STAFF REPORT

Report To: Board of Supervisors **Meeting Date:** June 16, 2016

Staff Contact: Hope Sullivan, Planning Manager

Agenda Title: For Possible Action: To consider a request from Capstone Communities for Tentative Subdivision Map known as Arbor Villas, consisting of 147 single family attached residential lots on property zoned Multi-Family Apartment (MFA), located on Little Lane, APN 004-021-13. (Hope Sullivan, hsullivan@carson.org)

Staff Summary: Per the provisions of Section 17.05.010 of the Carson City Municipal Code (CCMC), the Board of Supervisors is authorized to approve a Tentative Subdivision Map. The Planning Commission makes a recommendation to the Board. The Planning Commission reviewed the subject application at its meetings of April 27, 2016, and May 25, 2016, and has recommended approval of the request based on the ability to make the required findings subject to Conditions of Approval.

Agenda Action: Formal Action/Motion **Time Requested:** 45 minutes

---

Proposed Motion

I move to approve TSM-16-023, a Tentative Subdivision Map known as Arbor Villas, consisting of 147 single family attached residential lots on property zoned Multi-Family Apartment (MFA), located on Little Lane, APN 004-021-13, based on the ability to make the required findings in the affirmative and subject to the conditions of approval contained in the Memorandum dated June 1, 2016 from the Planning Manager to the Board of Supervisors.

Board's Strategic Goal

Quality of Life

Previous Action

At its meeting of May 25 2016, the Planning Commission voted 4-2, 1 absent to recommend approval of the subject application based on the ability to make the required findings in the affirmative subject to conditions of approval.

Background/Issues & Analysis

Please see attached memorandum from the Planning Manager dated June 1, 2016.

Applicable Statute, Code, Policy, Rule or Regulation

CCMC 17.05 (Tentative Maps), CCMC 17.07.005 (Findings); CCMC 18.04.105 (Multi-Famiy Apartment (MFA) Residential District

Financial Information

Is there a fiscal impact? ☐ Yes ☒ No

If yes, account name/number:

Is it currently budgeted? ☐ Yes ☒ No

Explanation of Fiscal Impact:

Alternatives

1. Approve the Tentative Subdivision Map subject to conditions different than those recommended by the Planning Commission based on the ability to make the required findings.

2. Deny the Tentative Subdivision Map based on the inability to make the required findings, stating which findings can not be made.

3. If additional information is submitted to the Board of Supervisors that the Board believes warrants further review and consideration of the application by the Planning Commission, refer the matter back to the Planning Commission.

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay

2) _____ _____

_____

_____

_____

_____

_____

(Vote Recorded By)

Carson City Planning Division

108 E. Proctor Street
Carson City, Nevada 89701
(775) 887-2180 – Hearing Impaired: 711
planning@carson.org
www.carson.org/planning

MEMORANDUM

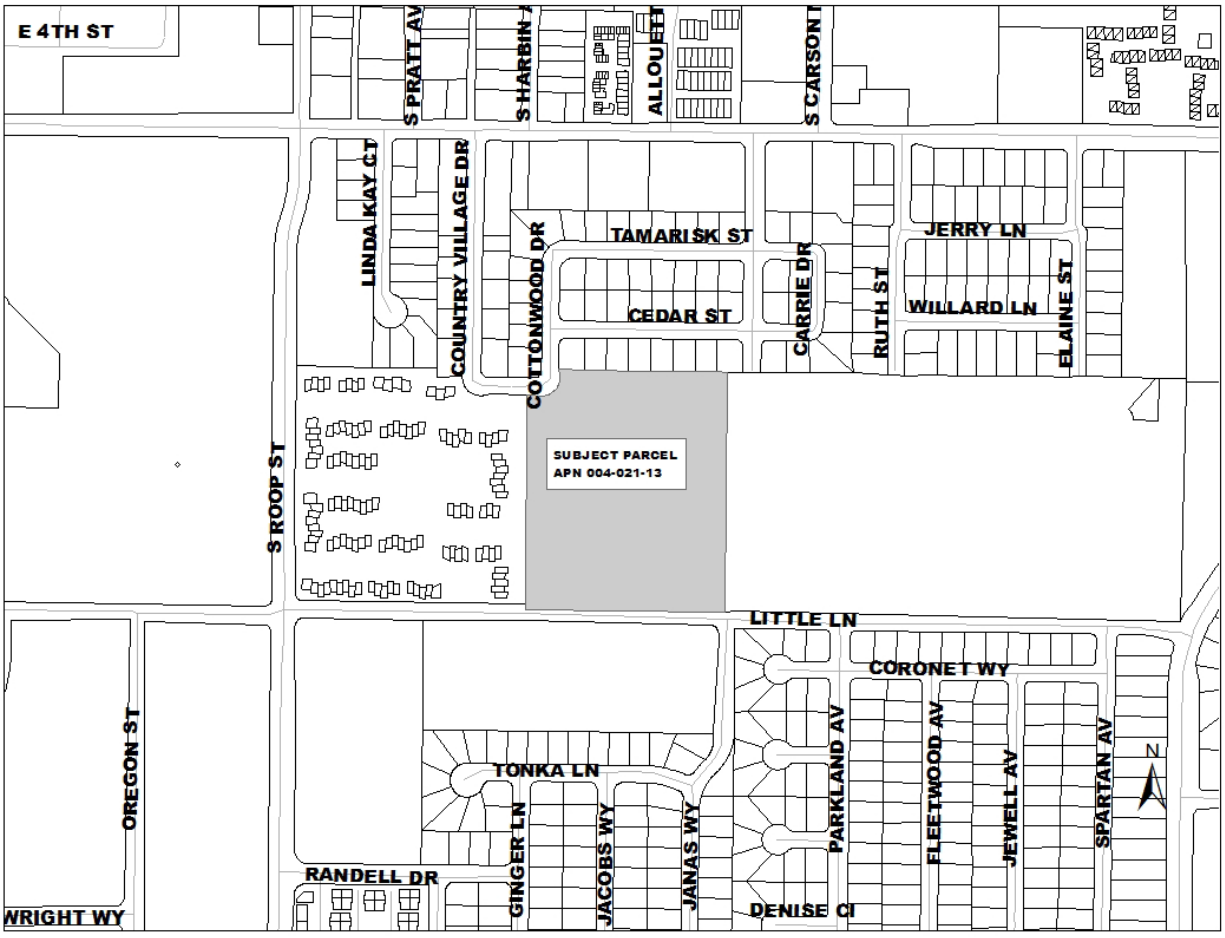
Board of Supervisors Meeting of June 16, 2016

TO: Board of Supervisors

FROM: Hope Sullivan, AICP
Planning Manager

DATE: June 1, 2016

SUBJECT: **TSM-16-023 – A request from Capstone Communities for Tentative Subdivision Map (Arbor Villas) approval to create 147 single-family attached residential lots on 10.31 acres on Little Lane in the Multi-Family Apartment (MFA) zoning district. APN 004-021-13.**



DISCUSSION

At its meeting of April 27, 2016, the Planning Commission reviewed a request from Capstone Properties for (1) VAR-16-024, a Variance to reduce the required driveway approach, and the minimum parcel size and dimensions for lots in the MFA zoning district, and (2) TSM-16-023, a Tentative Subdivision Map to create 147 single-family attached residential lots on 10.31 acres.

At the conclusion of the public hearing, the Planning Commission voted, with concurrence from the applicant, to continue the items to its meeting of May 25, 2016. The intent in continuing the items was:

1. To give the applicant the opportunity to review the project with the property owners to the north of the site;
2. To revise the site plan to demonstrate compliance with the turning radii required by the Fire Marshall.
3. To reconcile the presentation of the floor plans and the elevations.

At its meeting of May 25, 2016, the Planning Commission continued discussion of the two items, and voted (4-2, 1 absent) to approve VAR-16-024, and voted (4-2, 1 absent) to recommend approval of TSM-16-023 based on the ability to make the required findings subject to the following conditions of approval.

TENTATIVE MAP:

The following are general conditions of approval:

1. The applicant must sign and return the Notice of Decision including conditions of approval within 10 days of receipt of notification. If the Notice of Decision is not signed and returned within 10 days, the item may be rescheduled for the next Planning Commission meeting for further consideration.

2. Prior to submittal of any Final Map, the Engineering Division shall approve all on-site and off-site improvements. The applicant shall provide construction plans to the Engineering Division for all required on-site and off-site improvements, prior to any submittals for approval of a Final Map. The plan must adhere to the recommendations contained in the project soils and geotechnical report.

3. The 2009 International Energy Code (IECC) will no longer be accepted after June 30, 2016. All Building Division applications received after July 1, 2016 have to be designed in accordance with the 2012 International Energy Efficient Code.

4. The Building Department can record a Master; the first application will be submitted clearly identifying the master and options. All truss and engineering for those options have to be submitted. The second submittal will be the application with site plan detailing options selected. The site plan would have to show house location with

selected options, drainage, utilities, easement, and access, finish grade and finish floor height. The second submit application will be 80 percent of the permit fee.

5. All projects and improvements must be performed in accordance with Nevada State Revised Statutes (NRS) 623 & 624 and Carson City Municipal Code (CCMC) 15.05.020.

6. Improvements, Repairs, Replacement, and Alterations must comply with 2012 International Residential Code for Town Home Construction, Adopted International Energy Conservation Code, and 2012 Northern Nevada Amendments.

7. The project must comply with the 2012 IFC and Northern Nevada Fire Code Amendments.

8. Due to street width, no on street parking will be allowed. There must be either a red curb or fire lane signs posted.

9. Hydrant and road improvements must be in place prior to brining combustible materials onto the building sites.

10. Phasing of the hydrants and roads will be allowed, but they must be in place as required by the IFC for each building project.

11. Before the building permit for the 31st dwelling unit is issued, the secondary access must be constructed connecting to Parkland. This must meet International Fire Code requirements and a 20 foot wide pavement section. Before the building permit for the 74th dwelling unit is issued, the fully improved secondary access must be constructed as shown on the tentative map. Parcel map PM-16-041 is required to be updated to include: 1. An offer for dedication to Carson City for the property which includes the northern most one-third of the proposed extension of Parkland Avenue (60 foot ROW) as shown on the tentative map, and 2. A relocatable public utility and access easement for the remaining southernmost two-thirds of the proposed extension of Parkland Avenue (60 foot ROW), to ensure the ultimate connectivity of the existing stub streets.

12. Hydrants must be installed at locations per Appendix C of the 2012 IFC.

13. The project will need to meet all applicable codes found in Title 12.06 and Appendix 18 division 15.5 of the CCMC and all applicable codes found in Chapters 7 and 10 of the 2012 Uniform Plumbing Code (UPC).

14. A Site Improvement Permit will be required for all site improvements intended to serve the entire site.

15. The city will not be responsible for the maintenance of any drainage / open space areas and the common landscape areas within the development.

16. Hours of construction will be limited to 7:00 a.m. to 7:00 p.m., Monday through Friday, and 7:00 a.m. to 5:00 p.m. on Saturday and Sunday. If the hours of construction are not adhered to, the Carson City Building Division will issue a warning for the first violation, and upon a second violation, will have the ability to cause work at the site to cease immediately.

17. Along the northern property line, buildings will be limited to three unit clusters. These same buildings will have a building separation of 25 feet minimum. Landscaping will be installed between the buildings along the northern property line and the northern property line to help with screening. There will be a limited use of balconies in the units along the northern property line so that no more than 25 percent of the units have balconies.

18. In accordance with NRS 278.360, a Final Map, prepared in accordance with the Tentative Map, for the entire area for which the Tentative Map has been approved, or the first of the series of final maps covering a portion of the approved tentative map, must be approved by the Board of Supervisors for recording within four years after the approval of a Tentative Map unless a longer time is provided for in an approved development agreement with the City.

19. Prior to the recordation of the Final Map for any phase of the project, the improvements associated with said phase must either be constructed and approved by the City, or the specific performance of said work secured by providing the City with a proper surety in the amount of 150% of the engineer's estimate. In either case, upon acceptance of the improvements by the City, the developer shall provide the City with a proper surety in the amount of 10% of the engineer's estimate to secure the Developer's obligation to repair defects in workmanship and materials which may appear in the work within one year of acceptance by the City.

The following shall be included in the design of the Improvement Plans:

20. A landscape plan in compliance with Carson City Development Standards, Division 3 – Landscaping and with the Open Space requirements, shall be submitted with the Improvement Plans for the proposed project.

21. Provide information on proposed exterior lighting including specification sheets for review with the improvement plans. All exterior lighting shall be in compliance with Carson City Development Standards, Division 1.3.

