTRUCTION IS TO BE DONE TO CURRENT WASHOE CO. STANDARDS & SPECIFICATIONS.
13. SLOPE EASEMENTS MAY BE REQ'D IN CERTAIN TERRAIN TO ACCOMMODATE THE ROADWAY SECTION.
14. MIN 7.5' PUBLIC UTILITY/TRAFFIC CONTROL SIGNAGE/PLOWED SNOW EASEMENT IS REQ'D ON BOTH SIDES OF ROW.

NO.	REVISED	DATE	STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION	SECTION: WASHOE
6	changed adt	12/05sw	ROADWAY SECTIONS (B)	DRAWING NO: W-1.2
3	Sub/Notes	1/94vp	GENERAL APPLICATIONS	
4	Corr "U"	2/94/vp	URBAN AREAS/SUBURBAN AREAS	
5	Save As W-2.dwg	10/01vp	LOT SIZE: LESS THAN 0.5 ACRE	DATE: 2/93vp PAGE: 2

PROPOSED STREET SECTION

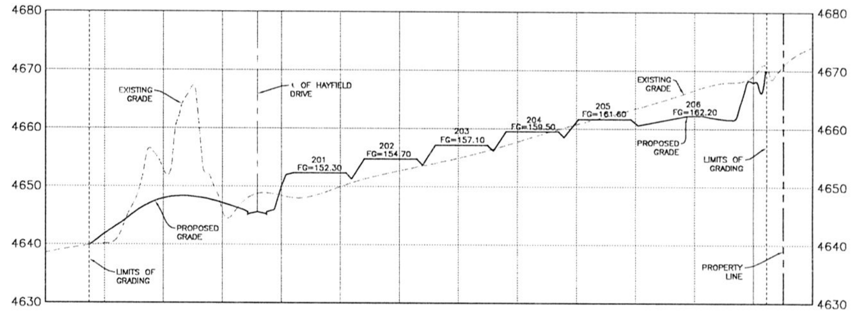
ABBREVIATIONS

AC	– ASPHALT CONCRETE	MH	– MANHOLE
AGG	– AGGREGATE	MIN	– MINIMUM
BC	– BEGIN CURVE	MISC	– MISCELLANEOUS
BFC	– BACK FACE OF CURB	NPWL	– NON POTABLE WATER LINE
BVC	– BEGIN VERTICAL CURVE	NTS	– NOT TO SCALE
BW	– BOTTOM OF WALL	OD	– OUTSIDE DIAMETER
CL,℄	– CENTERLINE	P	– PROPOSED
CB	– CATCH BASIN	PAD	– PAD GRADE
CFS	– CUBIC FEET PER SECOND	PCC	– PORTLAND CEMENT CONCRETE
CO	– CLEAN OUT	PI	– POINT OF INTERSECTION
CONC	– CONCRETE	PIV	– POST INDICATOR VALVE
CONST	– CONSTRUCT	PL,℄	– PROPERTY LINE
COORD	– COORDINATE	PO	– PUSH ON
DET	– DETAIL	PRC	– POINT OF REVERSE CURVATURE
DI	– DROP INLET	PUE	– PUBLIC UTILITY EASEMENT
DOM	– DOMESTIC	PVC	– POLYVINYL CHLORIDE
E	– EXISTING	PVI	– POINT OF VERTICAL INTERSECTION
EC	– END CURVE	Q_5	– FIVE YEAR FLOW RATE
ELEV	– ELEVATION	Q_{100}	– ONE HUNDRED YEAR FLOW RATE
EVC	– END VERTICAL CURVE	Q_{CAP}	– CAPACITY FLOW RATE
FDC	– FIRE DEPARTMENT CONNECTION	R	– RADIUS
FF	– FINISHED FLOOR ELEVATION	REF	– REFERENCE
FFC	– FRONT FACE OF CURB	RP	– RADIUS POINT
FG	– FINISHED GRADE	RT	– RIGHT
FH	– FIRE HYDRANT	RW	– RIGHT-OF-WAY
FL,℄	– FLOW LINE	S	– SLOPE
FLG	– FLANGE	SCH	– SCHEDULE
FT	– FOOT	SD	– STORM DRAIN
GB	– GRADE BREAK	SF	– SQUARE FOOT
GV	– GATE VALVE	SS	– SANITARY SEWER
HC	– HANDICAPPED	STA	– STATION
HP	– HIGH POINT	STD	– STANDARD
IE	– INVERT ELEVATION	SW	– SIDEWALK
IN	– INCH	T	– TANGENT
INT	– INTERSECTION	TB	– THRUST BLOCK
IRR	– IRRIGATION	TC	– TOP OF CURB
L	– LENGTH	TOE	– TOE OF SLOPE
LAT	– LATERAL	TOP	– TOP OF SLOPE
LF	– LINEAR FEET	TW	– TOP OF WALL
LP	– LOW POINT	TYP	– TYPICAL
LT	– LEFT	V	– VELOCITY
MAX	– MAXIMUM	W	– WATER
MDD	– MAXIMUM DRY DENSITY	YD	– YARD



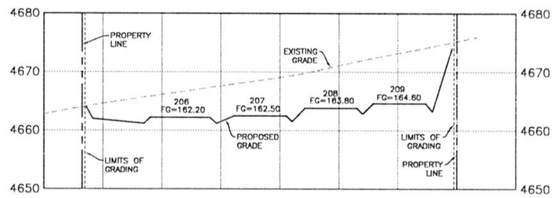
CROSS SECTION A-A

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'



CROSS SECTION B-B

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'



CROSS SECTION C-C

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'

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Autumn Trails Tentative Map

Washoe County, Nevada
0 Hayfield Drive
APN: 534-420-08

Brandt T. Kennedy, P.E.
Jared A. Krupa, P.E.

Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Site Sections

C-5

Additional Requirements

- Proof Of Property Tax Payment
- Street Name Reservation Form
- Survey Computations – Legal Description
- District Health Department Water & Sewer Commitment Letters

Request to Reserve New Street Name(s)

The Applicant is responsible for all sign costs.

Applicant Information

Name: Pinnacle Land Holdings LLC (Attn: Michael Fiore)

Address: 477 E. 9th Street

Reno, NV 89502

Phone : 775-842-8066 Fax: _____

☑ Private Citizen ☐ Agency/Organization

Street Name Requests

(No more than 14 letters or 15 if there is an "i" in the name. Attach extra sheet if necessary.)

Sundowner Court	Ferrier Court
Hiball Court	Hayfield Drive (Continuation)
Smoke Wagon Drive (Continuation)	

If final recordation has not occurred within one (1) year, it is necessary to submit a written request for extension to the coordinator prior to the expiration date of the original

Location

Project Name: The Autumn Trails Subdivision

☐ Reno ☐ Sparks ☑ Washoe County

Parcel Numbers: 534-420-08

☑ Subdivision ☐ Parcelization ☐ Private Street

Please attach maps, petitions and supplementary information.

Approved: _____ Date: _____

Regional Street Naming Coordinator

☐ Except where noted

Denied: _____ Date: _____

Regional Street Naming Coordinator

Washoe County Geographic Information Services

Post Office Box 11130 - 1001 E. Ninth Street

Reno, NV 89520-0027

Phone: (775) 328-2325 - Fax: (775) 328-6133

Legal Description

Sky Ranch North Tentative

All that certain piece or parcel of land located within a portion of the east one half of Section 25 Township 21 North, Range 20 East, M.D.M., Washoe County, Nevada and being more particularly described as follows:

BEGINNING at the east one quarter corner of said Section 25; thence South 00°44'17" West, a distance of 262.06 feet along the east line of said Section 25; thence North 89°15'43" West, a distance of 51.08 feet; thence North 89°18'49" West, a distance of 860.84 feet; thence South 00°41'11" West, a distance of 135.45 feet; thence North 89°18'49" West, a distance of 250.00 feet; thence South 00°41'11" West, a distance of 240.00 feet; thence South 89°18'50" East, a distance of 250.00 feet; thence South 00°41'11" West, a distance of 189.69 feet; thence North 89°18'49" West, a distance of 360.01 feet; thence North 88°59'44" West, a distance of 597.51 feet; thence South 53°30'42" West, a distance of 187.34 feet; thence North 36°29'18" West, a distance of 41.57 feet; thence South 53°30'42" West, a distance of 42.00 feet; thence South 54°13'11" West, a distance of 140.01 feet; thence South 53°27'16" West, a distance of 58.55 feet; thence North 49°35'48" West, a distance of 472.62 feet; thence North 40°24'11" East, a distance of 1431.58 feet; thence North 89°59'49" East, a distance of 1674.97 feet to a point on the east line of said Section 25; thence South 00°56'26" East, a distance of 375.57 feet to the POINT OF BEGINNING. Containing 47.61 Acres, more or less.

Bearings are based on the Nevada State Plane Coordinate System, West Zone, North American Datum of 1983/1994, High Accuracy Reference Network (NAD 83/94-HARN).

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

May 12, 2014

To: James English, P.E., District Health Department

From: Jason Phinney, Licensed Engineer

Subject: Acknowledgement of Sewer Service for Autumn Trails in Spanish Springs – 43 Lots

The above referenced project is located within the boundaries of the Washoe County sewer service area. Therefore, Washoe County will provide sewer service to this project in accordance with all local codes and ordinances. All sewer flows for this project will be conveyed to the Truckee Meadows Water Reclamation Facility (TMWRF). Sewer flows are subject to all applicable agency reviews.

Review of the information submitted does not constitute an application for service, imply the process of planning and construction of the facilities necessary for service have been completed, is not a will serve letter nor does it imply that any water connection fees have been paid. Capacity assurance will be determined after all fees have been paid and accepted.

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

May 12, 2014

To: Chris Anderson, P.E., District Health Department

From: Jason Phinney, Licensed Engineer

Subject: Acknowledgement of Water Service for Autumn Trails in Spanish Springs – 43 Lots

The above referenced project is located within the boundaries of the Washoe County water service area. Therefore, Washoe County will provide water service to this project in accordance with all local codes and ordinances.

Review of the information submitted does not constitute an application for service, imply the process of planning and construction of the facilities necessary for service have been completed, is not a will serve letter nor does it imply that any water connection fees have been paid.

Department of
Water Resources

UPDATED GEOTECHNICAL INVESTIGATION

PROPOSED

SKY RANCH UNIT 2, FINAL PHASES

SPANISH SPRINGS VALLEY

WASHOE COUNTY, NEVADA

Prepared For

Lakemont Homes Nevada, Inc.
5525 South Kietzke Lane, Suite 200
Reno, Nevada 89511

July 15, 2005

Job No. 4214.04-A

Pezonella Associates, Inc.
Consulting Engineers and Geologists
520 EDISON WAY • RENO, NEVADA 89502 • (775) 856-5566

Pezonella Associates, Inc.
Geotechnical & Environmental Engineers & Geologists

520 EDISON WAY • RENO, NEVADA 89502 • (775) 856-5566
FAX • (775) 856-6042
www.pezonella.com

September 4, 2014
Job No. 4214.04A

PHD Construction
477 East 9th Street
Reno, Nevada 89512

Attn: Mr. Michael Fiore, President

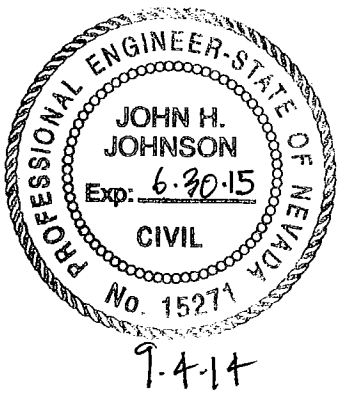
Re: Sky Ranch Unit 2, Final Phases

Dear Mr. Fiore:

Pezonella Associates performed a geotechnical investigation for Sky Ranch Unit 2 in Spanish Springs Valley. The most recent iteration of the report, *Updated Geotechnical Investigation, Proposed Sky Ranch Unit 2, Final Phases, Spanish Springs, Valley, Washoe County, Nevada* (the Report) is dated July 15, 2005. A copy of the Report is attached. We understand you wish to rely upon the Report for contemplated single-family residential development and associated public improvements at the site.

This office has reviewed the Report, performed a site walk, and reviewed aerial photographs of the site taken since 2005. It is our opinion the conclusions and recommendations of the Report remain valid, and the Report can be relied on for proposed improvements. Please be advised that probabilistic ground motion values were obtained from the USGS web site (http://earthquake.usgs.gov/designmaps/us/application.php) for Seismic Design using Site Class C, Risk Category I, II, or III, referencing the 2012 International Building Code. From the web site, the S_S value is 1.397*g* and the S_1 value is 0.469*g* (latitude 39.65704167° north, longitude 119.68334722° west). These values should be used for design in lieu of the values provided in Section B – *Faulting and Seismicity* from the Report.

If you have questions or require additional information, please do not hesitate to contact us.



Respectfully,

PEZONELLA ASSOCIATES, INC.

John H. Johnson, P.E.
Senior Geologist

Pezonella Associates, Inc.
Geotechnical & Environmental Engineers & Geologists

520 EDISON WAY • RENO, NEVADA 89502 • (775) 856-5566
FAX • (775) 856-6042
www.pezonella.com

July 15, 2005
Job No. 4214.04-A

Lakemont Homes Nevada, Inc.
5525 South Kietzke Lane, Suite 200
Reno, Nevada 89511

Attention: Mr. David Burks

Updated Geotechnical Investigation
Proposed Sky Ranch Unit 2, Final Phases
Spanish Springs Valley
Washoe County, Nevada

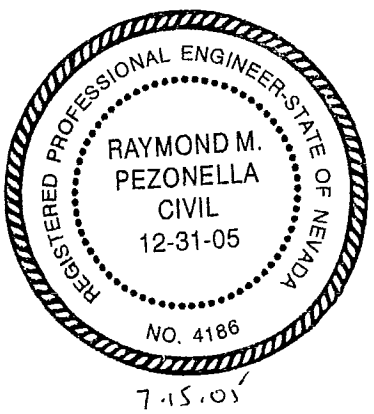
This report presents results of our updated geotechnical investigation, provides recommendations for the design and construction of the referenced project, and reflects the use of the 2003 International Building Code.

As discussed in the attached report, based on the results of our investigation, knowledge of the area and understanding of project development, we conclude that, from a geotechnical engineering standpoint, the site is suitable for the intended use of the project. The primary concerns, however, to be considered in the project design and construction are the presence of potentially **expansive soils** and the **very dense nature** and/or presence of **oversize material (i.e. gravel, cobbles and possibly boulders)** associated with the underlying materials.

We appreciate having been selected to perform this investigation and trust that the results will fulfill project design requirements. If you, or any of your design consultants, have any questions, please contact us.

Respectfully,

PEZONELLA ASSOCIATES, INC.



7.15.05

Raymond M. Pezonella
Civil Engineer - 4186

UPDATED GEOTECHNICAL INVESTIGATION

PROPOSED

SKY RANCH UNIT 2, FINAL PHASES

SPANISH SPRINGS VALLEY

WASHOE COUNTY, NEVADA

Prepared For

Lakemont Homes Nevada, Inc.
5525 South Kietzke Lane, Suite 200
Reno, Nevada 89511

By

Chris D. Betts
Engineering Geologist

Raymond M. Pezonella
Civil Engineer - 4186

Pezonella Associates, Inc.
520 Edison Way
Reno, Nevada 89502
(775) 856-5566

July 15, 2005

Job No. 4214.04-A

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

I INTRODUCTION

This report presents results of the updated geotechnical investigation our firm prepared for the design and construction of the proposed Sky Ranch Unit 2, Final Phases to be located in Washoe County, Nevada. The project site is situated at the eastern terminus of Sunset Lane, north of its intersection with Marilyn Mae Drive in the Spanish Springs Valley area. We have not received architectural plans; however, we understand project development will include the construction of isolated building pads for single-family residences to be serviced by community water, sewer and storm drain systems. We anticipate that the structures will be 1 to 2 stories, wood framed with joist supported floors, and will be supported with shallow conventional spread foundations. Dedicated asphaltic concrete surfaced roadways will complete project development.

