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City of Boise • Planning & Development Services • (208) 384-3802 • pds.cityofboise.org

#117: Planned Unit Development

Case #: PUD16-00015

Property Information

Address

Street Number:	Prefix:	Street Name:	Unit #:
1250	E	AMITY RD	

Subdivision name:	Block:	Lot:	Section:	Township:	Range:	Zoning:
BRECKENRIDGE SUB NO 5			25	3	2	R-1C

Parcel Number:	Additional Parcel Numbers:
R1071190185	R1071190151, R7198560050, S1036223002, S1036212422

Primary Contact

Who is responsible for receiving e-mail, uploading files and communicating with Boise City?

○ Agent/Representative ○ Applicant ◉ Owner

Applicant Information

First Name:	Last Name:
Jeremy	Telford

Company: Arete Investments Group, LLC

Address:	City:	State:	Zip:
2048 W. Astonte St.	Meridian	ID	83646

E-mail:	Phone Number:	Cell:	Fax:
Jeremy@JeremyTelford.com	(208) 577-0225		

Agent/Representative Information

Role Type: ○ Architect ○ Land Developer ○ Engineer ○ Contractor ◉ Other

First Name:	Last Name:
Jay	Walker

Company: Allterra Consulting

Address:	City:	State:	Zip:
9208 JR Way	Middleton	ID	83644

E-mail:	Phone Number:	Cell:	Fax:
walker@allterraconsulting.com	(208) 484-4479		

Owner Information

Same as Applicant? ○ No ◉ Yes (If yes, leave this section blank)

First Name:	Last Name:

Company:

Address:	City:	State:	Zip:
		ID	

E-mail:	Phone Number:	Cell:	Fax:

Project Information

Is this a Modification application? ○ Yes ◉ No File number being modified:

1. Neighborhood Meeting Held (Date):

05/26/2016

2. Neighborhood Association:

Southeast Boise

3. Comprehensive Planning Area:

Southeast

4. This application is a request to construct, add or change the use of the property as follows:

Subdivision of 3.66 acres into 28 Townhouse Building Lots and 1 Common Area Lot within the R1-C Zoning Guidelines.

5. Size of Property:

3.66 ○ Acres ○ Square Feet

6. Water Issues:

A. What are you fire flow requirements? (See International Fire Code):

1500 gpm

B. Number of hydrants (show location on site plan):
Note: Any new hydrants/hydrant piping require United Water approval.

Number of Existing: Number of Proposed: 2

C. Is the building "sprinklered"? ○ Yes ◉ No

D. What volume of water is available? (Contact United Water of Idaho at 362-7330):

1500 gpm

7. Existing uses and structures on the property are as follows:

None.

8. Are there any hazards on the property?

(Such as canals, hazardous material spills, soil or water contamination.) If so, describe them and give their locations:

There is a ground water plume underneath the property which is monitored and treated by Motive Power. Currently in good standing, but we are maintaining monitoring well access for them and designing our storm water retention to mitigate any

9. Adjacent property information:

	Building types and/or uses	Number of Stories	Zone
North:	Residential	2	(R-1C) Single Family Resider
South:	Commercial	1	(C-4D) Planned Commercial
East:	Residential	2	(R-1C) Single Family Resider
West:	Commercial	2	(M-1D) Limited Industrial w/

10. Non-Residential Structures:

A. Number of **Proposed** non-residential structures: 0

Square footage of proposed non-residential structures or additions (if 5+ floors, attach narrative with chart):

	Gross Square Feet	Net Leasable Square Feet
1st Floor	0	0
2nd Floor	0	0
3rd Floor	0	0
4th Floor	0	0

B. Maximum Proposed Height:

C. Number of stories: 0

D. Number of **EXISTING** non-residential structures to remain: 0

Square footage of existing non-residential structures or additions (If 5+ floors, attach narrative with chart):

	Gross Square Feet	Net Leasable Square Feet
1st Floor	0	0
2nd Floor	0	0
3rd Floor	0	0
4th Floor	0	0

E. Existing Structure Height(s): 0

F. Number of Stories: 0

11. Residential Structures:

A. Number of **Proposed** residential units (if applicable):: 28

B. Size of Proposed residential structures (if applicable):

	Number of Units	Square Foot per Unit	Total Square Feet
One-Bedroom:	0	0	0
Two-Bedroom:	6	1950	11700
Three-Bedroom:	16	2100	33600
Other:	6	2500	15000
Total Number:	28	0	60300

C. Number of **Existing** units to remain: 0

D. Maximum Proposed Structure Height(s): 45

E. Number of Stories: 4

12.Site Design:

A. Percentage of site devoted to building coverage:	39
B. Percentage of site devoted to landscaping:	41
C. Percentage of site devoted to paving:	20
D. Percentage of site devoted to other uses:	0
E. Describe other use:	N/A

13.Loading Facilities, if proposed (For Commercial uses only):

Number:		Location	
Size:		Screening	

14.Parking:

	Required		Proposed
A. Handicapped Spaces:	0	Handicapped Spaces:	0
B. Parking Spaces:	3	Parking Spaces:	16
C. Bicycle Spaces:	0	Bicycle Spaces:	0
D. Proposed Compact Spaces:	0		
E. Restricted (assigned, garage, reserved spaces) parking spaces proposed:			56
F. Are you proposing off-site parking?	○ Yes ◉ No	If yes, how many spaces?	
G. Are you requesting shared parking or a parking reduction?	○ Yes ◉ No	If yes, how many spaces?	

Note: If you are requesting shared parking or a parking reduction, you must submit a survey of persons using and working on the premises and any additional information demonstrating that use by the regular employees and visitors to the premises will require fewer off-street parking spaces than required by the Zoning Ordinance.

15.Setbacks (Plans that are not graphically dimensioned will not be accepted.)

	Building		Parking	
	Proposed	Required	Proposed	Required
Front:	7	7		
Rear:	7	7		
Side 1:	3	3		
Side 2:	3	3		

16.Waivers Requested:

A. Lot size:	◉ Yes ○ No	Description:	2275 SqFt Average
B. Internal Setbacks:	◉ Yes ○ No	Description:	3' Minimums between townhouse buildings
C. Frontage:	◉ Yes ○ No	Description:	19' Minimums

17. Sidewalks:

Proposed: ☑ **Attached** ☑ **Detached**

Adjacent: ☐ **Attached** ☐ **Detached**

18. Amenities:

Number: 4

Description: 1. Elevated Outdoor Living Space (Patios) on all homes. 2. Landscaped open area space between Top and Middle Tier of homes. 3. Paved or Gravel Walking

19. Density:

Allowed Density: 8

Proposed Density: 7.65

20. Building Exterior:

	Materials	**Colors**
Roof:	Metal & Asphalt	Various
Walls:	Stucco, Concrete, Metal	Various
Windows/Doors:	Fiberglass & Plastic	
Fascia, Trim etc.:	TBD	

21. Drainage (Proposed method of on-site retention):

Storm Water Retention Basin at base of Site

22. Floodways & Hillsides:

A. Is any portion of this property located in a Floodway or a 100-year Floodplain? ○ **Yes** ◉ **No**

B. Does any portion of this parcel have slopes in excess of 15%? ◉ **Yes** ○ **No**

Note: If the answer to either of the above is yes, you will be required to submit an additional Floodplain and/or Hillside application and additional fee. You must submit the additional required application(s) for review at the same time as this request.

23. Airport Influence Area:

Is the subject site located within the Airport Influence Area? (If yes, please mark which area.)

◉ **No** ○ **Area A** ○ **Area B** ○ **Area B1** ○ **Area C**

24. Street Layout:

A. PUBLIC Street Layout Review

The impacts of proposed development on adjacent land uses and transportation facilities must be considered. A "Traffic Impact Study" (TIS) will be generally required by the Ada County Highway District, if the proposed development contains no more than 100 dwelling units (includes hotels and motels as well as private dwelling units), more than 30,000 square feet of commercial use, or more than 50,000 square feet of industrial or institutional use, or has associated it with special circumstances deemed by ACHD to warrant an impact study. A copy of this study must be submitted with this application.

Is a Traffic Impact Study required?

○ **Yes** ◉ **No**

B. PRIVATE Street Layout Review

The impacts of proposed development on adjacent land uses and transportation facilities must be considered. A "Traffic Impact Study" (TIS) prepared by a traffic engineer will be required by Public Works and Planning & Development Services for the interior roadway and parking system. This requirement may be waived when it can be shown by the applicant that no section of on-site roadway will exceed 240 vehicle trips per day.

Is a Traffic Impact Study required?

○ **Yes** ◉ **No**

Are you proposing public street connection to adjacent properties?

○ **Yes** ◉ **No**

25. Solid Waste:

A. Type of trash receptacles:

☑ **Individual Can/Residential** ☐ **3 Yd Dumpster** ☐ **6 Yd Dumpster** ☐ **8 Yd Dumpster** ☐ **Compactor**

B. Number of trash receptacles:

28

C. Proposed screening method:

D. Is the proposed location accessible for collection? (Contact Boise Public Works at 384-3901.)

○ **Yes** ○ **No**

E. Is recycling proposed?

◉ **Yes** ○ **No**

Verification of Legal Lot or Parcel Status

Acceptance of this application does not validate the legal status of any lot or parcel. Prior to submitting for a Building Permit you must have a Verification of Legal Parcel Status form signed by the Boise City Subdivision Department. It is the applicant's responsibility to provide deeds and/or other documentation to the Subdivision Department. See Verification of Legal Lot or Parcel Worksheet for submittal requirements.

The undersigned declares that the above provided information is true and accurate.
The undersigned acknowledges that failure to provide true and accurate information may result in rejection of this application, possible revocation of the permit where wrongfully issued and subject the undersigned any applicable civil and/or criminal penalties.

Agent/Representative Signature:

Date:

ATTN: **City of Boise Planning & Development Services**
FROM: Jeremy Telford | Arete Investments Group, LLC
DATE: May 31st, 2016
REGARDING: Echelon Ridge Subdivision | 3.66 Acres in to 28 Townhome Lots

Arete Investments Group, LLC is submitting the following applications to subdivide 3.66 Acres into 28 Townhome Lots—to be built as Paired Townhome:

- PUD Application
- Subdivision Application
- Hillside & Foothills Development Application
- Variance Application

The property is located at the intersection of Federal Way and Amity Road in the Southeast area of Boise. Our intention is to build 28 Paired Townhomes (no middle units) that will have a strong architectural variety of mixed sizes and elevations. The design style will be similar to elevations found in Harris Ranch, Bown Crossing and Surprise Valley. Homes will range from 1900 to 2500 square feet with 2-3 stories of living space in each. Our anticipated selling price will be around $300,000.

There is a mild slope to the property and excellent views for future residents. We plan to take advantage of these views by building three tiers of buildings, cascading in 20′ +/- increments. This will allow for up to two outdoor patios in each residence—each with unobstructed views across the Treasure Valley.

This land was assembled through the purchase of five smaller parcels that, together, have solved a previously insurmountable ACHD access issue. The proposed access point has been aligned with an existing driveway (Maverik) across Amity Road, of which ACHD has been favorable. There is a 6″ existing sewer connection at the base of the property that will upsized to an 8″ line and there is a 12″ Suez Water main on site. There is no irrigation water available so all landscaping on the property will be designed with water conservation in mind.

Drainage facilities will be built on site to manage and contain all storm water and disseminate the runoff through a seepage bed at the base of the property. This will be designed as part of the Hillside Requirement and will retain all roof and landscape water. We will also work with Motive Power to ensure its continued access to the ground water (plume) monitoring wells that exist on site.

The roadway will be a shared private drive and will be wide enough to facilitate a ladder-enabled fire truck (26′ per Boise Fire) that can access a building exceeding 30 feet in height. Fire hydrants and 150′ 360 degree hose access have been accounted for as well as Idaho Power transformer stations and street light locations.

Thank you for your consideration. If you have any questions, please feel free to contact me.

Jeremy Telford, Manager
208.577.0225 | Jeremy@JeremyTelford.com

Planning & Development Services

Boise City Hall, 2nd Floor
150 N. Capitol Boulevard
P. O. Box 500
Boise, Idaho 83701-0500

Phone: 208/384-3830
Fax: 208/384-3753
TDD/TTY: 800/377-3529
Website: www.cityofboise.org/pds

Affidavit of Legal Interest

State of Idaho)
) ss
County of Ada)

I, Jeremy Telford, Manager of Arete Investments Group, LLC, 2048 W. Astonte St.
Name **Address**

Merdiain, Idaho
City **State**

being first duly sworn upon oath, depose and say:

(If Applicant is also Owner of Record, skip to B)

A. That I am the record owner of the property described on the attached, and I grant my permission to _____ _____
Name Address
to submit the accompanying application pertaining to that property.

B. I agree to indemnify, defend and hold Boise City and its employees harmless from any claim or liability resulting from any dispute as to the statements contained herein or as to the ownership of the property which is the subject of the application.

Dated this 31st day of May, 20 16

Signature

Subscribed and sworn to before me the day and year first above written.

April Ashby
Notary Public for Idaho

APRIL ASHBY NOTARY PUBLIC STATE OF IDAHO

Residing at: RESIDING IN KUNA, ID

My commission expires: COMMISSION EXPIRES 1-24-18

MATERIALS TESTING & INSPECTION

❑ Environmental Services ❑ Geotechnical Engineering ❑ Construction Materials Testing ❑ Special Inspections

GEOTECHNICAL ENGINEERING REPORT
of
Amity Ridge Development
East Amity Road and South Federal Way
Boise, ID

Prepared for:

Arete Investments Group, LLC
2048 West Astonte Street
Meridian, ID 83646

MTI File Number B1513296

2791 S Victory View Way • Boise, ID 83709 • (208) 376-4748 • Fax (208) 322-6515
www.mti-id.com • mti@mti-id.com

❑ Environmental Services ❑ Geotechnical Engineering ❑ Construction Materials Testing ❑ Special Inspections

Mr. Jeremy Telford
Arete Investments Group, LLC
2048 West Astonte Street
Meridian, ID 83646

Re: Geotechnical Engineering Report
Amity Ridge Development
East Amity Road and South Federal Way
Boise, ID

Dear Mr. Telford:

In compliance with your instructions, MTI has conducted a soils exploration and foundation evaluation for the above referenced development. Fieldwork for this investigation was conducted on 11 January 2016. Data have been analyzed to evaluate pertinent geotechnical conditions. Results of this investigation, together with our recommendations, are to be found in the following report. We have provided a PDF copy for your review and distribution.

Often, questions arise concerning soil conditions because of design and construction details that occur on a project. MTI would be pleased to continue our role as geotechnical engineers during project implementation. Additionally, MTI can provide materials testing and special inspection services during construction of this project. If you will advise us of the appropriate time to discuss these engineering services, we will meet with you at your convenience.

MTI appreciates this opportunity to be of service to you and looks forward to working with you in the future. If you have questions, please call (208) 376-4748.

Respectfully Submitted,
Materials Testing & Inspection, Inc.

REGISTERED PROFESSIONAL GEOLOGIST
KEVIN L. SCHROEDER
18 Jan 2016
964
STATE OF IDAHO

Kevin L. Schroeder, P.G.
Geotechnical Services Manager

Reviewed by: Monica Saculles, P.E.
Geotechnical Engineer

PROFESSIONAL ENGINEER
LICENSED
14919
1-18-16
STATE OF IDAHO
MONICA SACULLES

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INTRODUCTION

This report presents results of a geotechnical investigation and analysis in support of data utilized in design of structures as defined in the 2012 International Building Code (IBC). Information in support of groundwater and stormwater issues pertinent to the practice of Civil Engineering is included. Observations and recommendations relevant to the earthwork phase of the project are also presented. Revisions in plans or drawings for the proposed development from those enumerated in this report should be brought to the attention of the soils engineer to determine whether changes in the provided recommendations are required. Deviations from noted subsurface conditions, if encountered during construction, should also be brought to the attention of the soils engineer.

Project Description

The proposed development is within the southeastern portion of the City of Boise, Ada County, ID, and occupies a portion of the SE¼SW¼ of Section 25, Township 3 North, Range 2 East, Boise Meridian. The project is to consist of construction of roughly thirty multi-story residential apartment structures with garage/basement levels, to be developed with spread/continuous footings and concrete floor slabs. Total settlements are limited to 1 inch. Loads of up to 4,000 pounds per lineal foot for wall footings, and column loads of up to 50,000 pounds were assumed for settlement calculations. Additionally, assumptions have been made for traffic loading of pavements. Retaining walls are anticipated as part of the project in the form of basement and garage walls. MTI has not been informed of the proposed grading plan.

Authorization

Authorization to perform this exploration and analysis was given in the form of a written authorization to proceed from Mr. Jeremy Telford of Arete Investments Group, LLC to Kevin L. Schroeder of Materials Testing and Inspection, Inc. (MTI), on 30 November 2015. Said authorization is subject to terms, conditions, and limitations described in the Professional Services Contract entered into between Arete Investments Group, LLC and MTI. Our scope of services for the proposed development has been provided in our proposal dated 18 November 2015 and repeated below.

Purpose

The purpose of this Geotechnical Engineering Report is to determine various soil profile components and their engineering characteristics for use by either design engineers or architects in:

- Preparing or verifying suitability of foundation design and placement
- Preparing site drainage designs
- Indicating issues pertaining to earthwork construction
- Preparing light and heavy duty pavement section design requirements

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Scope of Investigation

The scope of this investigation included review of geologic literature and existing available geotechnical studies of the area, visual site reconnaissance of the immediate site, subsurface exploration of the site, field and laboratory testing of materials collected, and engineering analysis and evaluation of foundation materials.

Warranty and Limiting Conditions

MTI warrants that findings and conclusions contained herein have been formulated in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology only for the site and project described in this report. These engineering methods have been developed to provide the client with information regarding apparent or potential engineering conditions relating to the site within the scope cited above and are necessarily limited to conditions observed at the time of the site visit and research. Field observations and research reported herein are considered sufficient in detail and scope to form a reasonable basis for the purposes cited above.

Exclusive Use

This report was prepared for exclusive use of the property owner(s), at the time of the report, and their retained design consultants ("Client"). Conclusions and recommendations presented in this report are based on the agreed-upon scope of work outlined in this report together with the Contract for Professional Services between the Client and Materials Testing and Inspection, Inc. ("Consultant"). Use or misuse of this report, or reliance upon findings hereof, by parties other than the Client is at their own risk. Neither Client nor Consultant make representation of warranty to such other parties as to accuracy or completeness of this report or suitability of its use by such other parties for purposes whatsoever, known or unknown, to Client or Consultant. Neither Client nor Consultant shall have liability to indemnify or hold harmless third parties for losses incurred by actual or purported use or misuse of this report. No other warranties are implied or expressed.

Report Recommendations are Limited and Subject to Misinterpretation

There is a distinct possibility that conditions may exist that could not be identified within the scope of the investigation or that were not apparent during our site investigation. Findings of this report are limited to data collected from noted explorations advanced and do not account for unidentified fill zones, unsuitable soil types or conditions, and variability in soil moisture and groundwater conditions. To avoid possible misinterpretations of findings, conclusions, and implications of this report, MTI should be retained to explain the report contents to other design professionals as well as construction professionals.

Since actual subsurface conditions on the site can only be verified by earthwork, note that construction recommendations are based on general assumptions from selective observations and selective field exploratory sampling. Upon commencement of construction, such conditions may be identified that require corrective actions, and these required corrective actions may impact the project budget. Therefore, construction recommendations in this report should be considered preliminary, and MTI should be retained to observe actual subsurface conditions during earthwork construction activities to provide additional construction recommendations as needed.

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Since geotechnical reports are subject to misinterpretation, **do not** separate the soil logs from the report. Rather, provide a copy of, or authorize for their use, the complete report to other design professionals or contractors. Locations of exploratory sites referenced within this report should be considered approximate locations only. For more accurate locations, services of a professional land surveyor are recommended.

This report is also limited to information available at the time it was prepared. In the event additional information is provided to MTI following publication of our report, it will be forwarded to the client for evaluation in the form received.

Environmental Concerns

Comments in this report concerning either onsite conditions or observations, including soil appearances and odors, are provided as general information. These comments are not intended to describe, quantify, or evaluate environmental concerns or situations. Since personnel, skills, procedures, standards, and equipment differ, a geotechnical investigation report is not intended to substitute for a geoenvironmental investigation or a Phase II/III Environmental Site Assessment. If environmental services are needed, MTI can provide, via a separate contract, those personnel who are trained to investigate and delineate soil and water contamination.

SITE DESCRIPTION

Site Access

Access to the site may be gained via Interstate 84 to the Broadway exit. Continue northeast on Broadway Avenue for approximately 0.5 mile to its intersection with Federal Way. Proceed southeast on Federal Way approximately 1.5 miles to its intersection with Amity Road. The site occupies the northern corner of this intersection. Presently the site exists as a vacant lot. The location is depicted on site map plates included in the **Appendix**.

Regional Geology

The project site is located within the western Snake River Plain of southwestern Idaho and eastern Oregon. The plain is a northwest trending rift basin, about 45 miles wide and 200 miles long, that developed about 14 million years ago (Ma) and has since been occupied sporadically by large inland lakes. Geologic materials found within and along the plain's margins reflect volcanic and fluvial/lacustrine sedimentary processes that have led to an accumulation of approximately 1 to 2 km of interbedded volcanic and sedimentary deposits within the plain. Along the margins of the plain, streams that drained the highlands to the north and south provided coarse to fine-grained sediments eroded from granitic and volcanic rocks, respectively. About 2 million years ago the last of the lakes was drained and since that time fluvial erosion and deposition has dominated the evolution of the landscape. The project site is underlain by "Gravel of Sunrise Terrace" as mapped by Othberg and Stanford (1993). The Sunrise terrace is the third terrace above the modern Boise River in the eastern Boise Valley, composed of sandy pebble and cobble gravel, and is about 115 feet above river level. Quaternary faulting has probably truncated and tilted this terrace along with older surfaces. The surface of this deposit is mantled with 3-7 feet of loess containing a weakly to moderately developed duripan. Based on stratigraphic correlation the Sunrise terrace may be correlative with the Wilder terrace further to the west.

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General Site Characteristics

We understand this proposed development consists of approximately 3.5 acres of relatively steep terrain in the eastern portion of the site and relatively flat and level land in the western portion of the site. The site has a flat plateau on the south-western portion of the site. Cut slopes and an open drainage swale were encountered along the western edge of the property. Slopes as steep as roughly 1.2:1 exist through the northern and eastern portions of the site. Throughout the majority of the site, surficial materials consist of silt fills underlain by native silty sand and lean clay soils. Vegetation primarily consists of sagebrush, bunchgrass, and other native grass varieties typical of arid to semi-arid environments.

Regional drainage is north toward the Boise River. Stormwater drainage for the site is achieved by both sheet runoff and percolation through surficial soils. Runoff predominates for the steeper slopes while percolation prevails across the gently sloping and near level areas. The site is situated so that it is unlikely that it will receive any stormwater drainage from off-site sources. Stormwater drainage collection and retention systems are not in place on the project site and were not noted within the vicinity of the project site.

Regional Site Climatology and Geochemistry

According to the Western Regional Climate Center, the average precipitation for the Treasure Valley is on the order of 10 to 12 inches per year, with an annual snowfall of approximately 20 inches and a range from 3 to 49 inches. The monthly mean daily temperatures range from 21°F to 95°F, with daily extremes ranging from -25°F to 111°F. Winds are generally from the northwest or southeast with an annual average wind speed of approximately 9 miles per hour (mph) and a maximum of 62 mph. Soils and sediments in the area are primarily derived from siliceous materials and exhibit low electro-chemical potential for corrosion of metals or concretes. Local aggregates are generally appropriate for Portland cement and lime cement mixtures. Surface water, groundwater, and soils in the region typically have pH levels ranging from 7.2 to 8.2.

Geoseismic Setting

Soils on site are classed as Site Class D in accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) publication ASCE/SEI 7-10. Structures constructed on this site should be designed per IBC requirements for such a seismic classification. Our investigation did not reveal hazards resulting from potential earthquake motions including: slope instability, liquefaction, and surface rupture caused by faulting or lateral spreading. Incidence and anticipated acceleration of seismic activity in the area is low.

SOILS EXPLORATION

Exploration and Sampling Procedures

Field exploration conducted to determine engineering characteristics of subsurface materials included a reconnaissance of the project site and investigation by test pit at approximate locations requested by the design team. Test pit sites were located in the field by means of visual approximation from on-site features or known locations and are presumed to be accurate to within a few feet. Upon completion of investigation,

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each test pit was backfilled with loose excavated materials. Re-excavation and compaction of these test pit areas are required prior to construction of overlying structures.

In addition, samples were obtained from representative soil strata encountered. Samples obtained have been visually classified in the field by professional staff, identified according to test pit number and depth, placed in sealed containers, and transported to our laboratory for additional testing. Subsurface materials have been described in detail on logs provided in the **Appendix**. Results of field and laboratory tests are also presented in the **Appendix**. MTI recommends that these logs **not** be used to estimate fill material quantities.

Laboratory Testing Program

Along with our field investigation, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of subsurface materials necessary in an analysis of anticipated behavior of the proposed structures. Laboratory tests were conducted in accordance with current applicable American Society for Testing and Materials (ASTM) specifications, and results of these tests are to be found on the accompanying logs located in the **Appendix**. The laboratory testing program for this report included: Atterberg Limits Testing – ASTM D4318 and Grain Size Analysis – ASTM C117/C136.

Soil and Sediment Profile

The profile below represents a generalized interpretation for the project site. Note that on site soils strata, encountered between test pit locations, may vary from the individual soil profiles presented in the logs, which can be found in the **Appendix**.

The materials encountered during exploration were quite typical for the geologic area mapped as Gravel of Sunrise Terrace. Fill materials were visually noted at the surface of the southwestern most portion of the site; some of which have been graded relatively flat, and some that have been left in piles. The graded materials may have been near surface waste from development of the Amity and Federal Way projects. Piled materials contained more granular materials, most likely from a nearby site.

The first native soils encountered in our excavations consisted of lean clays or silts. These were dark brown in color, commonly exhibited moisture contents of slightly moist, and had consistencies that varied from stiff to hard. Organic materials were noted to range in depth from roughly 0.1 to 0.4 foot. At the time of our investigation, the upper several inches of this horizon appeared frozen. Additionally, this layer appears to thicken to the north. Beneath these soils we exposed silt to sandy silt soils that were tan to light brown, slightly moist, and stiff to hard. In test pit 1, the sand content appeared to increase with depth.

The more deeply developed sediments consisted of silty gravels to poorly graded gravel with sands. These were light brown to tan or grayish, and may include some iron staining as in test pit 4. Additionally, these were found to be dry in moisture content, and varied from medium dense to very dense in relative density. Significant calcic cementation was noted through portions of the silty gravels along the southern portion of the site. These were essentially absent in test pit 3 to the north. Areas with cementation were classified as dense to very dense, and we met with refusal in test pits 1 and 2, at depths of 5.9 and 6.9 feet, respectively. Test pit 4 contained sediments classed as weak to moderate in cementation content, and we were able to

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penetrate this layer at this location. With depth we encountered the poorly graded gravels with sands of this terrace, and remained in them to termination depths in both test pits 3 and 4. Rock clasts were found to be subrounded to rounded and increased in size with depth from 4-inch-minus to boulder size, as noted in test pit 3.

Competency of test pit walls varied little across the site. In general, fine grained soils remained stable while more granular sediments exhibited some sloughing with advancement. Moisture contents will also affect wall competency with saturated soils having a tendency to more readily slough when under load and unsupported.

Volatile Organic Scan

No environmental concerns were identified prior to commencement of the investigation. Therefore, soils obtained during on-site activities were not assessed for volatile organic compounds by portable photoionization detector. Samples obtained during our exploration activities exhibited no odors or discoloration typically associated with this type of contamination. No groundwater was encountered.

SITE HYDROLOGY

Existing surface drainage conditions are defined in the **General Site Characteristics** section. Information provided in this section is limited to observations made at the time of the investigation. Either regional or local ordinances may require information beyond the scope of this report.

Groundwater

During this field investigation, groundwater was not encountered in test pits advanced to a maximum depth of 16.2 feet bgs through the upper portion of the site, in test pit 3, and 7.9 feet of depth along the lower sloped area. Soil moistures in the test pits were generally slightly moist through the shallower soils, and dry through the deeper gravels. In the vicinity of the project site, groundwater levels are controlled in large part by residential and commercial irrigation activity and leakage from nearby canals. Maximum groundwater elevations likely occur during the later portion of the irrigation season. During previous investigations performed in November 2006, September 2013, December 2014, and May of 2015, and within approximately ½-mile of the project site, no evidence of groundwater was noted within numerous borings and test pits advanced to depths as great as 11.0 to 21.5 feet bgs.

Based on evidence of this investigation and background knowledge of the area, MTI estimates groundwater depths to remain greater than approximately 15 feet bgs throughout the year, for the lower portions of the site. However, this depth can be confirmed if access to information from the site piezometer wells can be obtained, or through long-term groundwater monitoring.

Soil Infiltration Rates

Soil permeability, which is a measure of the ability of a soil to transmit a fluid, was not tested in the field. Given the absence of direct measurements, for this report an estimation of infiltration is presented using generally recognized values for each soil type and gradation. Of soils comprising the generalized soil profile

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for this study, lean clay and silt soils generally offer little permeability, with typical hydraulic infiltration rates of less than 2 inches per hour. Silt with sand to sandy silt soils will commonly exhibit infiltration rates from 2 to 4 inches per hour. Silty gravel sediments usually display rates of 4 to 8 inches per hour; though calcium carbonate cementation may reduce this value to near zero. Poorly graded gravel with sand sediments typically exhibit infiltration values in excess of 12 inches per hour. Infiltration testing is generally not required within these sediments because of their free-draining nature.

It is recommended that infiltration facilities constructed on the site be extended into native poorly graded gravel with sand sediments. Excavation depths of approximately 5 to 8 feet bgs should be anticipated to expose these poorly graded gravel with sand sediments. Because of the high soil permeability, ASTM C33 filter sand, or equivalent, should be incorporated into design of infiltration facilities. An infiltration rate of 8 inches per hour should be used in design. Actual infiltration rates should be confirmed at the time of construction.

SLOPES AND SETBACKS

Native and cut slopes steeper than 3 feet horizontal to 1 foot vertical (3:1) are relatively common in the immediate area as well as on the project site. For structures to be constructed near slopes like these, it is necessary to apply slope setback requirements as outlined in the IBC. No potential slope stability deficiencies were noted during the investigation.

Soils onsite are not sufficiently stable to allow vertical cuts greater than 4 feet to stand for an extended period of time. Soils in the project vicinity are stable at a 2:1 gradient. However, soil types throughout the area are variable, and existing slopes will be dependent upon soil composition. Proposed cut-fill sections constructed from these soils should not be steeper than 2:1. Cut slopes in fine-grained soil are stable on a 1.5:1 slope with respect to mass movement and downslope creep. Fill slopes should be placed and compacted in a controlled manner as detailed in the **Structural Fill** section of this report. Fills to be constructed on existing slopes steeper than **20 percent** (approximately 5:1) should be benched a minimum of 10 feet into competent native soils.

To ensure slope stability with respect to surficial movement and gullying, cohesive soils should be placed on the face of slopes. This will help limit downslope creep and aid in re-vegetation of slope surfaces. When slopes are steeper than 2:1, soils must be aggressively protected from erosion. More granular soils will require an even greater degree of protection.