22. The Improvement Plans shall include dedication of the right of way on the north side of Little Lane to meet the full 60 foot width. This construction shall include a 5 foot sidewalk offset from the curb by 2 feet, a 2 foot buffer constructed to the approval of the Public Works Director, curb / gutter / drainage improvements, asphalt paving to tie with the existing edge of pavement, and striping for bike lanes in both directions.

23. The construction plans must demonstrate turning radii for the fire road around the new buildings of a minimum of 30 feet inside and 50 feet outside.

24. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.

25. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

26. The Final Map shall demonstrate compliance with a 30 foot building setback on the rear (north) property line.

The following shall be conditions to be completed prior to obtaining a Construction Permit or Final Map:

27. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.

28. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

29. Final improvement plans for the development shall be prepared in accordance with CCDS Division 19 and the Standard Specifications and Details for Public Works Construction, as adopted by Carson City.

30. The applicant is responsible for a proper dust and erosion control plan to be used for the duration of this project.

31. If the developer of this subdivision will disturb more than one acre, he/she is required to obtain coverage under NDEP's Construction Stormwater General Permit NVR100000. A Notice of Intent must be filed electronically and submitted with a $200 fee prior to commencing any earth-disturbing activities at the site. Visit NDEP's Bureau of Water Pollution Control's website at: http://ndep.nv.gov/bwpc/storm_cont03.htm for more information about this permit.

The following must be submitted or included with the Final Map:

32. All Final Maps shall be in substantial conformance with the approved Tentative Map.

33. The following notes shall be added to the Final Map:

34. These parcels are subject to Carson City's Growth Management Ordinance and all property owners shall comply with provisions of said ordinance.

35. All development shall be in accordance with the Arbor Villas Tentative Map (TSM-16 - 023).

36. The parcels created with this Final Map are subject to the Residential Construction Tax payable at the issuance of Building Permits for residential units.

37. A copy of the signed Notice of Decision shall be provided with the submission of any

Final Map.

38. The applicant shall provide evidence to the Planning Division indicating all agencies' concerns or requirements have been satisfied and that all conditions of approval have been met.

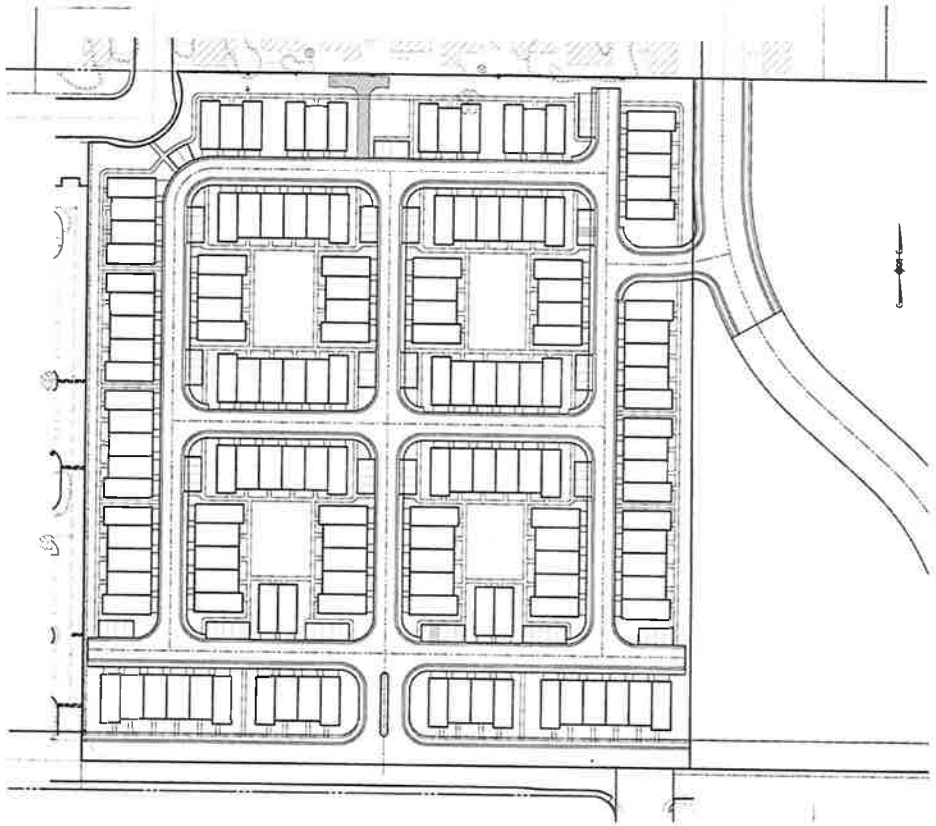
39. The District Attorney shall review any CC&Rs prior to recordation of the Final Map.

Attachments:

Revised lot layout submitted by the applicant at the May 25, 2016 Planning Commission meeting.
Revised elevations submitted by the applicant at the May 25, 2016 Planning Commission meeting.
Revised floor plans submitted by the applicant at the May 25, 2016 Planning Commission meeting.
Draft Minutes April 27, 2016 Planning Commission Meeting.
Case Record May 25 2016.
Case Record April 27, 2016.
Memorandum dated May 25, 2016 from the Planning Manager to the Planning Commission.
Memo dated April 27, 2016 from the Planning Manager to the Planning Commission.
Staff report dated April 27, 2016 to the Planning Commission.

REVISED LAYOUT

- Buildings limited to 3 unit clusters
- Increased building setbacks (25' min)
- Landscaping installed to help with screening
- Limit use of balconies on north boundary
- Increased parking



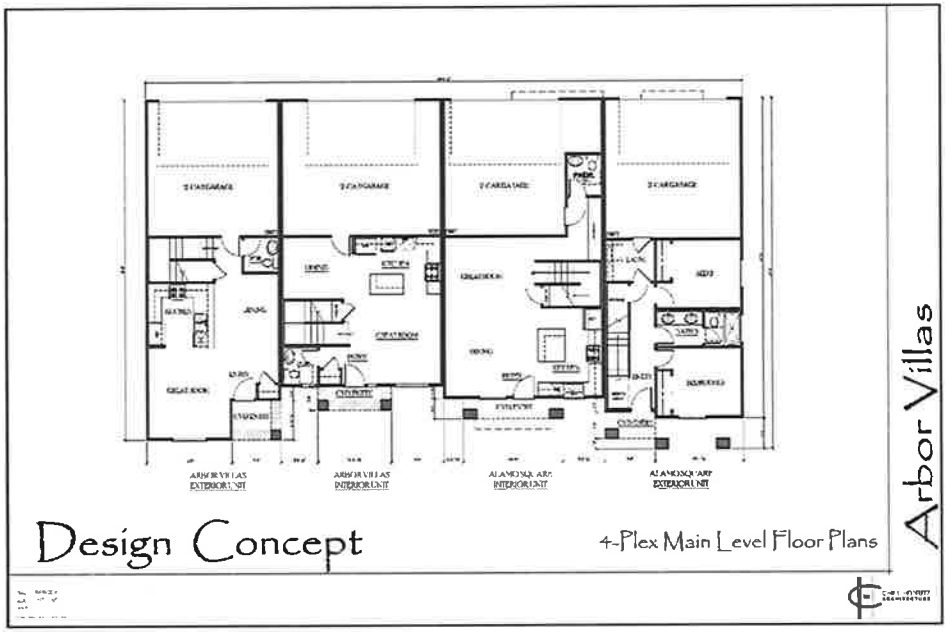
REVISED ELEVATIONS

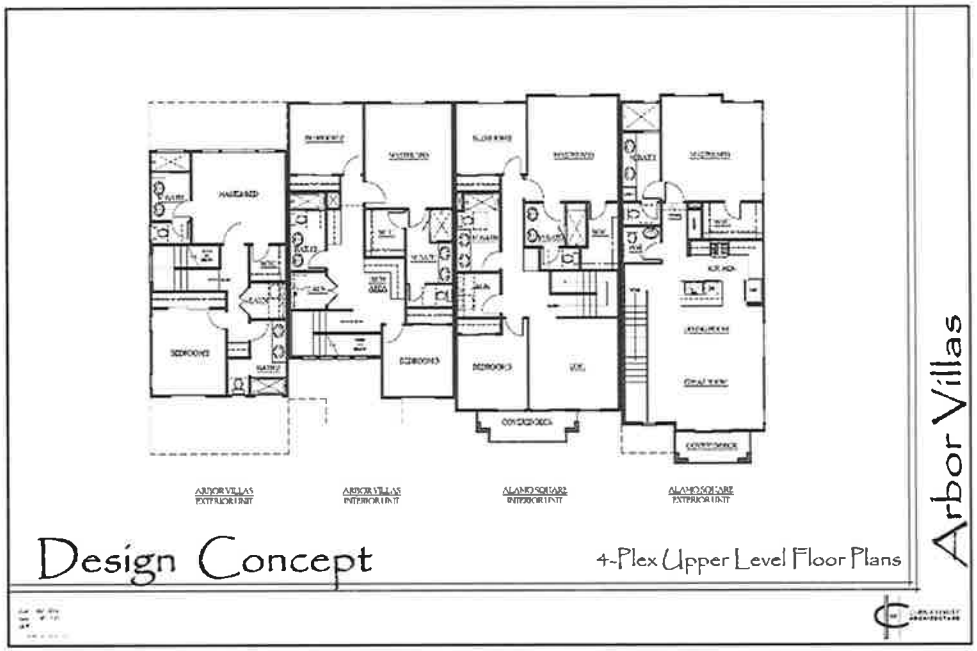
Arbor Villas

CAPSTONE COMMUNITIES

Front Elevation

REVISED FLOOR PLANS





DRAFT MINUTES
Regular Meeting
Carson City Planning Commission
Wednesday, April 27, 2016 ● 5:00 PM
Community Center Sierra Room, 851 East William Street, Carson City, Nevada

Commission Members

Chair – Paul Esswein
Vice Chair – Mark Sattler
Commissioner – Victor Castro
Commissioner – Monica Green
Commissioner – Elyse Monroy
Commissioner – Walt Owens
Commissioner – Daniel Salerno

Staff

Lee Plemel, Community Development Director
Hope Sullivan, Planning Manager
Danny Rotter, Engineering Manager
Susan Dorr Pansky, Special Projects Planner
Dan Yu, Deputy District Attorney
Tamar Warren, Deputy Clerk

NOTE: A recording of these proceedings, the board's agenda materials, and any written comments or documentation provided to the recording secretary during the meeting are public record. These materials are on file in the Clerk-Recorder's Office, and are available for review during regular business hours.

An audio recording of this meeting is available on www.Carson.org/minutes.

A. ROLL CALL, DETERMINATION OF QUORUM, AND PLEDGE OF ALLEGIANCE

(5:02:54) – Chairperson Esswein called the meeting to order at 5:02 p.m. Roll was called and a quorum was present. Commissioner Owens led the Pledge of Allegiance.

Attendee Name	Status	Arrived
Chairperson Paul Esswein	Present	
Vice Chairperson Mark Sattler	Present	5:15 p.m.
Commissioner Victor Castro	Absent	
Commissioner Monica Green	Present	5:15 p.m.
Commissioner Elyse Monroy	Present	
Commissioner Walt Owens	Present	
Commissioner Daniel Salerno	Present	

B. PUBLIC COMMENTS

(5:04:28) – John Bullis introduced himself as a resident on Chaparral Drive and expressed his "surprise and concern and disappointment" in the City and its Engineers for considering a planned unit development (PUD) on the property west of Mountain Street. Mr. Bullis believed that "it's not consistent with the area to consider such high density and small size lots" and was concerned about traffic and flooding of the open field. He also suggested that the Commission not approve the PUD.

(5:06:03) – Tommy Hughes introduced himself as a Carson City resident since 1975 and referred to a Nevada Appeal article where a developer's representative was quoted saying "if we build it, the City will provide Water". Mr. Hughes noted his agreement with Mr. Bullis and objected to a HUD-Financed development, adding that the water and sewer fees should revert to the initial $5,000 rate. Chairperson Esswein invited the public to attend the May 25, 2016 Planning Commission meeting in which the water issues will be discussed as part of growth management. Mr. Plemel clarified that public comment could not be discussed any further, since the development in question is not agendized for discussion in this meeting, per the Open Meeting Law.

(5:12:43) – Brian Ferenz introduced himself as a Carson City resident for 14 years. Mr. Ferenz praised many of the recent developments in the City; however, he objected to the Vintage property development because he believed that unlike other areas where open space, trails, and communities have been woven together, this development did not convey a similar balance.