We have not received structural information; however, we anticipate that foundation loads will be normal (relatively light) for the type of construction proposed, that foundations will bottom at least 24 inches below lowest adjacent exterior ground surface, and that structural design will be in accordance with the 2003 International Building Code.

We have not received civil Improvement plans; however, we understand through conversations with Wood Rodgers that earthwork necessary to attain finished pad elevations and for proper site drainage will consist of cuts and fills up to 6 feet. Depth of utility trench excavation is unknown. We anticipate that any slopes will be constructed at maximum inclinations of two horizontal to one vertical (2:1) or flatter, that earth retaining structures are not anticipated, and that any underground utilities existing within proposed structural areas will be relocated.

As stated in our proposal dated July 15, 2004, the scope of our work was to determine the general subsurface soil conditions across the site and to provide opinions and recommendations concerning:

1. Potential geological hazards;
2. Site preparation and grading;
3. Soil engineering design criteria for foundations with estimates of settlements;
4. Support of slabs-on-grade;
5. Design and support of flexible pavement sections.

This report is geotechnical in nature and not intended to identify other site constraints such as environmental hazards, wetlands determinations or the potential presence of buried utilities. Our office can be of assistance if further information is requested.

Recommendations included in this report are specific to development within the limits of the property and, as such, are not intended for off-site development.

The scope of our work is to update our original geotechnical investigation report dated August 31, 2004, to reflect the use of the 2003 International Building Code.

II FIELD EXPLORATION AND LABORATORY TESTS

To attain a general overview of the subsurface soil conditions across the site, we drilled 10 test borings with a truck mounted Central Mine Equipment (CME 55) drill-rig using hollow stem auger equipment to depths of 4-1/2 to 20 feet below the existing ground surface. The test boring locations, positioned in the field using pace and compass and based on a lot layout plan provided by Wood Rodgers, are depicted (approximate locations) on Plate 1. No greater accuracy is implied.

Our staff geologist recorded the location of each test boring using the global positioning system (GPS), logged and visually classified the materials encountered. Relatively undisturbed samples were collected from the test boring in a split spoon sampler utilizing a 140-pound hammer with a 30-inch drop. Sampler refusal and difficulty obtaining relatively undisturbed samples were frequently encountered due to the very dense nature and presence of oversize material (i.e. gravel cobbles and possibly boulders) associated with the underlying materials. The blows per foot required to advance the sampler were converted and recorded (Standard Penetration Test). Logs of the test borings are presented on Plates 2 through 8. The materials encountered are classified in accordance with the Unified Soil Classification System, which is explained on Plate 9.

The samples were returned to our laboratory and reviewed by our staff engineer to confirm their field classifications, to select representative samples for laboratory testing and to determine engineering design parameters. Results of particle size analysis, Atterberg Limits, Resistance R-Value determinations and compaction test data are presented on the logs and on Plates 10 through 15. Additional tests, Resistivity, pH and SO_4, were performed by an independent laboratory on selected samples to evaluate the corrosion potential and are presented on the logs.

Any subsequent relocation of proposed structures outside the limits of our investigation or any conceptual changes to project development, such as the use of alternative foundations or grade changes, may require additional drilling, laboratory testing and engineering analysis.

III SITE AND SOIL CONDITIONS

The project site is undeveloped and bound by single-family residences to the west, developing single family residences to the south, undeveloped land to the north and east. Due to the hillside terrain of the area, the surface of the site is uneven with a gentle to slightly moderate grade downwards from the east to the west and is covered by medium dense sagebrush and weeds, and numerous gravel, cobbles and boulders. Several unimproved (dirt) roads cross the site and 2 water storage tanks exist near the south-central portion.

Based on soil mapping by the U. S. Department of Agriculture, Soil Conservation Service (*Soil Survey of Washoe County, Nevada, South Part*, Sheet No. 17, dated 1980), the materials underlying the site consist of the following:

> Reno very stony fine sandy loam, 8 to 15 percent slopes (#681). This moderately deep, well drained unit is on pediments and river terraces and is formed in alluvium derived from rock sources. Typically, 5 to 15 percent of the surface is covered with stones. The surface layer is a grayish brown, very stony, fine sandy loam about 2 inches thick. The subsoil is a pale brown and light yellowish brown clay about 22 inches thick. The substratum is a strongly silica-cemented hardpan about 23 inches thick over weakly consolidated sediments. Depth to hardpan ranges from 20 to 40 inches. Permeability of the unit is described as very slow, available water capacity is very low, effective rooting depth is 20 to 40 inches, runoff is slow to medium, and the hazard of water erosion and soil blowing is slight. The main limitations associated with the use of this unit for urban development, as defined by the soil survey, are the high clay content, presence of hardpan and the low load-bearing strength.
>
> Reno stony sandy loam (#683), 2 to 8 percent slopes. This moderately deep, well drained unit is on pediments and river terraces and is formed in alluvium derived from rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is a grayish brown, stony, sandy loam about 4 inches thick. The subsoil is a pale brown and light yellowish brown clay about 20 inches thick. The substratum is a strongly silica-cemented hardpan about 23 inches thick over weakly consolidated sediments. Depth to hardpan ranges from 20 to 40 inches. Permeability is very slow, available water capacity is very low, effective rooting depth is 20 to 40 inches, runoff is slow, and the hazard of water erosion and soil blowing is slight. The main limitations associated with the use of this unit for urban development, as defined by the soil survey, are the high clay content, presence of hardpan and the low load-bearing strength.

Spasprey sandy loam, 4 to 8 percent slopes (# 1193): This moderately deep, well drained soil on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is a grayish brown sandy loam about 2 inches thick. The subsoil is a brown clay loam about 10 inches thick. The upper 17 inches of the substratum is a light brownish gray sandy loam, the next 17 inches is a pale brown strongly cemented hardpan, and the lower part to a depth of 60 inches is a pale brown sandy loam with varying degrees of cementation. Depth to hardpan ranges from 20 to 30 inches. Permeability is moderately slow; available water capacity is very low; effective rooting depth is 20 to 30 inches; runoff is slow, the hazard of water erosion is slight, and the hazard of soil blowing is moderate. The main limitations associated with this unit for urban development, as described by the soil survey, are the presence of hardpan and the susceptibility of the soil to frost heave.

Spasprey stony sandy loam, 4 to 8 percent slopes (# 1194): This moderately deep, well drained soil on lake terraces and alluvial fans and formed in alluvium derived from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is a grayish brown, stony, sandy loam about 3 inches thick. The subsoil is a brown clay loam about 11 inches thick. The upper 9 inches of the substratum is a light brownish gray, sandy loam, the next 17 inches is a pale brown, strongly cemented hardpan, and the lower part to a depth of 60 inches is a pale brown, sandy loam with varying degrees of cementation. Depth to hardpan ranges from 20 to 30 inches. Permeability is described as moderately slow; available water capacity is very low; effective rooting depth is 20 to 30 inches; runoff is slow and the hazard of water erosion and soil blowing is slight. The main limitations associated with this unit for urban development, as described by the soil survey, are the presence of hardpan and the susceptibility of the soil to frost heave.

Based on geologic mapping completed by Harold F. Bonham (Nevada Bureau of Mines and Geology, Geology and Mineral Deposits of Washoe and Storey Counties, Nevada, Bulletin 70, dated 1969), the materials underlying the site consist of Quaternary age Stream deposits, talus, slope wash, alluvial fan and eolian deposits (Qal).

Review of a geotechnical investigation report dated October 21, 2003, which our firm prepared for the design and construction of Sky Ranch North, Unit 2 (Job No. 2942.18-A), the underlying materials in the site vicinity consist of alternating layers of medium dense to very dense silty and clayey sand with varying amounts of gravel to the depths explored (14-1/2 to 15-1/2 feet). A minor amount of very dense clayey gravel with sand and cemented zones were additionally encountered. At the time of our subsurface exploration (June, 2003), no free water was encountered in any of our test borings.

Our investigation confirms, in general, the soil and geologic mapping and referenced geotechnical investigation, with the underlying native soils consisting of loose (near surface) to very dense clayey sand with gravel and cobbles (and possibly boulders), loose (near surface to dense silty sand with varying amounts of gravel and cobbles, and very dense clayey gravel with sand and cobbles (and possibly boulders) to the depths explored.

At the time of our subsurface exploration (August, 2004), no free water was encountered in any of our test borings to the depths explored.

Our investigation reveals that the native soils exist in a relatively dense compaction state, exhibit low to moderate potential for expansion and subsequent moderate supporting capability. Portions of the native soils (predominantly the dark brown clayey sands), however, exhibit a moderate to high potential for expansion. Laboratory test results conducted through an independent laboratory indicate that the native soils do not exhibit a corrosion potential to Type II Portland cement; however, portions do exhibit a corrosion potential to uncoated steel or metal.

IV GEOLOGIC AND SEISMIC CONSIDERATIONS

To delineate possible faulting and evaluate any other geological hazards on the site, our investigation included a review of available geological literature and maps.

A. Geology

The site is located along the eastern foothills of the Spanish Springs Valley, a complex basin bordered to the east by the Pah Rah Range which is composed of granite and gabbro intrusions, ash flow tuffs, and andesitic and basaltic flows and to the west by primarily granitic rock. The entire valley and accompanying ridges drain to the south. The southern 1/3 of the valley is poorly-drained and numerous small ponds have formed, in part, from the termination of the Orr Ditch.

B. Faulting and Seismicity

Based on the referenced geologic map no fault traces exist across the project site; however, faults capable of generating large-magnitudfe earthquakes have been identified in the area. Based on mapping by Craig M. dePolo, John G. Anderson, Diane M. dePolo, and Jonathan G. Price (*Earthquake Occurrence in the Reno-Carson City Urban Corridor*, Seismological Research Letters, Volume 68, dated May/June 1997), the nearest principal Quaternary fault to the project site is the Spanish Springs Peak Fault Zone. The Nevada Seismological Laboratory indicates an earthquake of magnitude 6.6 is possible along this fault zone (*Reno/Carson Fault Information*, updated January 31, 2003).

From the 2002 USGS Earthquake Hazards Program, the interpolated probabilistic ground motion values at the site for an earthquake of this magnitude include a Peak Ground Acceleration (PGA) of 0.29g with a 10% probability of exceedance (PE) in 50 years, and a PGA of 0.54g with a 2% PE in 50 years. From the USGS Maximum Considered Earthquake Ground Motion web site, the S_S is 1.3270g and the S_1 is 0.4851g.

Although a complete assessment of the Soil Profile Type in accordance with Table 1615.1.1 (Site Classifications Definitions) of the 2003 International Building Code would require drilling to a depth of 100 feet, we believe that the subsurface soils most closely approximate a Site Class of C as defined in the referenced table.

C. Liquefaction

Liquefaction, a loss of soil shear strength, is a phenomenon associated with loose, saturated deposits subjected to earthquake shaking, and can result in unacceptable movements of foundations and other structural elements supported by these soils. Although not included on the referenced geologic map, a review of earthquake hazards mapping completed within areas of similar geologic settings (valleys) indicates that this site may exist in an area underlain by potentially unstable, unconsolidated materials which may be potentially susceptible to pronounced slumping and ground disturbance along steep cuts or embankments. These soils may manifest amplified ground motion during a major seismic event and may be potentially susceptible to moderate to great shaking and, as a result, possibly experience liquefaction when associated with shallow ground water. Although a detailed analysis of liquefaction potential, which would require additional drilling to depths of at least 40 feet, plus detailed laboratory testing and engineering analysis, was not part of the

scope of our work, we believe that mitigation measures regarding liquefaction would be cost prohibitive considering the size of construction proposed. Generally, these types of mitigation measures are reserved for public safety facilities such as fire, police and hospitals or other buildings with high occupancy. We recommend that the decision to further evaluate the potential for liquefaction and/or to implement any mitigation measures be weighed by the Owner or Developer. If future information is requested, our office can be of assistance. From a preliminary standpoint, however, based on the results of our investigation, which reveal that the underlying materials exist in a relatively dense compaction state, exhibit cohesive characteristics and are absent of ground water, we believe that the susceptibility of the site to liquefaction can be considered very low.

D. Slope Stability

Due to the relatively dense compaction state and cohesive nature of the underlying materials, absence of ground water and our anticipation that any proposed fill slopes will be constructed with compacted materials at maximum inclinations of two horizontal to one vertical (2:1) or flatter, and protected with rip rap or vegetation, we estimate that susceptibility for landslide or rockfalls activity may be considered low.

E. Flooding

The property has been delineated by the Federal Emergency Management Agency (FEMA-Map Numbers 32031C2840 and 2845 E, effective date September 30, 1994) as being within Flood Hazard Zone X (unshaded), which are areas determined to be outside the 500-year floodplain.

F. Radon

Radon, a colorless, odorless, radioactive gas derived from the natural decay of uranium, is found in nearly all rocks and soils. The Environmental Protection Agency suggests that remedial action be taken to reduce radon in any structure with average indoor radon of 4.0 pCi/L or more. Based on studies completed by the Nevada Bureau of Mines and Geology in cooperation with the Nevada Division of Health and the U.S. Environmental Protection Agency (Radon In Nevada, Nevada Bureau of Mines and Geology, Bulletin 108, 1994), the project site, as well as much of northern Nevada, is in an area with an average indoor measurement equal to or greater than 4.0 pCi/L.

V CONCLUSIONS

Based on the results of our investigation, knowledge of the area and understanding of project development, we conclude that, from a geotechnical engineering standpoint, the site is suitable for the intended use of the project. The primary concerns, however, to be considered in the project design and construction are the presence of potentially **expansive soils** and the **very dense nature** and/or presence of **oversize material (i.e. gravel, cobbles and possibly boulders)** associated with the underlying materials.

Our investigation reveals that portions of the native soils (particularly the dark brown clayey sands) exhibit a potential for expansion. Expansive materials are subject to substantial volume changes (shrink and swell) with changes in moisture content. Changes in moisture content can occur as a result of seasonal variations in precipitation, landscape irrigation, broken or leaking water pipes and sewer lines, and/or poor site drainage. These volume changes can cause differential movements (settlement or heave) of foundations, interior slabs-on-grade, exterior flatwork (i.e. walkways, stoops and patios) and pavement sections.

One method to reduce the potential for movement is to remove (overexcavate) the expansive materials to a sufficient depth and replace them with select fill, thereby reducing the thickness of the expansive layer, providing surcharge, and maintaining moisture at a suitable and near constant level. In conjunction with overexcavation and filling, moisture conditioning of the exposed materials to a slightly over optimum moisture content will be needed.

Studies and experience have shown that minor movements can be expected, even if the recommended alternatives are followed, whenever underlying expansive materials are present. Therefore, the intent of our recommendations is to control this movement without exceeding economic feasibility; however, the Owner or Developer should weigh the benefits of deeper removal.

In addition to their expansive characteristics, clayey soils also exhibit a lower Resistance Value than granular material. To reduce the thickness of aggregate base and to minimize future maintenance within exterior flatwork and pavement areas, portions of these soils should be removed and replaced with compacted select fill subbase.