Setbacks from constructed slopes should adhere to provisions of Section 1808.7 of the 2012 IBC. Footing loads on soil masses adjacent to slopes must be set back in accordance with the provisions of the IBC. For buildings constructed above slopes steeper than 3:1, the horizontal setback distance from the face of slope to the face of an upslope footing must be no less than ⅓ the vertical height of the total slope, however, need not exceed 40 feet. Benches or steps in the slope do not modify slope height. For buildings constructed below slopes steeper than 3:1, the horizontal setback distance from the toe of the slope to the face of a downslope structure must be no less than ½ the vertical height of the total slope, however, need not exceed 15 feet.

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Retaining walls can be constructed to alter the dimensional parameters of a slope. The top of the retaining wall constitutes the toe of the slope, and slope height is determined from the top of wall. Downslope setback requirements can be reduced to zero if the retaining wall reduces the upslope gradient to 3:1 or flatter. Because upslope setbacks are determined at footing elevation, top of slope setbacks can be managed through the footing depth. In some cases, it may be desirable to use a foundation based on tip bearing piles or caissons to achieve greater footing depths.

Setback requirements for pools are ½ those required for structures. Additionally, pools with portions of their walls within 7 feet of the top of the slope must be capable of supporting pool water without soil support.

LATERAL EARTH PRESSURES

Retaining, below-grade, or basement walls will be subject to lateral earth pressures. The magnitude of earth pressure is a function of both type and compaction of backfill behind walls within the "active" zone, and allowable rotation of the top of the wall. The active zone is defined as the wedge of soil between the surface of the wall and a plane inclined 28 degrees from vertical passing through the base of the wall. All clayey soils must be completely removed from within the active zone. The following recommendations should be used when dealing with lateral earth pressures on a gravity block: 1) a sliding frictional coefficient of 0.45 is appropriate considering native silty gravel to poorly graded gravel with sand (GM/GP) sediments, and 2) a sliding frictional coefficient of 0.45 is appropriate considering granular structural fill (SP/GP) under typical conditions.

A state of plastic equilibrium is when the subject material is considered to be 1) homogeneous and unbounded and 2) at the point of incipient instability. This state is evaluated on the basis of unit weight, mechanical properties, and the definition of instability. For the purpose of this report, it is assumed that native relatively free draining soils and imported granular fill material will be the materials of concern regarding lateral earth pressures. If other materials are considered for use, MTI must be contacted to provide alternate lateral earth pressure information. Furthermore, changes in natural soil moisture, such as can be imposed by site stormwater systems, can change the values listed below.

Below-grade restrained walls, such as basement walls, should be designed based on at-rest pressures. Active pressures are appropriate under conditions where the wall moves or rotates away from the soil mass at failure. Passive pressures are used for conditions where the wall moves toward the soil mass at failure. Rotation, or lateral movement, of the top of the wall equal to 0.001 times the height of the wall will be necessary for on-site soil backfill to achieve an "active" loading condition. Lateral movement of the top of the wall equal to 0.001 times the height of the wall will be necessary for the "active" pressure condition for imported SP/GP structural backfill.

Retaining Wall Backfill Materials

For lateral earth pressure analysis, MTI anticipates that the soils of interest will be the native silt to sandy silt (ML) soils or silty gravel to poorly graded gravel with sand (GM/GP) sediments encountered between 2.5 and

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6 feet bgs in the test pits. Clay soils are not suitable for use as backfill on the soil side of walls. For ML and GM soils, the following values are applicable under non-surcharged, drained conditions.

Lateral Earth Pressure Values for Native Soil

Soil Type: Silt to Sandy Silt			
Internal Friction Angle:	28 °	Dry Unit Weight:	100 pcf
Cohesion:	100 psf	Buoyant Unit Weight:	58 pcf
Natural Void Ratio:	0.5	Natural Moisture:	16 %
At rest lateral earth pressure:	62 pcf[1]		K_o= 0.5
Active lateral earth pressure:	42 pcf[1]		K_a= 0.4
Passive lateral earth pressure:	321 pcf[1]		K_p= 2.8

[1]Lateral earth pressure values are in pounds per square foot, per foot of wall (psf/ft). Alternately, the values presented may also be considered as equivalent fluid with units of pounds per cubic foot (pcf).

Lateral Earth Pressure Values for Native Soil

Soil Type: Silty Gravel			
Internal Friction Angle:	35 °	Dry Unit Weight:	120 pcf
Cohesion:	100 psf	Buoyant Unit Weight:	78 pcf
Natural Void Ratio:	0.5	Natural Moisture:	10 %
At rest lateral earth pressure:	56 pcf[1]		K_o= 0.4
Active lateral earth pressure:	36 pcf[1]		K_a= 0.3
Passive lateral earth pressure:	487 pcf[1]		K_p= 3.7

[1]Lateral earth pressure values are in pounds per square foot, per foot of wall (psf/ft). Alternately, the values presented may also be considered as equivalent fluid with units of pounds per cubic foot (pcf).

Native GP and imported, compacted, structural material, which is must be used to backfill the soil side of walls, must demonstrate the following characteristics:

Lateral Earth Pressure Values for Fill Materials

Soil Type: Compacted Sandy Gravel / Native Gravel			
Internal Friction Angle:	35 °	Dry Unit Weight:	128 pcf
Cohesion:	NA	Buoyant Unit Weight:	83 pcf
Natural Void Ratio:	0.4	Natural Moisture:	5 %
At rest lateral earth pressure:	57 pcf[1]		K_o= 0.4
Active lateral earth pressure:	36 pcf[1]		K_a= 0.3
Passive lateral earth pressure:	496 pcf[1]		K_p= 3.7

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[1]Lateral earth pressure values are in pounds per square foot, per foot of wall (psf/ft). Alternately, the values presented may also be considered as equivalent fluid with units of pounds per cubic foot (pcf).

In the case that another material is used for backfill, MTI should be consulted for alternate lateral earth pressure values. Granular structural fill should consist of 4-inch-minus select, clean, granular soil with no more than 30 percent oversize (greater than ¾-inch) material and no more than 5 percent fines (passing the No. 200 sieve). Retaining wall and basement backfill must be placed in accordance with recommendations in the **Structural Fill** section of this report and must be properly compacted and tested.

Lateral earth pressure values do not incorporate specific factors of safety, and are only applicable for non-surcharged, drained conditions. Factors of safety, if applicable, should be integrated into the structural design of the wall. The preceding values are presented for idealized conditions relating to simple shallow structures. For complex structures, deep structures, or structures with significant perimeter landscaping, a soils engineer should be retained as part of the design team in developing appropriate project design parameters and construction specifications.

Retaining Wall Drainage

MTI recommends that a drainage system be incorporated into the retained soil mass. This can be accomplished by installing wall and toe drains as a part of each soil-supporting wall system. In areas where there is potential for significantly high soil moistures within the supported soil mass, installation of drains within the soil mass is recommended. Particular consideration of roof drain effluent and irrigation water must be made. Further, these drainage systems must be separate from other retaining wall/foundation systems. If the granular structural fill option to reduce lateral pressures is used, a compacted low permeability soil cap is recommended within the upper 2 feet of the surface to limit surface water infiltration behind the walls.

FOUNDATION, SLAB, AND PAVEMENT DISCUSSION AND RECOMMENDATIONS

Various foundation types have been considered for support of the proposed structures. Two requirements must be met in the design of foundations. First, the applied bearing stress must be less than the ultimate bearing capacity of foundation soils to maintain stability. Second, total and differential settlement must not exceed an amount that will produce an adverse behavior of the superstructure. Allowable settlement is usually exceeded before bearing capacity considerations become important; thus, allowable bearing pressure is normally controlled by settlement considerations.

Considering subsurface conditions and the proposed construction, it is recommended that the structures be founded upon conventional spread footings and continuous wall footings. Total settlements should not exceed 1 inch if the following design and construction recommendations are observed. Presently, there are approximately 30 residential apartment structures proposed for the project site. The following recommendations are not specific to the individual structures, but rather should be viewed as guidelines for the subdivision – wide development.

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Foundation Design Recommendations

Based on data obtained from the site and test results from various laboratory tests performed, MTI recommends the following guidelines for the net allowable soil bearing capacity:

Soil Bearing Capacity

Footing Depth	ASTM D1557 Subgrade Compaction	Net Allowable Soil Bearing Capacity
Footings must bear on competent, undisturbed, native silt to silty sand soils or compacted structural fill. Existing lean clay or organic soils, or fill materials must be completely removed from below foundation elements.[1] Excavation depths ranging from roughly 1 to 3 feet bgs should be anticipated to expose proper bearing soils.[2]	Not Required for Native Soil 95% for Structural Fill	2,000 lbs/ft^2 A ⅓ increase is allowable for short-term loading, which is defined by seismic events or designed wind speeds.
Footings must bear on competent, undisturbed, native silty gravels, poorly graded gravels with sand or compacted structural fill. Existing lean clay or silt soils, or fill materials must be completely removed from below foundation elements.[1] Excavation depths ranging from roughly 2.5 to 6 feet bgs should be anticipated to expose proper bearing soils.	95% Required for Native Soil and Structural Fill	4,000 lbs/ft^2 A ⅓ increase is allowable for short-term loading, which is defined by seismic events or designed wind speeds.

[1] It will be required for MTI personnel to verify the bearing soil suitability for each structure at the time of construction.
[2] Depending on the time of year construction takes place, the subgrade soils may be unstable because of high moisture contents. If unstable conditions are encountered, over-excavation and replacement with granular structural fill and/or use of geotextiles may be required.

Footings should be proportioned to meet either the stated soil bearing capacity or the 2012 IBC minimum requirements. Total settlement should be limited to approximately 1 inch, and differential settlement should be limited to approximately ½ inch. Objectionable soil types encountered at the bottom of footing excavations should be removed and replaced with structural fill. Excessively loose or soft areas that are encountered in the footings subgrade will require over-excavation and backfilling with structural fill. To minimize the effects of slight differential movement that may occur because of variations in the character of supporting soils and seasonal moisture content, MTI recommends continuous footings be suitably reinforced to make them as rigid as possible. For frost protection, the bottom of external footings should be 30 inches below finished grade.

Floor, Patio, and Garage Slab-on-Grade

Uncontrolled fill was encountered in portions of the site. MTI recommends that these fill materials be excavated to a sufficient depth to expose competent native soils, or to a minimum depth of 1½ feet below finished subgrade. If fill materials remain after over-excavation, the exposed subgrade must be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. MTI personnel must be present during excavation to identify these materials.

Organic, loose, or obviously compressive materials must be removed prior to placement of concrete floors or floor-supporting fill. In addition, the remaining subgrade should be treated in accordance with guidelines

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presented in the **Earthwork** section. Areas of excessive yielding should be excavated and backfilled with structural fill. Fill used to increase the elevation of the floor slab should meet requirements detailed in the **Structural Fill** section. Fill materials must be compacted to a minimum 95 percent of the maximum dry density as determined by ASTM D1557.

A free-draining granular mat (drainage fill course) should be provided below slabs-on-grade. This should be a minimum of 4 inches in thickness and properly compacted. The mat should consist of a sand and gravel mixture, complying with Idaho Standards for Public Works Construction (ISPWC) specifications for ¾-inch (Type 1) crushed aggregate. A moisture-retarder should be placed beneath floor slabs to minimize potential ground moisture effects on moisture-sensitive floor coverings. The moisture-retarder should be at least 15-mil in thickness and have a permeance of less than 0.01 US perms as determined by ASTM E96. Placement of the moisture-retarder will require special consideration with regard to effects on the slab-on-grade and should adhere to recommendations outlined in the ACI 302.1R and ASTM E1745 publications. The granular mat should be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D1557. Upon request, MTI can provide further consultation regarding installation.

Recommended Pavement Sections

MTI has made assumptions for traffic loading variables based on the character of the proposed construction. The Client shall review and understand these assumptions to make sure they reflect intended use and loading of pavements both now and in the future. Based on experience with soils in the region, a subgrade California Bearing Ratio (CBR) value of 4 has been assumed for near-surface clay soils on site. The following are minimum thickness requirements for assured pavement function. Depending on site conditions, additional work, e.g. soil preparation, may be required to support construction equipment.

Flexible Pavement Sections

The American Association of State Highway and Transportation Officials (AASHTO) design method has been used to calculate the following pavement sections. Calculation sheets provided in the **Appendix** indicate the soils constant, traffic loading, traffic projections, and material constants used to calculate the pavement sections. MTI recommends that materials used in the construction of asphaltic concrete pavements meet requirements of the ISPWC Standard Specification for Highway Construction. Construction of the pavement section should be in accordance with these specifications and should adhere to guidelines recommended in the section on **Construction Considerations**.

AASHTO Flexible Pavement Specifications

Pavement Section Component[1]	Driveways and Parking No Truck Access	Driveways and Parking Truck Access
Asphaltic Concrete	2.5 Inches	3.0 Inches
Crushed Aggregate Base	4.0 Inches	6.0 Inches
Structural Subbase	10.0 Inches	12.0 Inches
Compacted Subgrade	See **Pavement Subgrade Preparation** Section	See **Pavement Subgrade Preparation** Section

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[1]It will be required for MTI personnel to verify subgrade competency at the time of construction.

Asphaltic Concrete:	Asphalt mix design shall meet the requirements of ISPWC, Section 810 Class III plant mix. Materials shall be placed in accordance with ISPWC Standard Specifications for Highway Construction.
Aggregate Base:	Material complying with ISPWC Standards for Crushed Aggregate Materials.
Structural Subbase:	Granular structural fill material complying with the requirements detailed in the **Structural Fill** section of this report except that the maximum material diameter is no more than $^{2}/_{3}$ the component thickness. Gradation and suitability requirements shall be per ISPWC Section 801, Table 1.

Pavement Subgrade Preparation

Uncontrolled fill was encountered in portions of the site. MTI recommends that these fill materials be excavated to a sufficient depth to expose competent, native soils or to a minimum depth of 1½ feet below finished subgrade. If fill materials remain after over-excavation, the exposed subgrade must be compacted to at least 95 percent of the maximum dry density as determined by ASTM D698. MTI personnel must be present during excavation to identify these materials.

Common Pavement Section Construction Issues

The subgrade upon which above pavement sections are to be constructed must be properly stripped, compacted (if indicated), inspected, and proof-rolled. Proof rolling of subgrade soils should be accomplished using a heavy rubber-tired, fully loaded, tandem-axle dump truck or equivalent. Verification of subgrade competence by MTI personnel at the time of construction is required. Fill materials on the site must demonstrate the indicated compaction prior to placing material in support of the pavement section. MTI anticipated that pavement areas will be subjected to light to moderate traffic. MTI does not anticipate pumping material to become evident during compaction, but subgrade clays and silts near and above optimum moisture contents may tend to pump. Pumping or soft areas must be removed and replaced with structural fill.

Fill material and aggregates, as well as compacted native subgrade soils, in support of the pavement section must be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D698 for flexible pavements and by ASTM D1557 for rigid pavements. If a material placed as a pavement section component cannot be tested by usual compaction testing methods, then compaction of that material must be approved by observed proof rolling. Minor deflections from proof rolling for flexible pavements are allowable. Deflections from proof rolling of rigid pavement support courses should not be visually detectable.

MTI recommends that rigid concrete pavement be provided for heavy garbage receptacles. This will eliminate damage caused by the considerable loading transferred through the small steel wheels onto asphaltic concrete. Rigid concrete pavement should consist of Portland Cement Concrete Pavement (PCCP) generally adhering to ITD specifications for Urban Concrete. PCCP should be 6 inches thick on a 4-inch drainage fill course (see **Floor Slab-on-Grade** section), and should be reinforced with welded wire fabric. Control joints must be on 12-foot centers or less.

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CONSTRUCTION CONSIDERATIONS

Recommendations in this report are based upon structural elements of the project being founded on competent, undisturbed, native silt to silty sand soils, silty gravels, poorly graded gravels with sand, or compacted structural fill. Structural areas should be stripped to an elevation that exposes these soil types.

Earthwork

Excessively organic soils, deleterious materials, or disturbed soils generally undergo high volume changes when subjected to loads, which is detrimental to subgrade behavior in the area of pavements, floor slabs, structural fills, and foundations. Mature brush and thick grasses with associated root systems were noted at the time of our investigation. It is recommended that organic or disturbed soils, if encountered, be removed to depths of 1 foot (minimum), and wasted or stockpiled for later use. Stripping depths should be adjusted in the field to assure that the entire root zone or disturbed zone or topsoil are removed prior to placement and compaction of structural fill materials. Exact removal depths should be determined during grading operations by MTI personnel, and should be based upon subgrade soil type, composition, and firmness or soil stability. If underground storage tanks, underground utilities, wells, or septic systems are discovered during construction activities, they must be decommissioned then removed or abandoned in accordance with governing Federal, State, and local agencies. Excavations developed as the result of such removal must be backfilled with structural fill materials as defined in the **Structural Fill** section.

MTI should oversee subgrade conditions (i.e., moisture content) as well as placement and compaction of new fill (if required) after native soils are excavated to design grade. Recommendations for structural fill presented in this report can be used to minimize volume changes and differential settlements that are detrimental to the behavior of footings, pavements, and floor slabs. Sufficient density tests should be performed to properly monitor compaction. For structural fill beneath building structures, one in-place density test per lift for every 5,000 square feet is recommended. In parking and driveway areas, this can be decreased to one test per lift for every 10,000 square feet.

Dry Weather

If construction is to be conducted during dry seasonal conditions, many problems associated with soft soils may be avoided. However, some rutting of subgrade soils may be induced by shallow groundwater conditions related to springtime runoff or irrigation activities during late summer through early fall. Solutions to problems associated with soft subgrade soils are outlined in the **Soft Subgrade Soils** section. Problems may also arise because of lack of moisture in native and fill soils at time of placement. This will require the addition of water to achieve near-optimum moisture levels. Low-cohesion soils exposed in excavations may become friable, increasing chances of sloughing or caving. Measures to control excessive dust should be considered as part of the overall health and safety management plan.

Wet Weather

If construction is to be conducted during wet seasonal conditions (commonly from mid-November through May), problems associated with soft soils must be considered as part of the construction plan. During this time of year, fine-grained soils such as silts and clays will become unstable with increased moisture content,

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and eventually deform or rut. Additionally, constant low temperatures reduce the possibility of drying soils to near optimum conditions.

Soft Subgrade Soils

Shallow fine-grained subgrade soils that are high in moisture content should be expected to pump and rut under construction traffic. During periods of wet weather, construction may become very difficult if not impossible. The following recommendations and options have been included for dealing with soft subgrade conditions:

- Track-mounted vehicles should be used to strip the subgrade of root matter and other deleterious debris. Heavy rubber-tired equipment should be prohibited from operating directly on the native subgrade and areas in which structural fill materials have been placed. Construction traffic should be restricted to designated roadways that do not cross, or cross on a limited basis, proposed roadway or parking areas.
- Soft areas can be over-excavated and replaced with granular structural fill.
- Construction roadways on soft subgrade soils should consist of a minimum 2-foot thickness of large cobbles of 4 to 6 inches in diameter with sufficient sand and fines to fill voids. Construction entrances should consist of a 6-inch thickness of clean, 2-inch minimum, angular drain-rock and must be a minimum of 10 feet wide and 30 to 50 feet long. During the construction process, top dressing of the entrance may be required for maintenance.
- Scarification and aeration of subgrade soils can be employed to reduce the moisture content of wet subgrade soils. After stripping is complete, the exposed subgrade should be ripped or disked to a depth of 1½ feet and allowed to air dry for 2 to 4 weeks. Further disking should be performed on a weekly basis to aid the aeration process.
- Alternative soil stabilization methods include use of geotextiles, lime, and cement stabilization. MTI is available to provide recommendations and guidelines at your request.

Frozen Subgrade Soils

Prior to placement of structural fill materials or foundation elements, frozen subgrade soils must either be allowed to thaw or be stripped to depths that expose non-frozen soils and wasted or stockpiled for later use. Stockpiled materials must be allowed to thaw and return to near-optimal conditions prior to use as structural fill.

The onsite, shallow lean clay and silt soils are susceptible to frost heave during freezing temperatures. For exterior flatwork and other structural elements, adequate drainage away from subgrades is critical. Compaction and use of structural fill will also help to mitigate the potential for frost heave. Complete removal of frost susceptible soils for the full frost depth, followed by replacement with a non-frost susceptible structural fill, can also be used to mitigate the potential for frost heave. MTI is available to provide further guidance/assistance upon request.

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Structural Fill

Soils recommended for use as structural fill are those classified as GW, GP, SW, and SP in accordance with the Unified Soil Classification System (USCS) (ASTM D2487). Use of silty soils (USCS designation of GM, SM, and ML) as structural fill may be acceptable. However, use of silty soils (GM, SM, and ML) as structural fill below footings is prohibited. These materials require very high moisture contents for compaction and require a long time to dry out if natural moisture contents are too high and may also be susceptible to frost heave under certain conditions. Therefore, these materials can be quite difficult to work with as moisture content, lift thickness, and compactive effort becomes difficult to control. If silty soil is used for structural fill, lift thicknesses should not exceed 6 inches (loose), and fill material moisture must be closely monitored at both the working elevation and the elevations of materials already placed. Following placement, silty soils must be protected from degradation resulting from construction traffic or subsequent construction.

Recommended granular structural fill materials, those classified as GW, GP, SW, and SP, should consist of a 6-inch minus select, clean, granular soil with no more than 50 percent oversize (greater than ¾-inch) material and no more than 12 percent fines (passing No. 200 sieve). These fill materials should be placed in layers not to exceed 12 inches in loose thickness. Prior to placement of structural fill materials, surfaces must be prepared as outlined in the **Construction Considerations** section. Structural fill material should be moisture-conditioned to achieve optimum moisture content prior to compaction. For structural fill below footings, areas of compacted backfill must extend outside the perimeter of the footings for a distance equal to the thickness of fill between the bottom of foundation and underlying soils, or 5 feet, whichever is less. All fill materials must be monitored during placement and tested to confirm compaction requirements, outlined below, have been achieved.

Each layer of structural fill must be compacted, as outlined below:

- Below Structures and Rigid Pavements: A minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
- Below Flexible Pavements: A minimum of 92 percent of the maximum dry density as determined by ASTM D1557 or 95 percent of the maximum dry density as determined by ASTM D698.

The ASTM D1557 test method must be used for samples containing up to 40 percent oversize (greater than ¾-inch) particles. If material contains more than 40 percent but less than 50 percent oversize particles, compaction of fill must be confirmed by proof rolling each lift with a 10-ton vibratory roller (or equivalent) until the maximum density has been achieved. Density testing must be performed after each proof rolling pass until the in-place density test results indicate a drop (or no increase) in the dry density, defined as maximum density or "break over" point. The number of required passes should be used as the requirements on the remainder of fill placement. Material should contain sufficient fines to fill void spaces, and must not contain more than 50 percent oversize particles.

Backfill of Walls

Backfill materials must conform to the requirements of structural fill, as defined in this report. For wall heights greater than 2.5 feet, the maximum material size should not exceed 4 inches in diameter. Placing

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oversized material against rigid surfaces interferes with proper compaction, and can induce excessive point loads on walls. Backfill shall not commence until the wall has gained sufficient strength to resist placement and compaction forces. Further, retaining walls above 2.5 feet in height shall be backfilled in a manner that will limit the potential for damage from compaction methods and/or equipment. It is recommended that only small hand-operated compaction equipment be used for compaction of backfill within a horizontal distance equal to the height of the wall, measured from the back face of the wall.

Backfill should be compacted in accordance with the specifications for structural fill, except in those areas where it is determined that future settlement is not a concern, such as planter areas. In nonstructural areas, backfill must be compacted to a firm and unyielding condition.

Excavations

Shallow excavations that do not exceed 4 feet in depth may be constructed with side slopes approaching vertical. Below this depth, it is recommended that slopes be constructed in accordance with Occupational Safety and Health Administration (OSHA) regulations, Section 1926, Subpart P. Based on these regulations, on-site soils are classified as type "C" soil, and as such, excavations within these soils should be constructed at a maximum slope of 1½ feet horizontal to 1 foot vertical (1½:1) for excavations up to 20 feet in height. Excavations in excess of 20 feet will require additional analysis. Note that these slope angles are considered stable for short-term conditions only, and will not be stable for long-term conditions.

During the subsurface exploration, test pit sidewalls generally exhibited little indication of collapse; however, sloughing of native coarse granular sediments from test pit sidewalls was observed. For deep excavations, native granular sediments cannot be expected to remain in position. These materials are prone to failure and may collapse, thereby undermining upper soil layers. This is especially true when excavations approach depths near the water table. Care must be taken to ensure that excavations are properly backfilled in accordance with procedures outlined in this report.

Somewhat shallow soil cementation (caliche) was observed through portions of the site and may cause difficulties during foundation development and utility placement. Additionally, it would appear that portions of the site will undergo significant sculpting, and may bring these formations near to the surface. Cemented soils should be anticipated through the southern to possibly the center of the site at depths of 5 to 8 feet bgs.

Groundwater Control

Groundwater was not encountered during the investigation and is anticipated to be below the depth of construction. Special precautions may be required for control of surface runoff and subsurface seepage. It is recommended that runoff be directed away from open excavations. Silty or clayey soils may become soft and pump if subjected to excessive traffic during time of surface runoff. Ponded water in construction areas should be drained through methods such as trenching, sloping, crowning grades, nightly smooth drum rolling, or installing a French drain system. Additionally, temporary or permanent driveway sections should be constructed if extended wet weather is forecasted.

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GENERAL COMMENTS

When plans and specifications are complete, or if significant changes are made in the character or location of the proposed development, consultation with MTI should be arranged as supplementary recommendations may be required. Suitability of subgrade soils and compaction of structural fill materials must be verified by MTI personnel prior to placement of structural elements. Additionally, monitoring and testing should be performed to verify that suitable materials are used for structural fill and that proper placement and compaction techniques are utilized.

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APPENDICES

ACRONYM LIST

AASHTO:	American Association of State Highway and Transportation Officials
ACHD:	Ada County Highway District
ACI	American Concrete Institute
ASCE	American Society of Civil Engineers
ASTM:	American Society for Testing and Materials
bgs:	below ground surface
CBR:	California Bearing Ratio
D:	natural dry unit weight, pcf
ESAL	Equivalent Single Axle Load
GS:	grab sample
IBC:	International Building Code
IDEQ	Idaho Department of Environmental Quality
ISPWC:	Idaho Standards for Public Works Construction
ITD:	Idaho Transportation Department
LL:	Liquid Limit
M:	water content
MSL:	mean sea level
N:	Standard "N" penetration: blows per foot, Standard Penetration Test
NP:	nonplastic
OSHA	Occupational Safety and Health Administration
PCCP:	Portland Cement Concrete Pavement
PERM:	vapor permeability
PI:	Plasticity Index
PID:	photoionization detector
PVC:	polyvinyl chloride
Qc:	cone penetrometer value, unconfined compressive strength, psi
Qp:	Penetrometer value, unconfined compressive strength, tsf
Qu:	Unconfined compressive strength, tsf
RMR	Rock Mass Rating
RQD	Rock Quality Designation
R-Value	Resistance Value
SPT:	Standard Penetration Test (140:pound hammer falling 30 in. on a 2:in. split spoon)
USCS:	Unified Soil Classification System
USDA:	United States Department of Agriculture
UST:	underground storage tank
V:	vane value, ultimate shearing strength, tsf

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GEOTECHNICAL GENERAL NOTES

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION			
Coarse-Grained Soils	**SPT Blow Counts (N)**	**Fine-Grained Soils**	**SPT Blow Counts (N)**
Very Loose:	< 4	Very Soft:	< 2
Loose:	4-10	Soft:	2-4
Medium Dense:	10-30	Medium Stiff:	4-8
Dense:	30-50	Stiff:	8-15
Very Dense:	>50	Very Stiff:	15-30
		Hard:	>30

Moisture Content	
Description	**Field Test**
Dry	Absence of moisture, dusty, dry to touch
Moist	Damp but not visible moisture
Wet	Visible free water, usually soil is below water table

Cementation	
Description	**Field Test**
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or beaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

PARTICLE SIZE					
Boulders:	>12 in.	Coarse-Grained Sand:	5 to 0.6 mm	Silts:	0.075 to 0.005 mm
Cobbles:	12 to 3 in.	Medium-Grained Sand:	0.6 to 0.2 mm	Clays:	<0.005 mm
Gravel:	3 in. to 5 mm	Fine-Grained Sand:	0.2 to 0.075 mm		

UNIFIED SOIL CLASSIFICATION SYSTEM			
Major Divisions		**Symbol**	**Soil Descriptions**
Coarse-Grained Soils <50% passes No.200 sieve	Gravel & Gravelly Soils <50% coarse fraction passes No.4 sieve	GW	Well-graded gravels; gravel/sand mixtures with little or no fines
		GP	Poorly-graded gravels; gravel/sand mixtures with little or no fines
		GM	Silty gravels; poorly-graded gravel/sand/silt mixtures
		GC	Clayey gravels; poorly-graded gravel/sand/clay mixtures
	Sand & Sandy Soils >50% coarse fraction passes No.4 sieve	SW	Well-graded sands; gravelly sands with little or no fines
		SP	Poorly-graded sands; gravelly sands with little or no fines
		SM	Silty sands; poorly-graded sand/gravel/silt mixtures
		SC	Clayey sands; poorly-graded sand/gravel/clay mixtures
Fine Grained Soils >50% passes No.200 sieve	Silts & Clays LL < 50	ML	Inorganic silts; sandy, gravelly or clayey silts
		CL	Lean clays; inorganic, gravelly, sandy, or silty, low to medium-plasticity clays
		OL	Organic, low-plasticity clays and silts
	Silts & Clays LL > 50	MH	Inorganic, elastic silts; sandy, gravelly or clayey elastic silts
		CH	Fat clays; high-plasticity, inorganic clays
		OH	Organic, medium to high-plasticity clays and silts
Highly Organic Soils		PT	Peat, humus, hydric soils with high organic content

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GEOTECHNICAL INVESTIGATION TEST PIT LOG

Test Pit Log #: TP-1 **Date Advanced:** 11 Jan 2016 **Logged by:** Kevin L. Schroeder, P.G.

Excavated by: Struckman's Backhoe Service **Location:** See Site Map Plates

Depth to Water Table: Not Encountered **Total Depth:** 5.9 Feet bgs

Depth (Feet bgs)	Field Description and USCS Soil and Sediment Classification	Sample Type	Sample Depth (Feet bgs)	Qp	Lab Test ID
0.0-1.4	Silt (ML): *Dark brown to brown, slightly moist, stiff to very stiff* *--Organic materials through the upper 0.2 foot* *--Upper 0.2 foot of this layer was frozen*	GS	0.0-1.4	2.0-4.0	A
1.4-2.8	Silt with Sand (ML): *Tan, slightly moist, stiff to hard* *--Sands appear to increase with depth*				
2.8-5.9	Silty Gravel with Sand (GM): *Tan to grayish, dry, dense to very dense* *--With moderate to very strong calcic cementation* *--Rock clasts were sub-rounded to rounded, 4-inch-minus, imbricated cobbles and gravels* *--Minor iron staining through the cemented gravels* *--Met with Refusal at 5.9 feet of depth*				

Lab Test ID	M	LL	PI	Sieve Analysis (% passing)				
-	%	-	-	#4	#10	#40	#100	#200
A	21.0	NP	NP	100	100	99	98	94.0

Test Pit Log #: TP-2 **Date Advanced:** 11 Jan 2016 **Logged by:** Kevin L. Schroeder, P.G.