(5:16:26) – LeAnn Saarem introduced herself as a Carson City native and also objected to "the preliminary plans that are being proposed".

(5:17:56) – Jan Sullivan introduced herself as a Carson City resident since 1952. Ms. Sullivan objected to the Vintage development as well because of flooding, traffic, and high density concerns.

C. POSSIBLE ACTION ON APPROVAL OF MINUTES – March 30, 2016.

(5:19:54) – MOTION: I move to approve the minutes [of the March 30, 2016 meeting] as written.

RESULT:	**APPROVED (6-0-0)**
MOVER:	Sattler
SECONDER:	Owens
AYES:	Esswein, Sattler, Green, Monroy, Owens, Salerno
NAYS:	None
ABSTENTIONS:	None
ABSENT:	Castro

D. MODIFICATIONS OF AGENDA

(5:20:35) – Mr. Plemel recommended addressing items F-3A and F-3B, and items F-4A and F-4B together as they were related.

E. DISCLOSURES

(5:21:20) – There were no disclosures.

F. PUBLIC HEARING MATTERS

F-1 SUP-16-018 FOR POSSIBLE ACTION: TO CONSIDER A REQUEST FROM THE CARSON CITY SCHOOL DISTRICT (PROPERTY OWNER: CARSON CITY SCHOOL DISTRICT, FREMONT SCHOOL) FOR A SPECIAL USE PERMIT TO ALLOW A SINGLE-FACED LED CHANGEABLE MESSAGE CENTER DISPLAY SIGN ON PROPERTY ZONED PUBLIC (P), LOCATED AT 1511 FIREBOX RD., APN 010-041-30.

(5:21:30) – Chairperson Esswein introduced the item. Ms. Sullivan introduced Mark Johnson, Project Manager, and Mark Korinek, Carson City School District Director of Operations. She also presented the Staff Report and the accompanying photographs, incorporated into the record, and recommended approval, subject to conditions. She added that because the sign location is in the Public District, the Commission's approval is required.

(5:24:23) – Vice Chairperson Sattler was informed that the conditions of approval were consistent with the City's requirements for electronic signs. Ms. Sullivan noted that the default settings at this school for the illuminated sign were 6:30 a.m. until 10:00 p.m.

(5:29:18) – Chairperson Esswein invited Mark Johnson, applicant representative, to the podium. Mr. Johnson confirmed that he had read the Staff Report and was in agreement with the conditions of approval outlined by Staff. Commissioner Owens believed that having the sign lit until 10:00 p.m. was too late and Mr. Johnson noted that it was meant for the parents driving by the school to see the community and school activities. Commissioner Green believed that the LED lights are too bright to have on late at night and Mr. Johnson explained that the sign was "dimmable"; however, he was not aware of the actual dimming time. Commissioner Monroy pointed out the dimming information in the conditions of approval. Mr. Plemel provided additional clarification on the brightness levels. Discussion ensued regarding LED signs present at other schools in the district.

There were no public comments.

(5:32:45) – MOTION: I move to approve SUP-16-018, a Special Use Permit to allow a single-faced LED changeable message center display sign at 1511 Firebox Rd., APN 010-041-30 on property zoned Public (P), based on the findings and subject to the conditions of approval contained in the Staff Report.

RESULT:	**APPROVED (5-1-0)**
MOVER:	Sattler
SECONDER:	Salerno
AYES:	Esswein, Sattler, Green, Monroy, Salerno
NAYS:	Owens
ABSTENTIONS:	None
ABSENT:	Castro

F-2 SUP-16-019 FOR POSSIBLE ACTION: TO CONSIDER A REQUEST FROM THE CARSON CITY SCHOOL DISTRICT (PROPERTY OWNER: CARSON CITY SCHOOL DISTRICT, MARK TWAIN SCHOOL) FOR A SPECIAL USE PERMIT TO ALLOW A SINGLE-FACED LED CHANGEABLE MESSAGE CENTER DISPLAY SIGN ON PROPERTY ZONED PUBLIC (P), LOCATED AT 2111 CARRIAGE CREST DR., APN 002-101-46.

(5:33:38) – Chairperson Esswein introduced the item. Ms. Sullivan presented the Staff Report and the accompanying photographs, incorporated into the record, and recommended approval, subject to the conditions of approval outlined in the Staff Report.

(5:35:46) – Mr. Johnson stated that, on behalf of the applicant, he would accept the Staff's conditions of approval, incorporated into the record. Commissioner Owens believed that the sign should be lit until 9:00 p.m. and Mr. Johnson noted that 10:00 p.m. was the currently-approved time for the schools to turn off their signs.

There were no public comments.

(5:37:18) – I move to approve SUP-16-019, a Special Use Permit to allow a single-faced LED changeable message center display sign on property zoned Public (P), located at 2111 Carriage Crest Dr., APN 002-101-46, based on the findings and subject to the conditions of approval contained in the Staff Report.

RESULT:	**APPROVED (5-1-0)**
MOVER:	Sattler
SECONDER:	Salerno
AYES:	Esswein, Sattler, Green, Monroy, Salerno
NAYS:	Owens
ABSTENTIONS:	None
ABSENT:	Castro

F-3A VAR-16-022 FOR POSSIBLE ACTION: TO CONSIDER REQUEST FROM BELLA LAGO, LLC (PROPERTY OWNER: BELLA LAGO, LLC) FOR A VARIANCE TO ALLOW THE REDUCTION OF REQUIRED OPEN SPACE PER UNIT FOR RESIDENTIAL DEVELOPMENT IN A NON-RESIDENTIAL ZONING DISTRICT ON PROPERTY ZONED GENERAL COMMERCIAL (GC), LOCATED AT 1600 AIRPORT RD., APN 008-312-04.

F-3B SUP-16-021 FOR POSSIBLE ACTION: TO CONSIDER A REQUEST FROM BELLA LAGO, LLC (PROPERTY OWNER: BELLA LAGO, LLC) FOR A SPECIAL USE PERMIT TO ALLOW THE ADDITION OF 64 MULTI-FAMILY APARTMENTS WITHIN THE EXISTING 175-UNIT BELLA LAGO APARTMENT COMPLEX ON PROPERTY ZONED GENERAL COMMERCIAL (GC), LOCATED AT 1600 AIRPORT RD., APN 008-312-04.

(5:38:27) – Chairperson Esswein introduced the items and clarified that the two items will be heard jointly; however, they will be voted on separately.

(5:39:10) – Ms. Sullivan presented the agenda materials and accompanying photographs, incorporated into the record, and introduced applicant representative Mike Railey of Rubicon Design Group, LLC.

(5:45:56) – Vice Chairperson Sattler inquired about the open space landscaping requirement timeline and Ms. Sullivan noted that landscaping may be damaged during construction; therefore it may take place after the completion of the project. She also clarified that the proposed parking had met the accepted parking requirements. Ms. Sullivan explained to Commissioner Salerno that the current open space requirements are quantitative and that the qualitative portion would be addressed at a later date.

(5:50:56) – Mr. Railey indicated that Ben Farahi, the owner of Bella Lago, LLC, was also present in the audience. He also explained that the landscaping would be upgraded regardless of the project approval. Mr. Railey noted his agreement with the conditions of approval in the Staff Report; however, he reminded the Commission that the building code items referenced in those conditions applied only to the new buildings. Vice Chairperson Sattler

inquired about the tenants' input on the new buildings and was informed that many tenants were inquiring about two and three-bedroom units. Mr. Railey assured Commissioner Salerno that the new building would complement the existing ones. In response to a question by Chairperson Esswein, Ms. Sullivan confirmed that the density is consistent with the City's multi-family housing requirements.

There were no public comments.

(5:57:05) – I move to approve VAR-16-022, a Variance request to allow the reduction of required open space per unit for residential development in a non-residential zoning district, so as to allow a total amount of open space of approximately 40,792 square feet where 59,750 square feet [are] required, on property zoned General Commercial (GC), located at 1600 Airport Rd., APN 008-312-04, based on the findings and subject to the recommended conditions of approval contained in the Staff Report.

RESULT:	**APPROVED (4-2-0)**
MOVER:	Salerno
SECONDER:	Sattler
AYES:	Sattler, Green, Monroy, Salerno
NAYS:	Esswein, Owens
ABSTENTIONS:	None
ABSENT:	Castro

(5:59:27) – I move to approve SUP-16-021, a request for a Special Use Permit to allow the addition of 64 multi-family apartments within the existing 175-unit Bella Lago Apartment complex on property zoned General Commercial (GC), located at 1600 Airport Rd., APN 008-312-04, based on the findings and subject to the conditions of approval contained in the Staff Report.

RESULT:	**APPROVED (5-1-0)**
MOVER:	Salerno
SECONDER:	Sattler
AYES:	Esswein, Sattler, Green, Monroy, Salerno
NAYS:	Owens
ABSTENTIONS:	None
ABSENT:	Castro

F-4A VAR-16-024 FOR POSSIBLE ACTION: TO CONSIDER A REQUEST FROM CAPSTONE COMMUNITIES (PROPERTY OWNER: ANDERSEN FAMILY ASSOCIATES) FOR A VARIANCE TO REDUCE THE REQUIRED DRIVEWAY APPROACH, MINIMUM PARCEL SIZE AND DIMENSIONS, AND MINIMUM REAR YARD SETBACK FOR SINGLE-FAMILY ATTACHED RESIDENTIAL LOTS IN THE MULTI-FAMILY APARTMENT (MFA) ZONING DISTRICT, ON PROPERTY LOCATED ON LITTLE LN, APN 004-021-13.

F-4B TSM-16-023 FOR POSSIBLE ACTION: TO MAKE A RECOMMENDATION TO THE BOARD OF SUPERVISORS REGARDING A TENTATIVE SUBDIVISION MAP APPLICATION FROM CAPSTONE COMMUNITIES (PROPERTY OWNER: ANDERSEN FAMILY ASSOCIATES) TO

CREATE 147 SINGLE-FAMILY ATTACHED RESIDENTIAL LOTS ON 10.31 ACRES ON PROPERTY ZONED MULTI-FAMILY APARTMENT (MFA), LOCATED ON LITTLE LN, APN 004-021-13.

(6:00:40) – Chairperson Esswein introduced both items and noted that the applicant had withdrawn the request for the variance or the rear yard setback (a component of agenda item F-4A).

(6:02:08) – Ms. Sullivan presented the agenda materials with accompanying photographs. She also introduced Manhard Consulting Planning Manager and applicant representative Chris Baker. Ms. Sullivan noted that Staff recommended approval of the Variance because of its previous zoning of multi-family apartment units, which now would be single-family attached homes. She also explained that for rent apartments would not have required any approvals. Ms. Sullivan reviewed the conditions of approval and timelines, including those modified by the City Engineer. Vice Chairperson Sattler was informed that non-residential zones included parameters for single-family attached homes. Commissioner Green inquired about the Fire Department's turning radii and was informed that the Project engineer was in discussions with the Fire Marshall. Discussion ensued about lot sizes for apartments versus those for a single family unit.

(6:14:29) – Mr. Baker introduced himself and Mike Branson of Capstone Communities, and presented the property information which is incorporated into the record. He reiterated Ms. Sullivan's comments that the application was being reviewed only because it is a "for sale" versus "for rent" development. Mr. Baker also explained that each individual residence would have a two-car garage which will not be seen from the street side. Member Salerno wished to understand the discrepancy between the floor plans and the elevation drawings. He also objected to not having a private space per residence. Mr. Branson identified himself and explained that the second floor balconies have been planned. Mr. Baker noted that the residences would not have a yard or a private space. Commissioner Monroy inquired about the existence of standards for minimum parcel size and dimensions for single family attached residences and was informed that there were none; therefore, they needed a planned unit development (PUD) or a variance. Vice Chairperson Sattler was informed that a homeowners' association would maintain what is installed by the developer.