As revealed during our subsurface exploration, the underlying materials exist in a very dense compaction state and contain oversize material such as gravel, cobbles and possibly boulders. Consideration should be given to the difficulty of earthwork associated with these materials and the fact that excavation depths can be limited. Based on the results of our field exploration, we believe that excavations limited to the upper 15 feet can be excavated, overall, with a Caterpillar 225 Excavator and/or D8 Dozer or equivalent earthmoving equipment. Resistant areas will be encountered; however, we do not believe that blasting will be necessary.

Where encountered, removal of cobbles or boulders can result in undercutting of excavation sidewalls. The resulting trench width could be increased substantially and overbreak can occur. Additionally, as the presence of oversize material will affect fine grading, a leveling course could be needed to maintain structural sections. Boulders which protrude into foundations will require drilling, and epoxy for reinforcing steel and footings may need to be formed and/or stepped.

Consideration should be given to the subsequent reduction of the quantity of material available for use as fill as oversize material, which will require screening, will be generated during grading operations. Screening of oversize material will reduce the volume of material available for reuse unless sufficiently large equipment designed for compacting rock fill is utilized. Compaction approval will be based on visual performance specifications established by the Geotechnical Engineer and based on a performance specification with sufficient on-site observation. Technician time will be increased using a performance procedure which will increase the cost of inspection services. Screened rock could require off-hauling, thus requiring import material to balance earthwork quantities or to attain proposed grades. Screened oversize material may be stockpiled for use within landscape areas or possibly as rip rap. Landscaping which incorporates oversize material should be considered.

The soil survey suggests that slow permeability, low load-bearing strength and susceptibility to frost heave can be additional constraints associated with the use of the underlying soils for urban development. Based on our understanding that project development will utilize community water, sewer and storm drain systems, we do not believe that slow permeability rates will impact site development; however, consideration should be given to performing percolation testing where detention/retention basins are proposed. Based on our anticipation that foundations will bottom at least 24 inches below lowest exterior ground surface and on approved compacted granular soils, and that approved subbase, aggregate base and proper drainage will be provided in exterior flatwork and pavement areas, we do not believe that low load-bearing strength and frost susceptibility will adversely impact the site.

As previously mentioned, studies regarding the presence of radon gas suggest the project site, as well as much of northern Nevada, is in an area which could exceed the action levels established by the Environmental Protection Agency. Determinations regarding the potential presence of radon gas should be considered prior to site development.

As previously discussed, we recommend that the decision to further evaluate the potential for liquefaction and/or to implement any mitigation measures be weighed by the Owner or Developer. If future information is requested, our office can be of assistance. From a preliminary standpoint, however, based on the results of our investigation, which reveals that the underlying materials exist in a relatively dense compaction state, exhibit cohesive characteristics and are absent of ground water, we believe that the susceptibility of the site to liquefaction can be considered very low.

There are no apparent geologic hazards that would place unusual constraints on the project; however, strong ground shaking associated with the Spanish Springs Peak Fault Zones should be expected to occur during the life of the project.

VI RECOMMENDATIONS

A. Site Preparation and Grading

Initially, areas to be developed should be cleared of any debris, rubbish or vegetation. These materials should be removed from the site. Although not anticipated based on the results of our investigation, as directed by the Geotechnical Engineer (or his representative in the field), any significant root layers or organic soils should be stripped. Stripped soils should be stockpiled for use within landscape or designated "non-structural" areas. These materials should be evenly blended with soil, moisture conditioned, placed in 8-inch loose lifts and compacted to provide a surface which is firm. Delineation of any designated "non-structural" areas where vegetation or organics are placed should be illustrated on the approved plans in order to facilitate future development (i.e. additions, patios, etc.) if proposed.

Based on the use of conventional spread footings for structural support, to minimize the potential for movement within foundation areas, materials with a high potential for expansion remaining within 24 inches of foundation grade should also be removed and replaced with approved, compacted, structural fill material. Where materials with a moderate potential for expansion exist, the recommended separation may be reduced to 12 inches. Similarly, to minimize movement within slabs-on-grade, exterior flatwork and pavement areas, highly expansive materials should be removed a sufficient depth to provide for at least 18 inches of approved, compacted fill below planned subgrade. Where materials with a moderate potential for expansion exist, the recommended separation may be reduced to 12 inches. The extent of lateral removal (beyond interior and exterior foundation edges and slab and pavement edges) should be equivalent to that vertically removed.

Similarly, to reduce the thickness of aggregate base, materials with a Resistance R-Value of less than 30 (Modulus of Subgrade Reaction (k) of 125 pounds per square inch per inch) remaining within 6 inches of interior slabs-on-grade, exterior flatwork and flexible pavement subgrades should also be removed and replaced with approved compacted fill material.

As previously mentioned, studies and experience have shown that minor movements can be expected whenever underlying expansive and/or low R-Value materials are allowed to remain. The intent of our recommendations is to control this movement to tolerable limits without exceeding economic feasibility; however, the benefits of deeper removal should be weighed by the Owner or Developer.

The surfaces exposed by clearing, stripping, removal or overexcavation should be observed by the Geotechnical Engineer (or his representative in the field) to document that the conditions are as anticipated and that no objectionable materials exist.

Approved surfaces should be scarified to a depth of 6 inches, moisture conditioned to near optimum and compacted to 90 percent relative compaction.[1] Scarification and moisture conditioning may be waived by the Geotechnical Engineer (or his representative in the field), if it is determined that the exposed materials exist at a suitable moisture condition for attaining the specified compaction percentage, contain oversize material which will inhibit attaining the compaction or exist in a suitable compaction state.

The Earthwork Contractor is responsible for obtaining approval for each prepared surface prior to proceeding with placement of structural components and/or fill.

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[1] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the laboratory procedure ASTM Test Designation: D 1557.

B. Material Quality and Reuse

Where referred to within the text of this report, moderately expansive materials are defined as having a Liquid Limit between 40 and 50, Plasticity Index between 15 and 25, an Expansion Index between 50 and 91 and in excess of 12 percent passing the No. 200 sieve. Materials with Liquid Limits of 50 or greater, Plasticity Index of 25 or greater, an Expansion Index greater than 90 and in excess of 12 percent passing the No. 200 sieve are considered to exhibit high potential for expansion. Materials with Liquid Limits of 40 or less and a Plasticity Index of 15 or less exhibit low to negligible potential for expansion.

Structural zones are defined as the area 36 inches below and laterally away from foundations and 24 inches below and laterally away from slabs-on-grade, exterior flatwork and flexible pavement sections. Mass zones are defined as all areas outside the structural zones. In general, only select material may be utilized within structural zones; however, materials which do not meet the requirements for select fill may be used in mass zones with the prior approval of the Geotechnical Engineer (or his representative in the field).

Select fill materials (with the exception of structural fill material to be placed within public improvement areas) should be free of organic matter and conform, in general, to the following requirements:

Sieve Size	Percent Passing (by dry weight)
6 Inch	100
3/4 Inch	70 - 100
No. 4	50 - 100
No. 200	15 - 35

Liquid Limit = 40 Maximum
Plasticity Index = 15 Maximum
Resistance Value = 30 Minimum

Our investigation indicates that the portions of the native soils will not be suitable for reuse as select fill or meet the requirements for use as structural fill within dedicated public improvement areas. Generally, materials which do not meet these requirements may be reused as mass fill outside the defined structural zones with approval of the Geotechnical Engineer (or his representative in the field). Materials which meet the specifications for select or structural fill will typically exhibit a Resistance Value of at least 30. As previously mentioned, portions of the native soils exhibit a corrosion potential for uncoated steel or metal.

The Earthwork Contractor shall ensure that all proposed fill materials are approved by the Geotechnical Engineer (or his representative in the field). Fill sources should be identified at least 10 working days prior to use to allow for sampling and testing. Select or structural fill material should be conditioned to a near optimum moisture content and compacted to at least 95 percent relative compaction. Mass fill should be conditioned to a near optimum moisture content (over optimum is clayey) and compacted to at least 90 percent relative compaction.

The thickness of all lifts will be restricted to a maximum of 8 inches (loose), and individually tested, unless the Earthwork Contractor can demonstrate his ability to uniformly achieve the required compaction for the entire layer of material placed. If any surface or layer becomes frozen, earthwork construction cannot proceed until it is allowed to thaw. The Earthwork Contractor shall obtain approval from the Geotechnical Engineer (or his representative in the field) of each lift prior to placement of subsequent fill.

The recommendations for select fill are intended as a guideline and define a readily attainable, acceptable material. Adjustments to the specified limits to address the use of other potentially acceptable materials, such as those containing oversize rock or which deviate from the classification requirements, can be made provided: 1) the Earthwork Contractor can demonstrate his ability to place and compact the material in substantial conformance with industry standards to achieve an equivalent finished product as that specified; 2) all parties understand that the Standard ASTM Compaction Test procedures are invalid for certain material containing oversize aggregate. Compaction approval could only be achieved based on other criteria, such as a performance specification with sufficient on-site observation. Technician time could be increased substantially using the performance procedure which would, in turn, increase the cost of inspection services; and 3) only with the strict approval and observation by the Geotechnical Engineer.

C. Site Drainage and Landscape

The ground surface should be permanently sloped (at least 1 percent for pavement and 2 percent for soil) to drain away from any structure, so that water is not allowed to pond against perimeter walls, and to restrict infiltration within exterior flatwork and flexible pavement areas. Gutters should be considered to contain storm water and direct it away from any structure. Landscaping adjacent to structures should be limited and irrigation should be drip-type.

To mitigate the potential for water to collect within the structural section and to prevent the potential buildup of hydrostatic pressure, a provision (i.e. gravity outlet, French drain or sump pump) with positive drainage can convey any collected water to a disposal area outside the building. The ground surface in crawl spaces should be sloped toward a suitable point, which will aid in conveying any collected water to a disposal area outside the building.

Backfill around foundation stemwalls should consist of fine (clayey) grain soil, moisture conditioned to near optimum, and compacted to 90 percent relative compaction. Where clean (free draining) backfill is utilized around stemwalls, to control water migration, an impermeable membrane such as Mirafi coated fabric (MCF-1212 or equal) or 10-mil plastic layer should be considered between stemwalls and material used as backfill, and extend a sufficient distance to effectively cover all placed backfill. The layering should additionally be placed throughout the crawlspace with at least 12 inches of overlap and adhered to the foundations (see Plate 16).

D. Foundation Support and Lateral Resistance

Foundations can gain adequate support on the previously specified minimum section of firm native materials with low to negligible potential for expansion and/or approved, compacted select fill material (see Subsections A and B). In preparation for foundation construction, the Earthwork Contractor shall ensure that field density tests have been performed to document the relative compaction of the upper 6 inches of exposed materials and all new fill. Preparation of these materials shall be documented prior to placement of structural components.

For adequate confinement and frost protection, footings should bottom at least 24 inches below lowest adjacent exterior grade. Foundations, supported in accordance with our recommendations, can be designed to impose dead plus long-term live load bearing pressures of 2000 pounds per square foot (psf). The bearing pressure can be increased by 1/3 when considering total design loads, including wind or seismic forces. Resistance to lateral loads can be obtained from passive earth pressures and soil friction. We recommend the use of a coefficient of friction of 0.25 and a passive pressure of 250 pounds per cubic foot per foot of depth (equivalent fluid).

Although a complete assessment of the Soil Profile Type in accordance with Table 1615.1.1 (Site Classifications Definitions) of the 2003 International Building Code would require drilling to a depth of 100 feet, we believe that the subsurface soils most closely approximate a Site Class of C as defined in the referenced table.

For foundations designed and supported as subsequently recommended, we judge that the maximum post construction settlement due to foundation loads will be approximately 1/2-inch, and differential settlement will be approximately 1/4-inch.

Adequate corrosion potential can be mitigated by using Type II Portland cement concrete, by maintaining a minimum (3-inch) concrete cover over reinforcing steel or metal, and by maintaining good workmanship during concrete placement and finishing.

E. Slab-on-Grade Support

Interior slabs-on-grade and exterior flatwork, such as walkways and patios, can gain adequate support on the previously specified minimum section of firm native materials with low to negligible potential for expansion and/or approved, compacted select fill (see Subsections A and B). In preparation for slab or flatwork construction, the Earthwork Contractor shall ensure that field density tests have been performed to document the relative compaction of the upper 6 inches of exposed native soils and any new fill. Preparation of these materials shall be documented prior to placement of aggregate or structural components.

For slab-on-grade design, materials meeting the requirement for select fill exhibiting a Resistance Value of at least 30 (Modulus of Subgrade Reaction (k) of 125 pounds per square inch per inch) can be used.

We understand that fill materials, which do not conform strictly to the gradation requirements contained in Section 304.03 of the *Standard Specifications for Public Works Construction* dated 1996 (see Subsection B), and proposed to be placed within public improvement areas, will require review and approval by the governing agency prior to use.

All dedicated exterior flatwork should conform to standards provided by the governing agency including section composition, supporting material and reinforcing steel.

Interior slabs-on-grade and private exterior flatwork, such as walkways, should be underlain by at least 4 inches of free draining, crushed rock or gravel (compacted with a vibratory plate) or Type 2, Class B aggregate base material compacted to at least 95 percent relative compaction.

Exterior flatwork should consist of at least 4 inches of Type II Portland cement concrete with a minimum 28-day compressive strength of 4000 pounds per square inch (psi) with entrained air. Portland cement concrete with a lesser compressive strength may be used within private areas; however, the Owner or Developer should weigh the benefits associated with more durable concrete.

Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of the concrete and result in cracking and spalling of the slabs. We recommend that all placement and curing be performed in accordance with procedures outlined by the Portland Cement Association and American Concrete Institute. Special consideration should be given to concrete placed and cured during hot or cold weather conditions. Proper control joints and reinforcing mesh should be provided to minimize any damage resulting from shrinkage.

Due to the potential for lateral vapor migration to occur associated with seasonal moisture change and differences between the building interior and exterior ambient conditions, a vapor inhibitor should be considered where moisture sensitive floor coverings are proposed. Generally, a Mirafi coated fabric (MCF-1212 or equal) or 10-mil plastic layer placed throughout the crawlspace with at least 12 inches of overlap and adhered to the foundations is sufficient to reduce vapor transmission (see Plate 16).

F. Trench Excavation and Backfilling

We believe that excavations limited to the upper 15 feet can be excavated, overall, with a Caterpillar 225 Excavator and/or D8 Dozer or equivalent earthmoving equipment. As previously mentioned, the removal of cobbles or boulders can result in undercutting of excavation sidewalls. The resulting trench width could be increased substantially and overbreak can occur. Resistant areas will be encountered; however, we do not believe that blasting will be necessary.

For safety, the sides of the trench should be sloped or shoring should be used. The Earthwork Contractor must comply with the *Safety and Health Regulations for Construction* as directed by the Occupational Safety and Health Act (OSHA Standards, Volume 11, Part 1926, Subpart P) while excavating and backfilling. The Earthwork Contractor is also responsible for providing a competent person, as defined by the OSHA standards, to ensure excavation safety.

We recommend the use of clayey (less permeable) soils, within areas where they are naturally occurring, instead of the typical clean backfill material, to minimize the potential for subsurface water migration through the utility trenches. Backfill materials should be moisture conditioned to near optimum and compacted to at least 90 percent relative compaction. Lift thickness shall be restricted to 8 inches (loose) maximum, unless the Contractor can demonstrate his ability to achieve the required compaction uniformly throughout the entire layer placed.

At the direction of the Manufacturer, special coverings should be provided where uncoated steel or metal is proposed.