Excavated by: Struckman's Backhoe Service **Location:** See Site Map Plates

Depth to Water Table: Not Encountered **Total Depth:** 6.9 Feet bgs

Depth (Feet bgs)	Field Description and USCS Soil and Sediment Classification	Sample Type	Sample Depth (Feet bgs)	Qp	Lab Test ID
0.0-1.3	Lean Clay (CL): *Dark brown, slightly moist, stiff to very stiff* *--Organic materials through the upper 0.3 foot* *--Upper 0.2 foot of this layer was frozen*			2.0-4.0	
1.3-3.0	Silt (ML): *Tan, slightly moist, stiff to very stiff*			1.5-4.0	
3.0-6.2	Sandy Silt (ML): *Light brown, slightly moist, stiff to hard*			2.0-4.5+	
6.2-6.9	Silty Gravel with Sand (GM): *Light brown to tan, dry, dense to very dense* *--With moderate to very strong calcic cementation* *--Met with Refusal at 6.9 feet of depth*				

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GEOTECHNICAL INVESTIGATION TEST PIT LOG

Test Pit Log #: TP-3 **Date Advanced:** 11 Jan 2016 **Logged by:** Kevin L. Schroeder, P.G.
Excavated by: Struckman's Backhoe Service **Location:** See Site Map Plates
Depth to Water Table: Not Encountered **Total Depth:** 16.2 Feet bgs

Depth (Feet bgs)	Field Description and USCS Soil and Sediment Classification	Sample Type	Sample Depth (Feet bgs)	Qp	Lab Test ID
0.0-3.0	Lean Clay with Sand (CL): *Dark brown, slightly moist, medium stiff to very stiff* *--Organic materials through the upper 0.4 foot* *--Upper 0.3 foot of this layer was frozen*	GS	0.0-1.5	1.0-2.5	B
3.0-4.5	Sandy Silt (ML): *Light brown, slightly moist, stiff to very stiff*			2.0-4.0	
4.5-16.2	Poorly Graded Gravel with Sand (GP): *Tan, dry, medium dense to dense* *--Rock clasts were sub-rounded to rounded, 6-inch-minus through the upper portion of the formation, and graded to boulder sized clasts of 16-inch-minus from 14 feet of depth and deeper*				

Lab Test ID	M	LL	PI	Sieve Analysis (% passing)				
-	%	-	-	#4	#10	#40	#100	#200
B	5.1	28	8	93	91	84	78	73.2

Test Pit Log #: TP-4 **Date Advanced:** 11 Jan 2016 **Logged by:** Kevin L. Schroeder, P.G.
Excavated by: Struckman's Backhoe Service **Location:** See Site Map Plates
Depth to Water Table: Not Encountered **Total Depth:** 7.9 Feet bgs

Depth (Feet bgs)	Field Description and USCS Soil and Sediment Classification	Sample Type	Sample Depth (Feet bgs)	Qp	Lab Test ID
0.0-1.3	Lean Clay (CL): *Dark brown, slightly moist, stiff to hard* *--Organic materials through the upper 0.1 foot* *--Upper 0.3 foot of this layer was frozen*			2.0-4.5+	
1.3-2.5	Silt with Sand (ML): *Tan, slightly moist, stiff to very stiff*			2.0-3.0	
2.5-5.2	Silty Gravel with Sand (GM): *Light brown to tan, dry, dense* *--With weak to moderate calcic cementation*				
5.2-7.9	Poorly Graded Gravel with Sand (GP): *Tan to reddish tan, dry, medium dense to dense* *--Rock clasts were sub-rounded to rounded, 4-inch-minus in size*				

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AASHTO PAVEMENT THICKNESS DESIGN PROCEDURES

Pavement Section Design Location: Proposed Amity Ridge Development, No Truck Access

Average Daily Traffic Count:	132	All Lanes & Both Directions		
Design Life:	20	Years		
Percent of Traffic in Design Lane:	50%			
Terminal Seviceability Index (Pt):	2.5			
Level of Reliability:	95			
Subgrade CBR Value:	4		**Subgrade Mr:**	6,000

Calculation of Design-18 kip ESALs

	Daily Traffic	Growth Rate	Load Factors	Design ESALs
Passenger Cars:	30	2.0%	0.0008	213
Buses:	2	2.0%	0.6806	12,072
Panel & Pickup Trucks:	30	2.0%	0.0122	3,246
2-Axle, 6-Tire Trucks:	3	2.0%	0.1890	5,028
Concrete Trucks:	1.0	2.0%	4.4800	39,731
Dump Trucks:	0	2.0%	3.6300	0
Tractor Semi Trailer Trucks:	0	2.0%	2.3719	0
Double Trailer Trucks	0	2.0%	2.3187	0
Heavy Tractor Trailer Combo Trucks:	0	2.0%	2.9760	0
Average Daily Traffic in Design Lane:	66			

Total Design Life 18-kip ESALs:	60,290
Actual Log (ESALs):	4.780
Trial SN:	2.61
Trial Log (ESALs):	4.862
Pavement Section Design SN:	2.61

	Design Depth Inches	**Structural Coefficient**	**Drainage Coefficient**
Asphaltic Concrete:	2.50	0.42	n/a
Asphalt-Treated Base:	0.00	0.25	n/a
Cement-Treated Base:	0.00	0.17	n/a
Crushed Aggregate Base:	4.00	0.14	1.0
Pit Run Aggregate Subgrade:	10.00	0.10	1.0
Special Aggregate Subgrade:	0.00	0.09	0.9

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AASHTO PAVEMENT THICKNESS DESIGN PROCEDURES

Pavement Section Design Location: Proposed Amity Ridge Development, Truck Access

Average Daily Traffic Count:	180	All Lanes & Both Directions		
Design Life:	20	Years		
Percent of Traffic in Design Lane:	50%			
Terminal Seviceability Index (Pt):	2.5			
Level of Reliability:	95			
Subgrade CBR Value:	4		**Subgrade Mr:**	6,000

Calculation of Design-18 kip ESALs

	Daily Traffic	Growth Rate	Load Factors	Design ESALs
Passenger Cars:	50	2.0%	0.0008	355
Buses:	7	2.0%	0.6806	42,251
Panel & Pickup Trucks:	15	2.0%	0.0122	1,623
2-Axle, 6-Tire Trucks:	10	2.0%	0.1890	16,762
Concrete Trucks:	2.0	2.0%	4.4800	79,462
Dump Trucks:	2	2.0%	3.6300	64,386
Tractor Semi Trailer Trucks:	2	2.0%	2.3719	42,071
Double Trailer Trucks	2	2.0%	2.3187	41,127
Heavy Tractor Trailer Combo Trucks:	0	2.0%	2.9760	0
Average Daily Traffic in Design Lane:	90			

Total Design Life 18-kip ESALs:	288,036
Actual Log (ESALs):	5.459
Trial SN:	3.30
Trial Log (ESALs):	5.476
Pavement Section Design SN:	3.30

	Design Depth Inches	**Structural Coefficient**	**Drainage Coefficient**
Asphaltic Concrete:	3.00	0.42	n/a
Asphalt-Treated Base:	0.00	0.25	n/a
Cement-Treated Base:	0.00	0.17	n/a
Crushed Aggregate Base:	6.00	0.14	1.0
Pit Run Aggregate Subgrade:	12.00	0.10	1.0
Special Aggregate Subgrade:	0.00	0.09	0.9

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Vicinity Map

Plate 1



MAP NOTES:

- Delorme Street Atlas
- Not to Scale

LEGEND

Approximate Site Location

Amity Ridge Development

East Amity Road and South Federal Way
Boise, ID

Modified from DeLorme by: JBS
28 December 2015
Drawing: B151329g

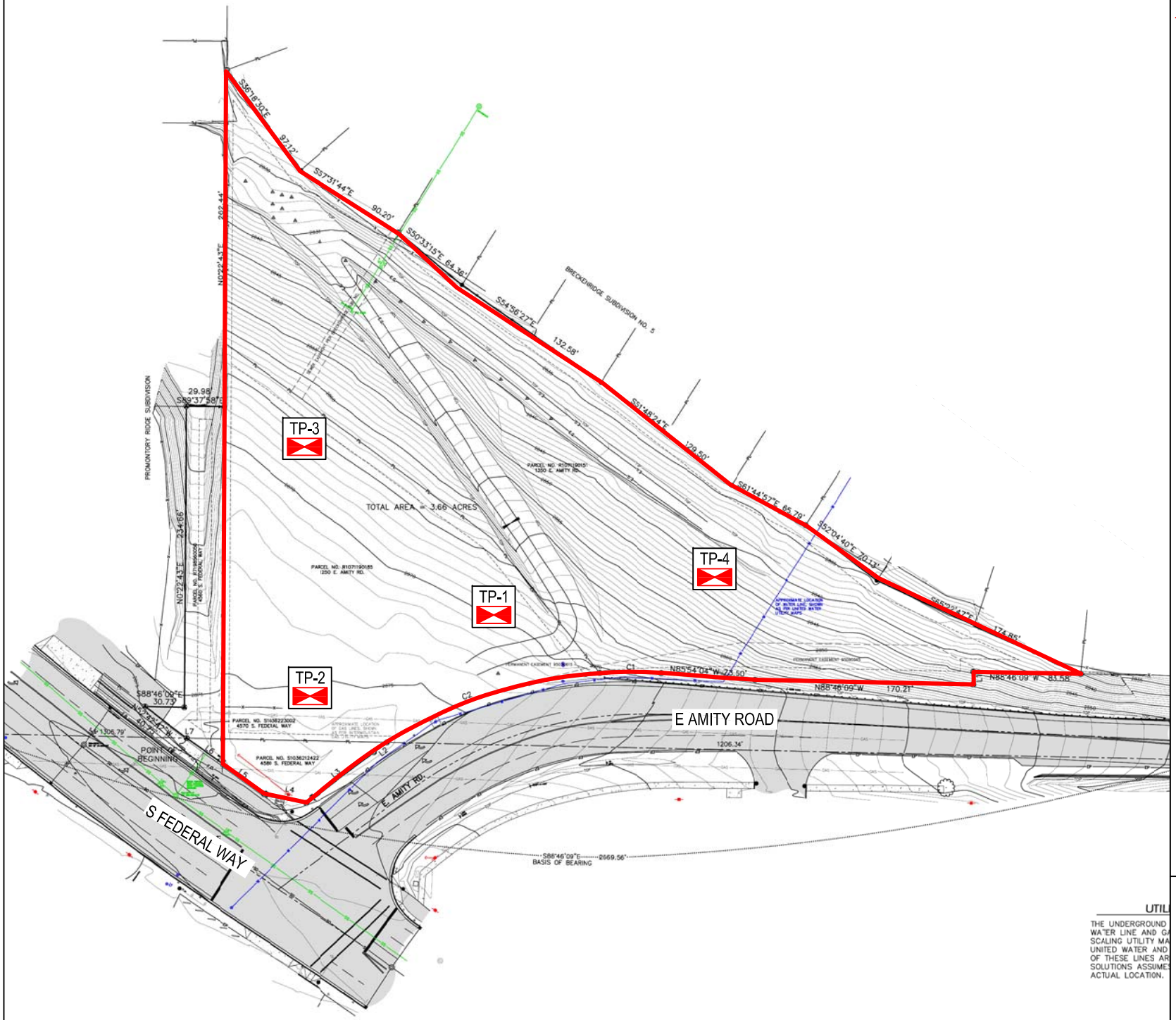
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Site Map

Plate 2



NOTES:

- Not to Scale

LEGEND

Approximate Site Boundary

Approximate MTI Test Pit Location

N

Amity Ridge Development
East Amity Road and South Federal Way
Boise, ID

Modified by: JBS
28 December 2015
Drawing: B151329g

MATERIALS TESTING & INSPECTION

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Preliminary Drainage Report

for

ECHELON RIDGE SUBDIVISION

1350 E. Amity Rd
Boise, Idaho 83716

Prepared for

ARETE INVESTMENTS GROUP, LLC
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4. Drawing Showing Site Drainage Area 5
5. Stormwater Runoff Calculations for Drainage Basin #1 6

Appendices

A. Runoff Coefficient and Rainfall Intensity. ..... 2 pages
B. Cut Sheet for Sand / Grease Trap ..... 1 page

1. Project Description

These calculations and attachments provide the background for the preliminary design for a new stormwater management system associated with site improvements for the Echelon Ridge project located at 1350 E. Amity Rd in Boise, Idaho.

These preliminary calculations, together with the preliminary grading plan are meant to provide information stormwater runoff from the proposed hillside site will generally be managed. These calculations are not intended to be final, since it is anticipated that further grading and drainage design will be required to move these preliminary design and calculations toward final design.

The site is general located at the northeast corner of Federal Way and Amity Rd in Boise. The upper portion of the site is generally flat, then transitions to hillside slopes along the northeast portion of the property.

Since the property is generally the highest property in the vicinity, there are not really any established drainage ways that need to be protected. Stormwater runoff appears to generally just flows uniformly along the side of the hill to the historical downstream receiving properties.

The property is generally the highest property in the area and does not receive any appreciable stormwater run-on from other properties. There is curb and gutter along Federal Way which contains the stormwater runoff from the adjacent street. Even though there is not curb and gutter along Amity Rd the existing road generally drains to the southeast so no appreciable run-on flows onto the site from the adjoining public roads.

As shown on the preliminary plat and preliminary grading plan, the property will have 3 rows of buildings constructed in terraces. The location of garages proposed for each building will vary somewhat and could be located on the first or second floor of the buildings.

The proposed shared driveway for the property is targeted to have slopes less than 10% to facilitate fire truck access through the property. Where possible in front of the middle and lower rows of buildings, the shared driveway will have slopes of about 6% to help facilitate grading from the garages out to the shared driveway.

As shown on the preliminary grading plan, most of the elevation transition will be along the length of the proposed buildings and lots themselves. With the upper side (southwest) of the buildings being on one floor and the lower sides (northeast) being 1-2 floors lower. It is anticipated that each building may need to be customized in design to fit the specific grades of the lot in order to minimize grading of the final lot.

According to the survey, the total property area is approximately 3.6 acres. As shown on Page 5 of this preliminary drainage report, it is anticipated that approximately 2.5 acres of area will be collected and managed in the proposed seepage bed, while the remaining 1.1 acres continues to flow to the historical downstream properties. This means that stormwater from approximately 70% of the area will be managed onsite, which will substantially decrease the amount of stormwater flowing on the downstream properties.

It is anticipated that the roof runoff from the lower buildings (on the 3 terrace) will be collected from the downspouts and piped underground to the proposed seepage bed.

For the purposes of this preliminary drainage report, it was assumed the entire drainage area had a runoff coefficient of 0.90. This is a high value that is representative of impervious surfaces on the site. This provides a conservative approach for calculating

As shown on the preliminary drainage plan, it is anticipated that 2 sand/grease traps will be used to help treat the stormwater runoff before entering the seepage bed. The distance between the baffles in the trap was selected to keep the velocity of water for the design storm less than 0.50 ft/sec to help allow sand and grit to settle in the trap.

The location of the proposed seepage bed was selected since it was an area that was outside the downhill footprint of the proposed building lots in our development, yet it still has pretty good distance from the existing houses located northeast of the building.

It is proposed that the ends and downstream side of the seepage bed will be installed with a 30-40 mil plastic liner to help direct water in the seepage bed to infiltrate downward instead of horizontally to the northeast.

We anticipate the Developer's surveyor will field verify the location and elevation of the existing homes located northeast of the proposed seepage bed to help verify that the bottom elevation of the proposed bed is lower than the crawl spaces of the nearest downstream homes.

The proposed seepage bed were sized to manage the stormwater runoff from the building and paved parking area for the City's design storm event (50-year, 1-hour). A, 18" thick layer of ASTM C-33 filter sand will be constructed under the seepage bed in order to provide additional treatment.

The general configuration and area of the drainage basin is shown on Sheet 5. Calculations for sizing the drainage basin is then provided along with appendices that outline the anticipated runoff coefficients, rainfall intensity, and soils information.

2. Sources of Information

A. CH2M Hill, Inc. Urban Runoff Control Handbook for Ada and Canyon Counties, Idaho Ada/Canyon Waste Treatment Management Committee (January 1977).

3. Applicable Standards

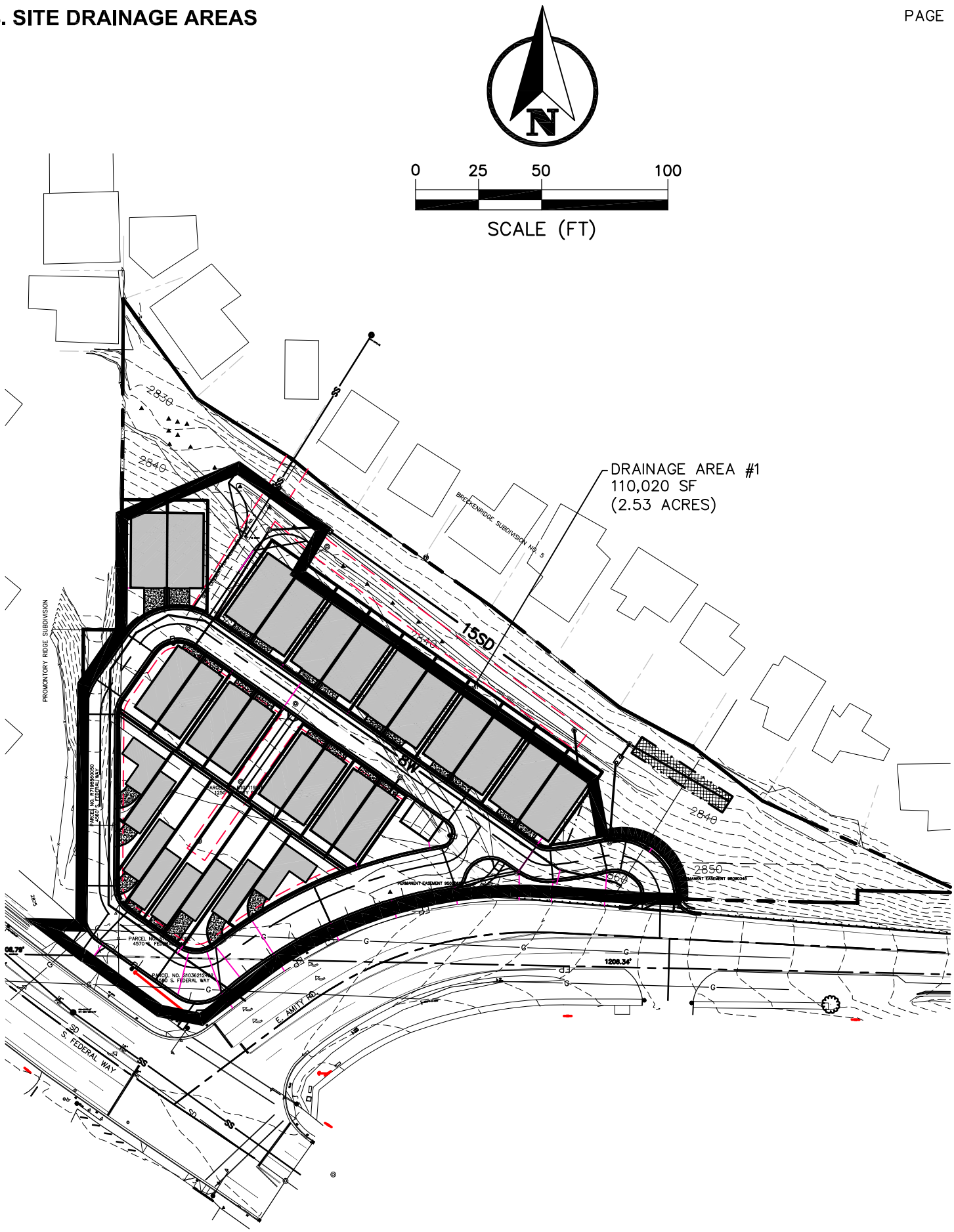
The following standards were used in preparing these calculations:

A. Idaho Standard Public Works Construction Committee. Idaho Standards for Public Works Construction, Current Edition.

B. Stormwater Management, A Design Manual. City of Boise (2015).

C. City of Boise Hillside Technical Report Submittal Guidelines.

4. SITE DRAINAGE AREAS



ASPEN ENGINEERS

5. RUNOFF CALCULATIONS FOR DRAINAGE BASIN #1 (SHORT)

A. FIND MAXIMUM DISCHARGE (Q)

Design Storm 50-yr, 10-min

Using the Rational Method (Q = CIA) for the 50-yr, 10-min storm which is the estimated time of concentration.

C	Runoff Coefficient	0.90		See Appendix A.1 (Assumed)
I	Intensity	2.60	in/hr	See Appendix A.2
A	Drainage Area	2.53	acres	See Sheet 5
Q	Discharge = C*I*A	5.92	cfs	

B. Find Required Pipe Size and Slope to Manage Flow using Mannings Equation

D	Pipe Diameter	15	in
A	Pipe flow area = pi * D^2 / 4	1.23	ft^2
n	Roughness coefficient	0.009	
R	Hydraulic Radius = D/4	0.313	feet
s	Slope	0.40%	

q Flow = [1.49 / n * A * R^2/3 * s^0.5]

q Flow = 5.92 cfs

Flow (q) > Peak (Q)? **5.92 cfs > 5.92**

Note: We will use two 15" pipes to convey water to the storm drains.

C. FIND VELOCITY IN GREASE TRAP (v)

	Grease Trap Size	1,500	gal	See Appendix B.1
wt	Trap Width	5.25	ft	
d	Distance Between Baffles	18.0	in	
a	Flow Area = wt*d	7.88	sf	
n	Number of Traps	2		
v	Velocity = (Q/a)/n	0.38	ft/s	

Velocity (vt) < 0.5 ft/s? **YES**

Project:	Echelon Ridge Subdivision	**Number:**	15078
Subject:	Preliminary Drainage Report	**Date:**	05/30/16
By:	L. Warnick	**Page:**	7

ASPEN ENGINEERS

D. FIND EXPECTED RUNOFF VOLUME (Vr)

Design Storm 50-yr, 1-hr

C	Runoff Coefficient	0.90		See Appendix A.1
I	Intensity	1.00	in/hr	See Appendix A.2
A	Drainage Area	2.53	acres	See Sheet 5
Q	Discharge = C*I*A	2.28	cfs	
t	Duration	1	hr	See Page A-2 of the BSWMDM
Vr	Runoff Volume = Q*t	8,197	cf	

E. FIND SEEPAGE BED PROPERTIES FOR AREA

Seepage Bed #1 =16' x 15' x 86'

H	Height	16	ft
W	Width	15	ft
L	Length	86	ft
Vb	Rock Volume = H*W*L	20,640	cf
Vs	Storage Volume = Vb*0.4	8,256	cf

F. CHECK AVAILABLE STORAGE > REQUIRED STORAGE (V)

Va	Available Storage Volume	8,256	cf
V	Required Storage Volume	8,197	cf
	Available > Required?	YES	

G. CHECK PERCOLATION TIME

W	Width	15	ft	Assume the bottom area of the bed
L	Length	86	ft	
Ap	Percolation Area (W*L)	1,290	sf	
r	Percolation Rate	4	in/hr	Use 1/2 of filter sand
t	Time to Percolate	19	hr	

APPENDIX A

RUNOFF COEFFICIENTS AND RAINFALL INTENSITY

Table-7 Recommended "C" coefficients for "Rational Method Equation"

Modified from ASCE (1972) and the Southeaster Wisconsin Regional Planning Commission

Description of Runoff Area	Runoff Coefficients "C"
Business	
Central business areas	0.70 - 0.95
District and local areas	0.50 - 0.70
Residential	
Single-family	0.35 - 0.45
Multi-family, detached	0.40 - 0.60
Multi-family, attached	0.60 - 0.75
Residential .5 acre lots or larger	0.25 - 0.40
Industrial and Commercial	
Light areas	0.50 - 0.80
Heavy areas	
Parks, cemeteries	0.10 - 0.25
Playgrounds	0.20 - 0.35
Railroad yard areas	0.20 - 0.40
Unimproved areas	0.10 - 0.30
Landscaped areas	0.20

For Impervious Surfaces

Character of Surface	Runoff Coefficient
Streets (asphalt, concrete), Drives and Walks, Roofs	0.90 - 0.95

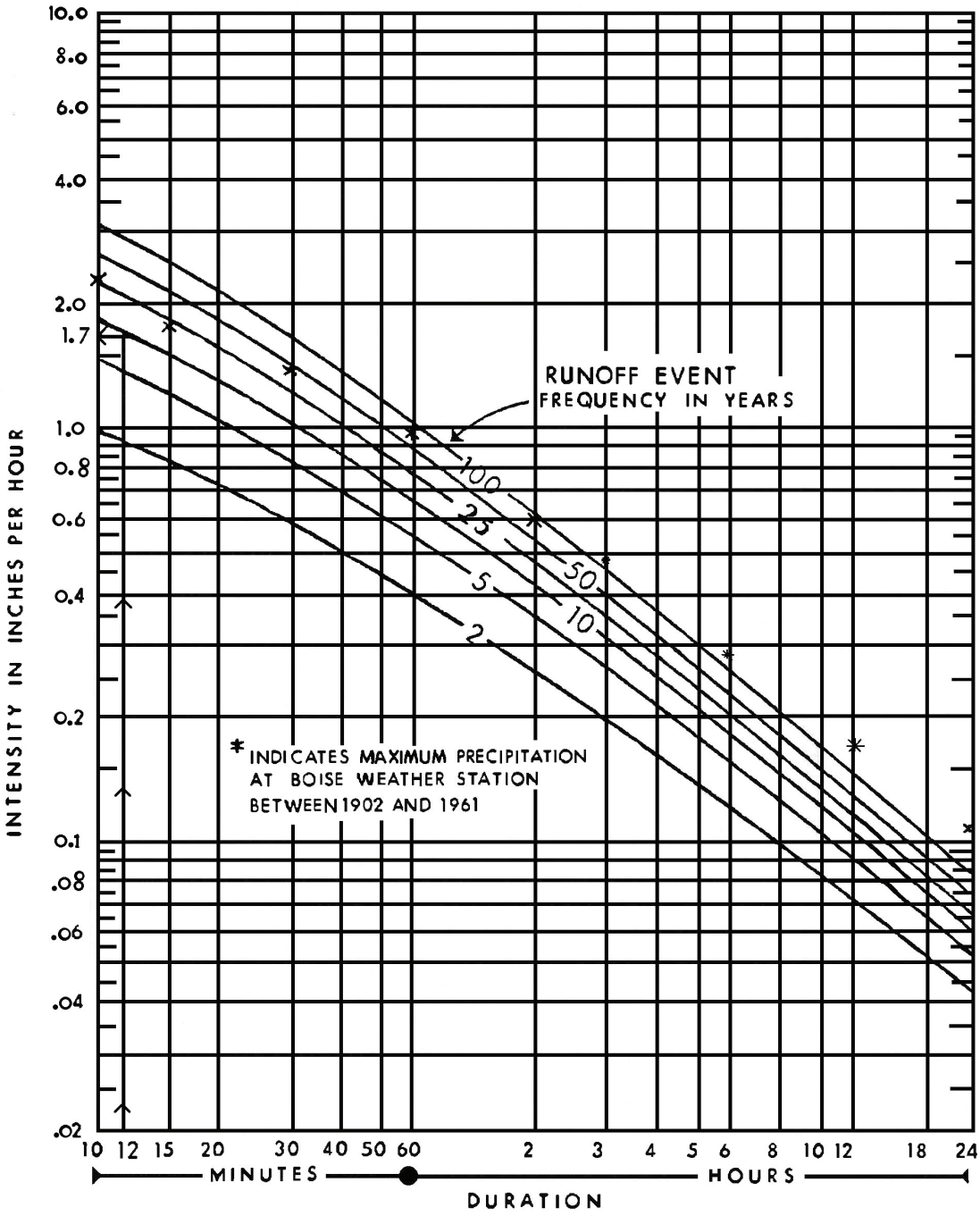
For Pervious Surfaces

		Runoff Coefficient			
Slope		**A soils**	**B soils**	**C soils**	**D soils**
Flat	0 - 2%	0.04	0.07	0.11	0.15
Average	2 - 6%	0.09	0.12	0.15	0.20
Steep	> 6%	0.13	0.18	0.23	0.28

Appendix C

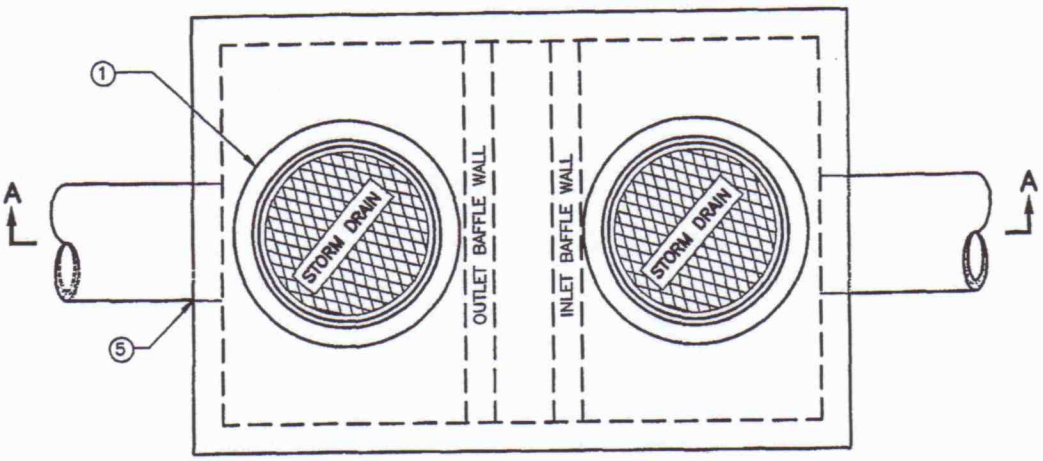
Hydrologic and Hydraulic Graphs

Figure-S Rainfall Intensity, Duration, and Frequency Relationship

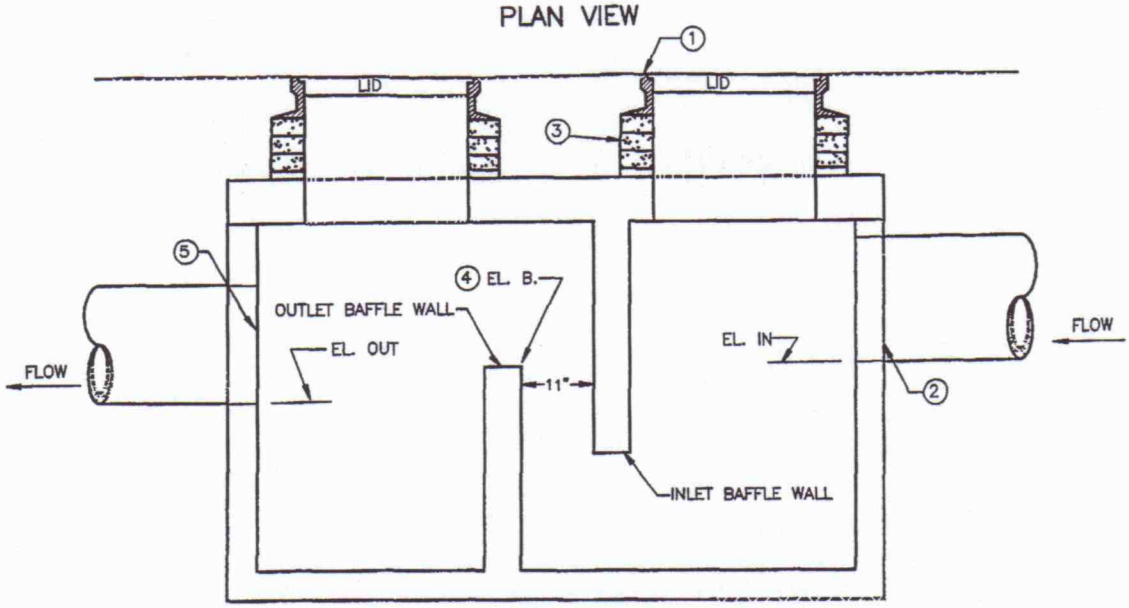


APPENDIX B

CUT SHEET FOR SAND / GREASE TRAP



PLAN VIEW



SECTION A–A

NOTES

(A) DESIGN LOAD: AASHTO HS–25 HIGHWAY LOADING.