PUBLIC COMMENTS

(6:49:19) – David Potts introduced himself as an area resident and inquired about school redistricting. He was also concerned about potential traffic. Chairperson Esswein noted that the Commission would not be involved in school redistricting issues. Suzanne Fox introduced herself as not an area resident but as an owner of rental properties. Ms. Fox was in favor of developing "eyesores"; however, she was concerned that residents would use their garages for storage and park on the streets. She also inquired about traffic control and speed limits in the area. Monika Franks stated that she represented her mother who had sent an opposition letter about the development, and was unhappy that the developers had not reached out to area residents. Charlie Muller, a Cedar Street resident, believed a two-story structure would ruin the neighbors' views and would take away the privacy in his backyard. Mike Snyder noted that he had purchased his home 12 years ago and objected to the development. He believed a fire truck could not get through the development as well. Terry Zimmerman, another Cedar Street resident was concerned that the condominiums would eventually turn into rentals and residents would park in the streets in order to store their items in the garages. John Drown inquired about traffic from Parkland to Little Lane and presented a photograph, incorporated into the record, of another development where cars were parked in front of garages. He also expressed concern over the lack of private space. Susan Palmer indicated that she was raised on Cedar Street and was concerned about the development causing a drop in area home values and the lack of privacy. Rick Lee, a Cedar Street resident also objected to the development and

echoed the sentiments of the previous speakers. Keith Work introduced himself as a Carson City resident not residing in the area, and stated his opposition citing the lack of publicly accessible parking spaces. He also inquired about the term "alley" used by the developer representative.

(7:13:12) – Chairperson Esswein invited the applicant and his representative to address the concerns brought forward by the public. Mr. Baker addressed the traffic issues and specifically the extension of Parkland Avenue, noting that it would not take place until the 74th unit is built. He also believed that Little Lane would be the main point of entry based on the traffic study. Mr. Baker clarified that the properties must be owner-occupied for the first twelve month of ownership, reducing the rental property concerns. He explained that the developer will meet the City's parking requirements. In response to the comments regarding obstructed views, Mr. Baker stated that they would do "anything to the best of our ability and within reason with some screening", adding that they were not proposing structures with "extreme heights" but could offer solutions that involve landscaping. Mr. Baker explained that the term "alley load" referred to a public street with a "rear loaded garage" in planning terminology. He also clarified that they had accepted a condition from the Carson City Fire Department to widen the fire truck returns.

(7:22:01) – Commissioner Monroy inquired about parking enforcement by the City and Mr. Plemel clarified that the photographs provided by Mr. Drown were of private and not public streets. He also noted that the parking enforcement on public streets would be conducted by the City. Vice Chairperson Sattler suggested redesigning the perimeter homes in such a way to avoid having the balconies look into neighbors' yards. Commissioner Salerno reiterated his concern about the private yard requirements and Mr. Plemel indicated that the open space requirements would be met by having common areas. Commissioner Green suggested tabling the item to provide the developer time to meet with concerned neighbors and Mr. Plemel offered to research the code and timelines prior to offering an answer. Member Salerno wished to see a redesign of the project to incorporate a private space for each unit, in addition to finding out where the unit numbers would be place. Commissioner Monroy stated that she was more comfortable with this project which she believed would be less congested than "300 apartments". Commissioner Sattler expressed "heartburn" over the north end of the property, which he believed should not interfere with the privacy of the current residents. Chairperson Esswein was informed that the Cedar Street zoning district allowed two-story structures. Mr. Plemel clarified that action on this item must be taken within 60 days of receiving a completed application; however, it could be extended with the applicant's consent, adding that this application was received 45 days ago. Mr. Baker requested a recess to consult with his client regarding a continuance, adding that an easement has been requested for the sewer.

(7:39:56) – Chairperson Esswein recessed the meeting.

(7:47:34) – Chairperson Esswein reconvened the meeting. A quorum was still present.

(7:47:45) – Mr. Baker explained that they would be "more than happy to meet with the residents" and would consent to the continuance, as long as the item was placed on the Commission's May agenda. He also noted that they would address "the interface on the north boundary" by doing their best. In response to Commissioner Salerno's inquiry, Mr. Baker stated that the home addresses would be displayed on the front and the rear of the homes. He also noted that this type of housing has been successful in many locations and believed that the common spaces encouraged neighbor interaction. Commissioner Monroy requested "updated current information" in the next meeting and Mr. Baker agreed to return with updated site plans and elevations. Chairperson Esswein entertained a motion.

(7:56:45) – At the applicant's request, I move to continue VAR-16-024 and TSM-16-023 to the Wednesday, May 25, 2016 Planning Commission meeting, as a continuation of the public hearing.

RESULT:	**APPROVED (5-1-0)**
MOVER:	Green
SECONDER:	Sattler
AYES:	Esswein, Sattler, Green, Monroy, Owens
NAYS:	Salerno
ABSTENTIONS:	None
ABSENT:	Castro

(7:58:00) – Mr. Baker thanked everyone for their input and suggested interested members of the public provide him with contact information for a neighborhood meeting.

G. STAFF REPORTS (NON-ACTION ITEMS)

G-1 DIRECTOR'S REPORT TO THE COMMISSION.

(7:59:30) – Mr. Plemel noted that the Silver Oak PUD amendment was approved by the Board of Supervisors. He also stated that Carson City Transportation Manager Patrick Pittenger would continue to work with the neighbors and address their traffic issues.

FUTURE AGENDA ITEMS

(7:58:43) – Mr. Plemel announced that the May meeting agenda will contain Growth Management, several Special Use Permits for medical marijuana establishments, and the continuance of agenda items F-4A and F-4B which will be agendized as the first two items for discussion. Mr. Rotter stated that he would present "a water update".

COMMISSIONER REPORTS/COMMENTS

(8:00:35) –Chairperson Esswein stated that he would not be present at the May meeting which will be chaired by Vice Chairperson Sattler.

H. PUBLIC COMMENT

(8:02:30) – LeAnn Saarem stated that a single-story option is more convenient for elderly tenants; however, Ms. Saarem did not specify to which agenda item she was referring. Sean Gallagher stated "I came her very upset, but to your credit, I would really like to thank all of you", adding that he was happy to see some scrutiny of the projects. Mr. Gallagher also voiced his concern regarding miscommunication and "terrible public relations" regarding the upcoming Vintage project and urged the Commission to continue being critical of the project.

I. FOR POSSIBLE ACTION: FOR ADJOURNMENT

(8:07:32) – MOTION: Vice Chairperson Sattler moved to adjourn. The motion was seconded by Commissioner Green. The meeting was adjourned at 8:08 p.m.

The Minutes of the April 27, 2016 Carson City Planning Commission meeting are so approved this 25th day of May, 2016.

PAUL ESSWEIN, Chair

CARSON CITY PLANNING COMMISSION

CASE RECORD

MEETING DATE: May 25, 2016 **AGENDA ITEM NO.:** F-1B

APPLICANT(s) NAME: Capstone Communities **FILE NO.** TSM-16-023
PROPERTY OWNER(s): Andersen Family Associates

ASSESSOR PARCEL NO(s): 004-021-13
ADDRESS: Little Ln.

APPLICANT'S REQUEST: To make a recommendation to the Board of Supervisors regarding a Tentative Subdivision Map application to create 147 single-family attached residential lots on 10.31 acres on property zoned Multi-Family Apartment (MFA).

COMMISSIONERS PRESENT: **[X] CASTRO** **[] ESSWEIN** **[X] SATTLER**

[X] GREEN **[X] SALERNO** **[X] OWEN** **[X] MONROY**

STAFF REPORT PRESENTED BY: Hope Sullivan **[X] REPORT ATTACHED**
STAFF RECOMMENDATION: **[X] CONDITIONAL APPROVAL**
APPLICANT REPRESENTED BY: Chris Baker, Manhard Engineering

X_APPLICANT/AGENT WAS and PRESENT and SPOKE

[X] APPLICANT/AGENT INDICATED THAT HE/SHE HAS READ THE STAFF REPORT, AGREES AND UNDERSTANDS THE FINDINGS, RECOMMENDATIONS, AND CONDITIONS, AND AGREES TO CONFORM TO THE REQUIREMENTS THEREOF.

___ PERSONS SPOKE IN FAVOR OF THE PROPOSAL ___ PERSONS SPOKE IN OPPOSITION OF THE PROPOSAL

DISCUSSION, NOTES, COMMENTS FOR THE RECORD:

PC:

Salerno – The streets should be private; the city cannot maintain the public street they have. Question re: public roads vs. private roads. Question re: water quality vis-à-vis stormwater

Revision 2 (Chris Baker) – Larger gaps in building on northside
No balcony product
6' fencing
75% 3 of 12 units on north p/l have balconies

Bob Schreichans, Fire Chief – the design meets the Fire Code.

Public:

Leanne Saarem – How many units? (147) 146 Units? Chris wants to keep 147 units 12 units on north P/L

Roger Rakow – 7' driveway, narrow roads, snow piles. Snow removal could be difficult.

Monica Frank – 3rd house in development is her mother's house, school bus stop? Better plan but would prefer 1 story. Opposed.

John Drown – 2 houses there, 1 house is his son's. Apartments are preferable, against Millennium – Millennium didn't have sufficient parking, who prepared the traffic survey. Lot size variance?

Fred Voltz – People don't park in their garage; not enough communal parking spaces, width of streets – Millennium posted for local trips only. Street width. Parking, delivery access.

Tom Hughes, CC resident since 1975 - – went to the community meeting, complimented Chris (Baker)

Charles Muller, Cedar St resident since 1968 – Cedar Street impacted by property values. It will take away privacy.

Caroline Averson (Abend?) – mother owns a home in neighborhood, where will the snow go, public roads will impact city's budget. Development will impact schools and other services.

PC:

Commissioner Green – smarter development that what could be proposed. Smart project and better design than minimum public standards.

Commissioner Salerno – interior streets should be private. "Policing" should be HOA's responsibility.

MOTION WAS MADE TO APPROVE WITH THE FINDINGS AND CONDITIONS AS ENUMERATED ON THE STAFF REPORT. As revised by the applicant with the additional conditions as stated by staff.

MOVED: Green SECOND: Monroy PASSED: 6 /AYE 2 /NO 0 /ABSTAIN 1 /ABSENT

BOS: June 16, 2016

CARSON CITY PLANNING COMMISSION

CASE RECORD

MEETING DATE: April 27, 2016 **AGENDA ITEM NO.:** F-4A

APPLICANT(s) NAME: Capstone Communities **FILE NO.** VAR-16-024
PROPERTY OWNER(s): Andersen Family Associates

ASSESSOR PARCEL NO(s): 004-021-13
ADDRESS: Little Ln.

APPLICANT'S REQUEST: To consider a request for a Variance to reduce the required driveway approach, minimum parcel size and dimensions, and minimum rear yard setback for single-family attached residential lots in the Multi-Family Apartment (MFA) zoning district.

COMMISSIONERS PRESENT:	**[] CASTRO**	**[X] ESSWEIN**	**[X] SATTLER**
[X] GREEN	**[X] SALERNO**	**[X] OWEN**	**[X] MONROY**

STAFF REPORT PRESENTED BY: Hope Sullivan **[X] REPORT ATTACHED**
STAFF RECOMMENDATION: **[X] CONDITIONAL APPROVAL**
APPLICANT REPRESENTED BY: Chris Baker

X_APPLICANT/AGENT WAS and PRESENT and SPOKE

[X] APPLICANT/AGENT INDICATED THAT HE/SHE HAS READ THE STAFF REPORT, AGREES AND UNDERSTANDS THE FINDINGS, RECOMMENDATIONS, AND CONDITIONS, AND AGREES TO CONFORM TO THE REQUIREMENTS THEREOF.

___ PERSONS SPOKE IN FAVOR OF THE PROPOSAL ___ PERSONS SPOKE IN OPPOSITION OF THE PROPOSAL

DISCUSSION, NOTES, COMMENTS FOR THE RECORD:

Public Comments
David Potts – Parkland Ave. resident – Will they change school zoning? More traffic. Parkland Avenue access. Against project.
Suzanne Fox – owns two mobile homes on south side of Little Lane - What prevents rental? Will garage space be used for storage instead of parking? Will there be traffic controls when Parkland goes through?
Monica Frank – Ella Davis's daughter – Parkland going through will "ruin" neighborhood. 3 options, go to single level.
Charlie Muller – Cedar St. resident – View gone, privacy gone. Consider single story homes adjacent to existing homes along property line.
Mike Snyder – owner home for 12 years – issues re: views, Phase 2 Tanglewood, overhead power.
Terry Zerman – Cedar St. resident – issues: parking, rentals no driveways concerns. Too dense.
John Drown – Cedar St. home owner – Parkland going through Little Lane? When will Parkland be complete? Parking in front of garages.
Susan Palmer – grew up on Cedar St (1970). Will lose "privacy". 30 feet is close for a two-story building. Impact on property value. Tanglewood was for sale, now rentals.
Rich Lee – Cedar St. resident – Echos others concerns. Property values.
Keith Work – Carson City resident 20+years. Guest parking is not adequate. 74 Spaces are inadequate.
Applicant
Chris Baker: Commits to CC&R's requiring owner-occupancy for first year. May be able to add screening at north property line.
- Ok with tabling item until May agenda.
- Key Issue: North property Line. Will work with neighbors.