G. Permanent Cut and Fill Slopes

All permanent cut and fill slopes shall be constructed with maximum inclinations of two horizontal to one vertical (2:1). Where fill is to be placed on natural slopes of 5:1 or steeper, keying and benching shall be provided along the fill/native soil interface. A keyway, located at the base of the slope, shall be at least 1 foot in depth (or into competent material) and 8 feet in width. Additionally, a perforated pipe should be installed within the keyway area to allow for drainage of any migrating (seepage) water. The pipe should extend the length of the keyway and daylight at a suitable low point to allow for disposal. The pipe should be completely encapsulated with crushed, 3/4-inch gravel and a filter fabric (i.e. Mirafi 140 N or equal) material should be placed above the gravel layer prior to placing fill material (see Plate 17).

In general, a rock lined drainage swale with positive drainage, sufficient to divert runoff and suspended material down and away from the slope should be considered at the top of any slope in excess of 10 feet. Protective fencing should be considered at the top of any slope exceeding 10 feet to contain any oversize aggregate which may become dislodged and/or to discourage activity along the slopes.

The Contractor shall overfill and trim the face of all fill slopes or compact them to provide a firm surface, free of loose soil that would be subject to erosion and sloughing. To further minimize erosion potential and future maintenance, upon completion of grading, all two to one (2:1) slopes should be protected, in general, with a 12- to 18-inch layer of rip rap stabilization. Rip rap material should consist of 8- to 12-inch angular rock fragments from a competent (sound) source, exhibit a minimum specific gravity of at least 2.5 and an absorption of less than 4 percent. Where three to one (3:1) or flatter slopes are proposed, the face of the slope should be planted with dense-rooted, rapid growing vegetation.

All slopes should be evaluated by the Geotechnical Engineer to document that the conditions are as anticipated and that slope height and bench width are appropriate.

H. Pavement Sections

Pavement sections can gain adequate support on the previously specified minimum section of firm native materials with low to negligible potential for expansion and/or approved, compacted select fill (see Subsections A and B). In addition to meeting the fill requirements, the upper 6 inches of subgrade should exhibit a minimum Resistance Value of at least 30, which our investigation indicates the native materials and materials meeting the requirements of select fill will meet.

We understand that fill materials, which do not conform strictly to the gradation requirements contained in Section 304.03 of the *Standard Specifications for Public Works Construction* (latest edition), and proposed to be placed within public improvement areas, will require review and approval by the governing agency prior to use.

All dedicated sections should conform to standards provided by the governing agency, including section composition, supporting material thickness and any requirements for reinforcing steel.

Based on our understanding of project development and Washoe County requirements, we believe that the minimum acceptable flexible pavement section adopted by Washoe County for "local" roadways consisting of 3 inches of Type 2 bituminous course over 6 inches of Type 2 Class B aggregate base underlain by the previously specified minimum section of approved subgrade or subbase will be adequate for a 20-year design life.

Additionally, we believe that that the minimum acceptable flexible pavement section adopted by Washoe County for "collector" roadways consisting of 4 inches of Type 2 bituminous course over 6 inches of Type 2 Class B aggregate base underlain by the previously specified minimum section of approved subgrade or subbase will be similarly adequate. We anticipate that certain streets will experience increasing traffic volume due to construction traffic associated with property development. Based on this anticipation, where construction traffic is routed, the aggregate base layer should be increased to 8 inches.

Where rigid pavement is utilized, we recommend a pavement section consisting of 6 inches of Portland cement concrete over 6 inches of compacted aggregate base underlain by the previously specified minimum subgrade/subbase. Reinforcing steel should be incorporated to reduce shrinkage cracks and where loads are transferred across separated sections.

When weights and repetitions become available, we should review the pavement sections to document that they are appropriate for the intended use.

In preparation for placement of the pavement section, the Earthwork Contractor shall ensure that proposed subgrade materials have been observed and/or tested by the Geotechnical Engineer (or his representative in the field) to document conformance with the Resistance Value requirements. Generally, at least the upper 6 inches of subgrade should be scarified, moisture conditioned and compacted to at least 95 percent relative compaction. Subsequently, aggregate base materials should be placed in thin lifts and compacted to at least 95 percent relative compaction. All subgrades and final grades should be rolled to provide a uniform surface which is smooth, firm, and non-yielding.

Aggregates should conform to the requirements contained in Section 200 of the *Standard Specifications for Public Works Construction* (latest edition).

A bituminous concrete mix design should be submitted for approval prior to paving. During paving, the bituminous mixture should be sampled and tested by the Geotechnical Engineer to ensure material quality and compaction. Periodic crack sealing and surface sealing must be implemented to increase service life of the pavement.

I. Additional Geotechnical Engineering Services

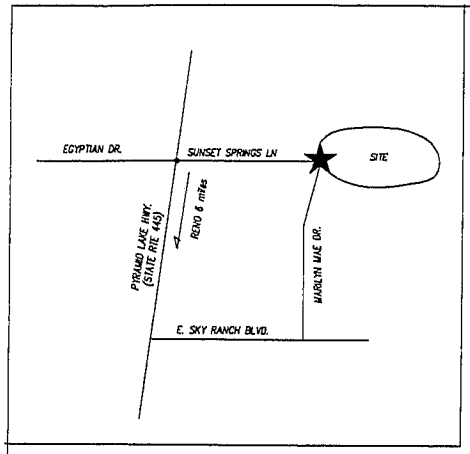
This report is geotechnical in nature and not intended to identify other site constraints such as environmental hazards, wetlands determinations and/or the potential presence of buried utilities. We can assist in evaluating these considerations should further information be requested.

All plans and specifications under the jurisdiction of the Washoe County Building Department should be reviewed for conformance with this geotechnical report and approved by the Geotechnical Engineer prior to submitting to the Building Department for review.

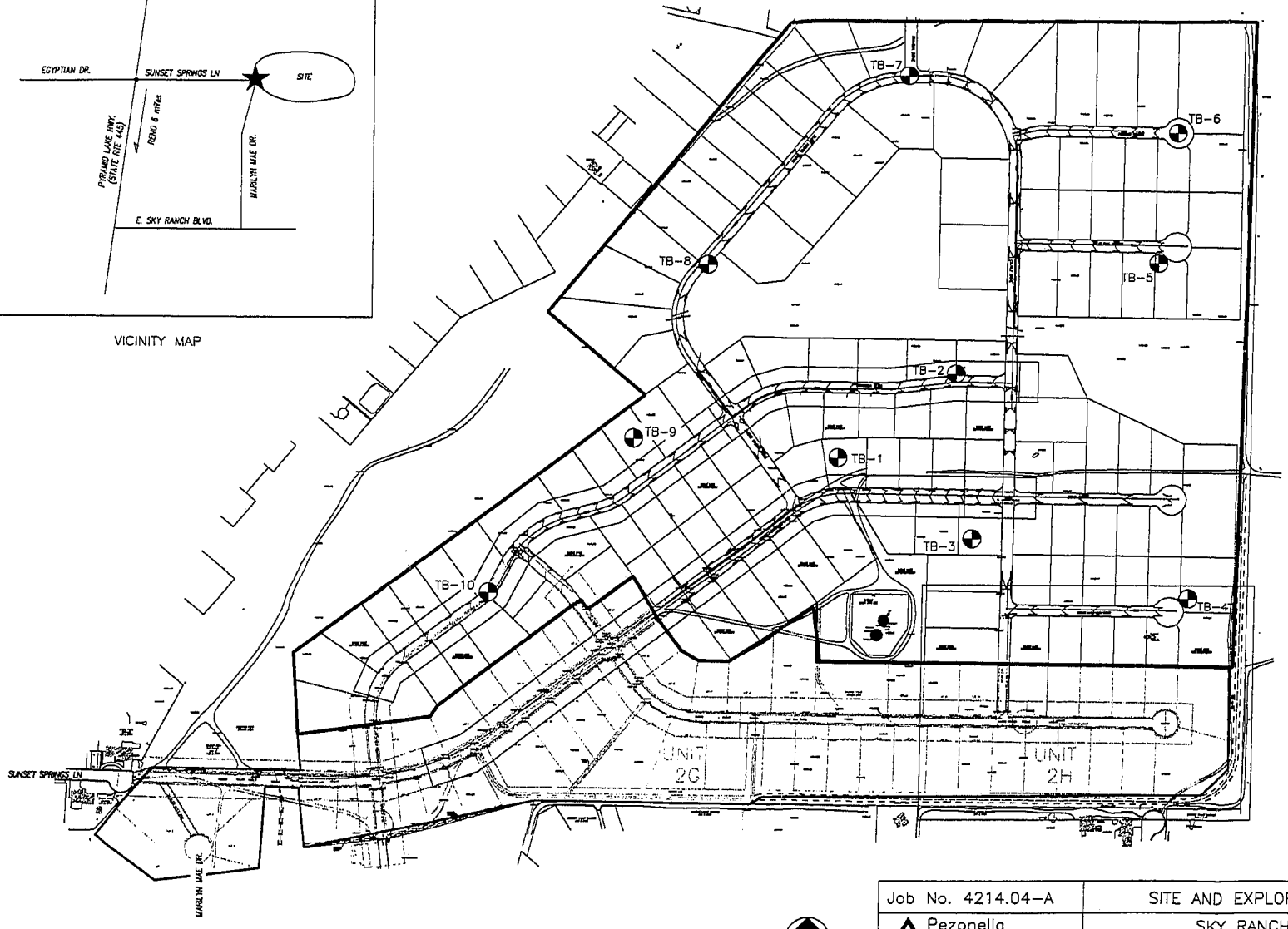
The recommendations presented in this report are based on the assumption that sufficient field inspection and construction review will be provided during all phases of construction. Prior to construction, a pre-job conference should be scheduled to include, but not be limited to, the Owner, Architect, Civil Engineer, General Contractor, Earthwork and Materials Sub-Contractors, Building Official and Geotechnical Engineer. The recommendations presented in this report should be reviewed by all parties to discuss applicable specifications and testing requirements. At this time, any applicable material quality and mix design reports should be submitted for approval by the Geotechnical Engineer.

We should provide on-site observations and testing during site preparation and grading, excavation, fill placement, foundation installation and paving. These observations would allow us to document that the soil conditions are as anticipated, and that the Contractor's work is in conformance with the intent of our recommendations and the approved plans and specifications.

VII ILLUSTRATIONS



VICINITY MAP



= Test Boring Location

Remarks: Not To Scale
Layout from plans furnished by Wood Rodgers

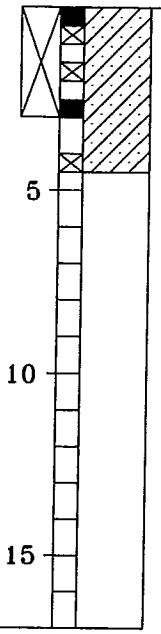
Job No. 4214.04-A	SITE AND EXPLORATION PLAN CDB/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5486 FAX (775) 856-6043	SKY RANCH, UNIT 2. FINAL PHASES WASHOE COUNTY, NEVADA
	Plate No. 1

LOG OF BORING 1

Equipment CME 55 Hollow Stem Auger

Elevation 4628 Date 08-03-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
	5/6" 14/6" 27/4" 27/4"			
	50/5"			
	50/2"			



BROWN CLAYEY SAND (SC)
medium dense, dry
color change to orange-brown with gravel and cobbles and becoming very dense below 1.0 feet
sampler refusal at 1.5 feet
sampler refusal at 2.0 feet
sampler refusal at 3.5 feet
sampler refusal at 4.5 feet

No Free Water Encountered

GPS: 39°39'17"N
119°40'59"W

Elevation Reference:

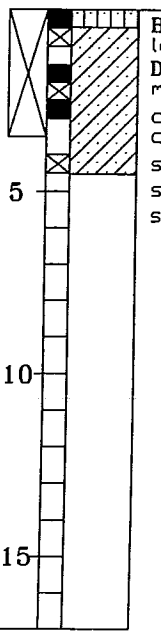
Topographical information taken from plans furnished by Wood Rodgers

LOG OF BORING 2

Equipment CME 55 Hollow Stem Auger

Elevation 4636 Date 08-04-04

	4/6" 5/6" 9/6"			
	27/5"			
	53/6"			
	50/3"			



BROWN SILTY SAND (SM)
loose, dry
DARK BROWN CLAYEY SAND (SC)
medium dense, dry
color change to orange-brown with gravel and cobbles and becoming very dense below 2.0 feet
sampler refusal at 2.5 feet
sampler refusal at 3.5 feet
sampler refusal at 4.5 feet
No Free Water Encountered

Elevation Reference:

See Log Of Boring 1

GPS: 39°39'20"N
119°40'54"W

Job No. 4214.04-A	BORING LOG	CAR/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 2

LOG OF BORING 3

Equipment CME 55 Hollow Stem Auger

Elevation 4647 Date 08-04-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
* Plasticity Chart (See Plate 12) ** pH=7.62 SO_4=19.6 ppm Resistivity=9091 Ohm-cm.	6/6" 12/6" 25/6" 27/5" 50/5" 50/4"			5 10 15

DARK BROWN CLAYEY SAND (SC) with gravel
medium dense, dry
color change to brown with cobbles and becoming very dense below 1.0 feet

sampler refusal at 2.0 feet
sampler refusal at 3.0 feet
sampler refusal at 4.5 feet
No Free Water Encountered

GPS: 39°39'14"N
119°40'52"W

Elevation Reference:

See Log Of Boring 1

Job No. 4214.04-A	BORING LOG	CDP/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 3

LOG OF BORING 4

Equipment CME 55 Hollow Stem Auger

Elevation 4658 Date 08-04-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample	
	18/6" 27/4"				DARK BROWN CLAYEY SAND (SC) with gravel dense, dry sampler refusal at 1.0 feet GRAY CLAYEY GRAVEL (GC) with sand and cobbles very dense, dry
	50/5"			5	sampler refusal at 4.5 feet bag auger cuttings at 6.0 feet
	50/4"			10	BROWN CLAYEY SAND (SC) with gravel and cobbles very dense, dry sampler refusal at 10.0 feet
	50/5"			15	sampler refusal at 15.0 feet
	50/4"			20	sampler refusal at 19.0 feet No Free Water Encountered

Elevation Reference:

See Log Of Boring 1

GPS: 39°39'11"N
119°40'43"W

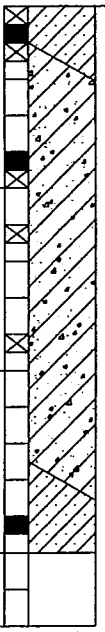
Job No. 4214.04-A	BORING LOG	CDB /appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 4

LOG OF BORING 5

Equipment CME 55 Hollow Stem Auger

Elevation 4655 Date 08-04-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
* Plasticity Chart (See Plate 13)	8/6", 8/6", 14/6"			*
	50/3"			5
	50/6"			10
	50/5"			15



DARK BROWN CLAYEY SAND (SC) with gravel
medium dense, dry

BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense, dry

sampler refusal at 5.0 feet
bag auger cuttings at 6.0 feet

sampler refusal at 9.5 feet

BROWN CLAYEY SAND (SC) with gravel and cobbles
very dense, dry
sampler refusal at 15.0 feet

No Free Water Encountered

Elevation Reference:

See Log Of Boring 1

GPS: 39°39'23"N
119°40'45"W

Job No. 4214.04-A	BORING LOG	CDB/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 5