(B) ALL REINFORCING STEEL SHALL BE GRADE 60.

(C) DETAILED DRAWING OF A PRECAST BOX OR A POURED IN PLACE BOX DESIGN MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

(D) HEIGHT OF OUTLET BAFFLE WALL AND LENGTH OF INLET BAFFLE WALL DETERMINED BY TANK CAPACITY AND FLOW RATE, PER MANUFACTURER.

(E) BEFORE THESE BOXES ARE USED THE APPLICATION MUST BE APPROVED BY THE ENGINEER.

(F) MANHOLE FRAME, COLLAR AND COVER SHALL BE PER SD–616 AND SD–617.

(G) PROVIDE STEPS WHEN THE DISTANCE FROM TOP OF MANHOLE FRAME TO TOP OF BOX EXCEEDS 24".

LEGEND

(1) MANHOLE FRAME AND COVER PER SD–617 (TYPICAL).

(2) LOCATION AND FLOW LINE ELEV. PER DESIGN PLANS (TYPICAL).

(3) H≤12" USE GRADE RINGS (TYPICAL). 12"<H 24" USE 24" DIA. RCP RISER. 24"<H 120" USE MANHOLE CONE AND 48" DIA. RISERS.

(4) EL. IN > EL. B BY 1" MIN. EL. OUT < EL. B BY MIN. OF 0.25' UNLESS OTHERWISE APPROVED BY THE ENGINEER.

(5) WATERTIGHT SEAL.

(6) PRECAST BOX MANUFACTURER SHALL MARK FLOW DIRECTION AND LABEL INLET OR OUTLET ON SIDE OF BOX.

2012

IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION	SAND AND GREASE TRAP	STANDARD DRAWING NO. SD–624

Dear Resident,

Boise City Code requires an opportunity for a meeting between the applicant of a development proposal and the residents of the neighborhood in which the development site is located. The meeting shall occur prior to formal submittal of the development application to the City.

This letter is such notice of an opportunity to review and discuss the subdivision of 3.66 Acres of land located at 1250 and 1350 E. Amity Road via a Planned Unit Development submitted to the City of Boise as Echelon Ridge Subdivision.

This is not a public hearing; public officials will not be present. If you have any questions regarding this Boise City Code neighborhood meeting requirement, please contact the Planning Division of the Planning & Development Services Department at 384-3830.

Purpose: To review and provide comments regarding the submittal of the Echelon Ridge Subdivision Application

When: Thursday, May 26th, 2016 at 6:00 PM

Where: Idaho Ice World Conference Room | 7072 S Eisenman Rd, Boise, ID 83716

Project Description: Arete Investments Group, LLC will be submitting a Planned Unit Development Application to subdivide 3.66 Acres of land located at 1250 and 1350 E. Amity Road via submission to the City of Boise as Echelon Ridge (and marketed as "The Townhomes @ Amity Ridge"). This project will include 28 Townhome Lots to be built as Paired Townhomes (14 Buildings Total). Traffic access will be taken off of Amity Road across from the current Maverik entrance. A raised roadway will be constructed with a dedicated retaining wall at that location only. See attached concept plan for details and locations. Additional details will be available at the meeting and during the Planning & Zoning Commission hearings.

If you have questions about the meeting or proposed development project, please contact:

Jeremy Telford Real Estate Services
3709 N. Locust Grove | Suite 150
Meridian, ID 83646
208.577.0225 | jeremy@jeremytelford.com.

Jeremy Telford
Real Estate Services

Neighborhood Meeting Sign in List
Echelon Ridge Townhomes

Thank you for signing in:

Name	Address in Boise, ID 83716	Phone
Cynthia Pohlman	1261 E Oakridge Dr Boise Id 83716	208 350-9649
TERRY CARR	1290 E. OAKRIDGE DR 83716	336-2052
Darice Peltier	4457 S Timridge 83716	384-6669
Sheila Valentine	1255 E. Oakridge	501-6101
Steve Bradum	1255 E. Oakridge	501-6101
Rick & Christine Bakeman	1367 E. Oakridge Dr.	571-6717

Jeremy Telford
Real Estate Services

Neighborhood Meeting Sign in List
Echelon Ridge Townhomes

Thank you for signing in:

Name	Address in Boise, ID 83716	Phone
Jeff Stonyohanic	1379 E oakridge dr	859-0994
Scott Wade	1301 E Oakridge D.	385-9447
Lois Salinas	1391 E Oakridge Pl.	514-6329
Pat A Smith	1290 E Oakridge Dr	336-2052
Maggie McDonald	1382 E Oakridge Dr	406-498-5611
Rebecca Nelson	4575 S. Constitution Ave, Boise	991-9343
SHASHANK RAYASAM	4466 S. Constitution Pl Boise	4096926
Carol HAGAN	1249 E. Oakridge Dr,	584-1379
Robert Herndon	1267 E. Oakridge Dr	258-0628
Desie Jakovac	4442 S. Constitution	869-2876

PRELIMINARY PLAT OF

ECHELON RIDGE SUBDIVISION

A PORTION OF LAND LOCATED IN A PORTION OF
THE SW1/4 OF SECTION 25 AND THE NW 1/4 OF SECTION 36,
T.3N, R.2E, B.M, BOISE CITY, ADA COUNTY, IDAHO
MAY 30, 2016

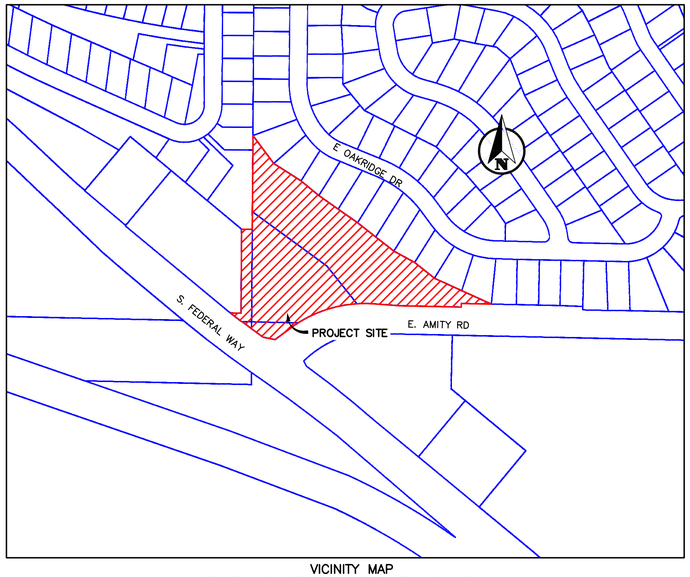
LEGEND

EXISTING	PROPOSED	
		PROPERTY LINE
		LOT LINE
		CENTERLINE
		SECTION LINE
		EASEMENT
EP	EP	EDGE OF PAVEMENT
EG	EG	EDGE OF GRAVEL
GAS	G	UNDERGROUND GAS LINE
W	W	WATER LINE
WS	WS	WATER SERVICE LINE
S	S	SEWER MAIN LINE
SS	SS	SEWER SERVICE LINE
SD	SD	STORM DRAIN LINE
OHP	OHP	OVERHEAD POWER
UP	UP	UNDERGROUND POWER
UT	UT	UNDERGROUND TELEPHONE
		FLOW LINE
GB	GB	GRADE BREAK
GC	GC	GRADE CHANGE
TB	TB	TOP OF BANK
TOE	TOE	TOE OF SLOPE
PI	PI	PRESSURE IRRIGATION LINE
IRR	IRR	GRAVITY IRRIGATION LINE
		CHAIN LINK FENCE
		WOOD FENCE
		VINYL FENCE
X	X	WIRE FENCE
2601		CONTOUR
SSMH		SEWER MANHOLE
		WATER BIBB/FAUCET
		SEWER SERVICE MARKER
		CLEANOUT
		FIRE HYDRANT
		WATER WELL
		WATER METER
WV		WATER SERVICE
		WATER VALVE
		BLOW-OFF ASSEMBLY & VAULT
		TEMPORARY BLOW-OFF
		PRESSURE IRRIGATION DRAIN
		PIPE END CAP
		PIPE ADAPTER
		FITTINGS W/THRUST BLOCK
		STORM MANHOLE
		STORM DRAIN CATCH BASIN
		STORM DRAIN DROP INLET
		SAND AND GREASE TRAP
PIV		AIR RELEASE VALVE
IRR		IRRIGATION BOX
		IRRIGATION MANHOLE
		UTILITY POLE
		POLE ANCHOR
		ELECTRICAL BOX
		LIGHT POLE
		TELEPHONE RISER
		GAS METER/MARKER
		GAS RISER
		CABLE TV RISER
		MAILBOX
		SIGN
		BARRICADE
		DECIDUOUS/CONIFER TREE
	1	LOT NUMBER
	1/A	DETAIL NUMBER SHEET NUMBER
	0.40%	GRADE & DIRECTION OF FLOW

NOTE: THIS IS A TYPICAL LINE AND SYMBOL LEGEND AND MAY NOT APPLY TO ALL PROJECTS.

ABBREVIATIONS

AC	ASPHALT ELEVATION	MDD	MODIFIED DRY DENSITY	TBC	TOP BACK ROLLED CURB
BOW	BACK OF WALK	ME	MATCH EXISTING	TBM	TEMPORARY BENCHMARK
CB	CATCH BASIN	MJ	MECHANICAL JOINT	TBVC	TOP BACK VERTICAL CURB
CF	CUBIC FEET	NTS	NOT TO SCALE	TOC	TOP OF CURB
CON	CONCRETE ELEVATION	PC	POINT OF CURVATURE	TOG	TOP OF GRATE
CFS	CUBIC FEET PER SECOND	PRC	POINT OF REVERSE CURV	TOW	TOP OF WALK
DIA	DIAMETER	PT	POINT OF TANGENCY	TYP	TYPICAL
EG	EXISTING GRADE	PUE	PUBLIC UTILITY EASEMENT	WALL	TOP OF RETAINING WALL
EP	EDGE OF PAVEMENT	PVI	POINT OF VERTICAL INTER		
FL	FLOW LINE	QTY	QUANTITY		
FLG	FLANGE	R	RADIUS		
GB	GRADE BREAK	ROW	RIGHT-OF-WAY		
GC	GRADE CHANGE	SDR	STD DIMENSION RATIO		
IE	INVERT ELEVATION	STA	STATION		
LF	LINEAR FEET	STD	STANDARD		
LIP	LIP OF GUTTER	TB	THRUST BLOCK		



VICINITY MAP
INTERSECTION OF S. FEDERAL WAY AND E. AMITY ROAD, BOISE, IDAHO
N.T.S

GENERAL NOTES

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL COMPLY WITH IDAHO CODE CHAPTER 22, TITLE 55 REGARDING UNDERGROUND FACILITIES DAMAGE PREVENTION. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES BEFORE COMMENCING WORK. THEY AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES. CALL DIGLINE, INC., 48 HOURS BEFORE COMMENCING ANY UNDERGROUND WORK AT 811 OR 342-1585.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT EDITION OF THE IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC).
3. ALL SANITARY SEWER MAINS SHALL BE 8" DIAMETER UNLESS OTHERWISE NOTED. SEWER MAINS SHALL BE DEDICATED TO THE CITY OF BOISE.
4. ALL DOMESTIC WATER MAINS SHALL BE 8" DIAMETER UNLESS OTHERWISE NOTED.
5. THIS PROPERTY IS NOT LOCATED WITHIN A FLOODPLAIN.
6. THIS PROPERTY IS LOCATED IN A HILLSIDE DEVELOPMENT AREA.
7. CONTINUATION OF GRAVITY IRRIGATION DITCHES OR DRAINS TO DOWNSTREAM PROPERTIES, SHALL BE PROVIDED IN ACCORDANCE WITH IDAHO CODE.
8. THIS PROPERTY DOES NOT HAVE A SURFACE IRRIGATION WATER RIGHT, THEREFORE LANDSCAPE IRRIGATION WATER WILL BE PROVIDED BY A CONNECTION TO THE POTABLE WATER SYSTEM.
9. STORMWATER FROM THE PROPOSED BUILDINGS AND SHARED DRIVEWAY WILL BE RETAINED ON SITE. IT IS ANTICIPATED THE UNDEVELOPED AREAS OF THE SITE WILL CONTINUE TO FLOW OFFSITE TO THE HISTORICAL DOWNSTREAM DISCHARGE AREAS. THIS PLAT CURRENTLY SHOWS THE CONCEPTUAL LOCATION OF FACILITIES, BUT THE ACTUAL LOCATION AND SIZE AND FACILITIES WILL BE DETERMINED AS PART OF FUTURE SUBDIVISION DESIGN. STORM DRAIN LINES, RETENTION FACILITIES AND TREATMENT SHALL COMPLY WITH DEQ'S STORMWATER BEST MANAGEMENT PRACTICES AND BE APPROVED BY THE CITY.
10. ANY RESUBDIVISION OF THIS PLAT SHALL BE IN COMPLIANCE WITH THE CURRENT SUBDIVISION STANDARDS OF THE CITY OF BOISE.
11. LOT 1 OF BLOCK 1 IS A COMMON LOT THAT WILL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND WILL CONTAIN THE PROPOSED SHARED DRIVEWAY AND CONTAINS A BLANKET PUBLIC UTILITY, DRAINAGE, BOISE CITY STREETLIGHT, BOISE CITY SEWER EASEMENT.
12. SEE THE ACCOMPANYING CONDITIONAL USE PERMIT SITE PLAN AND PRELIMINARY GRADING PLAN FOR CONFIGURATION OF THE PROPOSED BUILDINGS IN LOTS 2 THROUGH 29 OF BLOCK 1. THE BUILDING, PARKING LOT AND SITE IMPROVEMENTS SHOWN ON THIS DRAWING ARE ANTICIPATED TO BE CONSTRUCTED TO SUPPORT THE BUILDINGS AS THEY DEVELOP.
13. THERE IS A 10' PUBLIC UTILITY, IRRIGATION DRAINAGE EASEMENT AROUND THE PERIMETER OF THE SUBDIVISION UNLESS NOTED OTHERWISE.
14. THERE IS NOT ANY PUBLIC UTILITY EASEMENT ALONG THE INTERIOR LOTS OF THE SUBDIVISION.
15. THERE ARE NOT ANY NEW PUBLIC OR PRIVATE STREETS PROPOSED FOR THIS DEVELOPMENT.
16. THIS DEVELOPMENT WILL USE A NEW 30' WIDE DRIVEWAY FROM E. AMITY RD TO PROVIDE VEHICULAR ACCESS TO THE SITE. THIS NEW DRIVEWAY WILL BE LOCATED 8' WEST OF THE EXISTING DRIVEWAY FOR THE GAS STATION ON THE SOUTH SIDE OF E. AMITY RD. A SECONDARY EMERGENCY VEHICLE ACCESS WILL ALSO BE PROVIDE TO THE DEVELOPMENT FROM AN EXISTING CURB CUT DRIVEWAY FROM S. FEDERAL WAY. REMOVABLE BOLLARDS OR A CHAIN ACROSS THIS SECONDARY EMERGENCY VEHICLE ACCESS WILL BE USED TO LIMIT ACCESS TO ONLY EMERGENCY VEHICLES..
17. THE PROPOSED STREETLIGHTS WILL BE DEDICATED TO THE CITY OF BOISE.

DEVELOPER

ARETE INVESTMENTS GROUP, LLC
2048 W ASTONTE ST
MERIDIAN, ID 83646

CONTACT: JEREMY TELFORD
(208) 577-0225

ENGINEER

ASPEN ENGINEERS, CHARTERED
485 W. MAIN ST, SUITE B
PO BOX 205
KUNA, IDAHO 83634

CONTACT: LANCE WARNICK, P.E.
(208) 466-8181

DRAWING INDEX

1. PRELIMINARY PLAT LEGEND AND NOTES SHEET PP-1
2. PRELIMINARY PLAT DRAWING PP-2
3. PRELIMINARY GRADING AND DRAINAGE PLAN GP-1
4. PRELIMINARY PROFILES OF SHARED DRIVEWAY GP-2
5. PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN ESC-1

REVISIONS	
A	05/24/16 – REVIEW
B	05/30/16 – STORM

PROFESSIONAL ENGINEER — LICENSED — STATE OF IDAHO — LANCE WARNICK — 10077 — 05/30/2016

ASPEN ENGINEERS
485 W. Main St, Suite B · PO Box 205 · Kuna, Idaho 83634
Phone: (208) 466-8181 · www.AspenEngineers.com

OWNER / DEVELOPER
ARETE INVESTMENTS GROUP, LLC
2048 W ASTONTE ST
MERIDIAN, IDAHO 83642
CONTACT: JEREMY TELFORD
(208) 577-0225

ECHELON RIDGE SUBDIVISION
1350 E. AMITY RD
BOISE, IDAHO 83716

DRAWN	SCALE
PSL	SHOWN
CHECKED	REVISION
LBW	B

DATE: 05/30/2016

PROJECT: 15078

TITLE: ECHELON RIDGE SUBDIVISION
PRELIMINARY PLAT LEGEND AND NOTES

SHEET: PP-1

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PRELIMINARY PLAT OF

ECHELON RIDGE SUBDIVISION

A PORTION OF LAND LOCATED IN A PORTION OF
THE SW1/4 OF SECTION 25 AND THE NW 1/4 OF SECTION 36,
T.3N, R.2E, B.M, BOISE CITY, ADA COUNTY, IDAHO
MAY 30, 2016

NOTES

1. SEE SHEET PP-1 FOR LEGEND.
2. SEE SHEET PP-1 FOR ADDITIONAL NOTES.
3. SEE SHEET PP-1 FOR VICINITY MAP.
4. LOT 1 OF BLOCK 1 IS A COMMON LOT THAT WILL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND WILL CONTAIN THE PROPOSED SHARED DRIVEWAY AND CONTAINS A BLANKET PUBLIC UTILITY, DRAINAGE, BOISE CITY STREETLIGHT, BOISE CITY SEWER EASEMENT.
5. SEE SHEET GP-1 FOR PRELIMINARY GRADING PLAN.
6. SEE SHEET GP-2 FOR PRELIMINARY PROFILES OF SHARED DRIVEWAY.
7. SEE SHEET ESC-1 FOR PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN.

DEVELOPMENT DATA

TOTAL SUBDIVISION AREA:	3.66 ACRES±
EXISTING ZONING:	R-1C & C-4D
PROPOSED ZONING:	R-1C
TOTAL LOTS:	29 TOTAL (28 BUILDABLE LOTS AND 1 COMMON LOT)
COMMON LOT AREA:	2.20 ACRES± (LOT 1 OF BLOCK 1)
AVERAGE BUILDABLE SIZE:	2,275 SF± (0.052 ACRES±) EXCLUDES COMMON LOTS
GROSS DENSITY:	7.65± BUILDABLE LOTS (UNITS) PER GROSS ACRE

0 15 30 60
SCALE (FT)

REVISIONS		
A	05/24/16 – REVIEW	
B	05/30/16 – STORM	

PROFESSIONAL ENGINEER — REGISTERED — STATE OF IDAHO — 10077 — 05/30/2016 — LANCE WARREN

ASPEN ENGINEERS
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OWNER / DEVELOPER
ARRETE INVESTMENTS GROUP, LLC
2648 W. AMITY RD
MERIDIAN, IDAHO 83642
CONTACT: JEREMY TELFORD
(208) 577-0225

ECHELON RIDGE SUBDIVISION
1350 E. AMITY RD
BOISE, IDAHO 83716

DRAWN	SCALE
PSL	SHOWN
CHECKED	REVISION
LBW	B
DATE	
05/30/2016	
PROJECT	
15078	

TITLE
ECHELON RIDGE SUBDIVISION
PRELIMINARY PLAT DRAWING

SHEET
PP-2
2 of 5

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PRELIMINARY GRADING AND DRAINAGE PLAN FOR

ECHELON RIDGE SUBDIVISION

NOTES

1. SEE SHEET PP–1 FOR LEGEND.
2. CONTRACTOR SHALL PROTECT ALL SURVEY MONUMENTS ENCOUNTERED DURING CONSTRUCTION. ANY MONUMENT DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY A PROFESSIONAL LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR (SEE TOPOGRAPHIC SURVEY).
3. SHARED DRIVEWAY GRADES SHALL NOT EXCEED 10% IN ORDER TO FACILITATE ACCESS BY EMERGENCY VEHICLES.
4. THE SLOPE OF THE PROPOSED PAVED SEWER ACCESS DRIVEWAY SHALL NOT EXCEED 18%.
5. ADD 2800' TO SITE ELEVATIONS TO OBTAIN THE PROJECT DATUM.
6. FINISHED AND EXISTING CONTOUR LINES SHOWN AT AN INTERVAL OF 2'.
7. STORMWATER FROM THE PROPOSED BUILDINGS AND SHARED DRIVEWAY WILL BE RETAINED ON SITE. IT IS ANTICIPATED THE UNDEVELOPED AREAS OF THE SITE WILL CONTINUE TO FLOW OFFSITE TO THE HISTORICAL DOWNSTREAM DISCHARGE AREAS. THIS PLAT CURRENTLY SHOWS THE CONCEPTUAL LOCATION OF FACILITIES, BUT THE ACTUAL LOCATION AND SIZE AND FACILITIES WILL BE DETERMINED AS PART OF FUTURE SUBDIVISION DESIGN. STORM DRAIN LINES, RETENTION FACILITIES AND TREATMENT SHALL COMPLY WITH DEQ'S STORMWATER BEST MANAGEMENT PRACTICES AND BE APPROVED BY THE CITY.
8. IT IS ANTICIPATED THAT THE ROOF RUNOFF FROM THE PROPOSED BUILDINGS WILL BE PIPED FROM FROM THE DOWNSPOUTS TO THE PROPOSED SEEPAGE BED.
9. THERE ARE NOT ANY KNOWN LOCATION OF GEOLOGIC OR HYDROLOGIC FEATURES ON THE SITE THAT IMPACT THE DEVELOPMENT
10. SEE SHEET GP–2 FOR PRELIMINARY SHARED DRIVEWAY PROFILES.
11. VOLUME ESTIMATES:

    ESTIMATED CUT: 6129 CY
    ESTIMATED FILL: 6194 CY

    NOTE: THESE VOLUMES MAY VARY AT TIME OF FINAL DESIGN BASED ON FINAL GRADING PLAN AND THE CONFIGURATION OF THE WALLS AT THE BUILDINGS TO HELP RETAIN THE SITE.

0 10 20 40
SCALE (FT)

REVISIONS		
A	05/24/16	– REVIEW
B	05/30/16	– STORM

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2464 W. AMITY STREET
MERIDIAN, IDAHO 83642
CONTACT: JEREMY TELFORD
(208) 577-0225

ECHELON RIDGE SUBDIVISION
1350 E. AMITY RD
BOISE, IDAHO 83716

DRAWN	SCALE
PSL	SHOWN
CHECKED	REVISION
LBW	B

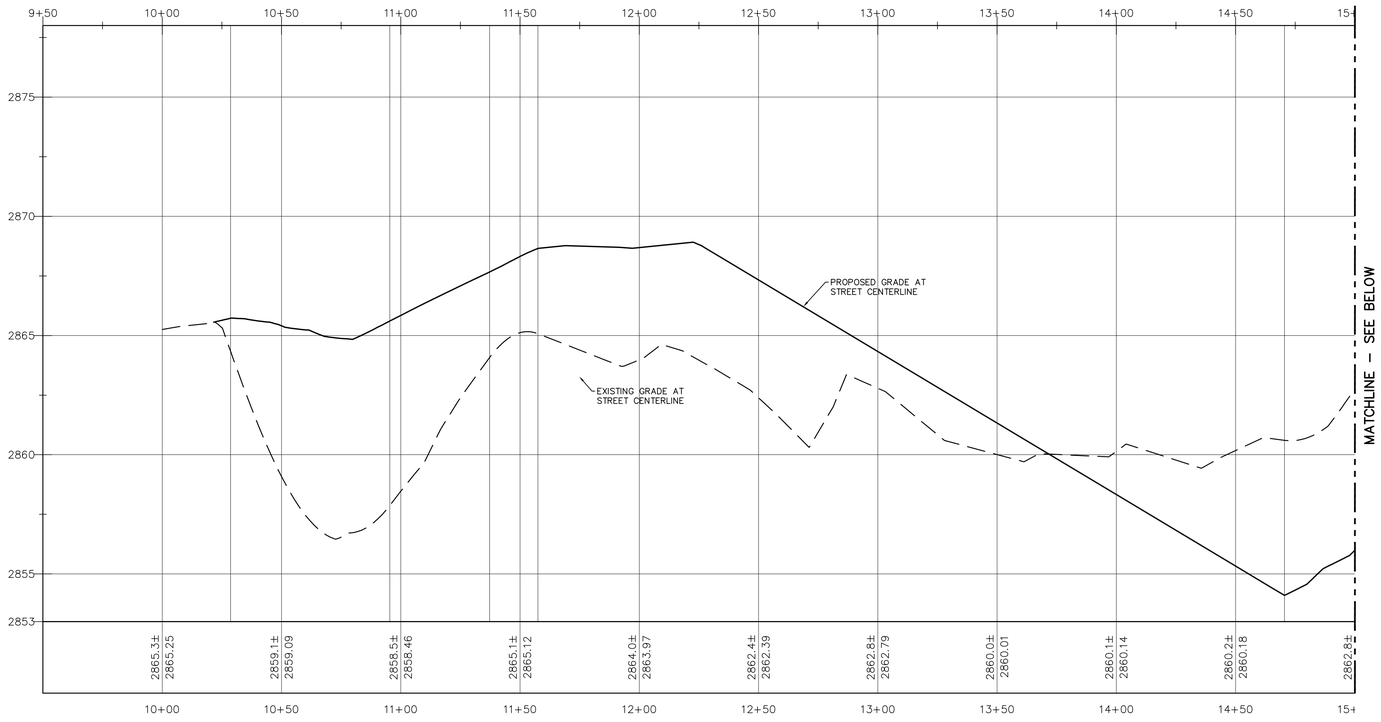
DATE 05/30/2016

PROJECT 15078

TITLE
ECHELON RIDGE SUBDIVISION
PRELIMINARY GRADING AND DRAINAGE PLAN

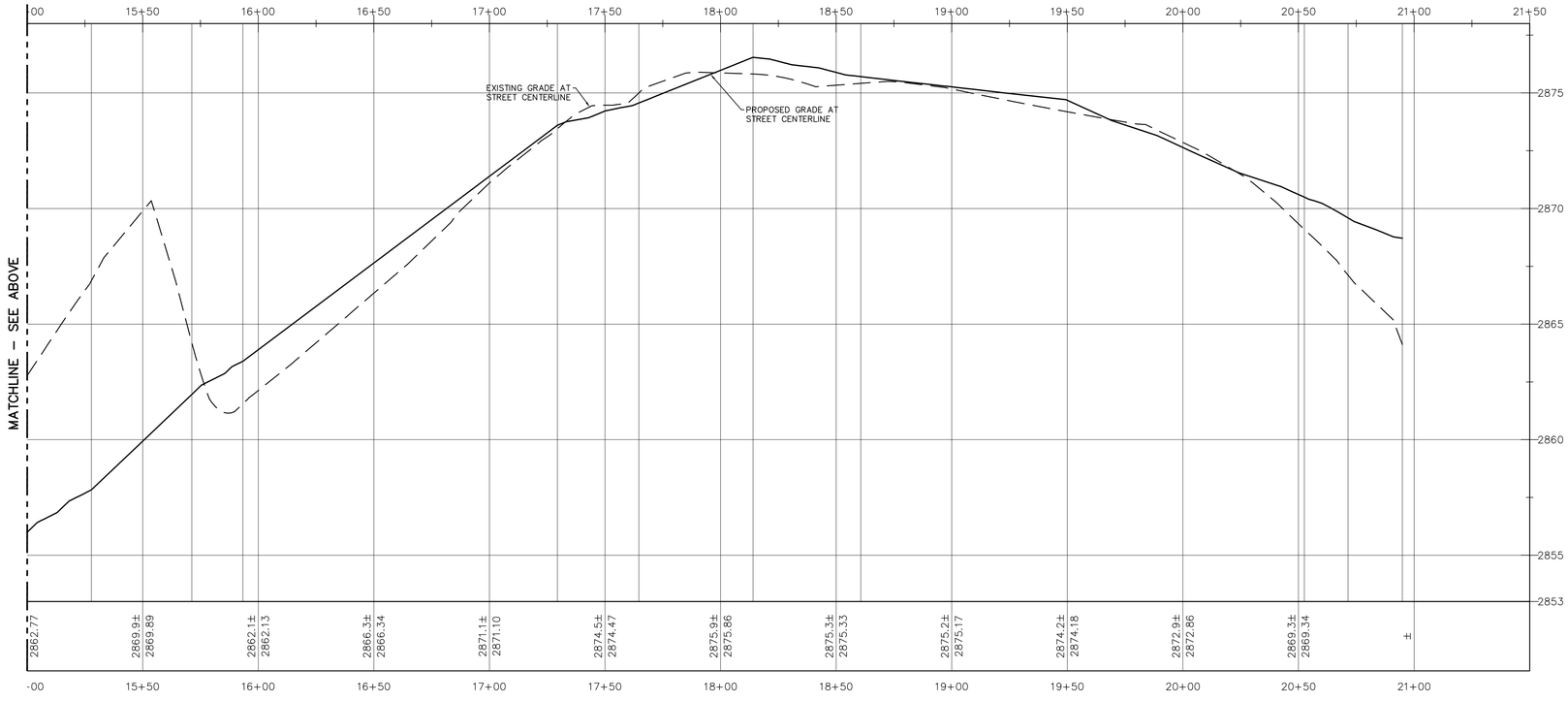
SHEET
GP-1
3 of 5

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PROFILE – SHARED DRIVEWAY

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=3'



PROFILE – SHARED DRIVEWAY

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=3'

PRELIMINARY GRADING AND DRAINAGE PLAN FOR

ECHELON RIDGE SUBDIVISION

NOTES

1. SEE SHEET PP–1 FOR LEGEND.
2. SEE SHEET PP–1 FOR ADDITIONAL NOTES.
3. SEE SHEET PP–1 FOR VICINITY MAP.
4. LOT 1 OF BLOCK 1 IS A COMMON LOT THAT WILL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION AND WILL CONTAIN THE PROPOSED SHARED DRIVEWAY AND CONTAINS A BLANKET PUBLIC UTILITY, DRAINAGE, BOISE CITY STREETLIGHT, BOISE CITY SEWER EASEMENT.
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6. SHARED DRIVEWAY GRADES SHALL NOT EXCEED 10% IN ORDER TO FACILITATE ACCESS BY EMERGENCY VEHICLES.
7. THE SLOPE OF THE PROPOSED PAVED SEWER ACCESS DRIVEWAY SHALL NOT EXCEED 18%.
8. ADD 2800' TO SITE ELEVATIONS TO OBTAIN THE PROJECT DATUM.
9. FINISHED AND EXISTING CONTOUR LINES SHOWN AT AN INTERVAL OF 2'.
10. STORMWATER FROM THE PROPOSED BUILDINGS AND SHARED DRIVEWAY WILL BE RETAINED ON SITE. IT IS ANTICIPATED THE UNDEVELOPED AREAS OF THE SITE WILL CONTINUE TO FLOW OFFSITE TO THE HISTORICAL DOWNSTREAM DISCHARGE AREAS. THIS PLAT CURRENTLY SHOWS THE CONCEPTUAL LOCATION OF FACILITIES, BUT THE ACTUAL LOCATION AND SIZE AND FACILITIES WILL BE DETERMINED AS PART OF FUTURE SUBDIVISION DESIGN. STORM DRAIN LINES, RETENTION FACILITIES AND TREATMENT SHALL COMPLY WITH DEQ'S STORMWATER BEST MANAGEMENT PRACTICES AND BE APPROVED BY THE CITY.