Commissioners:
Monroy – parking info
Sattler – flip houses
Green – developer meets with residents
Salerno – separation from houses
- Open space not qualitative
- Need some yard
- Streets should be private
- Parking issues
- Deliveries – pizza guy
- Back to design

Monroy – prefers 147 units
- Parking, design, layout

Sattler – Heartburn with north portion of property
Esswein - Cedar Street allows 2 story units
Applicant – Privacy on north side
- Table the item ok with applicant and put on next month's agenda (May 25th, 1st item)
- Open space – usable??
- Floor plans
- Turning radii

~~**MOTION WAS MADE TO APPROVE WITH THE FINDINGS AND CONDITIONS AS ENUMERATED ON THE STAFF REPORT.**~~

Continued on May 25, 2016 PC meeting.

MOVED: Green	**SECOND:** Sattler	**PASSED:**	**5 /AYE**	**/NO**	**1 /ABSTAIN** Salerno	**1 /ABSENT** Castro

Carson City Planning Division

108 E. Proctor Street
Carson City, Nevada 89701
(775) 887-2180 – Hearing Impaired: 711
planning@carson.org
www.carson.org/planning

MEMORANDUM

Planning Commission Meeting of May 25, 2016

TO: Planning Commission **Item F-1A & F-1B**

FROM: Hope Sullivan, AICP
Planning Manager

DATE: May 25, 2016

SUBJECT: **VAR-16-024 & TSM-16-023 Arbor Villas**

At its meeting of April 27, 2016, the Planning Commission voted 5-1 (Salerno opposed, Castro absent), with the concurrence of the applicant, to continue consideration of the above referenced applications to the meeting of May 25, 2016. The intent in continuing the items was:

1. To give the applicant the opportunity to review the project with the property owners to the north of the site;
2. To revise the site plan to demonstrate compliance with the turning radii required by the Fire Marshall.
3. To reconcile the presentation of the floor plans and the elevations.

Overview of the Request

The applicant is requesting:

1. Tentative Map approval to create a 147 lot subdivision with associated roadways and open space;
2. Variance from the requirement that a driveway approach from the property line to the garage doors be 20 feet, so as to allow a length of seven feet; and
3. Variance from the Minimum Lot Size of 6000 square feet, Minimum Lot Width of 60 feet, and Minimum Lot Depth of 150 feet, so as to yield lots averaging 1,005 square feet to accommodate attached single family units.

The applicant originally requested a variance from the required rear building setback. That request was withdrawn prior to the April 27, 2016 meeting.

Although the applicant has submitted conceptual architectural plans and the Planning Commission has discussed the architectural plans, architecture is not within the scope of review. Once the lots are created, the property owner may build a home meeting the dimensional requirements of the zoning district without additional review.

New Material/Information

The applicant has arranged for a meeting on May 19, 2016 with the neighbors to the north of the subject property. As the Planning Commission packet will be released prior to the meeting, a report on the community meeting will provided orally at the May 25 meeting.

The applicant has revised the site plan to comply with the Fire District's required turning radii, and to comply with the required 30 foot rear setback. The applicant has also redesigned the site plan to provide visual relief between the buildings closest to the northern property line. Rather than 315 linear feet of building mass, the linear feet of building is reduced to approximately 290 linear feet.

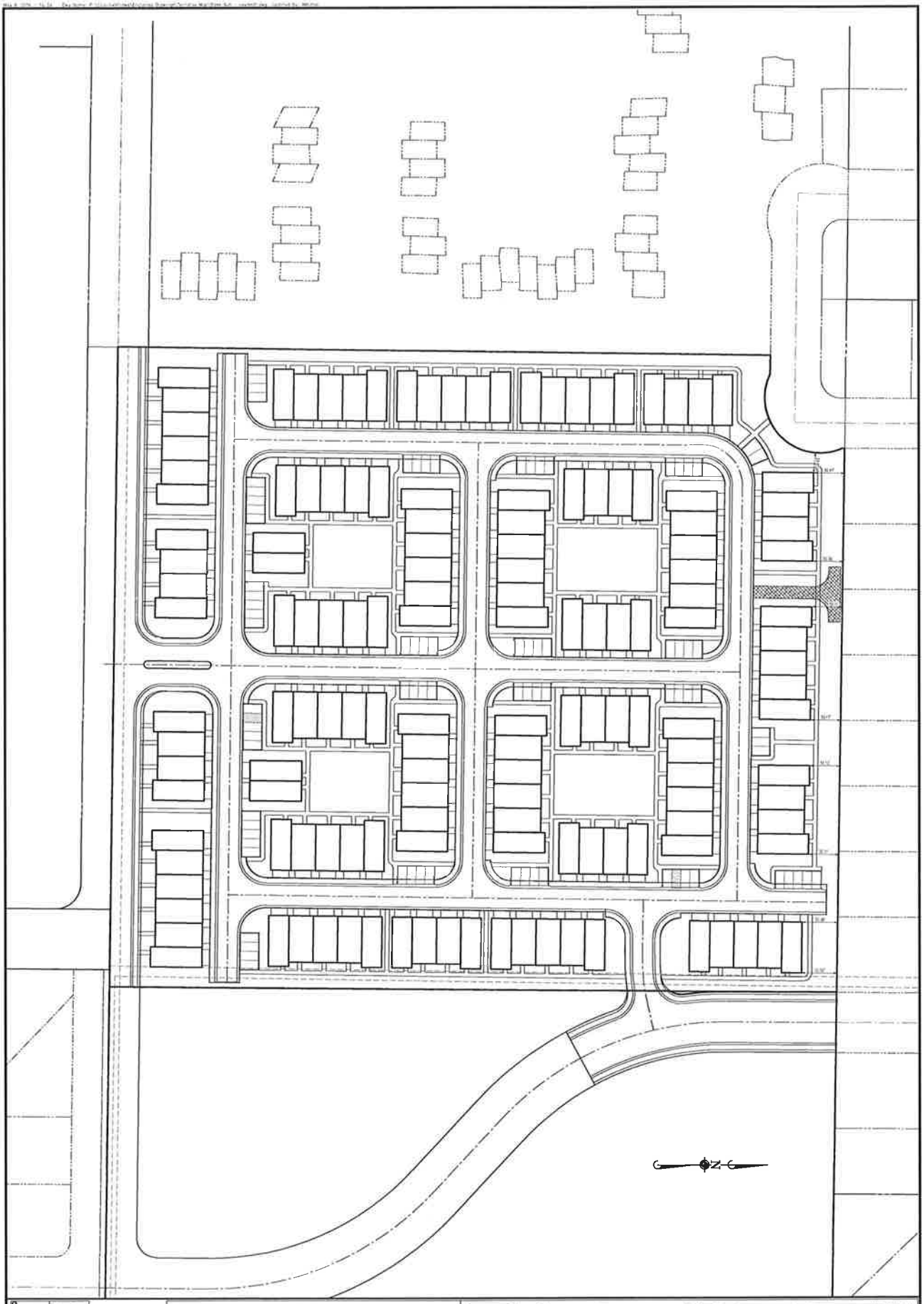
Recognizing that architecture is not within the Commission's scope of review with respect to these applications, the applicant has submitted updated elevations and floor plans. Whereas the elevations indicate a balcony for each unit, the floor plans provides for some units with balconies and some without. Note on the floor plan the balcony is referred to as a covered deck.

Lastly, during the Planning Commission meeting, the question was posed as to the functionality of the open space areas given that they are essentially drainage basins. Staff was able to visit one of the applicant's facilities in Reno, where the same open space design is provided. A photograph is attached. Although a drainage basin, staff finds that the open space areas will meet the qualitative requirements of functional open space.

Conclusion

Staff continues to recommend approval of both the requested Variance and the requested Tentative Map based on the ability to make the required findings subject to the conditions of approval.

Attachments
Revised site plan
Superseded site plan
Building elevations
Floor plans
Photo of open space area