LOG OF BORING 6

Equipment CME 55 Hollow Stem Auger

Elevation 4664 Date 08-05-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample	
* Particle Size Distribution Report with Atterberg Limits (See Plate 10)	8/6" 9/6" 18/6"			*	DARK BROWN CLAYEY SAND (SC) with gravel medium dense, dry
					BROWN SILTY SAND (SM) with gravel dense, dry
R-Value Report (See Plate 14)	27/4"			5	sampler refusal at 5.0 feet
					BROWN CLAYEY GRAVEL (GC) with sand and cobbles very dense, dry
					bag auger cuttings at 8.5 feet
	20/0"			10	sampler refusal at 10.0 feet
					bag auger cuttings at 13.5 feet
	50/3"			15	sampler refusal at 15.5 feet
					GPS: 39°39'29"N 119°40'44"W
	50/3"			20	sampler refusal at 20.0 feet
					No Free Water Encountered

Elevation Reference:

See Log Of Boring 1

Job No. 4214.04-A	BORING LOG	CDB/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 6

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
* Particle Size Distribution Report with Atterberg Limits (See Plate 11) Compaction Test Data (See Plate 15)	27/6" 50/4" 50/5" 20/0"			* 5 10 15

LOG OF BORING 7

Equipment CME 55 Hollow Stem Auger

Elevation 4642 Date 08-05-04

BROWN SILTY SAND (SM) with gravel and cobbles
medium dense, dry
bag auger cuttings at 0.5 feet
BROWN CLAYEY SAND (SC) with gravel and cobbles
very dense, dry
sampler refusal at 1.0 feet

sampler refusal at 4.5 feet

BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense, dry
bag auger cuttings at 6.5 feet

sampler refusal at 9.5 feet

bag auger cuttings at 13.0 feet

No Free Water Encountered

GPS: 39°39'30"N
119°40'56"W

Elevation Reference:

See Log Of Boring 1

LOG OF BORING 8

Equipment CME 55 Hollow Stem Auger

Elevation 4615 Date 08-05-04

Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
4/6" 15/6" 27/1" 27/3" 50/5" 20/0"			5 10 15

DARK BROWN CLAYEY SAND (SC) with gravel
loose, dry
becoming dense below 6 inches
BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense, dry

sampler refusal at 4.5 feet

BROWN CLAYEY SAND (SC) with gravel and cobbles
very dense, dry

sampler refusal at 10.0 feet

bag auger cuttings at 12.0 feet
BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense,dry
sampler refusal at 13.0 feet

No Free Water Encountered

GPS: 39°39'24"N
119°41'06"W

Elevation Reference:

See Log Of Boring 1

Job No. 4214.04-A	BORING LOG	CDB/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 7

LOG OF BORING 9

Equipment CME 55 Hollow Stem Auger

Elevation 4611 Date 08-06-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
	8/6" 27/5"			
	27/4"			5
	50/4"			10
	88			15

DARK BROWN SILTY SAND (SM) with gravel
medium dense, dry

BROWN CLAYEY SAND (SC) with gravel and cobbles
very dense, dry
sampler refusal at 1.0 feet

BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense, dry
sampler refusal at 4.5 feet

sampler refusal at 10.0 feet

BROWN CLAYEY SAND (SC) with gravel and cobbles
very dense, dry

GPS: 39°39'16"N
119°41'08"W

No Free Water Encountered

Elevation Reference:

See Log Of Boring 1

LOG OF BORING 10

Equipment CME 55 Hollow Stem Auger

Elevation 4582 Date 08-06-04

Laboratory Tests and (Other Information)	Driving Resistance Blows/Ft.	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample
	3/6" 27/6"			
	27/5"			5
* pH=7.42 SO_4=16.9 ppm Resistivity= 15,221 Ohm-cm.	50/5"			* 10
	87/11"			15

DARK BROWN CLAYEY SAND (SC) with gravel
loose, dry
color change to brown and
becoming very dense below 6 inches
sampler refusal at 1.0 feet

BROWN CLAYEY GRAVEL (GC) with sand and cobbles
very dense, dry
sampler refusal at 4.5 feet

sampler refusal at 9.5 feet

sampler refusal at 15.5 feet

No Free Water Encountered

GPS: 39°39'11"N
119°41'16"W

Elevation Reference:

See Log Of Boring 1

Job No. 4214.04-A

BORING LOG

CDB/appr./08-23-04

Pezonella Associates, Inc
Consulting Engineers
520 Edison Way Reno, Nevada 89502
PHONE (775) 856-5566 FAX (775) 856-6042

SKY RANCH UNIT 2
FINAL PHASES
WASHOE COUNTY, NEVADA

Plate No. 8

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (MORE THAN HALF IS LARGER THAN #200 SIEVE)	GRAVELS (MORE THAN HALF COURSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS (MORE THAN HALF COURSE FRACTION IS SMALLER THAN No. 4 SIEVE SIZE)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN HALF IS SMALLER THAN #200 SIEVE)	SILTS AND CLAY (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS SILTY CLAYS, LEAN CLAYS
			OL	INORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

SAMPLE DESIGN

■ "Undisturbed" Sample ☒ Bulk or Classification Sample

STRENGTH TESTS

VANE SHEAR TEST
F = Field
L = Laboratory

UNCONFINED COMPRESSION TEST

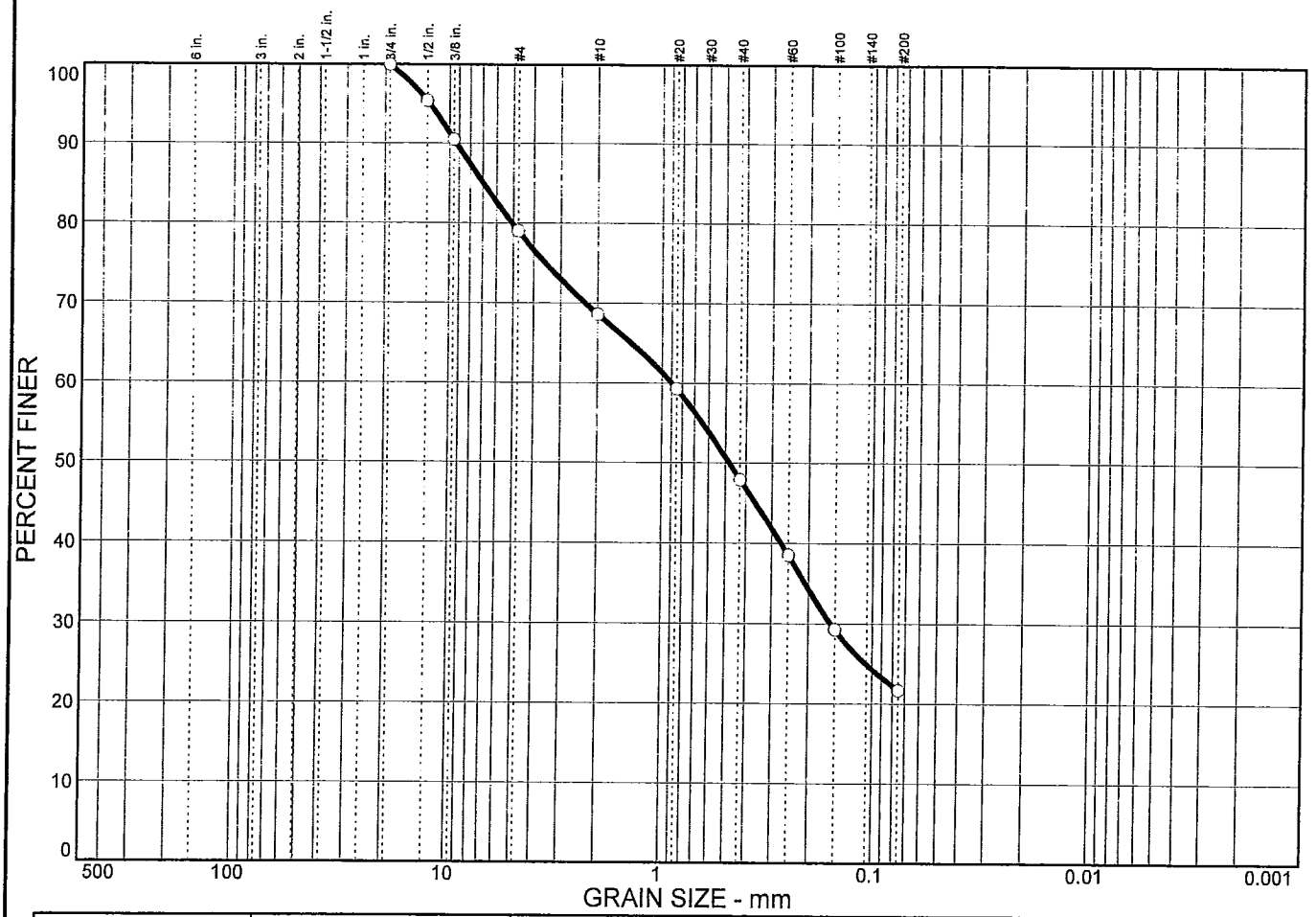
1000 DIRECT SHEAR TEST
CD = Consolidated Drain
Stress Normal to Shear Plane (psf)

1000 TRIAXIAL COMPRESSION TEST
UU = Unconsolidated – Undrained
CU = Consolidated – Undrained
CD = Consolidated – Drained
1/2 Deviator Stress
Confining Stress

KEY TO TEST DATA

Job No. 4214.04-A	SKY RANCH UNIT 2 FINAL PHASES CDB/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SOIL CLASSIFICATION CHART AND KEY TO TEST DATA Plate No. 9

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	21.0	57.3	21.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	95.4		
.375 in.	90.5		
#4	79.0		
#10	68.6		
#20	59.3		
#40	47.9		
#60	38.5		
#100	29.3		
#200	21.7		

* (no specification provided)

Soil Description

Brown silty sand (SM) with gravel

Atterberg Limits

PL= 19 LL= 26 PI= 7

Coefficients

D_{85}= 6.95 D_{60}= 0.895 D_{50}= 0.479
D_{30}= 0.157 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= (SM) AASHTO=

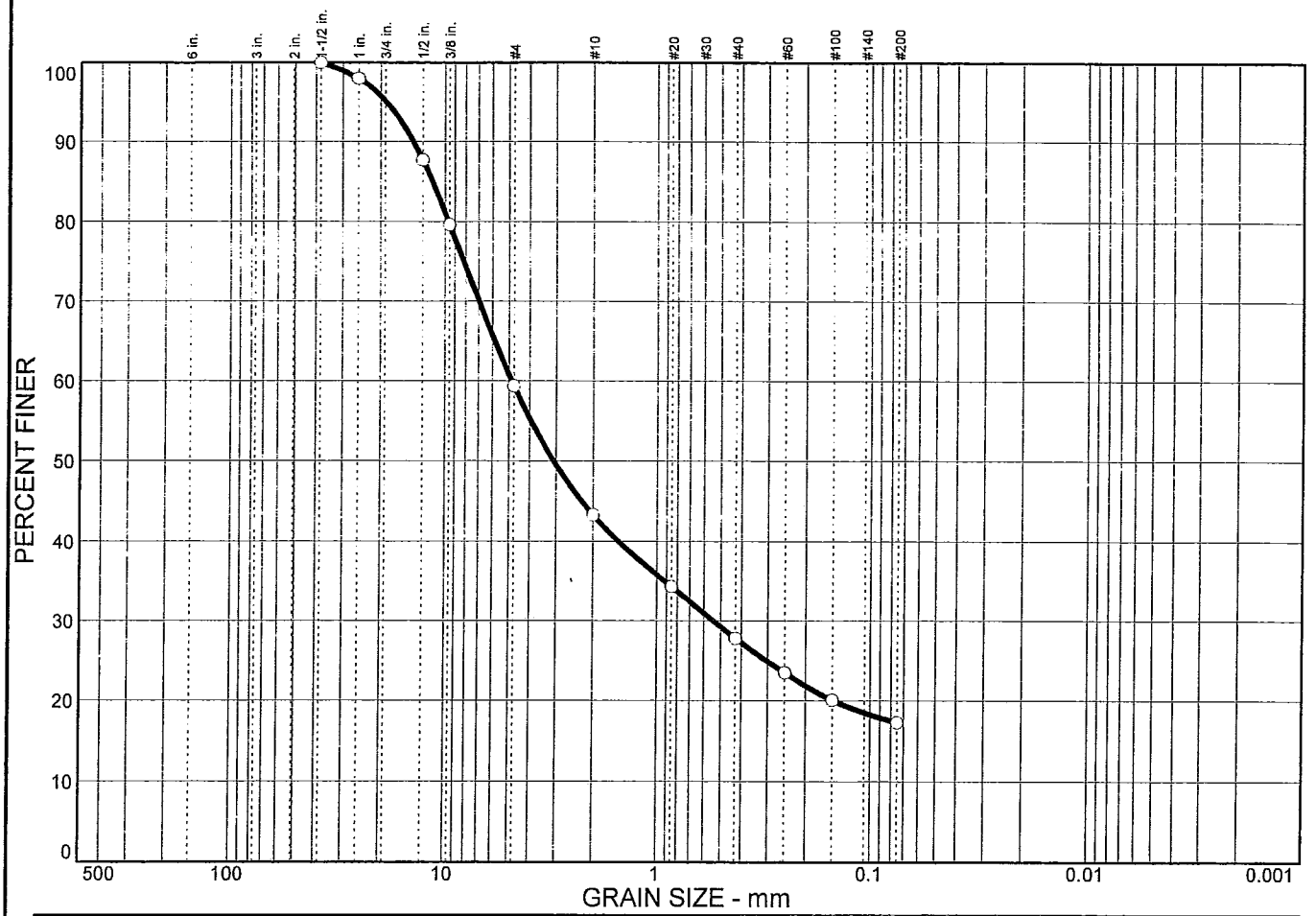
Remarks

Sample No.: **Source of Sample:** TB-6 **Date:** 08-09-04
Location: **Elev./Depth:** 1.0 to 4.0 feet

PEZONELLA ASSOCIATES, INC.