0 15 30 60

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=3'

REVISIONS	
A	05/24/16 – REVIEW
B	05/30/16 – STORM

PROFESSIONAL ENGINEER – REGISTERED – STATE OF IDAHO – 10077 – 05/30/2016 – LANCE W. WARREN

ASPEN ENGINEERS
485 W. Main St, Suite B · PO Box 205 · Kuna, Idaho 83634
Phone: (208) 466-8181 · www.AspenEngineers.com

OWNER / DEVELOPER

ARETE INVESTMENTS GROUP, LLC
2665 W. AMITY
MERIDIAN, IDAHO 83642
CONTACT: JEREMY TELFORD
(208) 577-0225

ECHELON RIDGE SUBDIVISION
1350 E. AMITY RD
BOISE, IDAHO 83716

DRAWN	SCALE
PSL	SHOWN
CHECKED	REVISION
LBW	B

DATE: 05/30/2016

PROJECT: 15078

TITLE: ECHELON RIDGE SUBDIVISION

PRELIMINARY PROFILES OF SHARED DRIVEWAY

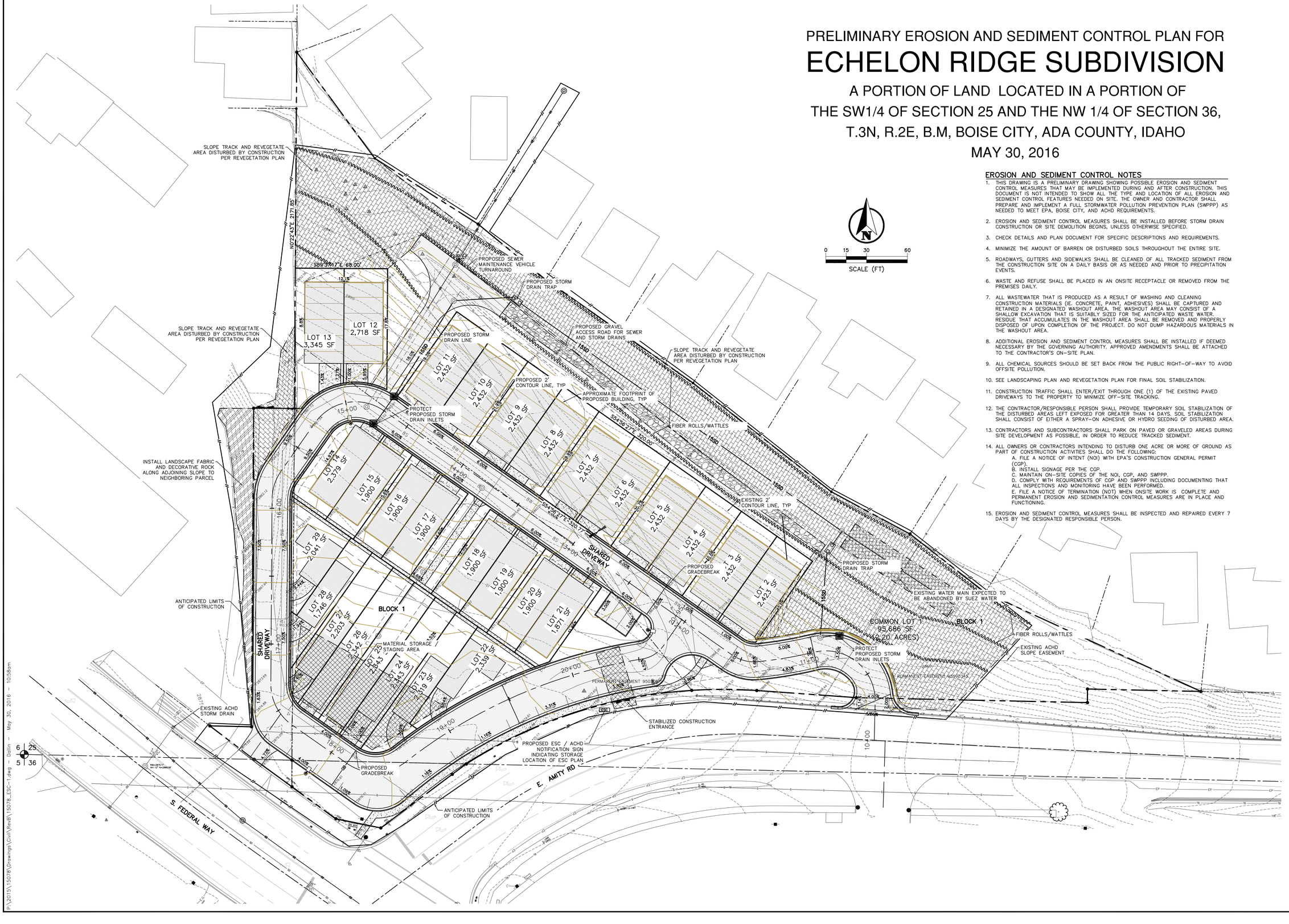
SHEET: GP-2

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PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN FOR

ECHELON RIDGE SUBDIVISION

A PORTION OF LAND LOCATED IN A PORTION OF
THE SW1/4 OF SECTION 25 AND THE NW 1/4 OF SECTION 36,
T.3N, R.2E, B.M, BOISE CITY, ADA COUNTY, IDAHO
MAY 30, 2016



N

0 15 30 60

SCALE (FT)

EROSION AND SEDIMENT CONTROL NOTES

1. THIS DRAWING IS A PRELIMINARY DRAWING SHOWING POSSIBLE EROSION AND SEDIMENT CONTROL MEASURES THAT MAY BE IMPLEMENTED DURING AND AFTER CONSTRUCTION. THIS DOCUMENT IS NOT INTENDED TO SHOW ALL THE TYPE AND LOCATION OF ALL EROSION AND SEDIMENT CONTROL FEATURES NEEDED ON SITE. THE OWNER AND CONTRACTOR SHALL PREPARE AND IMPLEMENT A FULL STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AS NEEDED TO MEET EPA, BOISE CITY, AND ACHD REQUIREMENTS.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BEFORE STORM DRAIN CONSTRUCTION OR SITE DEMOLITION BEGINS, UNLESS OTHERWISE SPECIFIED.
3. CHECK DETAILS AND PLAN DOCUMENT FOR SPECIFIC DESCRIPTIONS AND REQUIREMENTS.
4. MINIMIZE THE AMOUNT OF BARREN OR DISTURBED SOILS THROUGHOUT THE ENTIRE SITE.
5. ROADWAYS, GUTTERS AND SIDEWALKS SHALL BE CLEANED OF ALL TRACKED SEDIMENT FROM THE CONSTRUCTION SITE ON A DAILY BASIS OR AS NEEDED AND PRIOR TO PRECIPITATION EVENTS.
6. WASTE AND REFUSE SHALL BE PLACED IN AN ONSITE RECEPTACLE OR REMOVED FROM THE PREMISES DAILY.
7. ALL WASTEWATER THAT IS PRODUCED AS A RESULT OF WASHING AND CLEANING CONSTRUCTION MATERIALS (IE. CONCRETE, PAINT, ADHESIVES) SHALL BE CAPTURED AND RETAINED IN A DESIGNATED WASHOUT AREA. THE WASHOUT AREA MAY CONSIST OF A SHALLOW EXCAVATION THAT IS SUITABLY SIZED FOR THE ANTICIPATED WASTE WATER. RESIDUE THAT ACCUMULATES IN THE WASHOUT AREA SHALL BE REMOVED AND PROPERLY DISPOSED OF UPON COMPLETION OF THE PROJECT. DO NOT DUMP HAZARDOUS MATERIALS IN THE WASHOUT AREA.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IF DEEMED NECESSARY BY THE GOVERNING AUTHORITY. APPROVED AMENDMENTS SHALL BE ATTACHED TO THE CONTRACTOR'S ON-SITE PLAN.
9. ALL CHEMICAL SOURCES SHOULD BE SET BACK FROM THE PUBLIC RIGHT-OF-WAY TO AVOID OFFSITE POLLUTION.
10. SEE LANDSCAPING PLAN AND REVEGETATION PLAN FOR FINAL SOIL STABILIZATION.
11. CONSTRUCTION TRAFFIC SHALL ENTER/EXIT THROUGH ONE (1) OF THE EXISTING PAVED DRIVEWAYS TO THE PROPERTY TO MINIMIZE OFF-SITE TRACKING.
12. THE CONTRACTOR/RESPONSIBLE PERSON SHALL PROVIDE TEMPORARY SOIL STABILIZATION OF THE DISTURBED AREAS LEFT EXPOSED FOR GREATER THAN 14 DAYS. SOIL STABILIZATION SHALL CONSIST OF EITHER A SPRAY-ON ADHESIVE OR HYDRO SEEDING OF DISTURBED AREA.
13. CONTRACTORS AND SUBCONTRACTORS SHALL PARK ON PAVED OR GRAVELED AREAS DURING SITE DEVELOPMENT AS POSSIBLE, IN ORDER TO REDUCE TRACKED SEDIMENT.
14. ALL OWNERS OR CONTRACTORS INTENDING TO DISTURB ONE ACRE OR MORE OF GROUND AS PART OF CONSTRUCTION ACTIVITIES SHALL DO THE FOLLOWING:
    A. FILE A NOTICE OF INTENT (NOI) WITH EPA'S CONSTRUCTION GENERAL PERMIT (CGP).
    B. INSTALL SIGNAGE PER THE CGP.
    C. MAINTAIN ON-SITE COPIES OF THE NOI, CGP, AND SWPPP.
    D. COMPLY WITH REQUIREMENTS OF CGP AND SWPPP INCLUDING DOCUMENTING THAT ALL INSPECTIONS AND MONITORING HAVE BEEN PERFORMED.
    E. FILE A NOTICE OF TERMINATION (NOT) WHEN ONSITE WORK IS COMPLETE AND PERMANENT EROSION AND SEDIMENTATION CONTROL MEASURES ARE IN PLACE AND FUNCTIONING.
15. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND REPAIRED EVERY 7 DAYS BY THE DESIGNATED RESPONSIBLE PERSON.

REVISIONS	
A	05/24/16 – REVIEW
B	05/30/16 – STORM

PROFESSIONAL ENGINEER — REGISTERED — STATE OF IDAHO — 10077 — 05/30/2016 — LANCE WARREN

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DRAWN	SCALE
PSL	SHOWN
CHECKED	REVISION
LBW	B

DATE: 05/30/2016

PROJECT: 15078

TITLE: ECHELON RIDGE SUBDIVISION

PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN

SHEET: ESC-1

5 of 5

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LANDSCAPE NOTES:

1. REGULATIONS & STANDARDS
   - 1.1. All contractor work shall be conducted in accordance with ISPWC (Idaho Standard Public Works Construction), 2016; and City of Boise, ID codes, standards and state and local regulations.
2. EXISTING CONDITIONS
   - 2.1. All utilities shall be located prior to construction and protected. Any damage to structures, utilities or concrete will be replaced at contractor's expense.
   - 2.2. The site has many existing improvements such as underground utilities, curb and gutter, light poles and sidewalks.
   - 2.3. See Engineer's plans for information about existing features.
3. GRADING & SITE PREPARATION
   - 3.1. Prepare finish grades for planting by grubbing and removing weeds. If necessary apply Round-Up (or equivalent herbicide), using a certified applicator. Remove rocks and other materials over 2".
   - 3.2. All gravel overprep to be removed and disposed of off site.
   - 3.3. Finish grade to be smooth transition to allow for entire site to be a natural flowing space.
   - 3.4. Fine grade lawn areas to elevations set by Engineer's plans with positive drainage away from structures.
   - 3.5. Refer to Engineer's plans for grading information & for all drainage pipes and locations. Protect and retain drainage at all times.
   - 3.6. No pooling or standing water will be accepted per industry standards.
3. SOILS
   - 3.2. Reuse of existing topsoil that has been stockpiled on site is permitted if:
     - 3.2.1. Topsoil is tested and analyzed to ensure a proper growing medium. Provide additional amendments as determined by soil tests. And
     - 3.2.2. Topsoil is to be loose, friable sandy loam that is clean and free of toxic materials, noxious weeds, weed seeds, rocks, grass or other foreign materials.
     - 3.2.3. Topsoil should have a ph of 5.5 to 7.0.
     - 3.2.4. If on site topsoil does not meet these minimum standards contractor is responsible for providing approved imported topsoil or improving onsite topsoil per the approval of the Landscape Architect.
   - 3.3. If imported topsoil is used it must be from a local source and be screened free of any debris or foreign matter. Topsoil must not contain rocks, sticks, lumps, or toxic matter.
   - 3.4. Smooth, compact, and fine grade topsoil in lawn areas to smooth and uniform grade .5" below adjacent surfaces.
   - 3.5. Amend soil for all new plantings 2 parts topsoil & 1 part compost.
4. PLANTER BED MULCH
   - 4.1. All planter beds to receive 3" depth of Black and Tan Mini mulch, submit for approval prior to placement.
   - 4.2. Install over commercial grade weed barrier fabric.
5. LAWN AREAS
   - 5.1. Sodded lawn to be tall turf-type fescue (regionally harvested).
   - 5.2. Lay sod within 24 hrs of harvesting. Lay sod to form a solid mass with offset, tightly fitted joints on even grades.
   - 5.3. Steel edging at all lawn locations adjacent to all planter beds per detail 3/L1.00
6. PLANTS
   - 6.1. All plant material shall be installed per industry standards.
   - 6.5. All plant material shall meet or exceed the minimum federal standards as regulated by ANSI Z60.1, American Standard for Nursery Stock. Plants not meeting these standards for quality, or plants determined to be unhealthy by Owner's representative, will be rejected.
   - 6.6. All Ball and Burlap trees to be installed per Balled and Burlapped planting detail 2/L1.00.
   - 6.7. All shrubs to be installed per detail 1/L1.00.
   - 6.8. Trees and shrubs over 36" shall not be planted within clear vision triangles per city code.
   - 6.9. Fertilize all trees and shrubs with 'Agriform' planting tablets or approved equal. Apply per manufacturers recommendations.
7. IRRIGATION (POC)
   - 6. Irrigation system shall be built to the following specifications:
     - 6.0.1. Adhere to city codes when connecting to city water.
     - 6.0.1. All irrigation material to be new with manufacturers' warranty fully intact.
     - 6.0.2. Install indoor rated controller in specified location on plan. Coordinate with project manager on exact location.
       - 6.0.2.1. Controller to include On/Off rain switch or other rain shut off device that does not alter program.
     - 6.0.3. Irrigation system piping in landscape areas to be minimum schedule 40 PVC or approved equal, sleeves to be double the size of pipes located within, all wires to be contained in separate sleeves 1-1/2" dia min.
     - 6.0.4. Coordinate all sleeving & pipe runs with owner (Local Construct) & Builder before installing.
     - 6.0.5. Use common trenching where possible.
     - 6.0.6. All wires to be 18 gauge direct, bury wire at a minimum of 12" below finished grade. Size wire for correct voltage loss.
     - 6.0.7. Supply a minimum of (2) spare wires to furthest valves from controller in all directions.
     - 6.0.8. Flow control device to be included on all remote control valves, including master control valve.
     - 6.0.9. Connect mainline to point of connection in approximate location shown on plan.
     - 6.0.10. Provide ¾" winterization port in location near POC. Winterization port to be located inside of its own standard valve box.
     - 6.0.11. Contractor is responsible complying with all codes and paying all permits necessary.
     - 6.0.12. Sprinkler heads shall have matched precipitation within each control circuit. Velocities shall not exceed 5 feet per second.
     - 6.0.13. Locate irrigation materials in planters when possible.
7. CONTRACTOR RESPONSIBILITIES
   - 7.1. Estimated quantities are shown for general reference only. Contractor shall be responsible for all quantity estimates.
   - 7.2. Refer to note 2.1 regarding damages to existing utilities & permitting note in irrigation section.
   - 7.3. All plant material and workmanship shall be guaranteed for a period of one year beginning at the date of Acceptance by Owner. Replace all dead or unhealthy plant material immediately with same type and size at no cost to Owner.
   - 7.4. Landscape contractor to turn in as built drawings at the end of project. Substantial completion will not be granted until 2 copies @ 1"=20' scale are turned in and approved by owner's representative.
8. In the event of a discrepancy, notify the Landscape Architect immediately.

LANDSCAPE REQUIREMENTS:

(PER BOISE CITY CODE)

SCREENING & BUFFERING:

STREETS & PROPERTY PERIMETER:

STREETSCAPE TREES: 1 TREE 40LF (CLASS II OR III)

**NO TREES WITHIN 10' OF SUBSURFACE STORM SEEPAGE BEDS

**NO TREES OR SHRUBS OVER 36" WITHIN CLEAR VISION TRIANGLE

INTERSECTIONS: 40'x40' ALONG CURBS

**PRESERVE & PROTECT ALL EXISTING TREES WITHIN PROJECT BOUNDARY

PERIMETER:	LENGTH (LF)	TREES REQUIRED	TREES PROVIDED
NORTH	N/A	N/A	N/A
EAST	632	16	16
SOUTH	141	4	4
WEST	N/A	N/A	N/A

OWNER TO PROVIDE 1 TREE / 30' ALONG NORTH/EAST BORDER TO PROVIDE SCREENING FOR ADJACENT PROPERTIES.

PERIMETER:	LENGTH (LF)	TREES REQUIRED	TREES PROVIDED
NORTH/EAST	814	27	34

PLANT SIZING MINIMUM REQUIREMENTS:

TREE SIZING:

CANOPY TREES: MIN 2" CAL, B&B MIN

CONIFER TREES: MIN 6' H MIN

SHRUB SIZING:

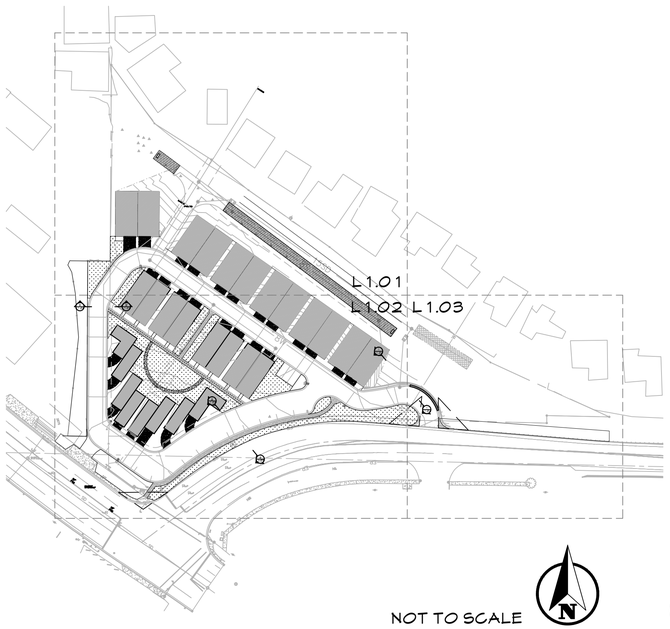
SHRUBS 2GAL POTS MIN

REFERENCE NOTES SCHEDULE

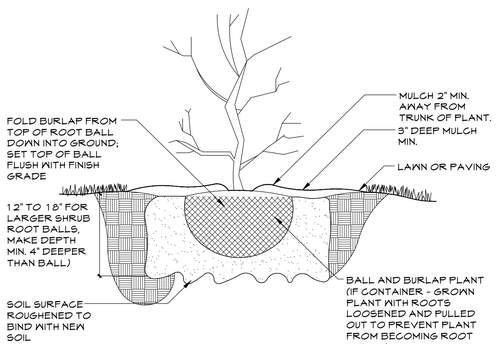
CODE	DESCRIPTION	QTY	DETAIL
1	SIDEWALK AND/OR WALKWAY REF. CIVIL		
2	ENTRY FEATURE (TBD)		
3	PROPERTY LINE		
4	NEW BUILDING REF. ARCHITECT/CIVIL		
6	CLEAR VISION TRIANGLE, NO TREES OR SHRUBS OVER 36" PLANTED WITHIN (40' x 40') @ INTERSECTION		
7	LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)		
8	STEEL EDGING AT ALL LAWN LOCATIONS ADJACENT TO ALL PLANTER BEDS		3/L1.00
9	PATHWAY (MATERIAL TBD)		
10	BENCH (TBD)		
11	EXISTING WELL HEADS REF. CIVIL		
12	ON STREET PARKING REF. CIVIL		
13	NATIVE GRASS SEED MIX (TBD)		
14	WALKWAY WITH STAIRS TO HOUSE. LAYOUT TBD		
15	NATIVE GRASS SEED MIX OR APPROVED MATERIAL BY ADJACENT PROPERTY OWNER		

PLANT SCHEDULE

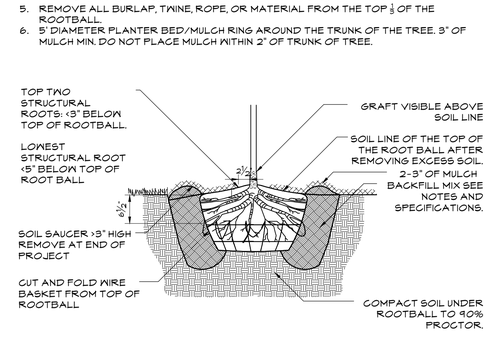
TREES	CODE	BOTANICAL NAME / COMMON NAME	CONT	CAL	SIZE		QTY
	CAR FRA	Carpinus betulus 'Franz Fontaine' / Franz Fontaine Hornbeam	B & B	2"Cal			8
	FRA AU2	Fraxinus pennsylvanica 'Autumn Purple' / Autumn Purple Ash	B & B	2"Cal			7
	PIC LAY	Picea pungens 'Layered' / Layered Colorado Blue Spruce	B & B		8'-9'H X 3'-4'W		8
	PRU TH2	Prunus cerasifera 'Thundercloud' / Thundercloud Plum	B & B	2"Cal			13
	PRU VIR	Prunus virginiana 'Shubert' / Canada Red Cherry	B & B	2"Cal			13
	PRU CHA	Pyrus calleryana 'Chanticleer' / Chanticleer Pear	B & B	2"Cal			5
SHRUBS	CODE	BOTANICAL NAME / COMMON NAME	SIZE	FIELD2	FIELD3		QTY
	CAL KAR	Calamagrostis x acutiflora 'Karl Foerster' / Feather Reed Grass	1 gal				29
	CEN JUP	Centranthus ruber 'Albiflorous' / Jupiter's Beard	1 gal				10
	FES ELI	Festuca cinerea 'Elijah's Blue' / Elijah's Blue Fescue	1 gal				41
	LAV MUN	Lavandula angustifolia 'Munstead' / Munstead English Lavender	2 gal				41
	PEN HAM	Pennisetum alopecuroides 'Hameln' / Hameln Dwarf Fountain Grass	1 gal				68
	PRU OTT	Prunus laurocerasus 'Otto Luyken' / Luykens Laurel	5 gal				20
	SAL NEM	Salvia nemorosa 'East Friesland' / East Friesland Perennial Sage	1 gal				56



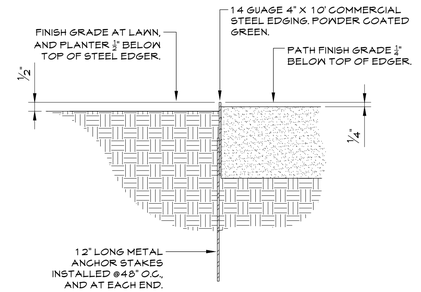
NOT TO SCALE



1 SHRUB PLANTING
1" = 1'-0" 329333.16-01



2 BALL AND BURLAP TREE PLANTING
3/4" = 1'-0" 329343.33-05



3 STEEL LANDSCAPE EDGING
3" = 1'-0" 329413.12-01

STACK ROCK GROUP

STACK ROCK GROUP, INC.
LANDSCAPE ARCHITECTURE/ MASTER PLANNING

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PRELIMINARY NOT FOR CONSTRUCTION

ECHELON RIDGE TOWNHOMES

AMITY / FEDERAL WAY
BOISE, ID

REVISIONS

MRK	DATE	Description
1	**	**

JOB NO:	16-428
DATE:	MAY 31, 2016
DRAWN BY:	KS
CHECKED BY:	WH

DRAWING TITLE

LANDSCAPE OVERVIEW

SHEET NUMBER
L1.00

SHEET 1 OF 7



AMITY RIDGE
DRAFT LAYOUT
(05/31/2016)

0 10 20 40
SCALE (FT)

LANDSCAPE ELEMENTS:

- NATIVE GRASS SEED MIX
- LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)
- STORMWATER UTILITIES
- GREASE TRAP AND SEEPAGE BED
- CONCRETE
- STREET SIGNS
- WATER METER AND WATER LINE CONNECTIONS
- PARKING SYMBOLS

PLANT SCHEDULE

TREES	BOTANICAL NAME / COMMON NAME
	Carpinus betulus `Franz Fontaine` / Franz Fontaine Hornbeam
	Fraxinus pennsylvanica `Autumn Purple` / Autumn Purple Ash
	Picea pungens `Layered` / Layered Colorado Blue Spruce
	Prunus cerasifera `Thundercloud` / Thundercloud Plum
	Prunus virginiana `Shubert` / Canada Red Cherry
	Pyrus calleryana `Chanticleer` / Chanticleer Pear
SHRUBS	BOTANICAL NAME / COMMON NAME
	Calamagrostis x acutiflora `Karl Foerster` / Feather Reed Grass
	Centranthus ruber `Albiflorous` / Jupiter's Beard
	Festuca cinerea `Elijah's Blue` / Elijah's Blue Fescue
	Lavandula angustifolia `Munstead` / Munstead English Lavender
	Pennisetum alopecuroides `Hameln` / Hameln Dwarf Fountain Grass
	Prunus laurocerasus `Otto Luyken` / Luykens Laurel
	Salvia nemorosa `East Friesland` / East Friesland Perennial Sage

REFERENCE NOTES SCHEDULE

CODE	DESCRIPTION
1	SIDEWALK AND/OR WALKWAY REF. CIVIL
2	ENTRY FEATURE (TBD)
3	PROPERTY LINE
4	NEW BUILDING REF. ARCHITECT/CIVIL
6	CLEAR VISION TRIANGLE, NO TREES OR SHRUBS OVER 36" PLANTED WITHIN (40' x 40') @ INTERSECTION
7	LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)
8	STEEL EDGING AT ALL LAWN LOCATIONS ADJACENT TO ALL PLANTER BEDS
9	PATHWAY (MATERIAL TBD)
10	BENCH (TBD)
11	EXISTING WELL HEADS REF. CIVIL
12	ON STREET PARKING REF. CIVIL
13	NATIVE GRASS SEED MIX (TBD)
14	WALKWAY WITH STAIRS TO HOUSE. LAYOUT TBD
15	NATIVE GRASS SEED MIX OR APPROVED MATERIAL BY ADJACENT PROPERTY OWNER

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Seals

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REVISIONS

MRK	DATE	Description
1	**	**

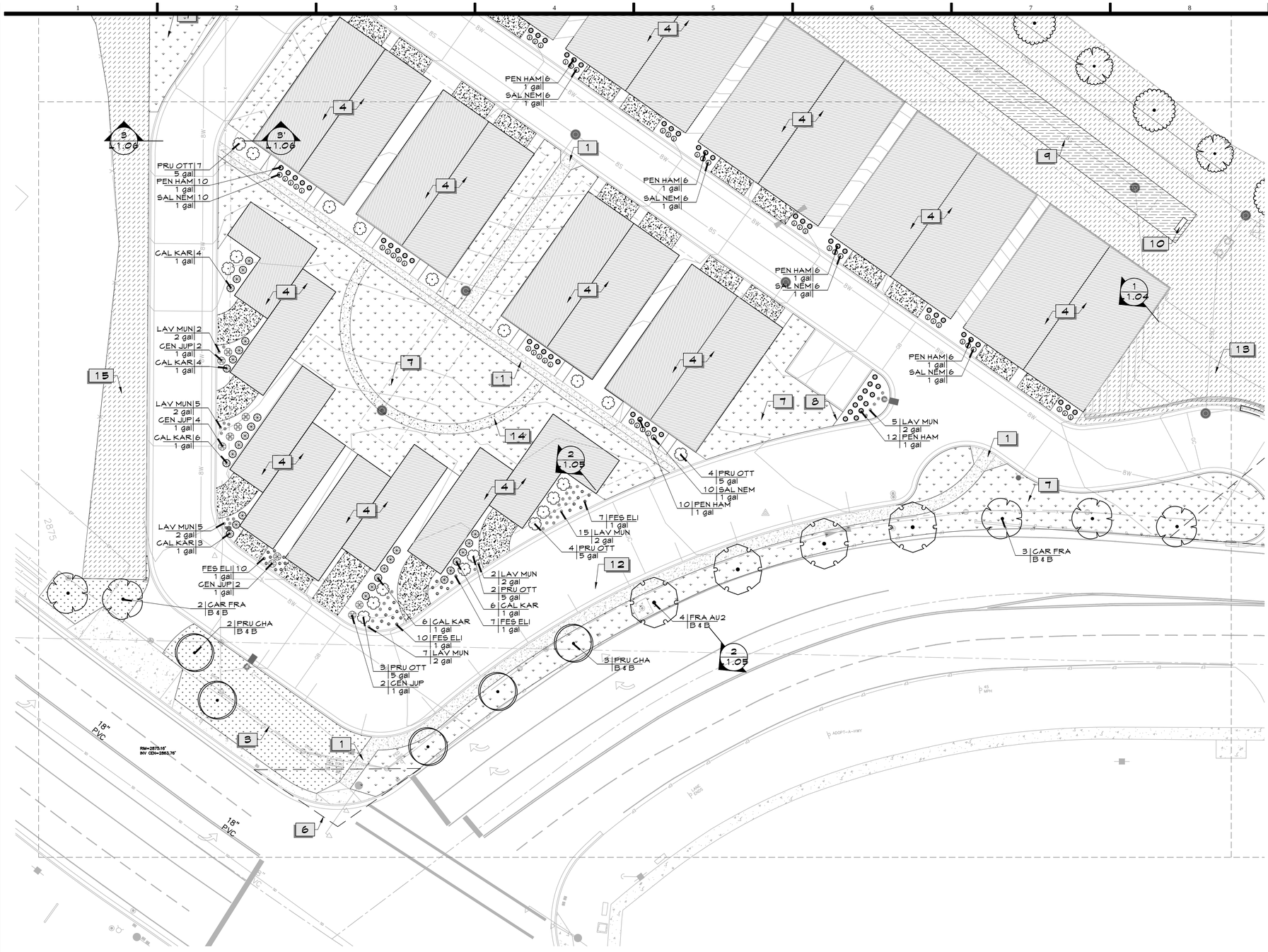
JOB NO:	16-428
DATE:	MAY 31, 2016
DRAWN BY:	KG
CHECKED BY:	WH