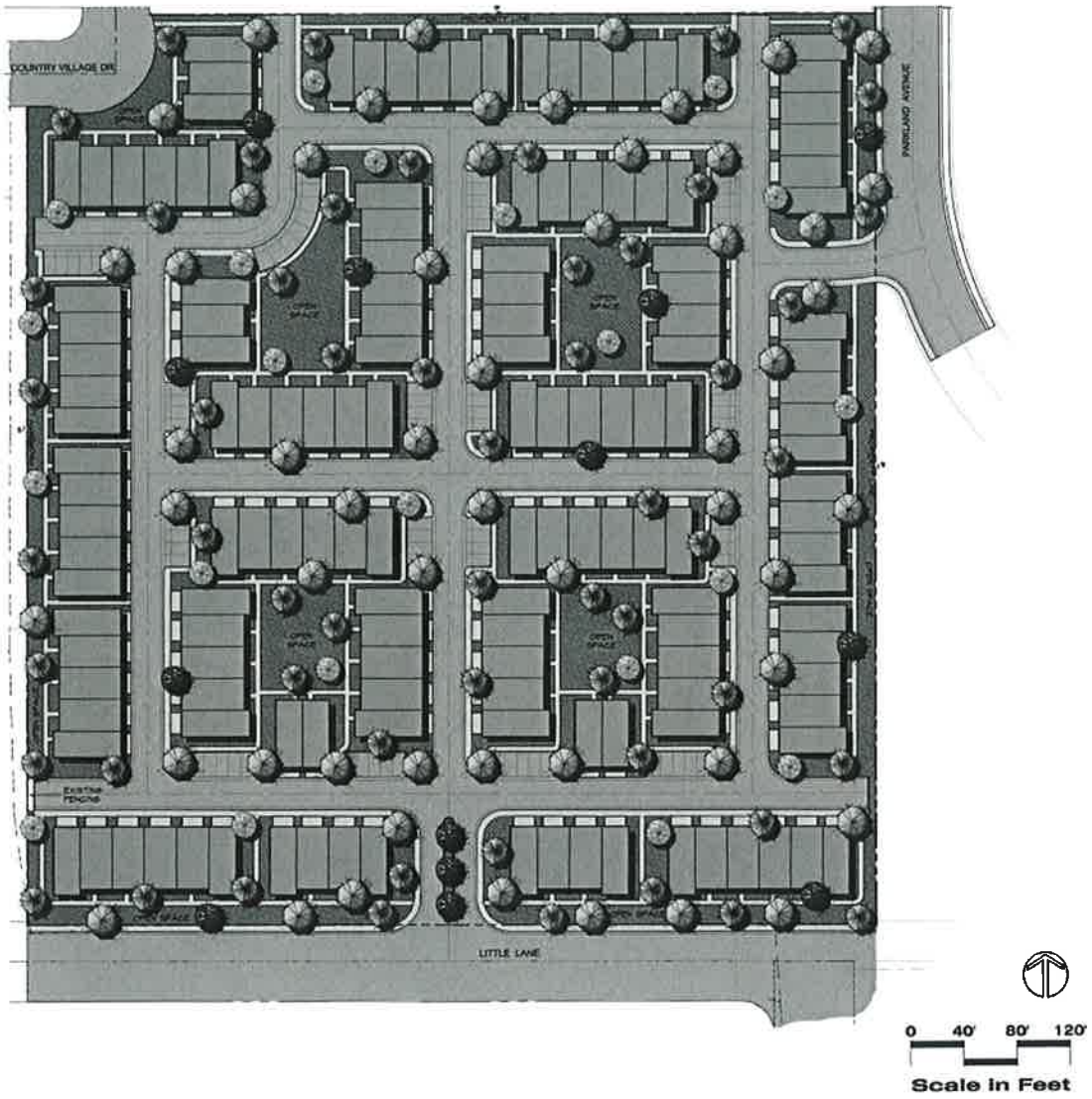
ARBOR VILLAS	
CARSON CITY, NEVADA	
REVISED SITE LAYOUT	

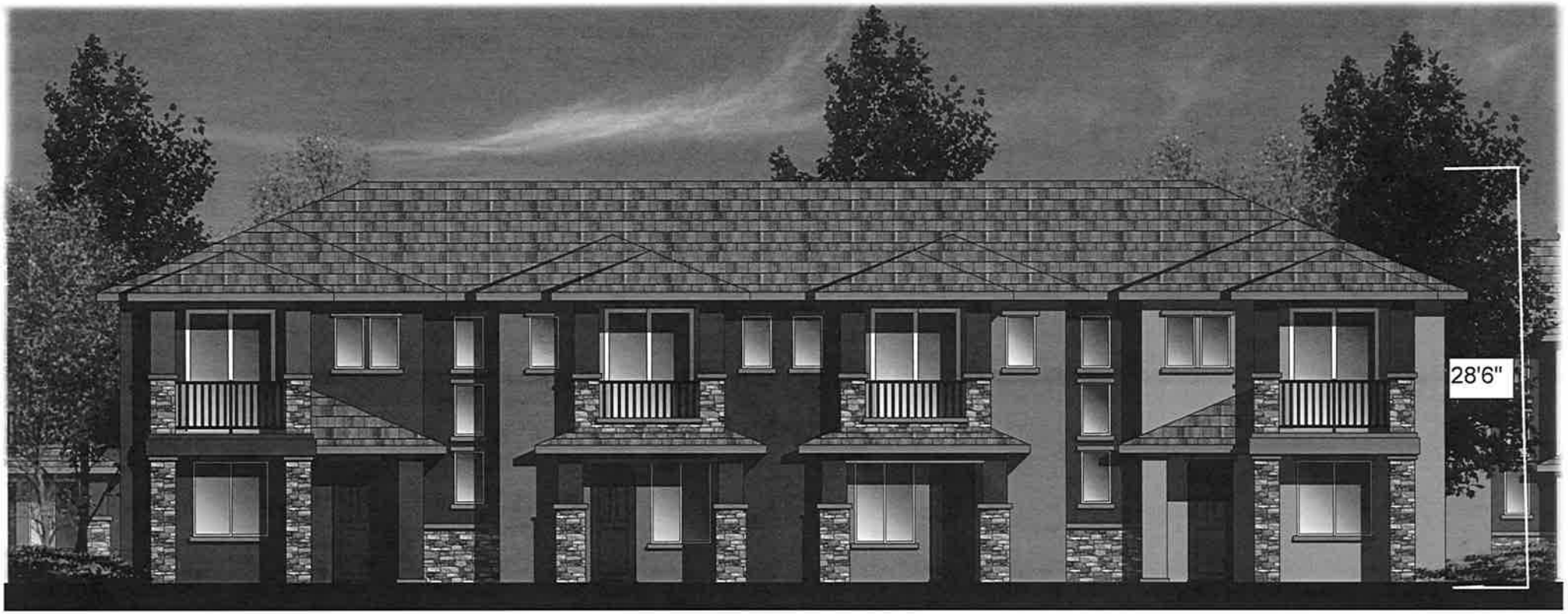
Manhard CONSULTING LTD

Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

SUPERSEDED

Figure 4: Preliminary Site & Landscape Plan

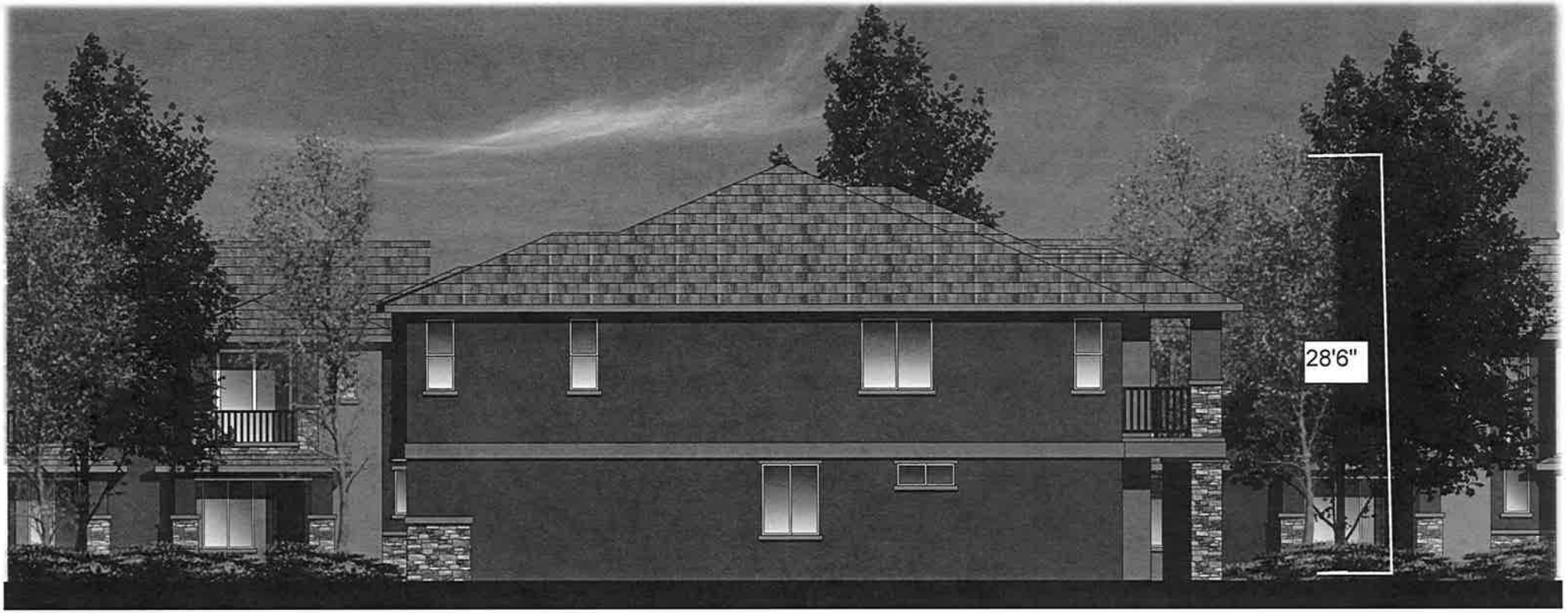




Arbor Villas

Front Elevation

CAPSTONE COMMUNITIES



Arbor Villas

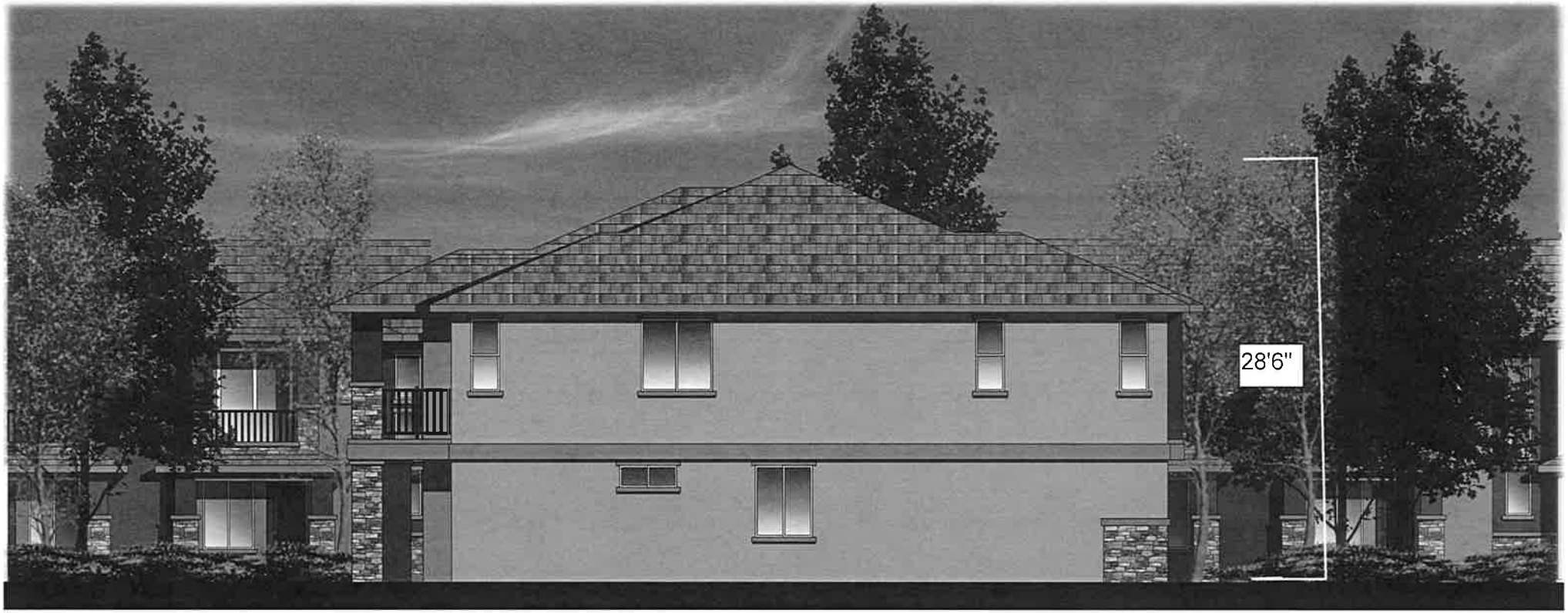
Left Elevation

CAPSTONE COMMUNITIES

Arbor Villas

Rear Elevation

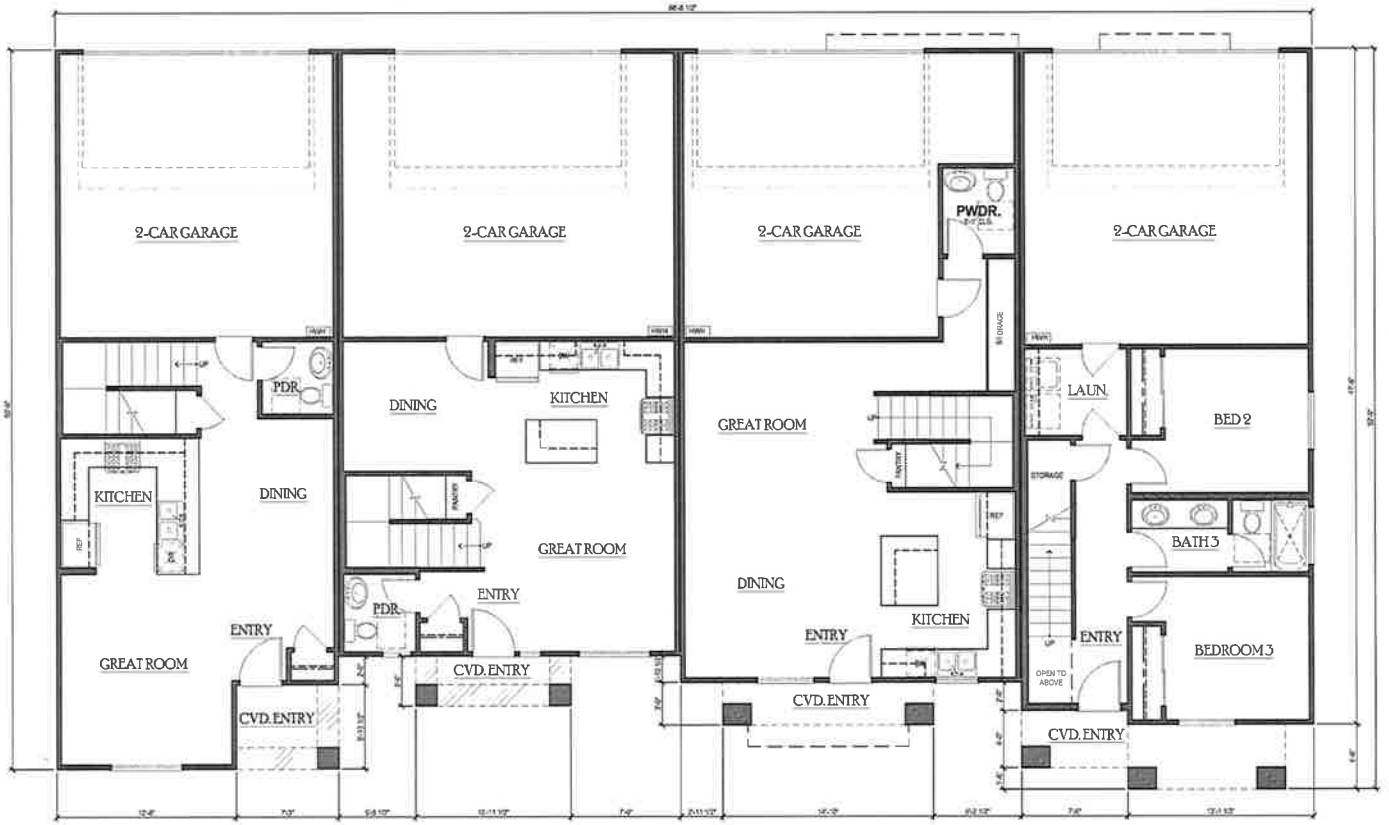
CAPSTONE COMMUNITIES



Arbor Villas

Right Elevation

CAPSTONE COMMUNITIES



Design Concept

4-Plex Main Level Floor Plans

Arbor Villas

Date 02/11/2016
Scale 1/4" = 1'-0"
Job #

CHRIS HEINRITZ ARCHITECTURE

ARBOR VILLAS EXTERIOR UNIT

ARBOR VILLAS INTERIOR UNIT

ALAMO SQUARE INTERIOR UNIT

ALAMO SQUARE EXTERIOR UNIT

Design Concept

4-Plex Upper Level Floor Plans

Arbor Villas

Date 02/11/2016
Scale 1/4" = 1'-0"
Job #

CHRIS HEINRITZ ARCHITECTURE

Fifth Avenue Development

(New Proposed Development behind Cedar and Parkland)

VAR-16-024
TSM-16-023

Next meeting Wed, 5/25/16 at 5:00p Carson Community Center Sierra Room, 851 East William Street

The 30 acres North of Little Lane and South of Cedar behind the existing homes has been sold. A new subdivision is planned for that area. They intend to put **450 single family homes** in the existing field.