Client:
Project: Sky Ranch Unit 2, Final Phases
Project No: 4214.04-A **Plate** 10

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	40.6	42.1	17.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	98.0		
.5 in.	87.7		
.375 in.	79.6		
#4	59.4		
#10	43.3		
#20	34.3		
#40	27.8		
#60	23.5		
#100	20.1		
#200	17.3		

* (no specification provided)

Soil Description

Brown clayey sand (SC) with gravel and cobbles

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 11.5 D_{60}= 4.86 D_{50}= 3.08
D_{30}= 0.541 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= (SC) AASHTO=

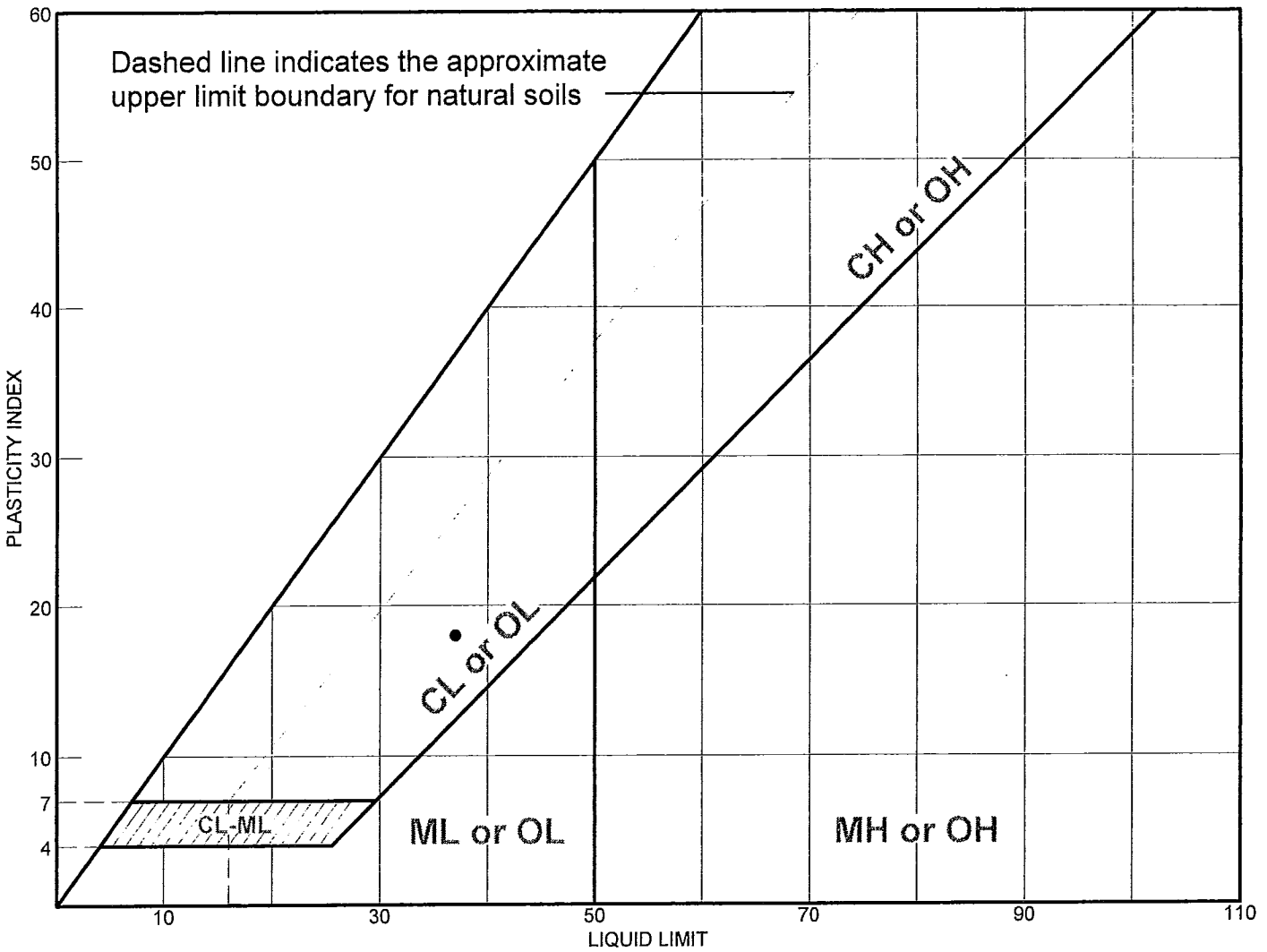
Remarks

Sample No.: **Source of Sample:** TB-7 **Date:** 08-09-04
Location: **Elev./Depth:** 1.0 to 5.0 feet

PEZONELLA ASSOCIATES, INC.

Client:
Project: Sky Ranch Unit 2, Final Phases
Project No: 4214.04-A **Plate** 11

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clayey sand (SC) with gravel	37	19	18		28.9	(SC)

Project No. 4214.04-A **Client:** CDB

Project: Sky Ranch Unit 2, Final Phases

● **Source:** TB-3 **Elev./Depth:** 1.5 feet

Remarks:

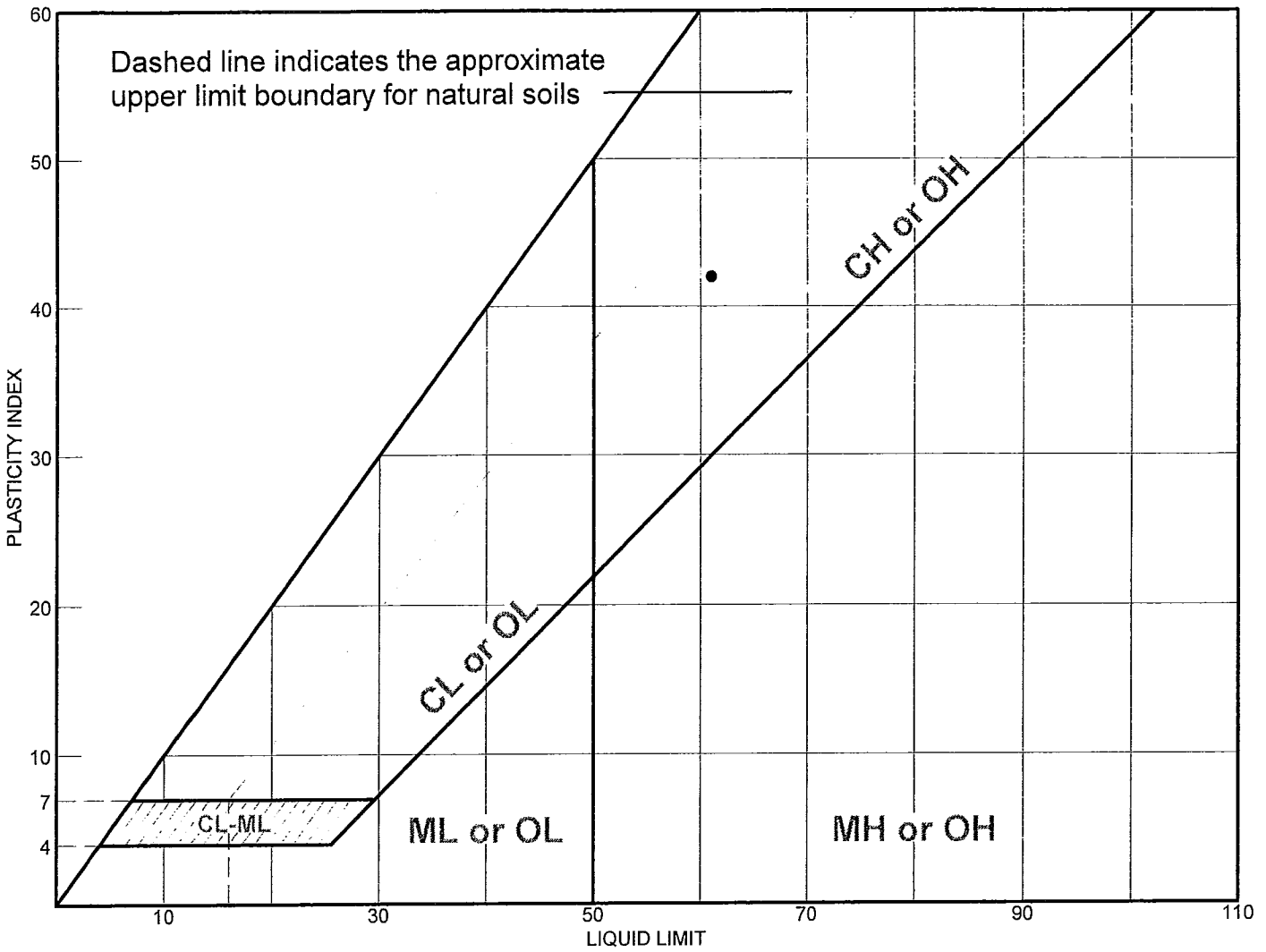
●

LIQUID AND PLASTIC LIMITS TEST REPORT

PEZONELLA ASSOCIATES, INC.

Plate 12

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark brown clayey sand (SC) with gravel	61	19	42		45.3	(SC)

Project No. 4214.04-A **Client:** CWS

Project: Sky Ranch Unit 2, Final Phases

● **Source:** TB-5 **Elev./Depth:** 0.5 feet

Remarks:

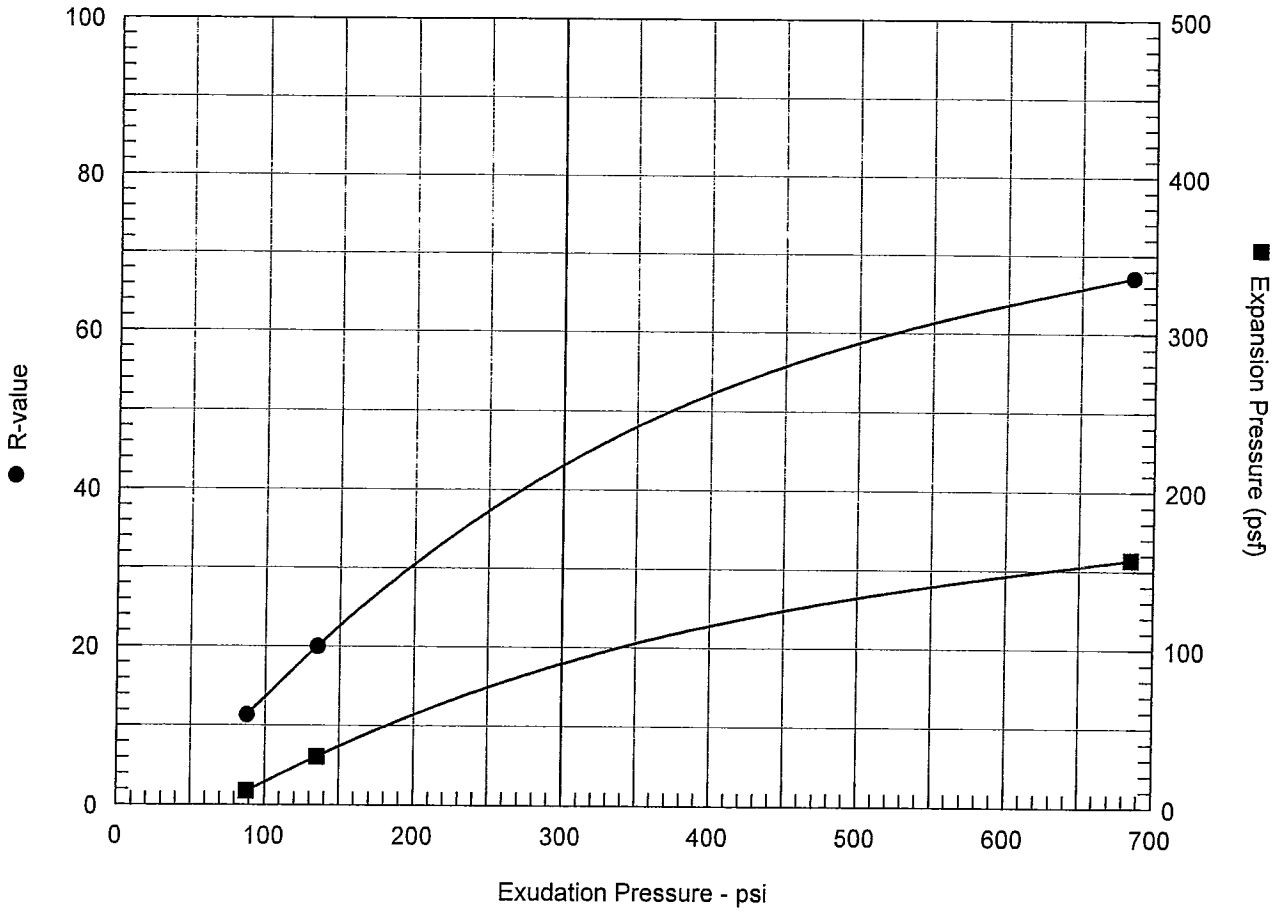
●

LIQUID AND PLASTIC LIMITS TEST REPORT

PEZONELLA ASSOCIATES, INC.

Plate 13

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psf	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	300	127.0	10.5	157	43	2.51	685	67	67
2	300	120.4	15.6	9	134	2.70	88	10	11
3	300	121.3	13.5	31	120	2.67	135	18	20

Test Results	Material Description
R-value at 300 psi exudation pressure = 43 **Exp. pressure at 300 psi exudation pressure =** 90 psf	Brown silty sand (SM) with gravel

Project No.: 4214.04-A
Project: Sky Ranch Unit 2, Final Phases
Source of Sample: TB-6 **Depth:** 1.0 to 4.0 feet
Date: 8/19/2004

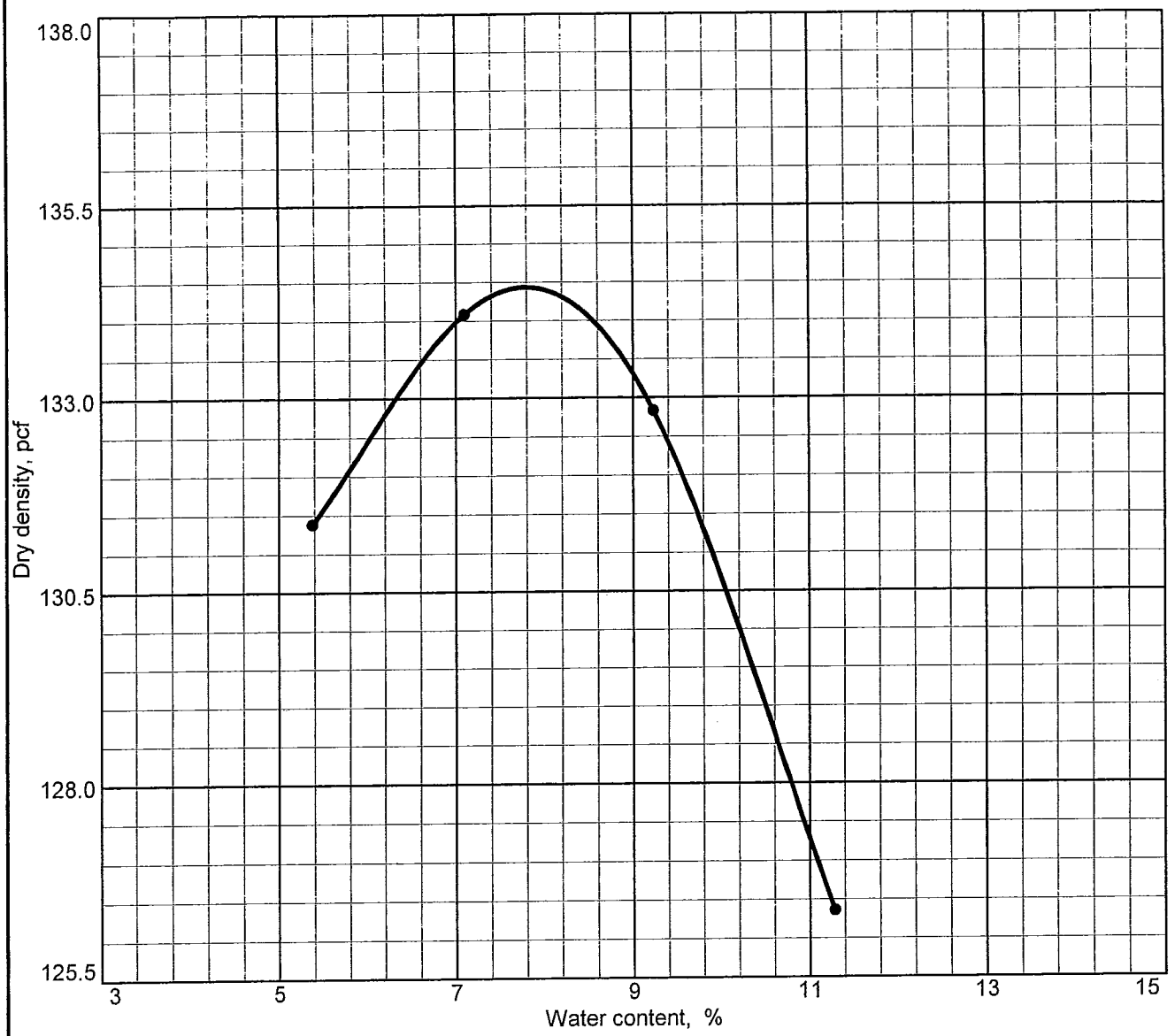
Tested by:
Checked by: CAB
Remarks:

R-VALUE TEST REPORT

PEZONELLA ASSOCIATES, INC.