DRAWING TITLE

LANDSCAPE PLAN

SHEET NUMBER
L1.01

SHEET 2 OF 7



AMITY RIDGE
DRAFT LAYOUT
(05/31/2016)

0 10 20 40
SCALE (FT)

LANDSCAPE ELEMENTS:

- NATIVE GRASS SEED MIX
- LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)
- STORMWATER UTILITIES
- GREASE TRAP AND SEEPAGE BED
- CONCRETE
- STREET SIGNS
- WATER METER AND WATER LINE CONNECTIONS
- PARKING SYMBOLS

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	Lavandula angustifolia `Munstead` / Munstead English Lavender
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PRELIMINARY NOT FOR CONSTRUCTION

ECHELON RIDGE TOWNHOMES

AMITY / FEDERAL WAY
BOISE, ID

REVISIONS

MRK	DATE	Description
1	**	**

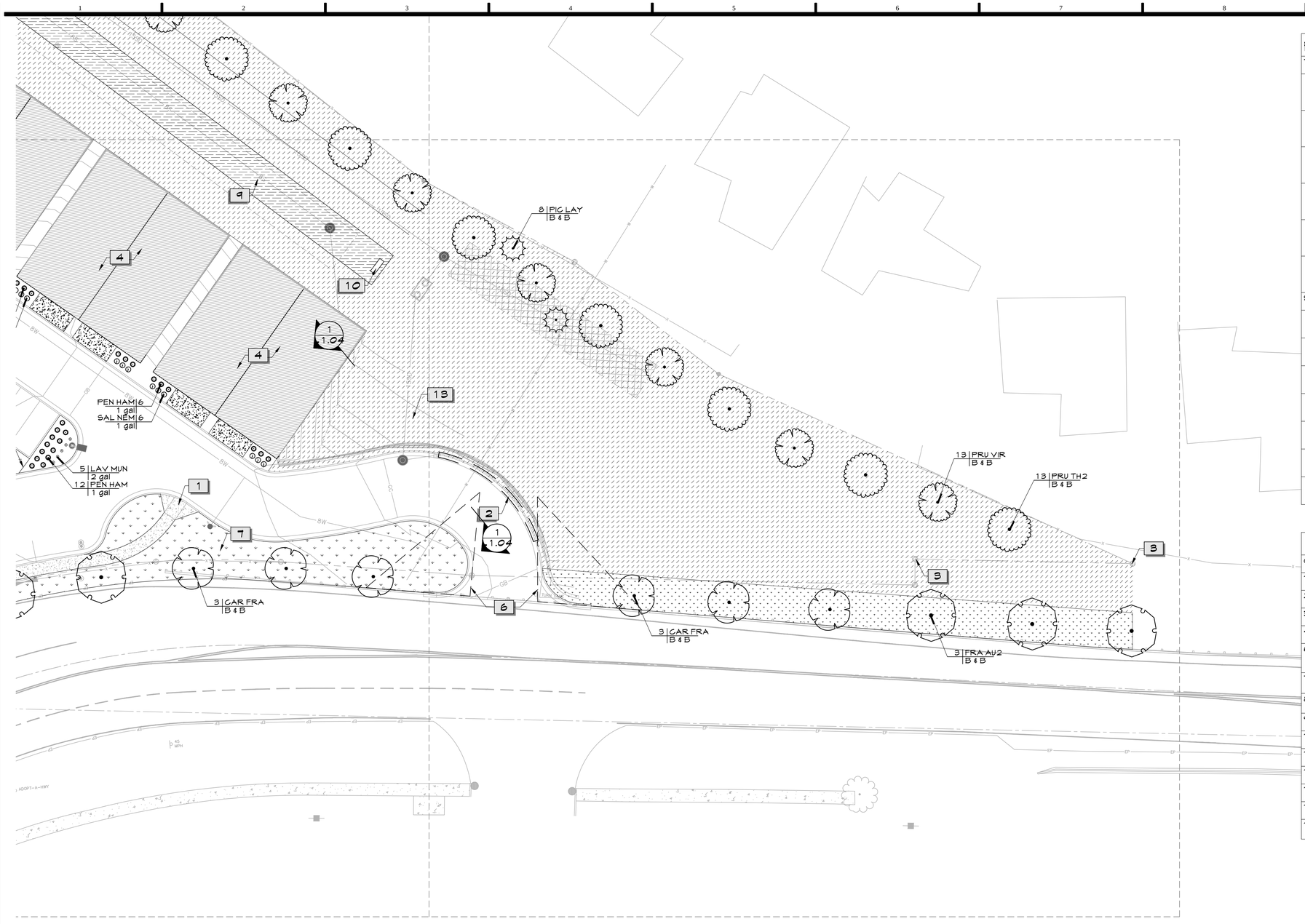
JOB NO:	16-428
DATE:	MAY 31, 2016
DRAWN BY:	KG
CHECKED BY:	WH

DRAWING TITLE

LANDSCAPE PLAN

SHEET NUMBER
L1.02

SHEET 3 OF 7



AMITY RIDGE
DRAFT LAYOUT
(05/31/2016)

0 10 20 40
SCALE (FT)

LANDSCAPE ELEMENTS:

- NATIVE GRASS SEED MIX
- LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)
- STORMWATER UTILITIES
- GREASE TRAP AND SEEPAGE BED
- CONCRETE
- STREET SIGNS
- WATER METER AND WATER LINE CONNECTIONS
- PARKING SYMBOLS

PLANT SCHEDULE

TREES	BOTANICAL NAME / COMMON NAME
	Carpinus betulus 'Franz Fontaine' / Franz Fontaine Hornbeam
	Fraxinus pennsylvanica 'Autumn Purple' / Autumn Purple Ash
	Picea pungens 'Layered' / Layered Colorado Blue Spruce
	Prunus cerasifera 'Thundercloud' / Thundercloud Plum
	Prunus virginiana 'Shubert' / Canada Red Cherry
	Pyrus calleryana 'Chanticleer' / Chanticleer Pear
SHRUBS	**BOTANICAL NAME / COMMON NAME**
	Calamagrostis x acutiflora 'Karl Foerster' / Feather Reed Grass
	Centranthus ruber 'Albiflorous' / Jupiter's Beard
	Festuca cinerea 'Elijah's Blue' / Elijah's Blue Fescue
	Lavandula angustifolia 'Munstead' / Munstead English Lavender
	Pennisetum alopecuroides 'Hameln' / Hameln Dwarf Fountain Grass
	Prunus laurocerasus 'Otto Luyken' / Luykens Laurel
	Salvia nemorosa 'East Friesland' / East Friesland Perennial Sage

REFERENCE NOTES SCHEDULE

CODE	DESCRIPTION
1	SIDEWALK AND/OR WALKWAY REF. CIVIL
2	ENTRY FEATURE (TBD)
3	PROPERTY LINE
4	NEW BUILDING REF. ARCHITECT/CIVIL
6	CLEAR VISION TRIANGLE, NO TREES OR SHRUBS OVER 36" PLANTED WITHIN (40' x 40') @ INTERSECTION
7	LAWN, SOD, TALL TURF-TYPE FESCUE, OR APPROVED EQUAL (TYP.)
8	STEEL EDGING AT ALL LAWN LOCATIONS ADJACENT TO ALL PLANTER BEDS
9	PATHWAY (MATERIAL TBD)
10	BENCH (TBD)
11	EXISTING WELL HEADS REF. CIVIL
12	ON STREET PARKING REF. CIVIL
13	NATIVE GRASS SEED MIX (TBD)
14	WALKWAY WITH STAIRS TO HOUSE. LAYOUT TBD
15	NATIVE GRASS SEED MIX OR APPROVED MATERIAL BY ADJACENT PROPERTY OWNER

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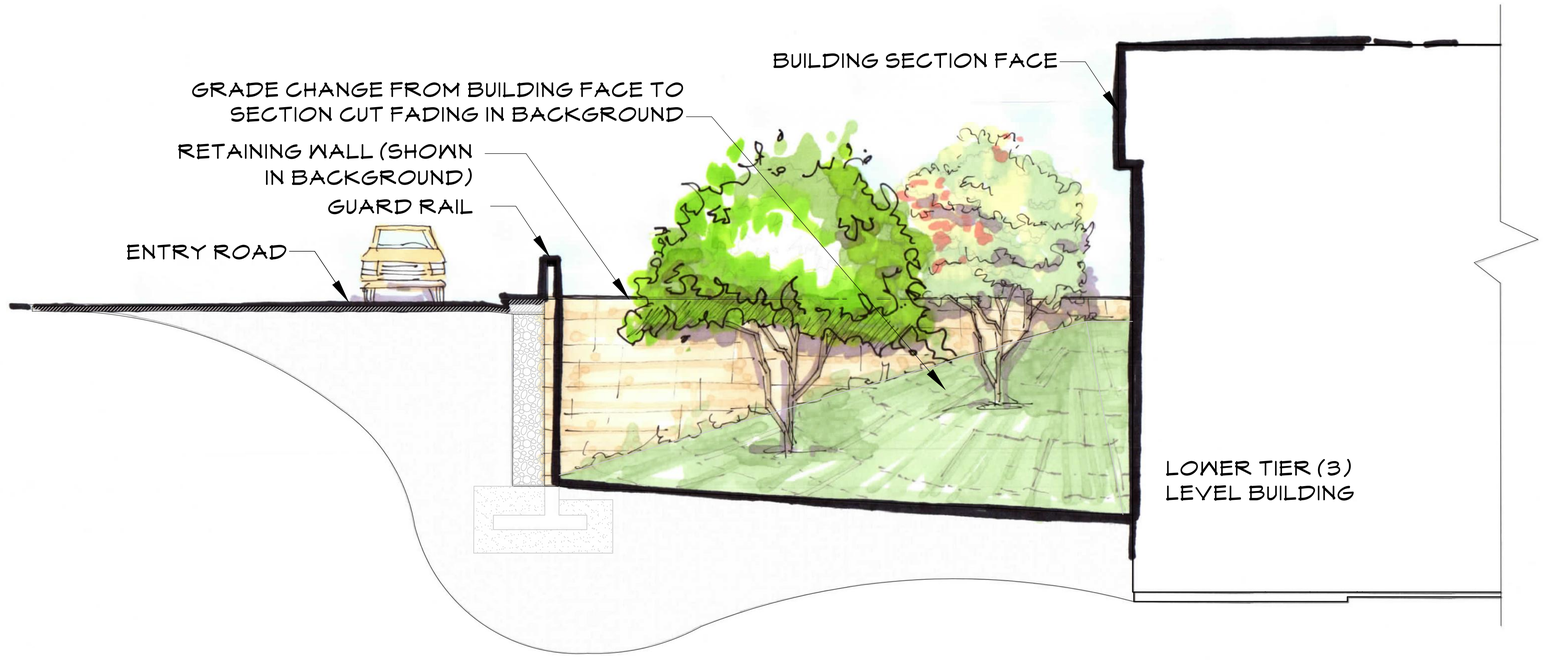
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LANDSCAPE PLAN

SHEET NUMBER
L1.03

SHEET 4 OF 7





1
L1.04

1'
L1.04

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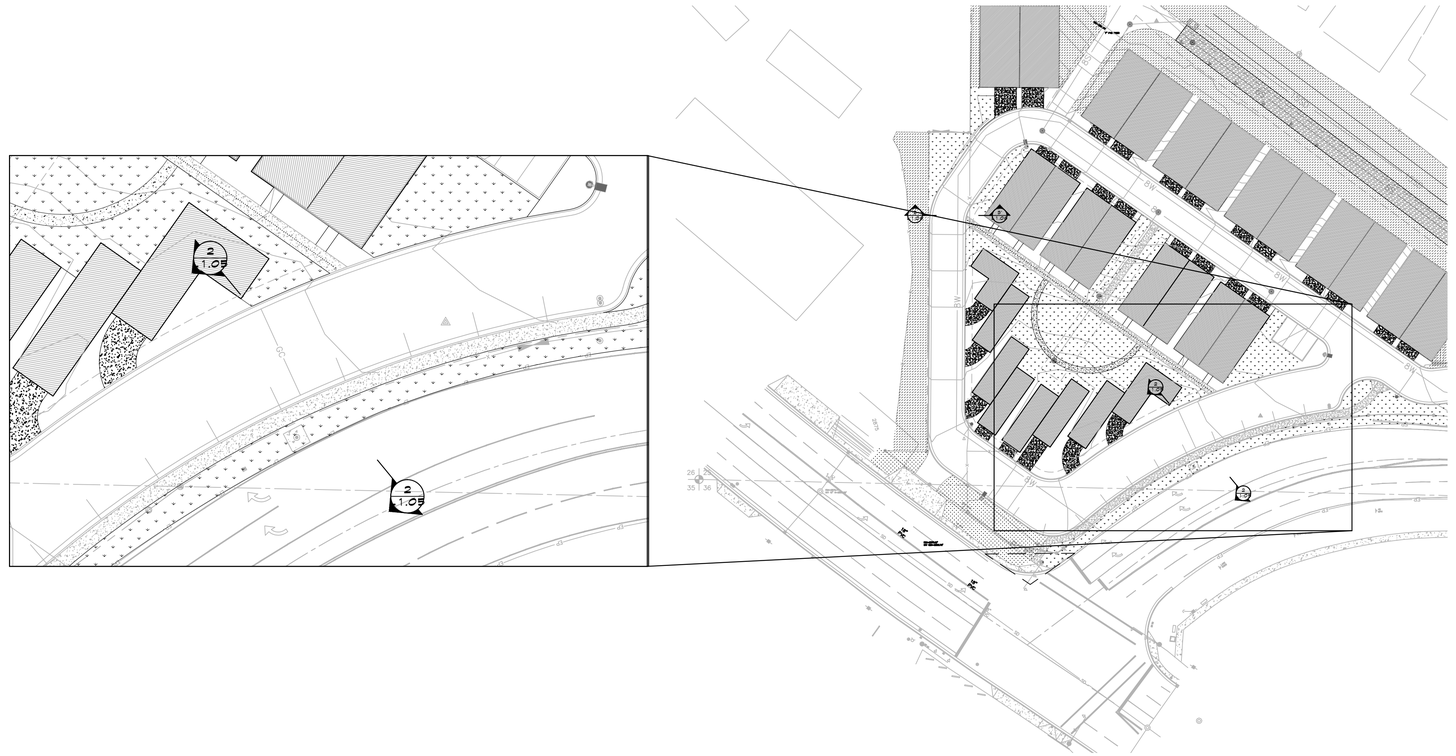
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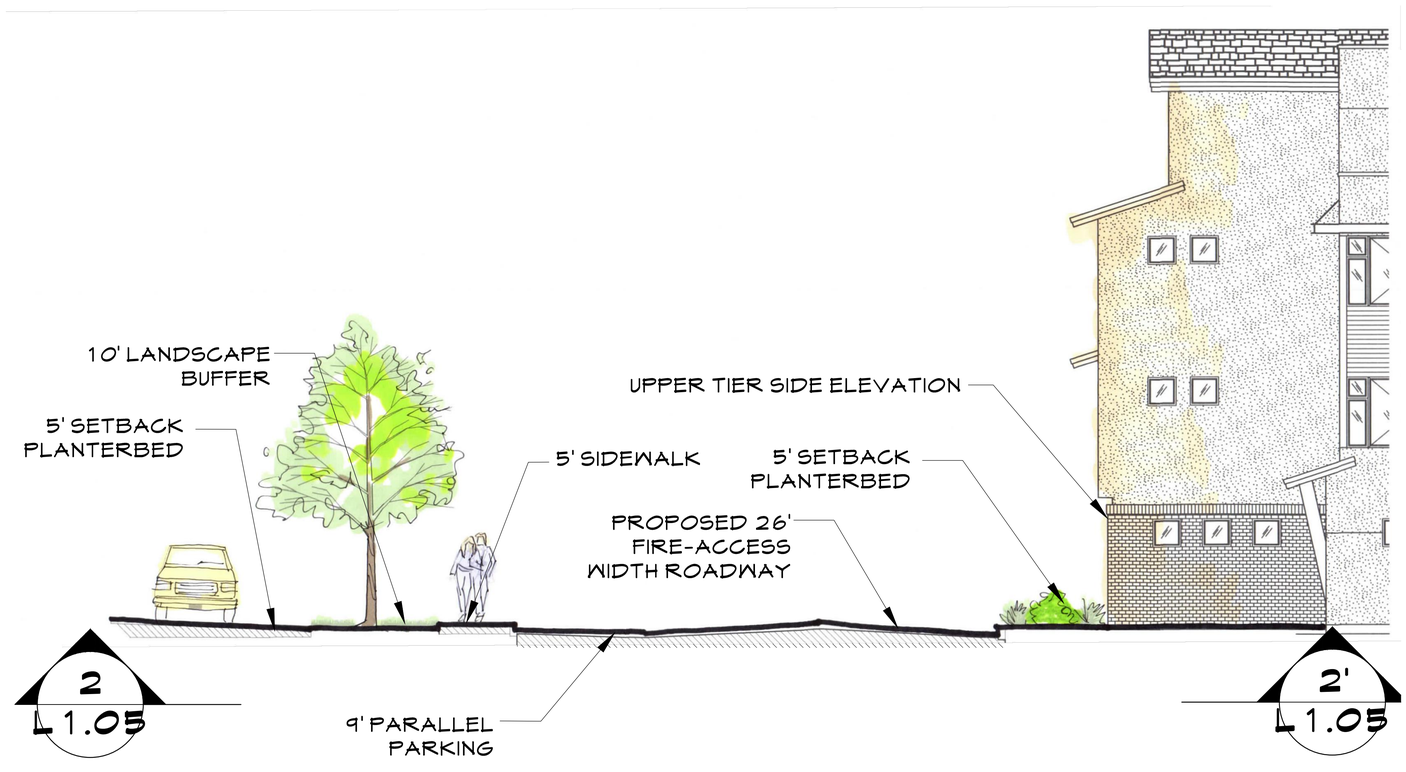
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LANDSCAPE SECTION

SHEET NUMBER
L1.04

SHEET 5 OF 7





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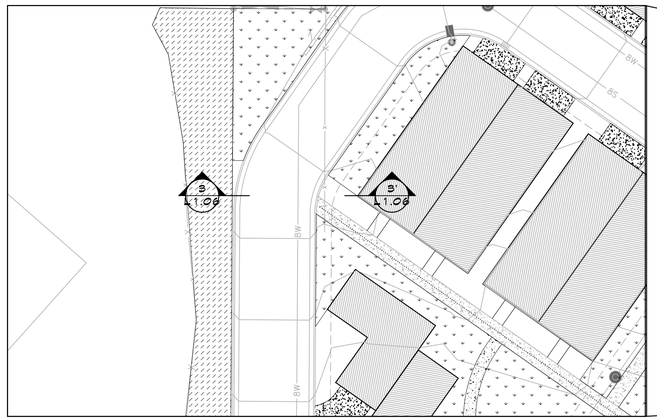
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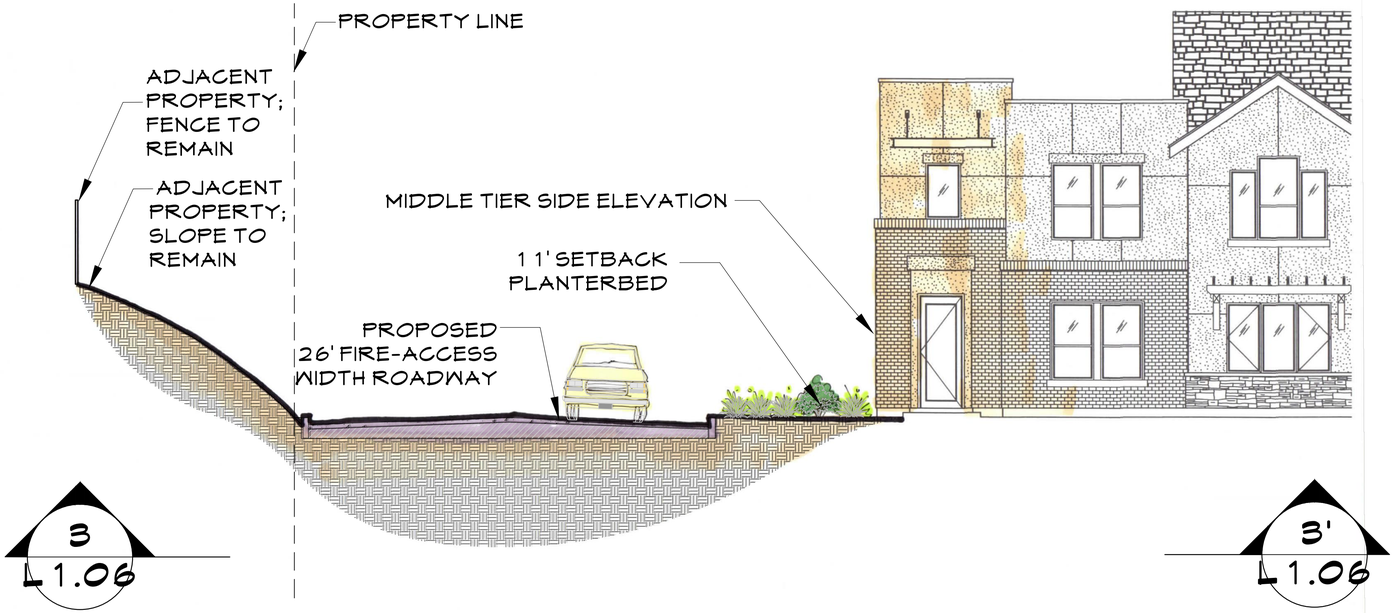
LANDSCAPE SECTION

SHEET NUMBER
L1.05

SHEET 6 OF 7







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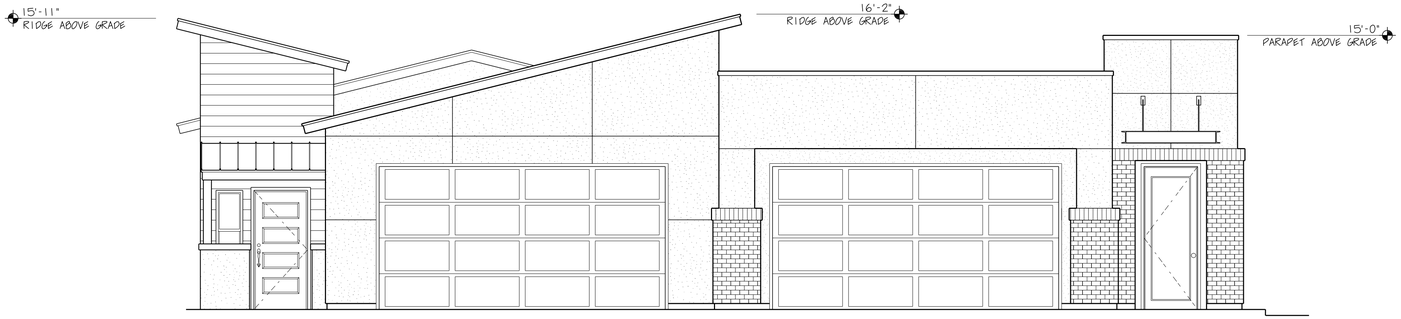
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DRAWING TITLE

LANDSCAPE SECTION

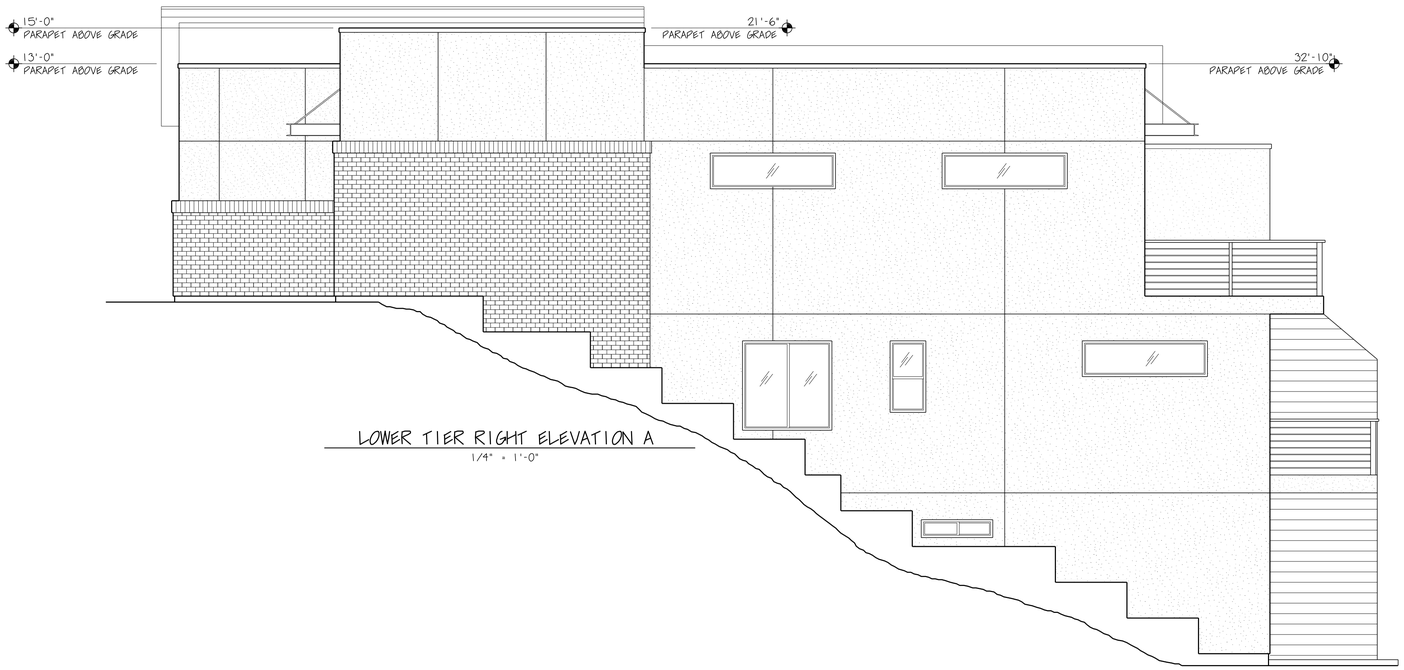
SHEET NUMBER
L1.06

SHEET 7 OF 7



LOWER TIER REAR ELEVATION A

1/4" = 1'-0"



LOWER TIER RIGHT ELEVATION A

1/4" = 1'-0"

SUB DATE:
5/23/2016

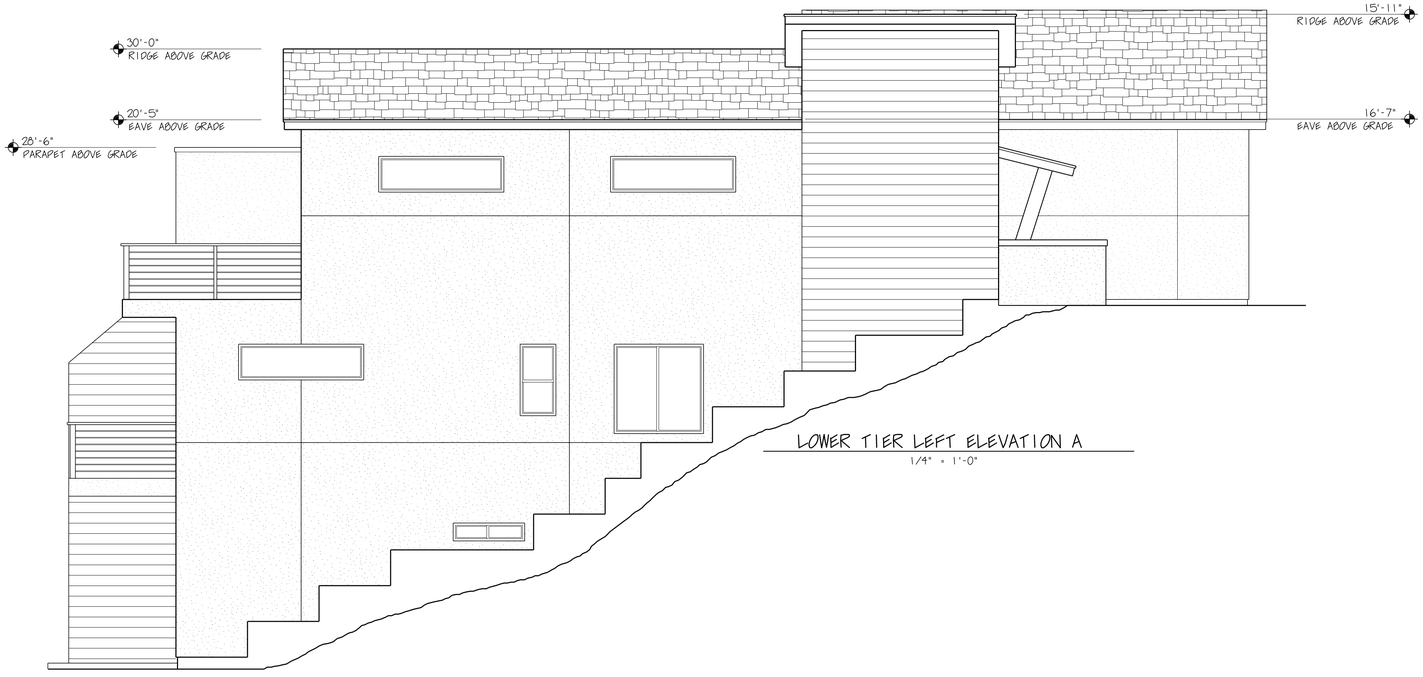
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AIA LU+ tomlinsondesigns@cableone.net

EXTERIOR ELEVATIONS

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LOWER TIER LEFT ELEVATION A

1/4" = 1'-0"



LOWER TIER REAR ELEVATION A

1/4" = 1'-0"

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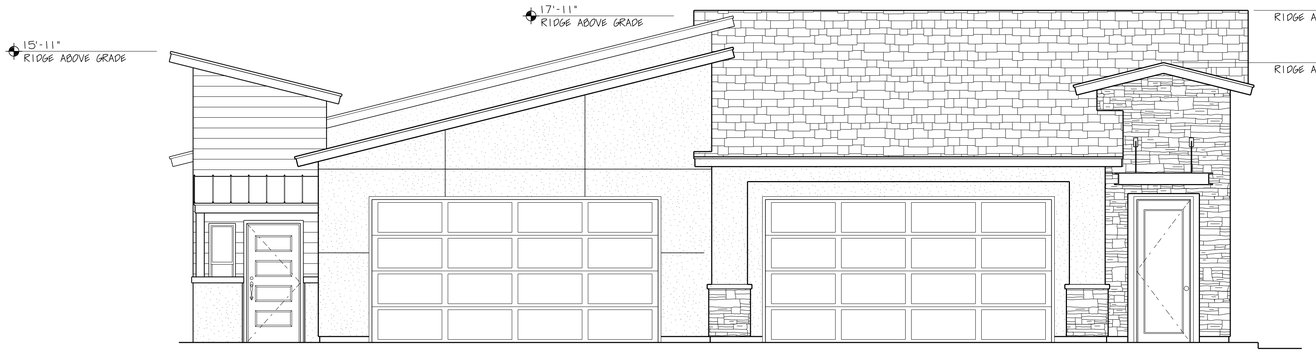
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PHONE: 208.863.3516