The first phase of the plan is to build 150 homes on the far west ten (10) acres.

The Project Planners do not intend to extend Parkland through to Little Lane in the first phase. In the last meeting on 5/17, the project planners said they did survey see how much NOT extending PARKLAND would impact the current residents to have about **300 extra cars driving through on Parkland.**
Who did the survey?
When did they do the survey?
Exactly who was contacted for the survey?

The project is to put a 2,000 sq ft home on a 1,000 sq ft piece of land. These homes will have no outside area for the owners. There will be no yard space to care for, which some owners may find appealing.
No outdoor area for children to play.
No yard available for pets,
No yard or patio area for a barbeque,
No outdoor storage space.
There will be a garage to store a car.
No space to park in the driveway because the planners have asked the City for an allowance to reduce the 20 ft easement to 7ft 6 in, from the street.
The streets won't be large enough for standard fire trucks. In the event of a fire, they will have to respond in smaller sized, less capable vehicles due to the limited street size.

There will be NO PARKING allowed on the streets.
Where will UPS, FedEx, and Delivery vehicles park to deliver packages. They certainly won't park out of the complex and walk the deliveries into

the houses. They will park delivering in front of the garages, blocking the street to deliver their packages.

I have noticed that the homes in the neighborhoods off Fifth Street, like Cedar, Tamarisk, Parkland, Jerry, Ruth, and Willard have a minimum of two (2) cars per home and some have up to five (5) cars, taking up the parking on the street in front of the home. Most families have at least two (2) cars.

That is a minimum of 300 cars **increasing the traffic in our neighborhoods** and specifically on PARKLAND until they put Parkland through to Little lane.

We have children, grandchildren, elderly, and pets in these areas and do not need the extra traffic on our streets threatening the safety of our children, grand-children, elderly and our pets.

In the last meeting, THEY said that if the buyers had pets or children, then they shouldn't be living in this development. ***Who are they to say who should or shouldn't buy there?*** There will by people who will buy homes in these areas and move out and rent the homes to others with children, pets, and more cars with little or no management or upkeep.

CCRs were mentioned to keep rules in place to maintain the neighbors. CCRs go away unless they are maintained and revised. They will only delay the inevitable.

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

GRADING AND UTILITY PLAN

Manhard CONSULTING LTD

SHEET 7

ARBOR VILLAS - TENTATIVE MAP
CARSON CITY, NEVADA
SITE PLAN
Manhard CONSULTING LTD
C2-1
PARKLAND AVENUE
(EXISTING/PUBLIC)
COTTONWOOD DR.
(EXISTING/PUBLIC)
ANDERSON FAMILY ASSOC.
GRAPHIC SCALE

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF APRIL 27, 2016

FILE NOs: **VAR-16-24 and TSM-16-023** **AGENDA ITEMs: F- 4(A) & (B)**

STAFF AUTHOR: Hope Sullivan, AICP
Planning Manager

REQUESTS:

A) VAR-16-024 – To consider a request for a Variance to reduce the required driveway approach, and minimum parcel size and dimensions for single-family attached residential lots in the Multi-Family Apartment (MFA) zoning district. *(Note the request for a variance to the rear building setback has been withdraw.)*

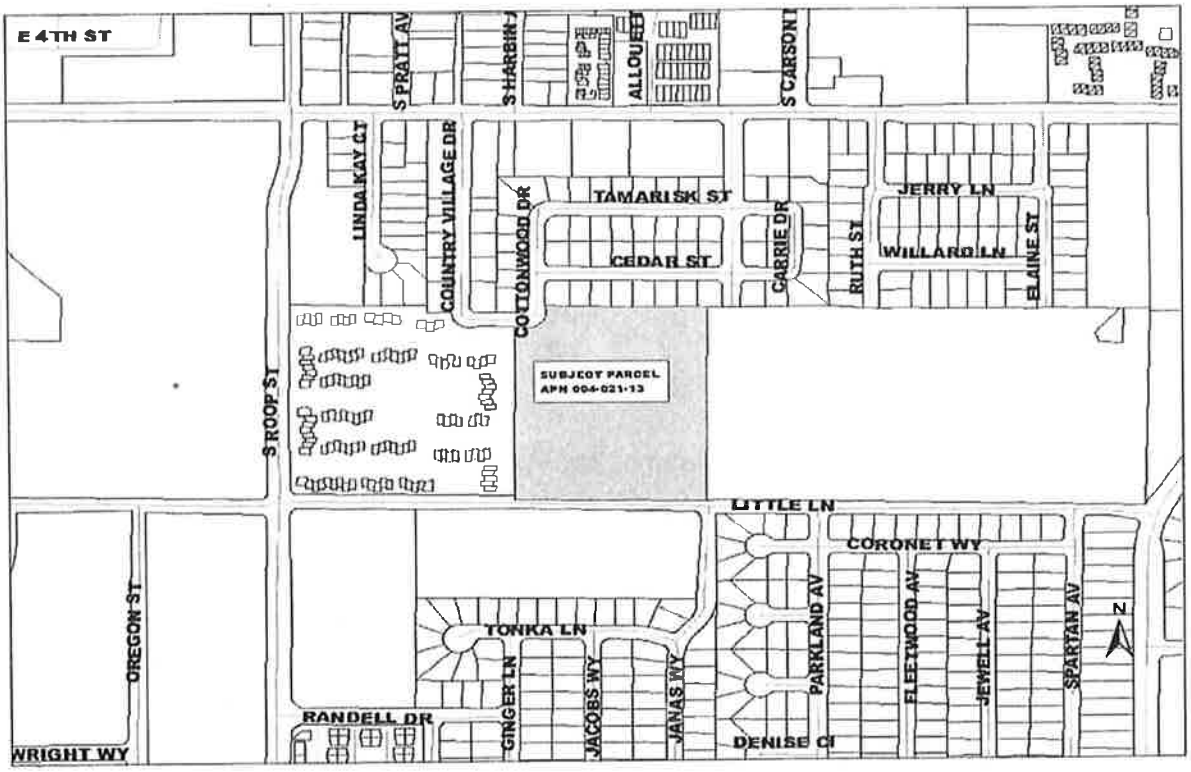
B) TSM-16-023 – To make a recommendation to the Board of Supervisors regarding a Tentative Subdivision Map to create 147 single-family attached residential lots on 10.31 acres in the Multi-Family Apartment (MFA) zoning district.

APPLICANT: Capstone Communities

OWNER: Andersen Family Associates

LOCATION: Little Lane

APN: 004-021-13



RECOMMENDED MOTIONS:

A) VAR-16-024 – "I move to approve VAR-16-024, a request from Capstone Communities (property owner: Andersen Family Associates) for a variance to reduce the required driveway approach, and to reduce the minimum parcel size and dimensions for single-family attached residential lots in the Multi-Family Apartment (MFA) zoning district based on the findings and subject to the conditions of approval contained in the staff report. This motion does not include a variance from the rear setback as the applicant has withdrawn that request."

B) TSM-16-023 – "I move to recommend to the Board of Supervisors approval of TSM-16-023, a Tentative Subdivision Map known as Arbor Villas, consisting of 147 single family attached residential lots on property zoned Multi-Family Apartment (MFA), located on Little Lane, APN 004-021-13, based on the findings and subject to the conditions of approval contained in the staff report."

RECOMMENDED CONDITIONS OF APPROVAL

VARIANCE

1. The applicant must sign and return the Notice of Decision including conditions of approval within 10 days of receipt of notification. If the Notice of Decision is not signed and returned within 10 days, the item may be rescheduled for the next Planning Commission meeting for further consideration.

2. Approval of this Variance shall remain valid concurrent with the Tentative Subdivison Map, TSM-16-023.

TENTATIVE MAP:

The following are general conditions of approval:

1. The applicant must sign and return the Notice of Decision including conditions of approval within 10 days of receipt of notification. If the Notice of Decision is not signed and returned within 10 days, the item may be rescheduled for the next Planning Commission meeting for further consideration.

2. Prior to submittal of the any Final Map, the Engineering Division shall approve all on-site and off-site improvements. The applicant shall provide construction plans to the Engineering Division for all required on-site and off-site improvements, prior to any submittals for approval of a Final Map. The plan must adhere to the recommendations contained in the project soils and geotechnical report.

3. The 2009 International Energy Code (IECC) will no longer be accepted after June 30, 2016. All Building Division applications received after July 1, 2016 have to be designed in accordance with the 2012 International Energy Efficient Code.

4. Building permit values will be based upon $112.65 living and $43.33 for Utility. This is the ICC current data table from the Building Journal as of February 2015. The data table changes every February.

5. The Building Department can record a Master; the first application will be submitted clearly identifying the master and options. All truss and engineering for those options

have to be submitted. The second submittal will be the application with site plan detailing options selected. The site plan would have to show house location with selected options, drainage, utilities, easement, and access, finish grade and finish floor height. The second submit application will be 80 percent of the permit fee.

6. All projects and improvements must be performed in accordance with Nevada State Revised Statutes (NRS) 623 & 624 and Carson City Municipal Code (CCMC) 15.05.020.

7. Improvements, Repairs, Replacement, and Alterations must comply with 2012 International Residential Code for Town Home Construction, Adopted International Energy Conservation Code, and 2012 Northern Nevada Amendments.

8. The project must comply with the 2012 IFC and Northern Nevada Fire Code Amendments.

9. Due to street width, no on street parking will be allowed. There must be either a red curb or fire lane signs posted.

10. Hydrant and road improvements must be in place prior to brining combustible materials onto the building sites.

11. Phasing of the hydrants and roads will be allowed, but they must be in place as required by the IFC for each building project.

12. Before the building permit for the 31st dwelling unit is issued, the secondary access must be constructed connecting to Parkland. This must consist of a minimum of a half-street improvement with a minimum width of 27 feet including a 5 foot sidewalk, 2 foot curb and gutter, and a 20 foot wide pavement section.

13. Hydrants must be installed at locations per Appendix C of the 2012 IFC.

14. The project will need to meet all applicable codes found in Title 12.06 and Appendix 18 division 15.5 of the CCMC and all applicable codes found in Chapters 7 and 10 of the 2012 Uniform Plumbing Code (UPC).

15. A Site Improvement Permit will be required for all site improvements intended to serve the entire site.

16. The city will not be responsible for the maintenance of any drainage / open space areas and the common landscape areas within the development.

17. Hours of construction will be limited to 7:00 a.m. to 7:00 p.m., Monday through Friday, and 7:00 a.m. to 5:00 p.m. on Saturday and Sunday. If the hours of construction are not adhered to, the Carson City Building Division will issue a warning for the first violation, and upon a second violation, will have the ability to cause work at the site to cease immediately.

18. A Final Map, prepared in accordance with the Tentative Map, for the entire area for which the Tentative Map has been approved must be approved by the Board of Supervisors for recording within four years after the approval of a Tentative Map unless a longer time is provided for in an approved development agreement with the City.

19. Prior to the recordation of the Final Map for any phase of the project, the improvements

associated with said phase must either be constructed and approved by the City, or the specific performance of said work secured by providing the City with a proper surety in the amount of 150% of the engineer's estimate. In either case, upon acceptance of the improvements by the City, the developer shall provide the City with a proper surety in the amount of 10% of the engineer's estimate to secure the Developer's obligation to repair defects in workmanship and materials which may appear in the work within one year of acceptance by the City.

The following shall be included in the design of the Improvement Plans:

1. A landscape plan in compliance with Carson City Development Standards, Division 3 – Landscaping and with the Open Space requirements, shall be submitted with the Improvement Plans for the proposed project.

2. Provide information on proposed exterior lighting including specification sheets for review with the improvement plans. All exterior lighting shall be in compliance with Carson City Development Standards, Division 1.3.