Plate 14

COMPACTION TEST REPORT



Test specification: ASTM D 1557-78 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
1.0 to 5.0 feet	(SC)						40.6	17.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 134 pcf Optimum moisture = 8 %	Brown clayey sand (SC) with gravel and cobbles

Project No. 4214.04-A **Client:** UDB

Project: Sky Ranch Unit 2, Final Phases

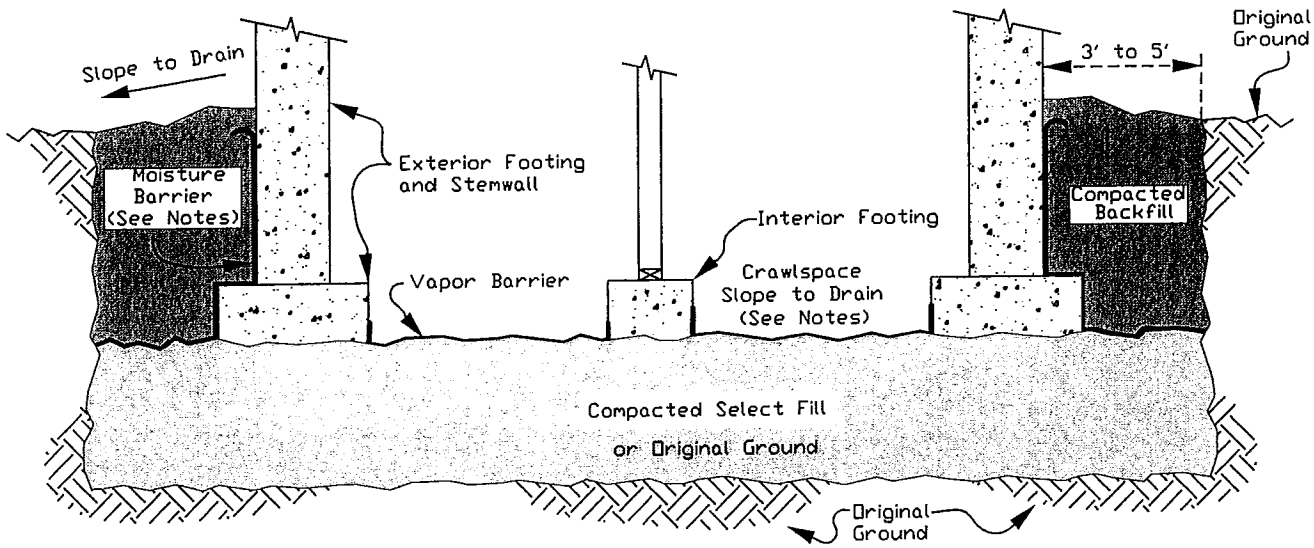
Remarks:

● **Source:** TB-7 **Elev./Depth:** 1.0 to 5.0 feet

COMPACTION TEST REPORT

PEZONELLA ASSOCIATES, INC.

Plate 15



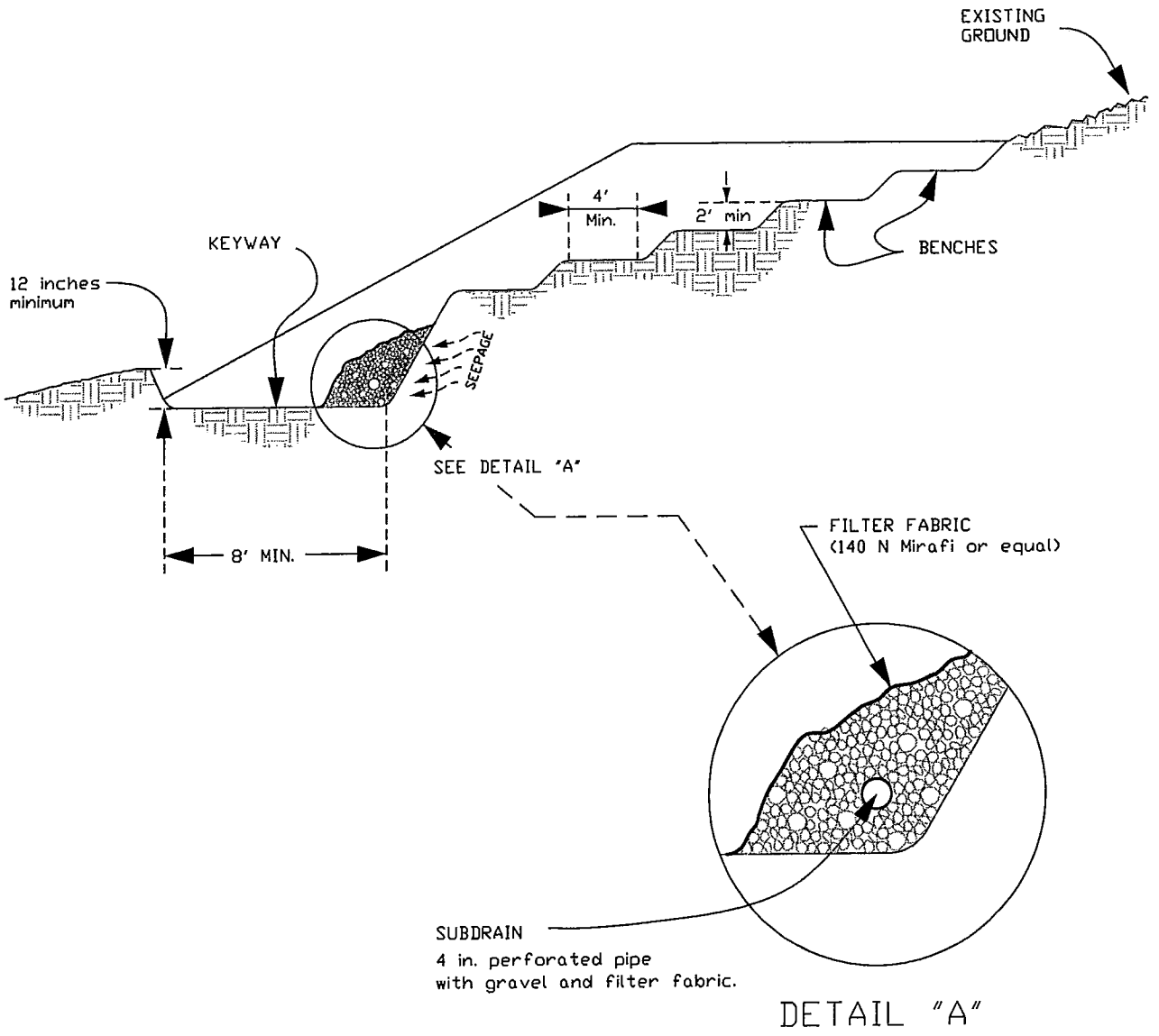
NOTES:

1.) A moisture barrier shall be provided where granular material is used as backfill

2.) Crawlspace shall be sloped to a suitable point which will aid in conveying any collected water outside the building

Not to Scale

Job No. 4214.04-A	FOUNDATION AND BACKFILL DETAIL /appr./08-23-04	
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-6566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 16



DETAIL "A"

NOTE: This detail applies when existing ground slopes are 5:1 and steeper.

Not to Scale

Job No. 4214.04-A	DETAIL FOR FILLING ON SLOPES	CNS/appr./08-23-04
Pezonella Associates, Inc Consulting Engineers 520 Edison Way Reno, Nevada 89502 PHONE (775) 856-5566 FAX (775) 856-6042	SKY RANCH UNIT 2 FINAL PHASES WASHOE COUNTY, NEVADA	Plate No. 17

VIII GLOSSARY OF TEST PROCEDURES

ASTM Test Designation: C 136: *Standard Test Methods for Sieve Analysis of Fine and Coarse Aggregates.*

ASTM Test Designation: D 420: *Standard Guide to Site Characterization for Engineering Design and Construction Purposes.*

ASTM Test Designation: D 1140: *Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 (75- um) Sieve.*

ASTM Test Designation: D 1557: *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 KN-m/m^3)).*

ASTM Test Designation: D 1586: *Standard Test Method for Penetration Test and Split-Barrel Sampling of soils.*

ASTM Test Designation: D 2487: *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).*

ASTM Test Designation: D 2844: *Standard Test Method for Resistance R-Value and Expansion Pressure of Compacted Soils.*

ASTM Test Designation: D 4318: *Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.*

IX DISTRIBUTION

Unbound wet stamped original, two bound copies and three bound wet stamped copies to:

Lakemont Homes Nevada, Inc.
5525 South Kietzke Lane, Suite 200
Reno, Nevada 89511
Attention: Mr. David Burks
Telephone: (775) 824-3690
Facsimile: (775) 824-3695

Tentative Hydrology Report

FOR:

The Autumn Trails Subdivision

Prepared For:
Pinnacle Land Holdings LLC
Attn: Michael Fiore
477 E. 9th Street
Reno, NV 89512

Prepared By:

3100 Mill Street, Suite 107
Reno, NV 89502
(775)355.0505 Fax(775)355.0566

September, 2014

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References:

- Hydrology & Hydraulics Report for Sky Ranch North Master Hydrology Report & Unit 2G and 2H Site Hydraulics Report, prepared by Wood Rodgers Inc. – May 2004
- On-Site Hydrology Report for Sky Ranch North Unit 2I, prepared by Summit Engineering Corporation – July 2005, Revised September 2005
- On-Site Hydrology Report for Sky Ranch North Unit 2J, prepared by Summit Engineering Corporation – December 2005

Introduction

The proposed Autumn Trails Subdivision will be comprised of 43 single family residential lots and will complete the previously approved Sky Ranch North Phase 2 Subdivision with minor modifications. The proposed lots will range in size from 0.5 acre to 1.5 acres. The ±47.608 acre site is located on APN: 534-420-08, which is located in Spanish Springs to the east of the Pyramid Highway near the end of Sunset Springs Lane. The development is to the north of the completed phases of the Sky Ranch North Development and south of the Bridal Path subdivision. There have been several drainage studies related to the development of this parcel as well as the adjacent parcels. The proposed improvements will be consistent with the Master Hydrology Report prepared by Wood Rodgers Inc. which details the detention requirements and offsite flows through the project. The proposed improvements will include the construction of the final detention pond for the subdivision which will collect the majority of flows from this development as well as offsite flows and flows from Sky Ranch North Phases 2I & 2J. The proposed development will allow for unobstructed emergency access at all times and will not result in an increase of flows over the existing conditions.

Existing Conditions

To the north and west of the site is the Bridal Path subdivision, to the south are the existing phases of the Sky Ranch North Phase 2 subdivision and to the east are rural properties with limited development. The general slope on the property is from northeast to southwest with moderate slopes ranging between 2% and 5%. The majority of the site is currently in its native state with minimal

disturbance from previous phases of the development. These disturbances include a turnaround at the end of Smoke Wagon Drive and a soil stockpiling area. The site is currently covered with moderate natural vegetation mostly consisting of sage brush and grasses.

There are several drainage improvements on the site. The flow from an existing detention pond constructed with Sky Ranch North Phase 2J outlets onto the proposed Common Area where it flows through the site, around the turnaround at the end of Smoke Wagon Drive. It is at this location where flow from Sky Ranch North Phase 2I is discharged into the drainage swale. From This point, the flow continues to the southwest where it enters the main detention basins along Sunset Springs Lane. From there the flow passes under Sunset Springs Lane where it continues to the south.

The flow generated onsite splits into two directions although both ultimately end up in the detention basins located to the north of Sunset Springs Lane. The majority of the site slopes toward the previous phases of Sky Ranch North where it is intercepted by the main drainage channel along the southern project boundary. A smaller portion of the site drains to the western boundary where it is intercepted by a drainage channel which was constructed as a part of the Bridal Path improvements to intercept offsite flows. The project lies within FEMA flood zone X which designates it as an area outside the 1-percent annual chance floodplain.

Proposed Drainage System

The proposed drainage system will consist of a combination catch basins which will utilize an underground storm drain network as well as open channel flows which will convey the flows generated onsite into onsite detention ponds. The system will be designed to intercept and convey the 5-year and 100-year storm events without increasing peak outfall from the development. The flows for this phase of the development have been planned for in the previous phases of Sky

Ranch North Phases 2G, 2H and 2J. The analysis of the detention ponds as well as pipe and open channel flows were completed with the abovementioned phases of the development and can be referenced in the hydrology reports associated with each.

The offsite flow entering the site from the northeast will be captured by an open channel running along the eastern property line. This channel will connect to an existing open channel constructed with Sky Ranch North Phase 2J. This channel will outlet the offsite flows into an existing detention pond along Hayfield Drive.

The flow generated in Phase 1 of the proposed development will be collected by two catch basins located at the intersection of Hayfield Drive and Sundowner Court. These catch basins will discharge into the underground storm drain network which will connect to the stub in Hayfield Drive and ultimately discharge the flow into the existing detention pond located near the end of Cordoba Boulevard on Hayfield Drive. The flow from this pond will outlet under Hayfield drive through a 24" culvert which will discharge into another existing open channel which runs along the southern property line. This channel designed as a part of the previous development.

The majority of flow generated in Phase 2 of the development will be captured by two catch basins located at the low point in Smoke Wagon Drive. This flow will be discharged into a proposed detention pond located to the east of Smoke Wagon Drive where it will combine with the flow from the open channel along the southern property line as well as flows which outlet into the pond from Sky Ranch North Phase 2I. This detention pond has previously been analyzed in the Master Hydrology Report prepared by Wood Rodgers Inc. The proposed development is slightly larger than the previous approval and therefore, this detention pond will be enlarged and designed to accommodate any increased flows. A small portion of the flow generated on the lots to the north of Smoke Wagon Drive will match the existing drainage patterns and will be directed to the rear of the lots where it

will be intercepted by the existing drainage channel constructed with the Bridal Path subdivision. The flow to this channel will be reduced when compared to the existing conditions.