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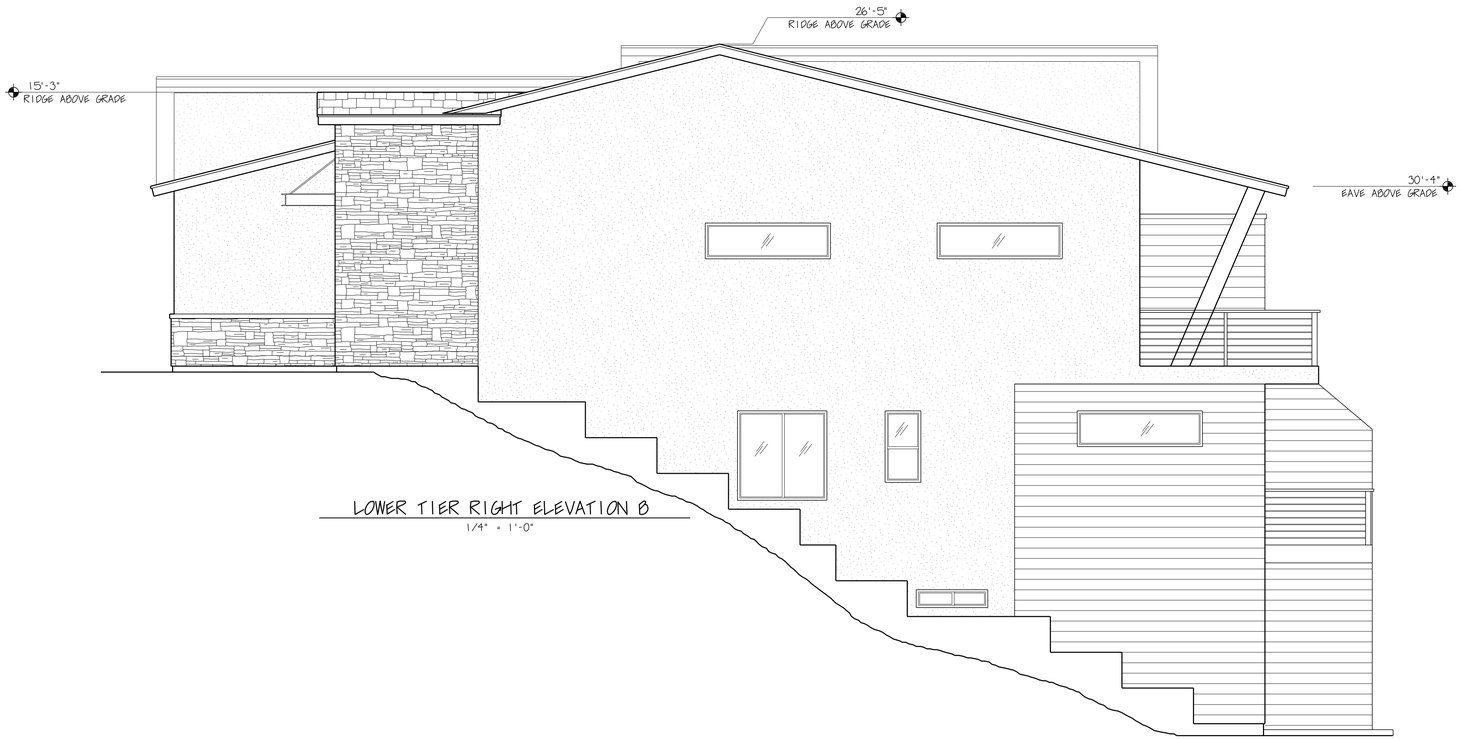
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LOWER TIER REAR ELEVATION B

1/4" = 1'-0"



LOWER TIER RIGHT ELEVATION B

1/4" = 1'-0"

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TOMLINSON DESIGNS

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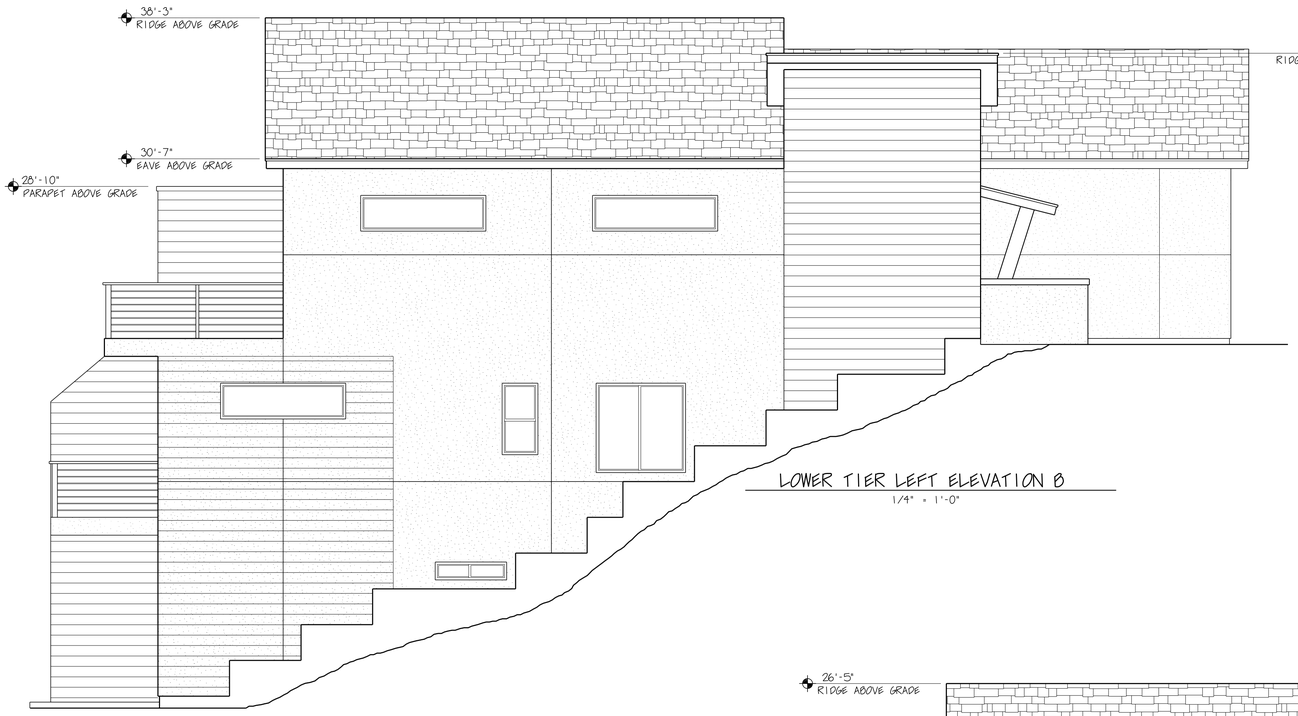
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LOWER TIER LEFT ELEVATION B

1/4" = 1'-0"



LOWER TIER REAR ELEVATION B

1/4" = 1'-0"

SUB DATE:
5/23/2016

REVISIONS:

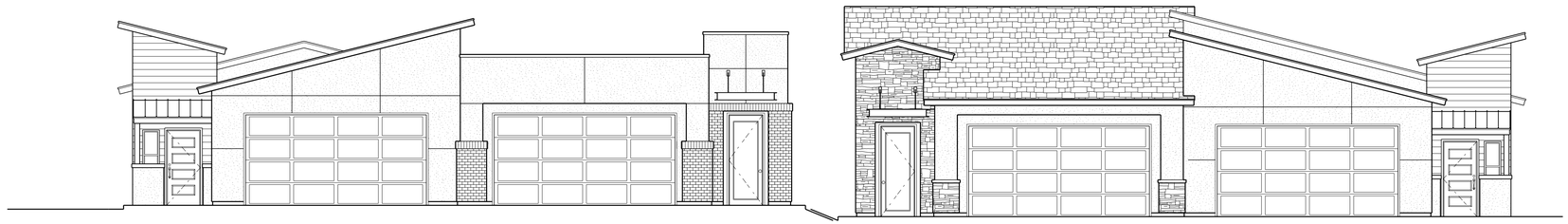
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LOWER TIER STREET ELEVATION





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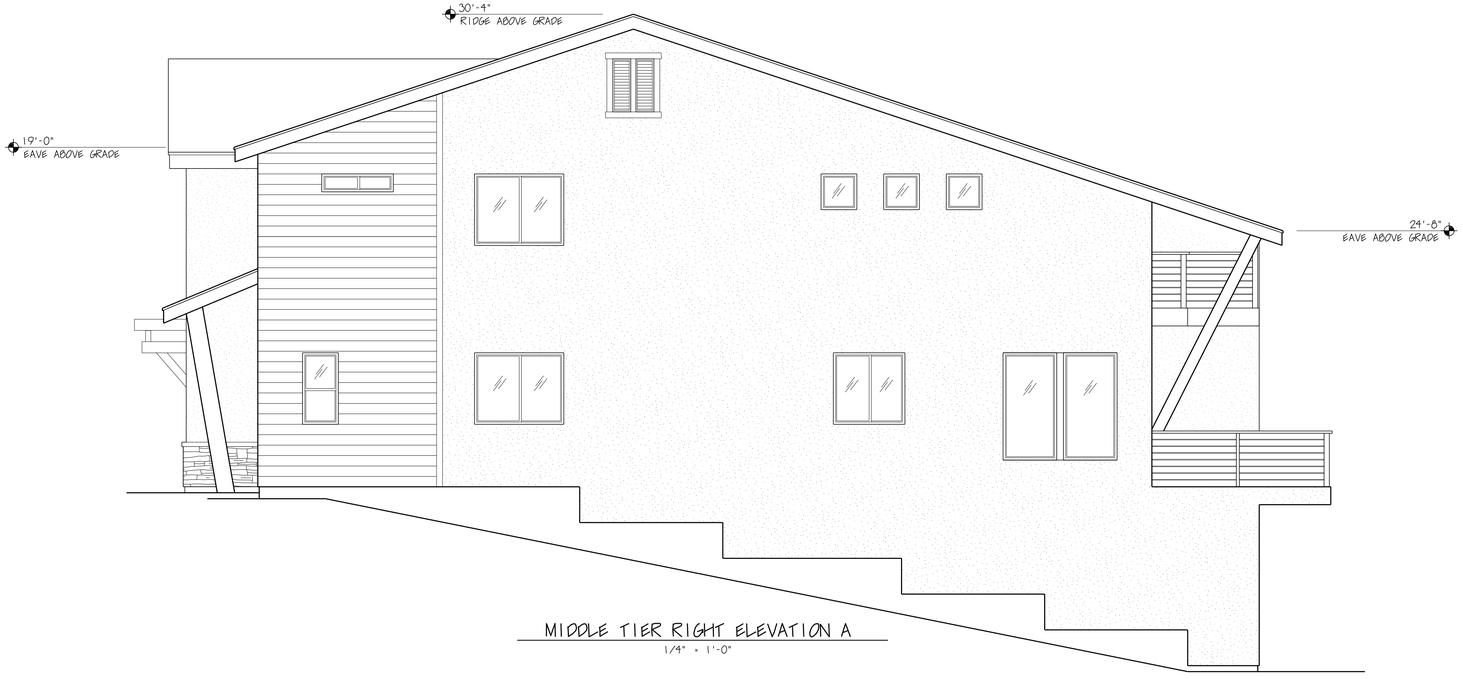
EXTERIOR ELEVATIONS

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MIDDLE TIER FRONT ELEVATION A

1/4" = 1'-0"



MIDDLE TIER RIGHT ELEVATION A

1/4" = 1'-0"

SUB DATE:
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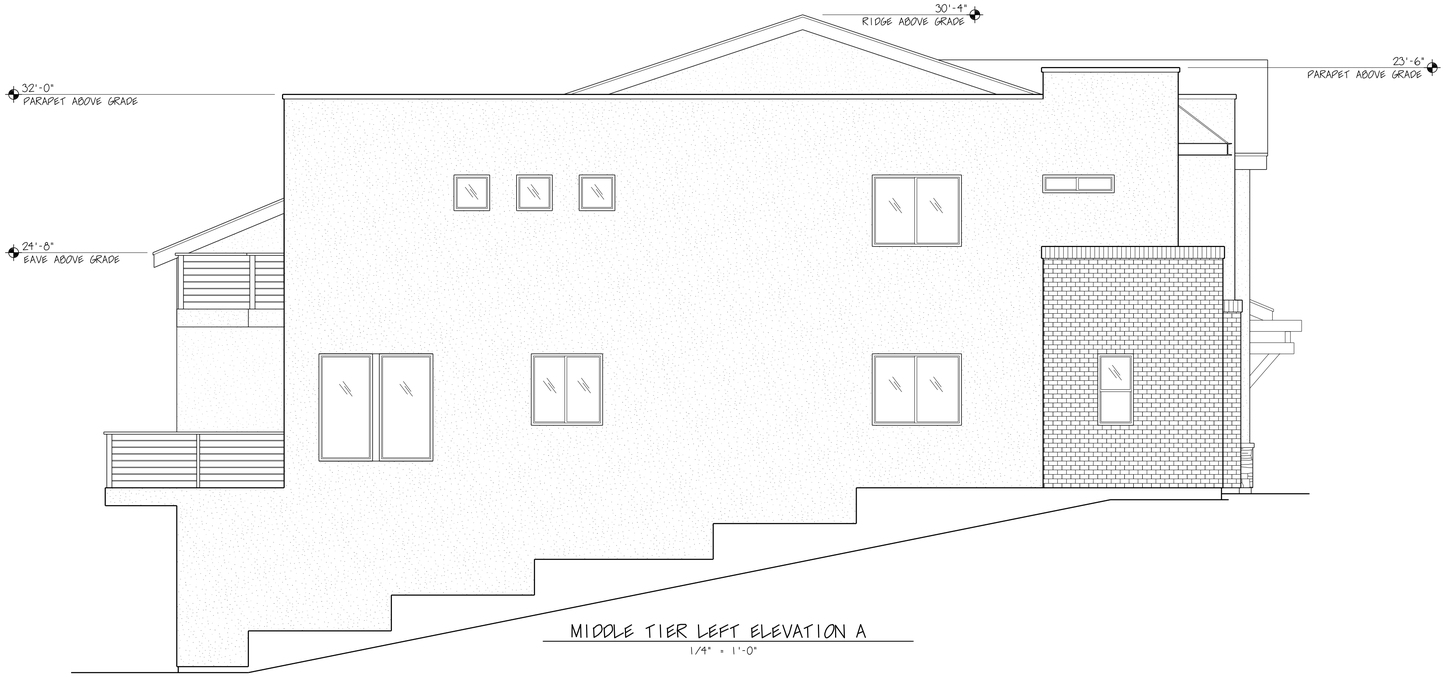
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MIDDLE TIER REAR ELEVATION A

1/4" = 1'-0"



MIDDLE TIER LEFT ELEVATION A

1/4" = 1'-0"

SUB DATE:
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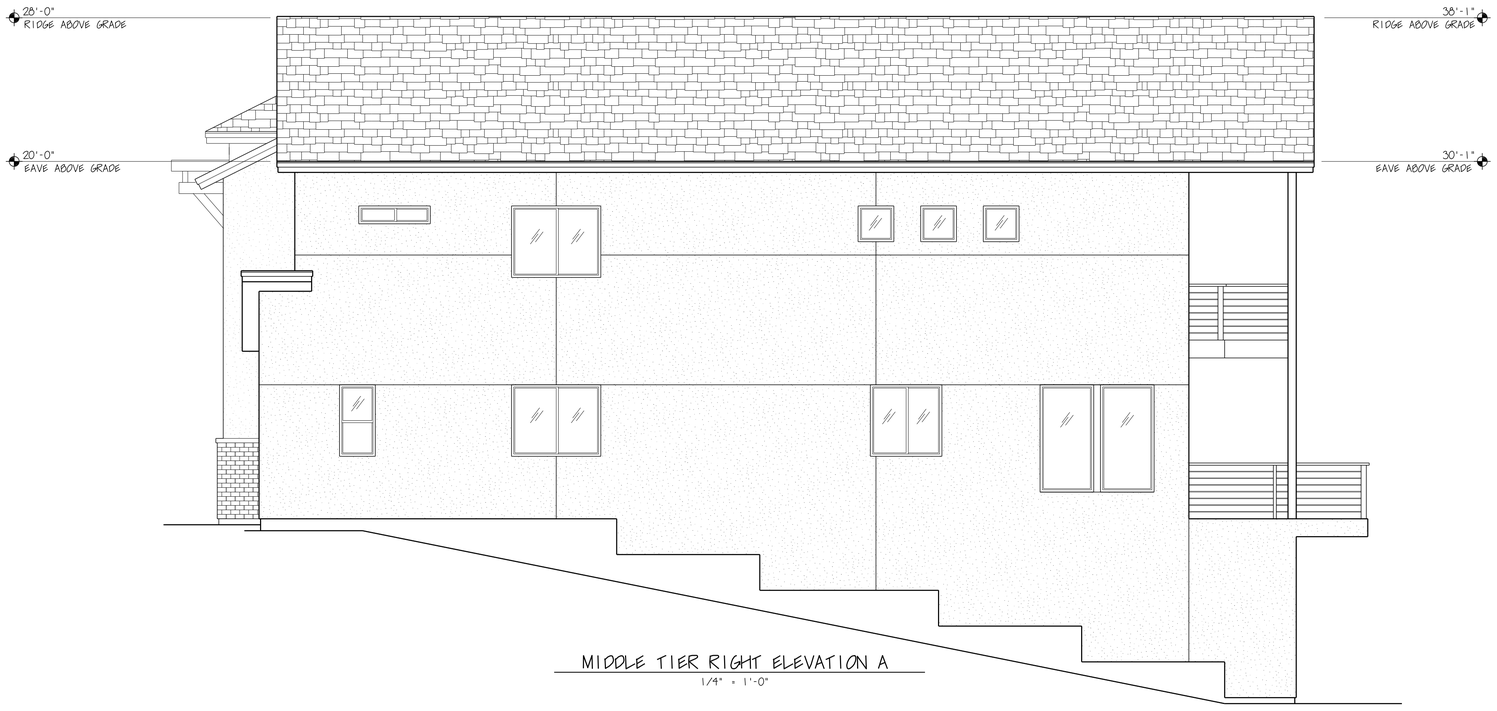
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MIDDLE TIER FRONT ELEVATION A

1/4" = 1'-0"



MIDDLE TIER RIGHT ELEVATION A

1/4" = 1'-0"

SUB DATE:
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MIDDLE TIER REAR ELEVATION A

1/4" = 1'-0"



MIDDLE TIER LEFT ELEVATION A

1/4" = 1'-0"

SUB DATE:
5/23/2016

REVISIONS:

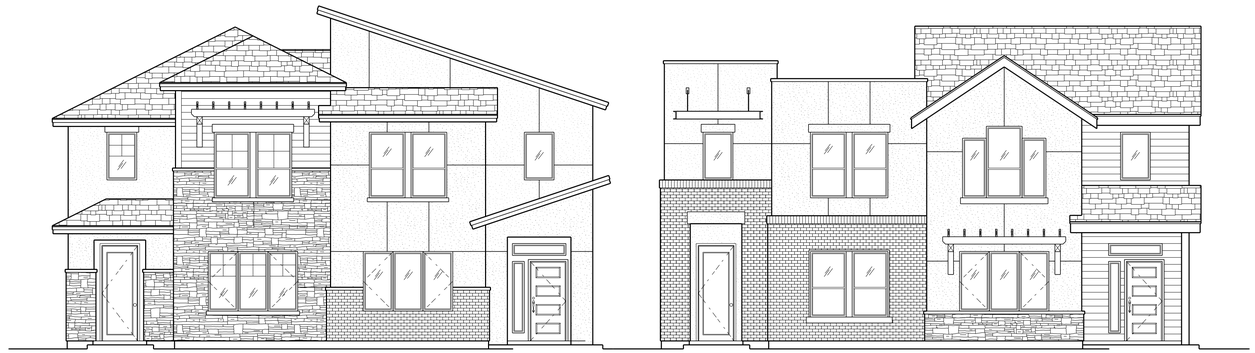
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AMITY RIDGE
MIDDLE TIER STREET ELEVATION





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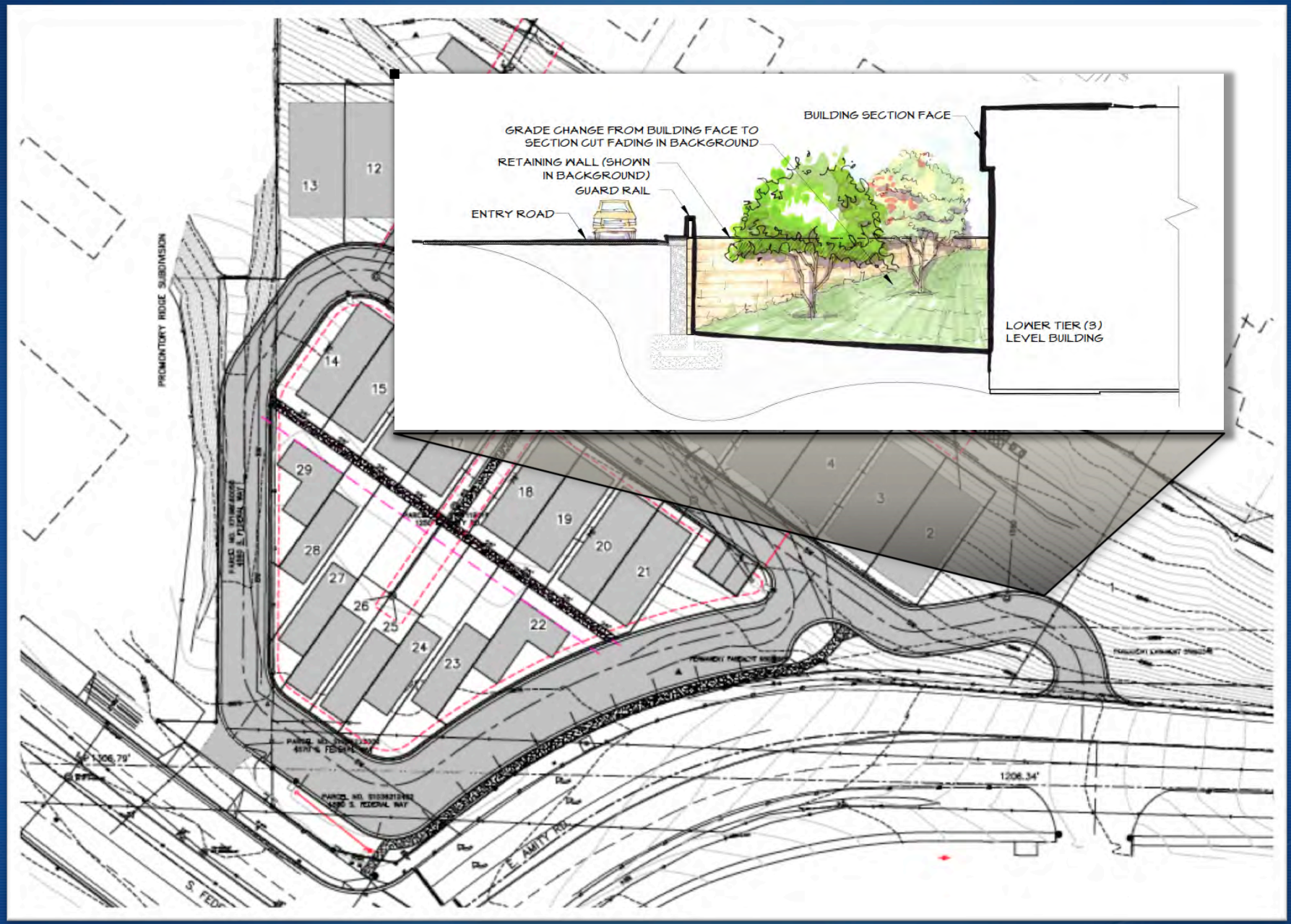
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Arete Investments

an Opportunity-based Company

Echelon Ridge Townhomes


E Oakridge Dr
E Amity Rd
S Timrod
4442
4438
4466
25
1255
1261
1267
1273
1279
1284
1254
1262
1274
1280
1301
1308
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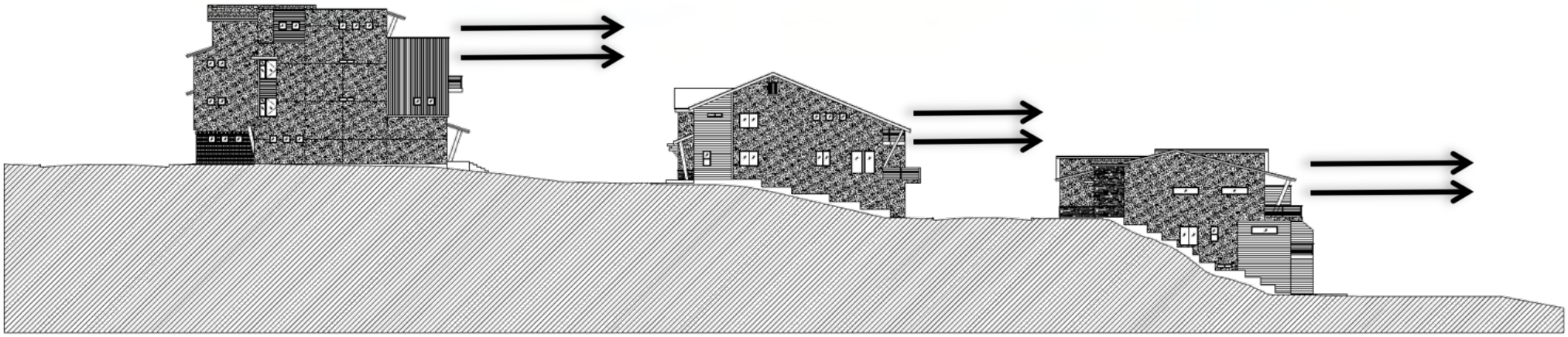
ARETE INVESTMENTS
an Opportunity-based Company

Four Views of the Entrance Slope



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Planning for Views



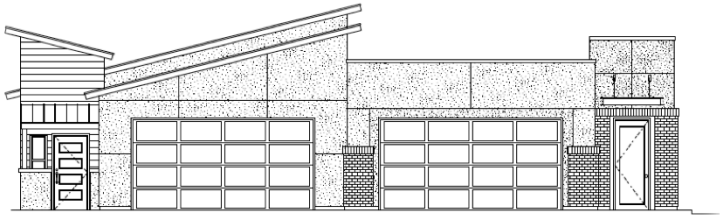
2 SITE SECTION
SCALE: 1" = 15.00'



UPPER TIER FRONT ELEVATION B



MIDDLE TIER FRONT ELEVATION A



LOWER TIER REAR ELEVATION A
1/4" = 1'-0"

ARETE INVESTMENTS
an opportunity-based company





City Views from Property

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Neighboring Commercial Properties


Mattress Factory


Motive Power


Maverik Country Store

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Architectural Themes

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Mixed Architecture Theme

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Mixed Style, Themes & Color

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an opportunity-based company



Mixed Style, Themes & Color

ARETE INVESTMENTS
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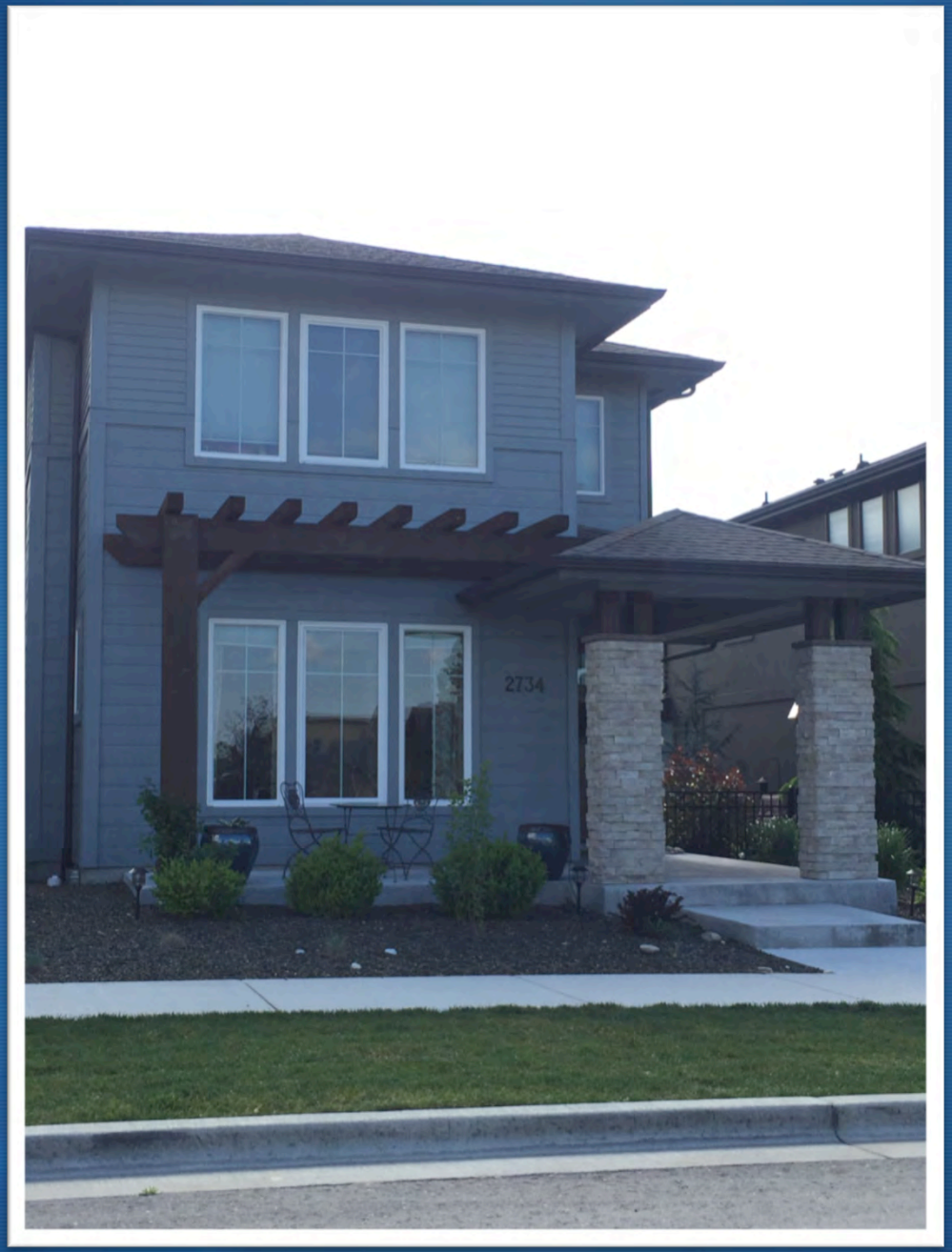
Sample Elevation

ARETE INVESTMENTS
an opportunity-based company



Sample Elevation

ARETE INVESTMENTS
an opportunity-based company



Sample Elevation

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Sample Elevation

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Sample Elevation

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What we are trying to avoid by Mixing Architecture...