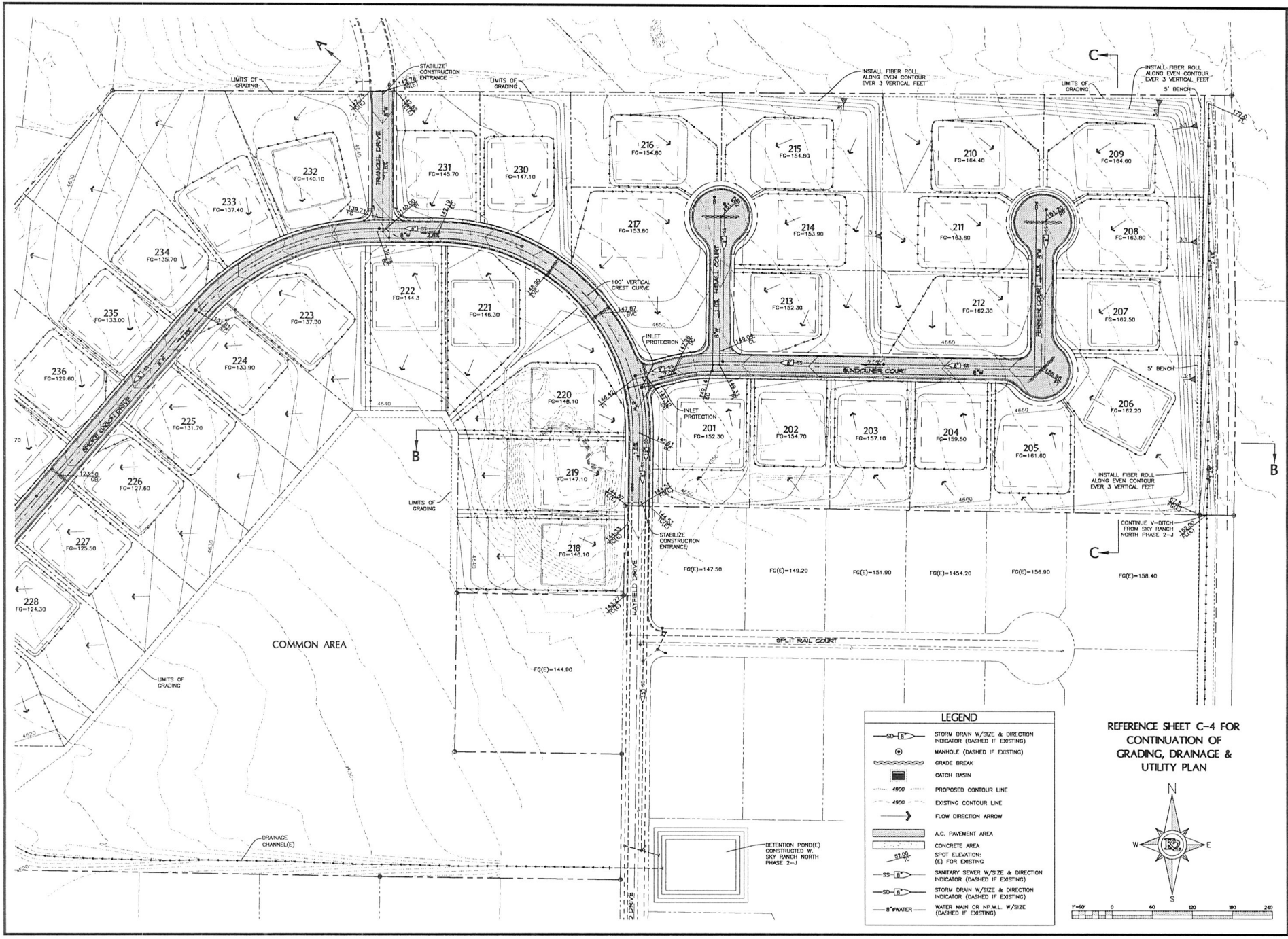
Conclusions

The proposed storm drain system will be designed to intercept and convey the 5-year & 100-year storm events while allowing for unimpeded emergency access. The onsite detention facilities as well as the open channels have been designed with the previous phases of Sky Ranch North Phase 2 and can be referenced in the Master Hydrology Report prepared by Wood Rodgers Inc. The post development condition should result in a reduced storm flow to the existing Bridal Path subdivision and will not increase peak outfall to the adjacent properties and drainage system. All improvements will be consistent with the Washoe County Development Code and with all other regulating agencies.

Appendix A
Drawings

Tentative Map	Vicinity Map	K2 ENGINEERING AND STRUCTURAL DESIGN
for		3100 Mill Street, # 107
Autumn Trails		Reno, NV 89502
APN: 534-420-08		P: (775) 355-0505 F: (775) 355-0566

Tentative Map for Autumn Trails APN: 534-420-08	Phasing Plan	K2 ENGINEERING AND STRUCTURAL DESIGN 3100 Mill Street, # 107 Reno, NV 89502 P: (775) 355-0505 F: (775) 355-0566



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Reno, NV 89502
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F: (775) 355-0566
www.K2eng.net

Autumn Trails Tentative Map

Washoe County, Nevada

0 Hayfield Drive
APN: 534-420-08

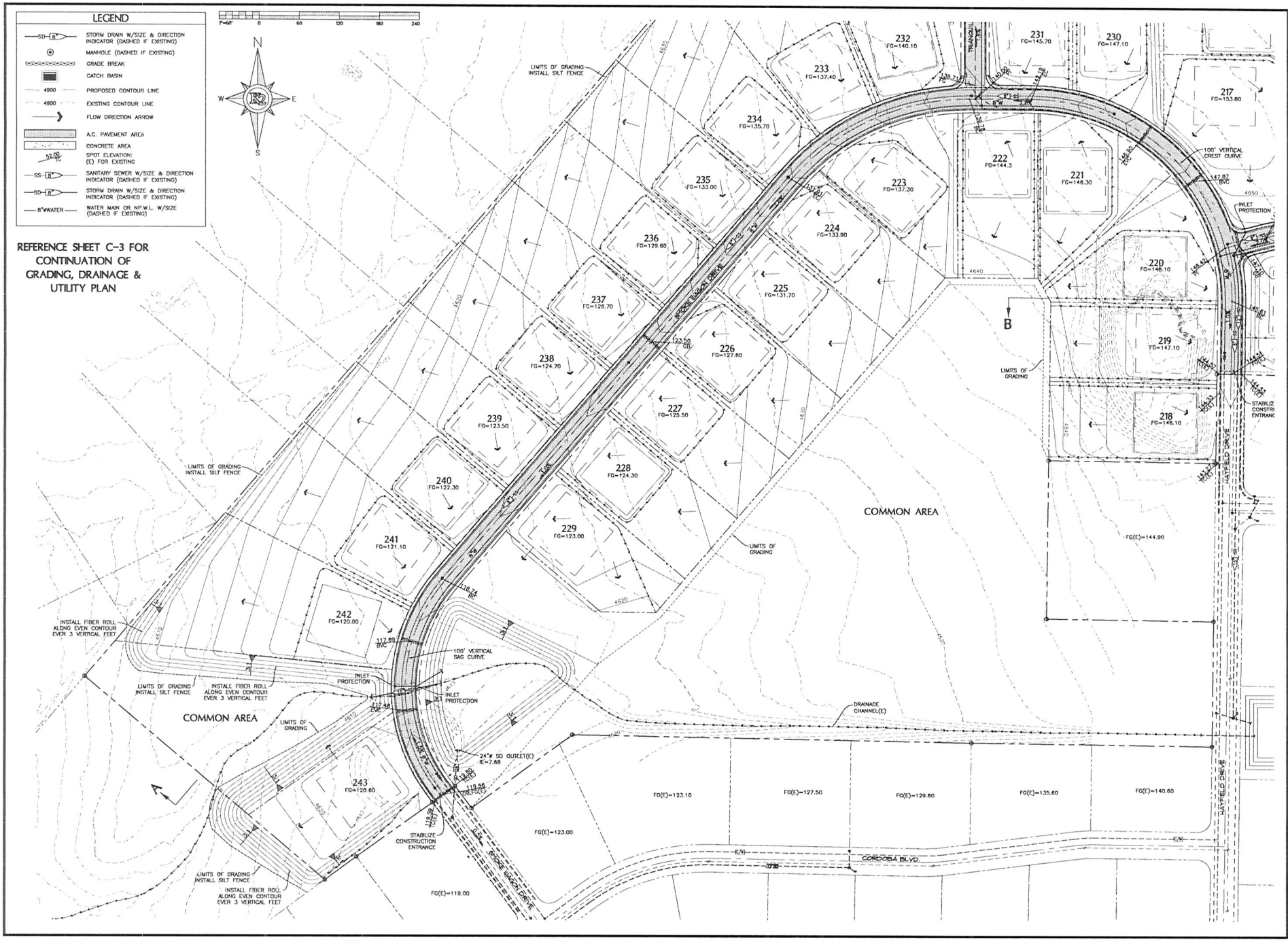
Brandt T. Kennedy, P.E.
Jared A. Krupa, P.E.

Revisions

Date	9/15/14
Drawn	K2
Checked	JAK
Project No.	14-166

Site Grading Drainage & Utility Plan

C-3



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Date	9/15/14
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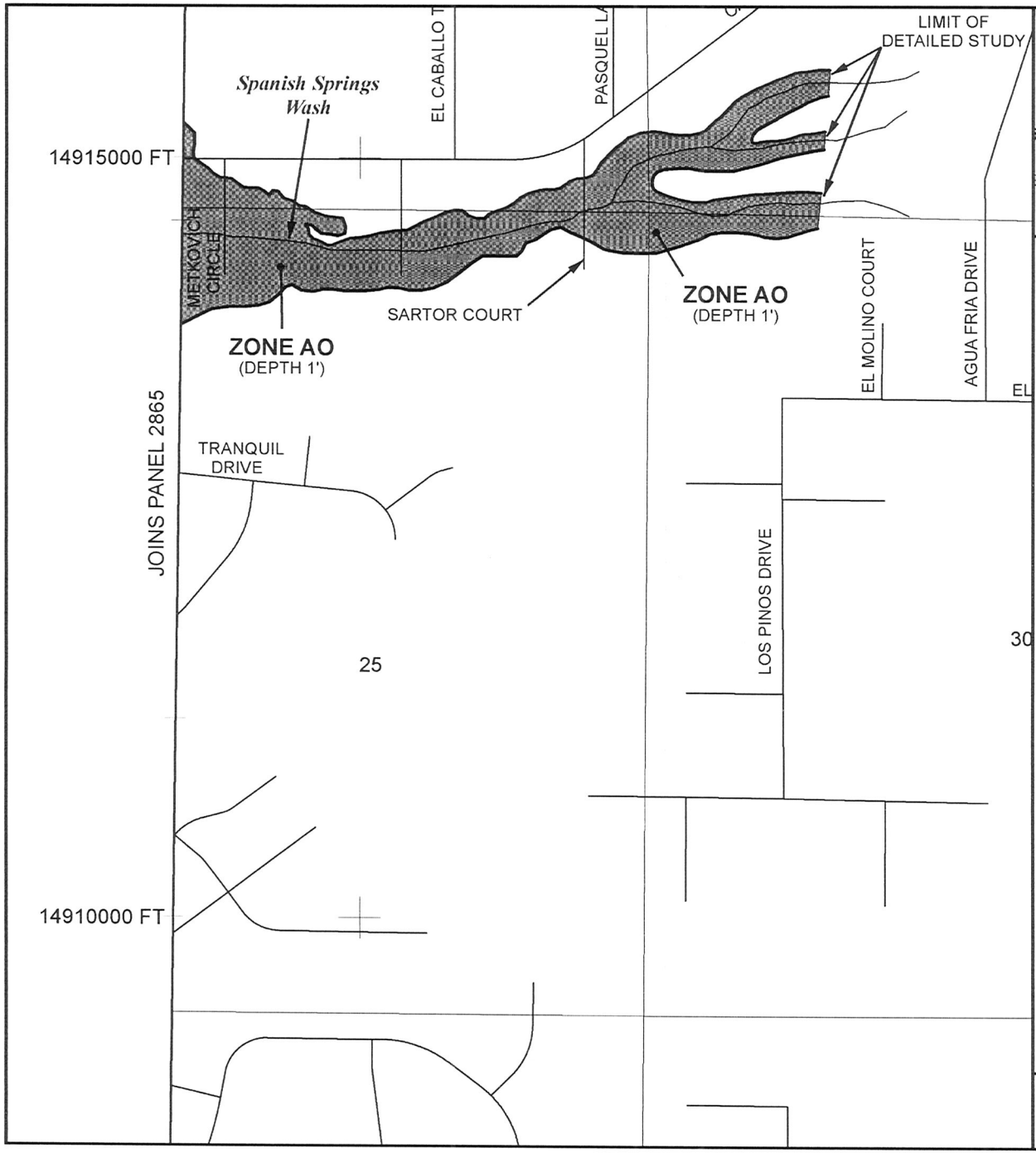
Project No.	14-166

Site Grading, Drainage & Utility Plan

C-4



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

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2870G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 2870 OF 3475
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

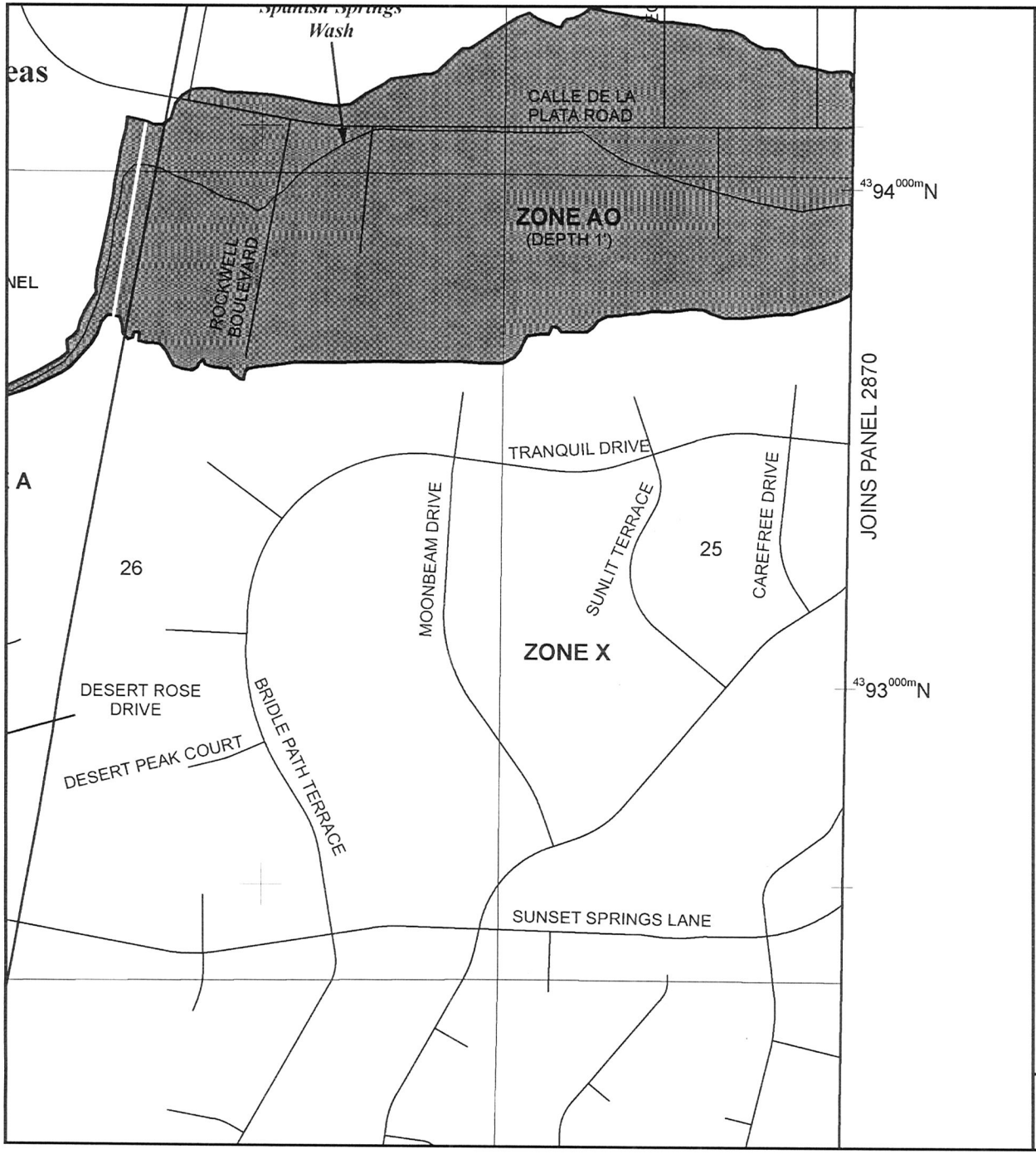
COMMUNITY	NUMBER	PANEL	SUFFIX
SPARKS, CITY OF	320021	2870	G
WASHOE COUNTY	320019	2870	G

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
32031C2870G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency



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