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Another Good Mix-in Option

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Paired Townhome Format

ARETE INVESTMENTS
an opportunity-based company



ARETE INVESTMENTS
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Paired Townhome Format

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Architectural Designs

ARÊTE INVESTMENTS
an opportunity-based company

Lower Tier | Street & Rear Profiles



ARETE INVESTMENTS
an opportunity-based company

Middle Tier | Front and Street Profiles



ARETE INVESTMENTS
an opportunity-based company

Upper Tier | Front and Street Profiles

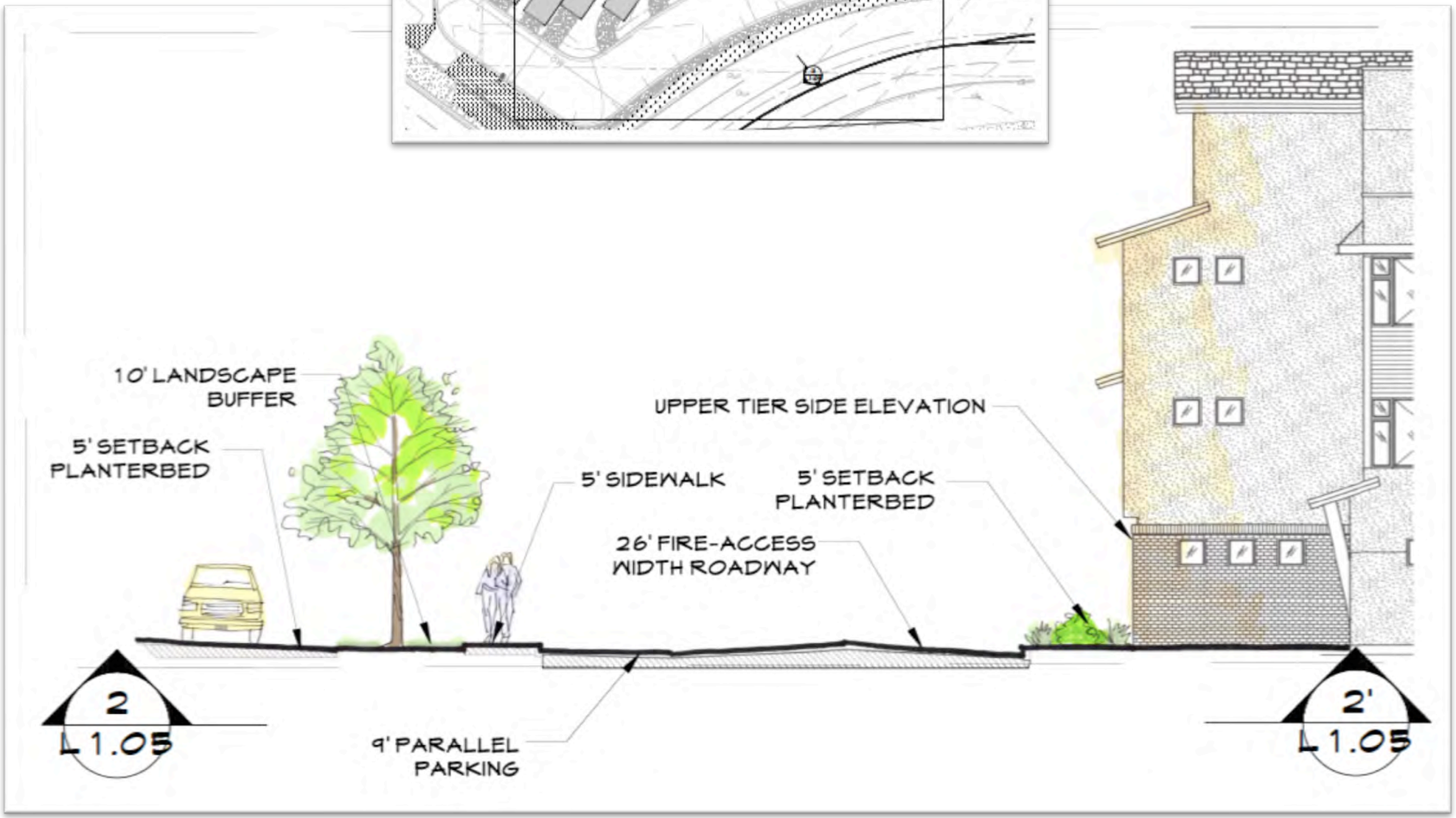


ARETE INVESTMENTS
an opportunity-based company

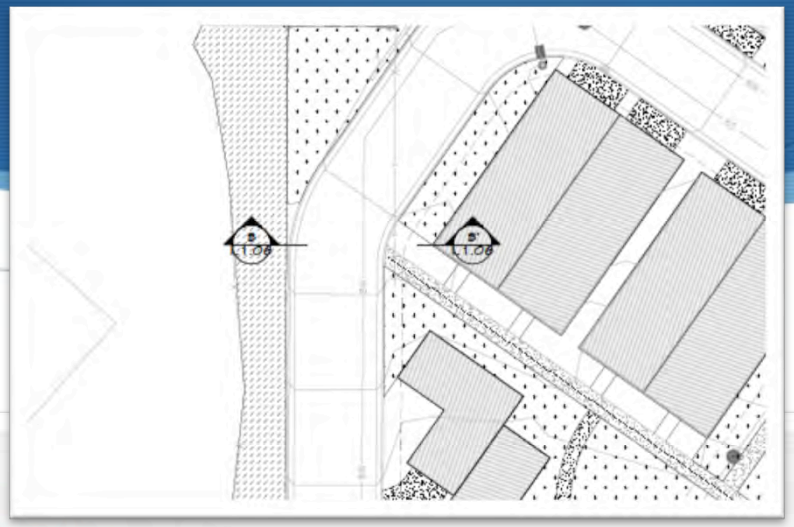
Landscape Profiles

ARÊTE INVESTMENTS
an opportunity-based company





ARETE INVESTMENTS
an Opportunity-based Company



PROPERTY LINE

ADJACENT PROPERTY; FENCE TO REMAIN

ADJACENT PROPERTY; SLOPE TO REMAIN

MIDDLE TIER SIDE ELEVATION

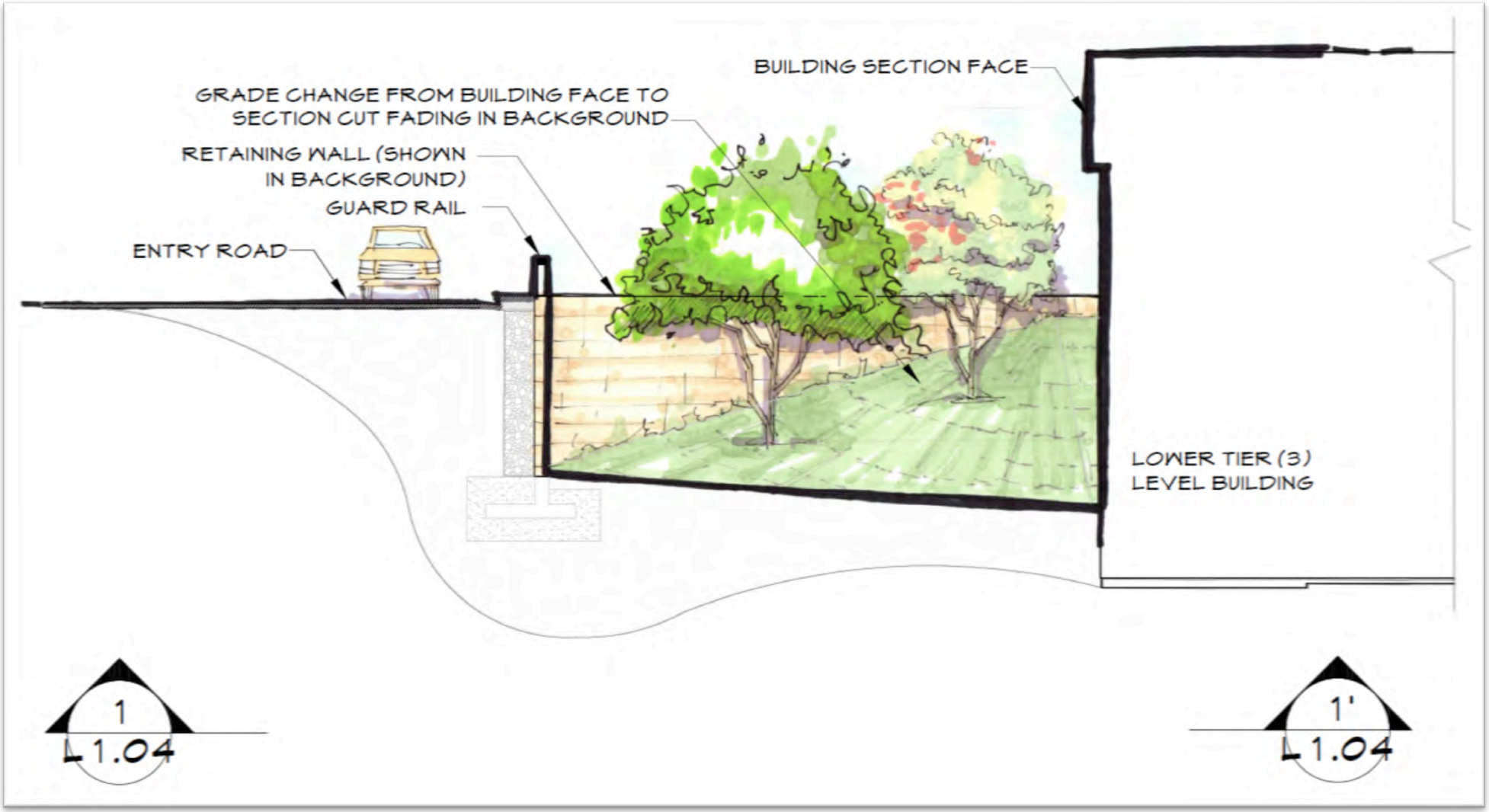
11' SETBACK PLANTERBED

PROPOSED 26' FIRE-ACCESS WIDTH ROADWAY

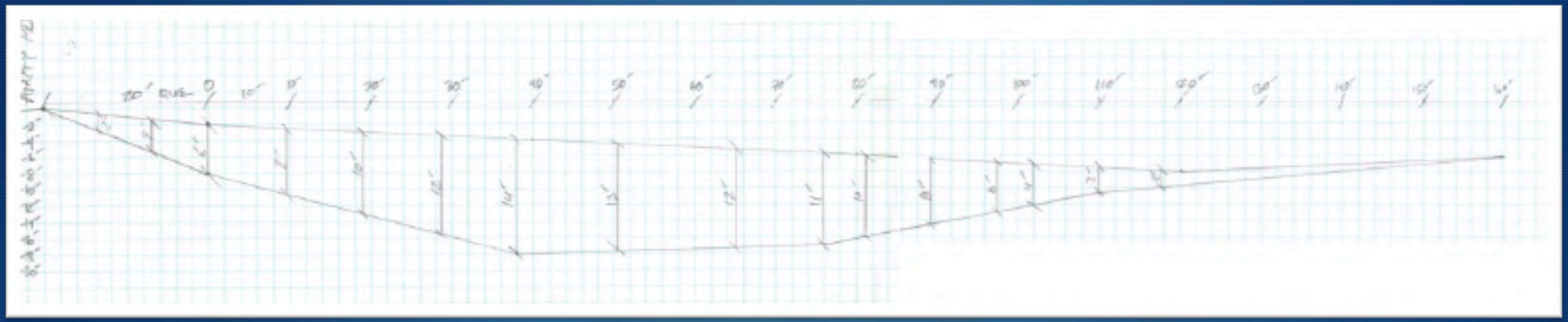
3
L1.06

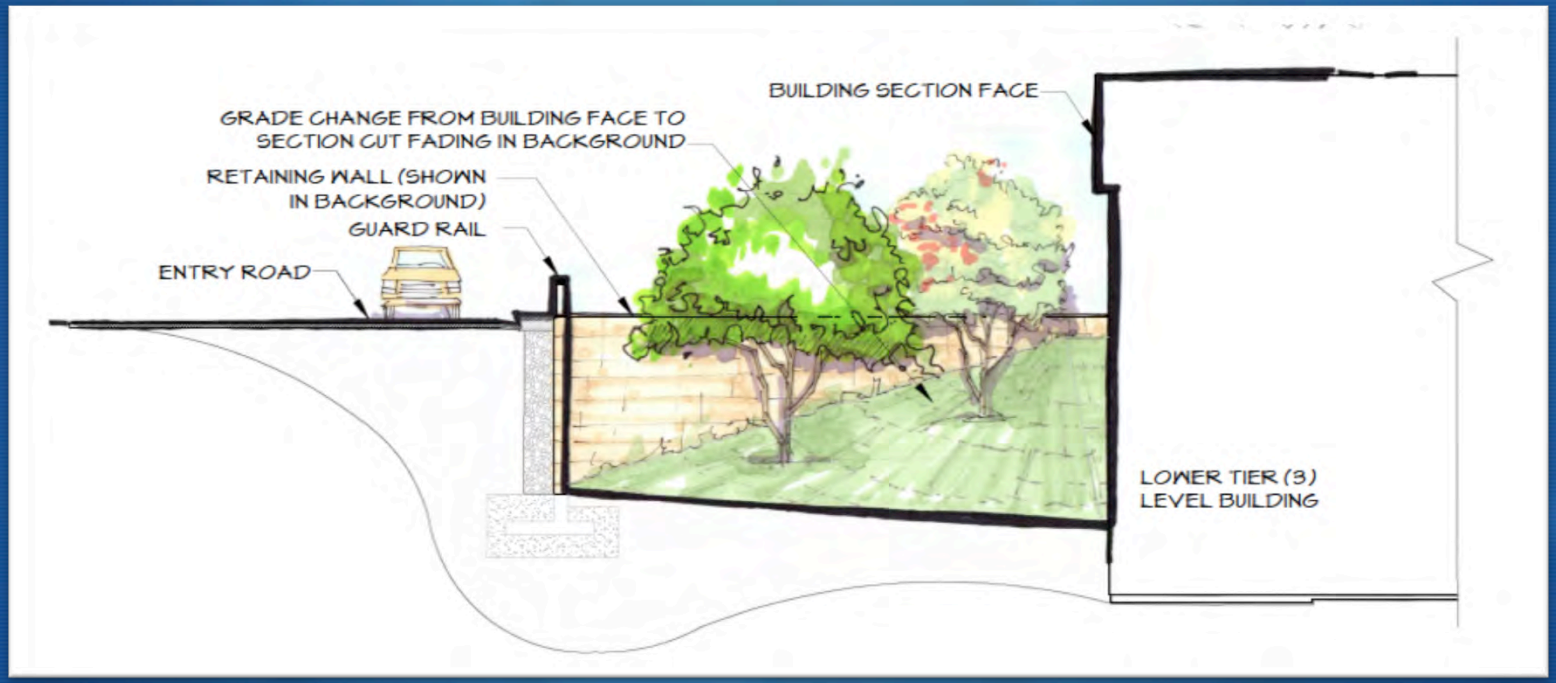
3'
L1.06

Retaining Wall Profile



ARETE INVESTMENTS
an opportunity-based company





Retaining Wall Profile

120 feet long with Max Depth of 15-16′

ARETE INVESTMENTS
an Opportunity-based Company

Company Info

Arete Investments Group, LLC
208.577.0225
jeremy@jeremytelford.com

Founded—

January 2009 in Boise, ID

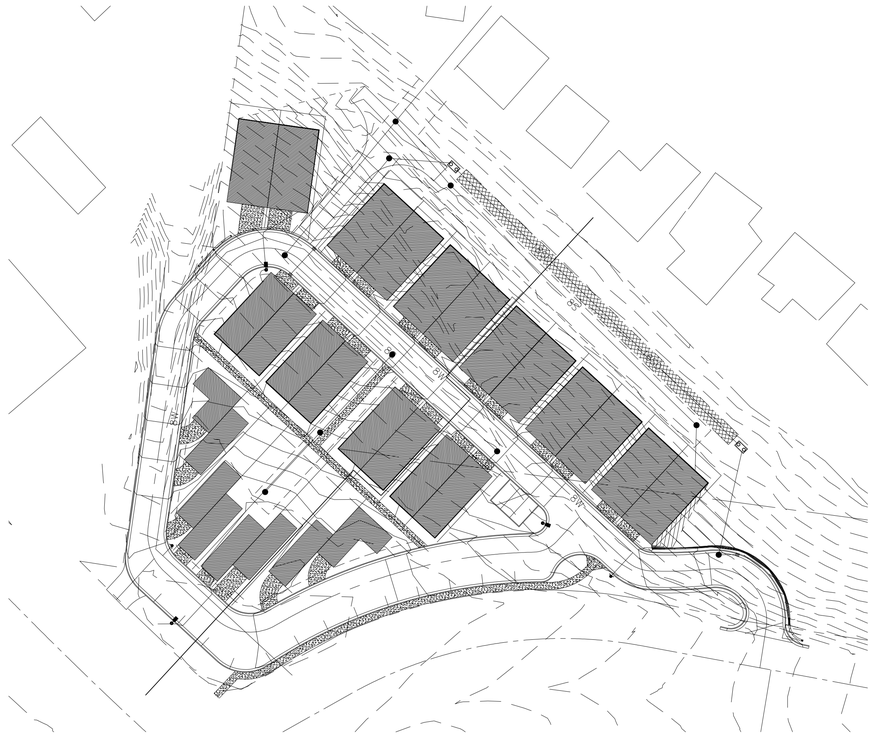
Managing Member—

Jeremy Telford, MBA

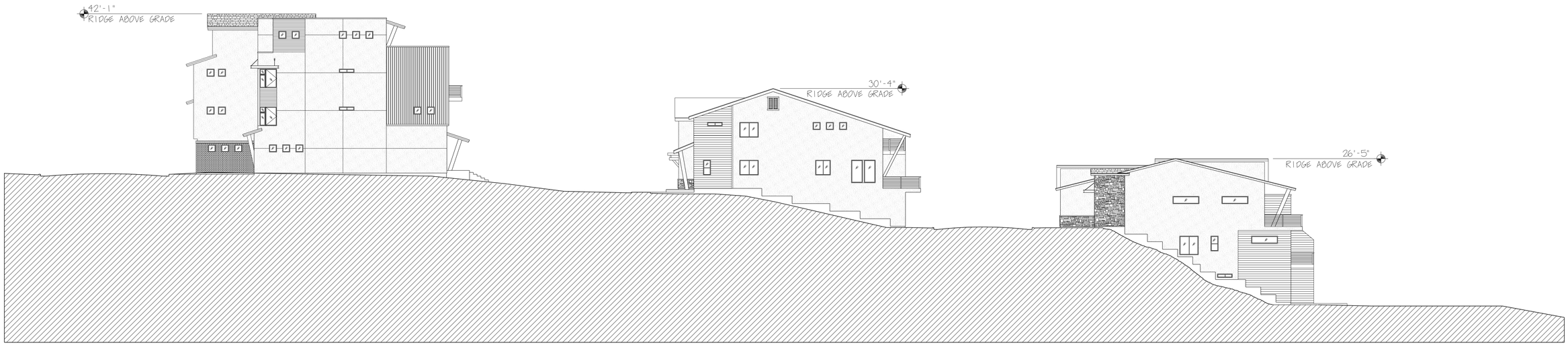
- BYU MBA Class of 2005
  Hawes Award Recipient—
  the highest honor given to an MBA student
- Member/Manager—TelQuist, LLC, a family-owned commercial real-estate investment group (1998-Present)
- Former Land Acquisition Project Manager—Woodside Homes of California (2005-2008)
- Designated Real Estate Broker in Idaho and California
- Guest Lecturer—BYU Marriott School of Management's Real Estate Academy
- Motivated father of four—married for 17 years to Trisha Steelman

ARETE INVESTMENTS
an opportunity-based company


ARETE INVESTMENTS
an opportunity-based company



1 SITE PLAN
SCALE: 1" = 60.00'



2 SITE SECTION
SCALE: N.T.S.

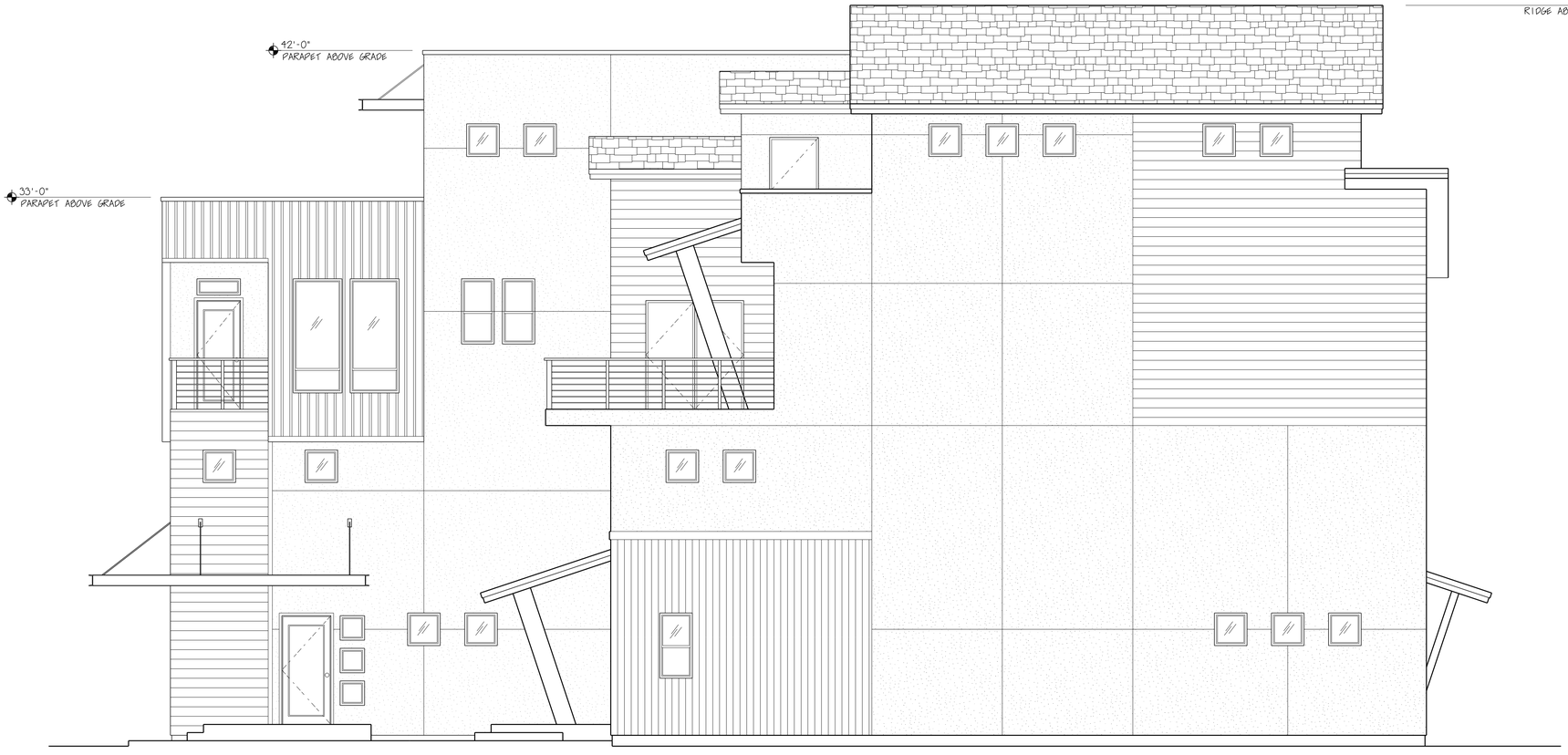
SUB DATE:
5/23/2016

REVISIONS:

AMITY RIDGE
BOISE, IDAHO

TOMLINSON DESIGNS
3983 E. RIVER RUN
BOISE, IDAHO 83716
208.695.3516
EMAIL tomlinsondesigns@cableone.net
www.tomlinsondesignsarchitecture.com

EXTERIOR ELEVATIONS



UPPER TIER RIGHT ELEVATION A

1/4" = 1'-0"



UPPER TIER FRONT ELEVATION A

1/4" = 1'-0"

SUB DATE:
5/23/2016

REVISIONS:

AMITY RIDGE
BOISE, IDAHO

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2651 S. ARMOR DR.
BOISE, IDAHO 83716
208.863.3516
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www.tomlinsondesignsarchitecture.com

EXTERIOR ELEVATIONS

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UPPER TIER LEFT ELEVATION A

1/4" = 1'-0"



UPPER TIER REAR ELEVATION A

1/4" = 1'-0"

SUB DATE:
5/23/2016

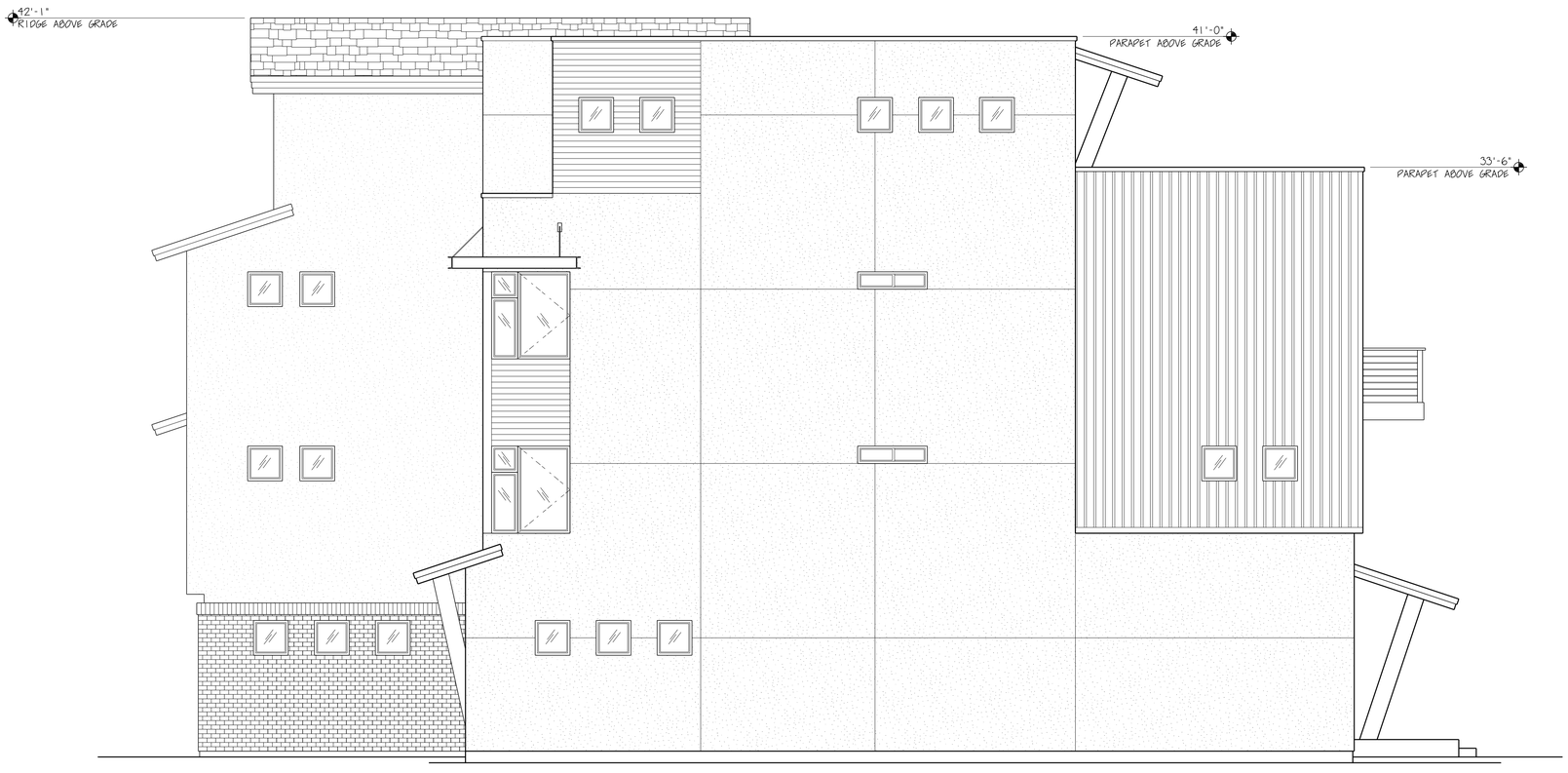
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EXTERIOR ELEVATIONS

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UPPER TIER LEFT ELEVATION B

1/4" = 1'-0"



UPPER TIER FRONT ELEVATION B

1/4" = 1'-0"

SUB DATE:
5/23/2016

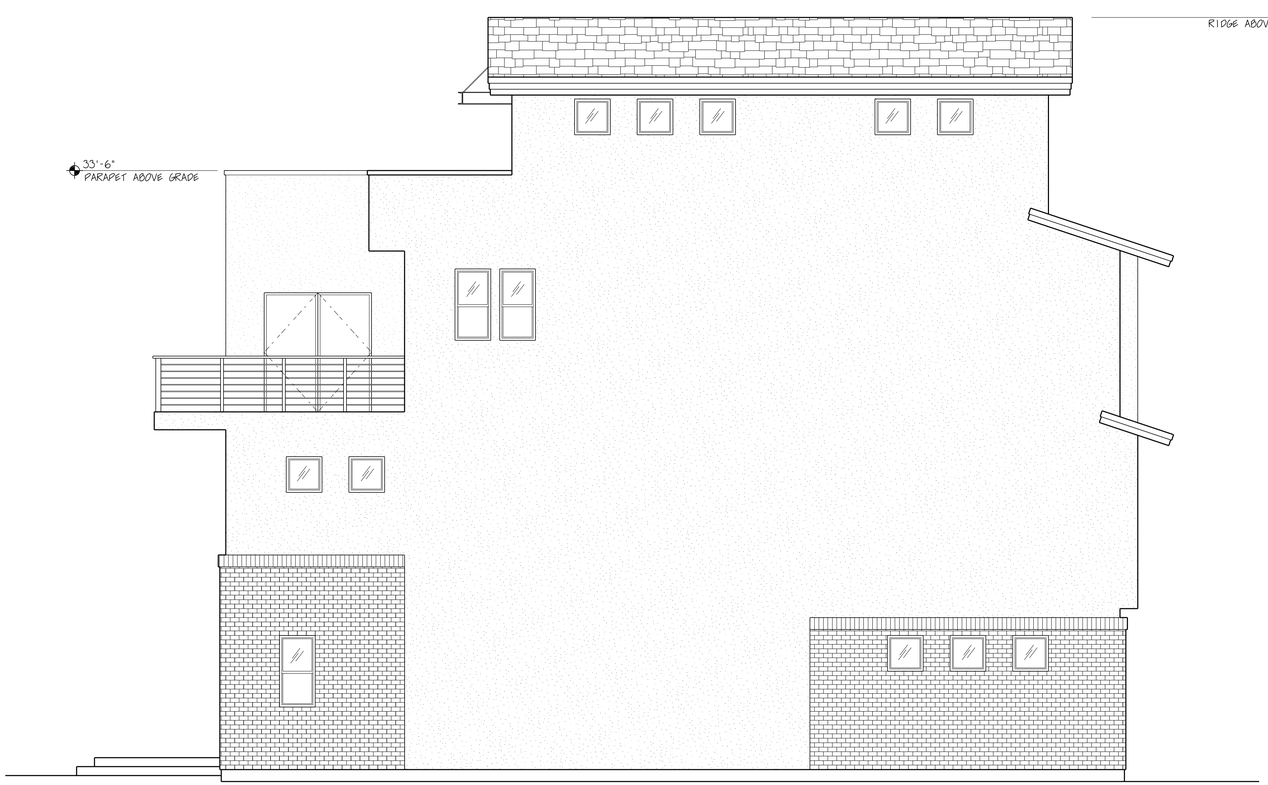
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EXTERIOR ELEVATIONS

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UPPER TIER RIGHT ELEVATION B

1/4" = 1'-0"



UPPER TIER REAR ELEVATION B

1/4" = 1'-0"

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AMITY RIDGE
UPPER TIER STREET ELEVATION





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TD

EXTERIOR ELEVATIONS

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Vicinity Map