3. The Improvement Plans shall include an off-street, paved, and shared path along the north side of Little Lane consistent with the Unified Pathways Master Plan.

4. The construction plans must demonstrate turning radii for the fire road around the new buildings of a minimum of 30 feet inside and 50 feet outside.

5. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.

6. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

7. The Final Map shall demonstrate compliance with a 30 foot building setback on the rear (north) property line.

The following shall be conditions to be completed prior to obtaining a Construction Permit or Final Map:

1. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.

2. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

3. Final improvement plans for the development shall be prepared in accordance with CCDS Division 19 and the Standard Specifications and Details for Public Works

Construction, as adopted by Carson City.

4. The applicant is responsible for a proper dust and erosion control plan to be used for the duration of this project.

5. If the developer of this subdivision will disturb more than one acre, he/she is required to obtain coverage under NDEP's Construction Stormwater General Permit NVR100000. A Notice of Intent must be filed electronically and submitted with a $200 fee prior to commencing any earth-disturbing activities at the site. Visit NDEP's Bureau of Water Pollution Control's website at: http://ndep.nv.gov/bwpc/storm_cont03.htm for more information about this permit.

The following must be submitted or included with the Final Map:

1. All Final Maps shall be in substantial conformance with the approved Tentative Map.

2. The following notes shall be added to the Final Map:

   A. These parcels are subject to Carson City's Growth Management Ordinance and all property owners shall comply with provisions of said ordinance.

   B. All development shall be in accordance with the Arbor Villas Tentative Map (TSM-16 -023).

   C. The parcels created with this Final Map are subject to the Residential Construction Tax payable at the issuance of Building Permits for residential units.

3. A copy of the signed Notice of Decision shall be provided with the submission of any Final Map.

4. The applicant shall provide evidence to the Planning Division indicating all agencies' concerns or requirements have been satisfied and that all conditions of approval have been met.

5. The District Attorney shall review any CC&Rs prior to recordation of the Final Map.

LEGAL REQUIREMENTS: CCMC 18.02.085 (Variances); CCMC 17.05 (Tentative Maps); CCMC 17.07 (Findings); NRS 278.330; CCMC 18.02.050 (Review); CCMC 18.04.105 (Multi-Family Apartment); and Development Standards 1.7 (Multi-Family Apartment Development Standards)

MASTER PLAN DESIGNATION: High Density Residential (HDR)

ZONING DISTRICT: Multifamily Apartments (MFA)

KEY ISSUES: Does the proposal meet the Tentative Map requirements and other applicable requirements? Will the City or public be materially injured by the approval of the associated abandonment?

SURROUNDING ZONING AND LAND USE INFORMATION

NORTH: Single Family 6000 (SF6)/Single Family Residential
SOUTH: Neighborhood Business (NB)/Vacant
WEST: Multi-family Apartment (MFA-P)/Multi-Family Residential
EAST: Multi-family Duplex (MFD)/Vacant

ENVIRONMENTAL INFORMATION:

FLOOD ZONE: Zone X-Shaded (Between 100-year and 500-year flood plain)
SLOPE/DRAINAGE: Generally flat
SEISMIC ZONE: Zone I (Severe) – No identified faults on or adjacent to the property

SITE DEVELOPMENT INFORMATION:

SUBJECT SITE AREA:	10.31 Acres
EXISTING LAND USE:	Vacant Land
TOTAL RESIDENTIAL LOTS:	147 single family attached
PROPOSED LOT SIZES:	Minimum Lot Size 1,005 sqft
PROPOSED SETBACKS:	
Perimeter	N: 30 feet, S: 20 feet, E: 19 feet, W: 20 feet
Internal	0 feet (attached units)
PARKING REQUIRED:	Two spaces per dwelling unit, plus .5 guest spaces per unit
PROJECT PHASING:	Phasing is not currently proposed..
VARIANCES REQUIRED:	Variance to reduce the required driveway approach, and minimum parcel size and dimensions for single family attached residential lots. Since the publication of the agenda, the variance request for the rear setback has been withdrawn.

SITE HISTORY:

CSM-16-005 – Conceptual Subdivision Map Review for 154 Single-family attached residential lots

BACKGROUND:

On February 1, 2016, the applicant participated with City staff in a Conceptual Subdivision Map Review for the proposed project. The letter containing staff comments regarding the conceptual map is included in the application package.

DISCUSSION:

Arbor Villas is proposed to be located on the north side of Little Lane. Adjacent land uses are single family residential, multi-family residential, and vacant land. The subject property is zoned Multi-family Apartments zoning district, and single family residential development is allowed by right in this zoning district.

The applicant is proposes 147 residential lots, intended to contain individually owned attached single family residential homes. The proposed lots are a minimum of 1005 square feet, and are primarily 1006 and 1007 square feet. Each lot represents the "footprint" of the unit and the buildings are surrounded by common area.

For the perimeter lots, the site design will involve the front of the building facing the exterior property line, with rear loaded garages accessed from the internal road system. For the interior lots, the front of the building will face and internal courtyard / open space areas, and the rear loaded garages will also be accessed from the internal roadway system.

As the proposal utilizes a "zero lot line" design, the proposed design will require a variance from the following requirements:

- Development Standard 1.17.3.a: Requirement for a minimum driveway approach from property line to garage doors of 20 feet.
- CCMC 18.04.190: Minimum Lot Area is 6000 square feet, Minimum Lot Width is 60 feet, Minimum Lot Depth is 150 feet..

CCMC Section 18.04.195 – Non-residential Districts Intensity and Dimensional Standards states the following:

> *Except in the RC, A, P, PN, PC and PR zoning districts, minimum area includes all common areas, parking, landscaping and building areas associated with a project for the purposes of creating building envelopes or condominium units where common access is provided to the project site. Minimum Lot Width (Feet) and Maximum Lot Depth (Feet) requirements may be waived.*

As the subject property is in a residential zoning district, this provision, which has been utilized for other developments utilizing a "zero lot line" design, cannot be utilized in this case.

As the subject property is zoned Multi-Family Apartment, the proposed development is required to comply with the Multi-Family Apartment Development Standards identified in Section 1.17 of the Development Standards.

1.17 Multi-Family Apartment Development Standards.

The following standards are intended to establish minimum standards for residential development within the Multi-Family Apartment (MFA) zoning district.

1. Maximum permitted density:
   a. For one-bedroom or studio units, one unit per 1,200 square feet of area. (36 units / acre)
   b. For two or more bedroom units, one unit per 1,500 square feet of area. (29 units / acre)

The applicant proposed 2 and 3 bedroom units. Given a project area size of 10.31 acres, and proposed development of 147 lots, the proposed project will yield one unit per 3055 square feet of area. (14.3 units / acre)

2. Maximum building height: 45 feet

The applicant proposes a maximum building height of 28 feet, 6 inches, thus well below the maximum height of 45 feet.

3. Setbacks:
   a. Front yard: 10 feet, plus an additional 10 feet for each story above two stories; minimum driveway approach from property line to garage doors is 20 feet.
   b. Side yard: 10 feet for external project boundaries; minimum 10 feet between residential structures for internal setbacks. Where a side yard is adjacent to a single-family zoning district, an additional 10 feet is required for each story above one story.
   c. Street side yard: 10 feet, plus an additional 5 feet for each story above two stories; minimum driveway approach from property line to garage doors is 20 feet.
   d. Rear yard: 20 feet. Where a rear yard is adjacent to a single-family zoning district, an additional 10 feet is required for each story above one story.

   As the applicant designed the site utilizing a 20 foot rear setback, and submitted an application for a variance for the same, the proposal did not initially meet the required setbacks. The applicant has withdrawn the requested variance. Therefore, staff has included a condition that the final map must comply with the required thirty foot rear setback. With this condition, the proposal will meet the setback requirements.

   As previously noted, the applicant is seeking to utilize a 7 foot driveway approach as opposed to the required 20 foot approach, and is seeking a variance for the same.

4. Required parking: Two spaces per dwelling unit; and in compliance with the Development Standards Division 2, Parking and Loading.

   The applicant proposes that each unit will include a two car garage. As the length of the driveway and the roadway width will preclude parking in either the driveway or on the road, 74 additional guest stalls are dispersed throughout the development.

5. Open Space:

   a. A minimum of 150 square feet per dwelling unit of common open space must be provided. For projects of 10 or more units, areas of common open space may only include contiguous landscaped areas with no dimension less than 15 feet, and a minimum of 100 square feet per unit of the common open space area must be designed for recreation, which may include but not be limited to picnic areas, sports courts, a softscape surface covered with turf, sand or similar materials acceptable for use by young children, including play equipment and trees, with no dimension less than 25 feet.

   b. A minimum of 100 square feet of additional open space must be provided for each unit either as private open space or common open space.

   c. Front and street side yard setback areas may not be included toward meeting the open space requirements.

   The proposed development consists of 147 residential lots, thus requiring 36,750 square feet of common open space (150 square feet per unit of common open space, and 100 square feet per unit of either private or common open space is required.) The applicant proposes 68,588 square feet of common open space. The

applicant has not provided a detailed plan for improvements within the open space areas. Staff is recommending a condition of approval that would require the applicant to provide landscape plans and improvement plans as appropriate for the open space areas to demonstrate compliance with the Open Space requirements, specifically with regard to areas designed for recreational use. These plans should be submitted prior to recordation of the Final Map.

6. Landscaping. Landscaping shall comply with the Carson City Development Standards Division 3, Landscaping.

   The applicant has not submitted a landscape plan. Staff has recommended a condition of approval that would require the applicant to submit a landscape plan demonstrating compliance with Division 3 at the time improvement plans area submitted.

Staff will address the Tentative Subdivision Map and Variance issues separately for the purposes of legal findings for each, but the Planning Commission should consider and discuss the issues concurrently prior to rendering a decision on either application.

PUBLIC COMMENTS: Public notices were mailed to 55 property owners within 300 feet of the subject site pursuant to the provisions of NRS and CCMC for the Tentative Subdivision Map application. As of the completion of this staff report, 3 letters opposing the application have been received. Any written comments that are received after this report is completed will be submitted prior to or at the Planning Commission meeting on April 27, 2016, depending on their submittal date to the Planning Division.

OTHER CITY DEPARTMENT OR OUTSIDE AGENCY COMMENTS: The following comments were received from City departments. Recommendations have been incorporated into the recommended conditions of approval, where applicable.

Engineering Division:

TENTATIVE MAP RECOMMENDATION: If the tentative map is approved, the Engineering Division has the following recommended conditions of approval for the project:

FINDINGS: The Conceptual Findings by the Engineering Division are:

(a) *Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal;*
The development is required to comply with all applicable environmental and health laws concerning water and air pollution and disposal of solid waste.

(b) *The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision;*
Water supplied to the development will meet applicable health standards. Carson City's water supply capability will not be exceeded by final approval of this development.

(c) *The availability and accessibility of utilities;*
All other utilities are available in the area to serve this development.

(d) *General conformity with the governing body's master plan of streets and highways;*
It appears that access will be acceptable after Parkland St improvements are completed.

(e) *The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision;*
In general, the development will not cause adverse impacts to the existing street system.

(f) *Physical characteristics of the land such as floodplain, slope and soil.*
The physical characteristics of the area do not preclude the development as proposed.

RECOMMENDATION: If the tentative map is approved, the Engineering Division has the following recommended conditions of approval for the project:

A. Specific Conditions to be included in the Design of the Improvement Plans:

1. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.
2. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

B. Conditions to be Completed Prior to Submitting for Construction Permit or Final Map

1. Final improvement plans for the development shall be prepared in accordance with CCDS Division 19 and the Standard Specifications and Details for Public Works Construction, as adopted by Carson City.
2. The applicant shall obtain a dust control and stormwater pollution prevention permit from the Nevada Division of Environmental Protection (NDEP). The site grading must incorporate proper dust control and erosion control measures.

C. General Conditions

1. Prior to the recordation of the final map for any phase of the project, the improvements associated with said phase must either be constructed and approved by the City, or the specific performance of said work secured by providing the City with a proper surety in the amount of one hundred fifty percent (150 %) of the engineer's estimate. In either case, upon acceptance of the improvements by the City, the developer shall provide the City with a proper surety in the amount of ten percent (10 %) of the engineer's estimate to secure the Developers obligation to repair defects in workmanship and materials which may appear in the work within one year of acceptance by the City.

DISCUSSION BULLETS: The following discussion is offered within Engineering Division areas of purview relative to the proposed Tentative Map:

- All public water mains will require locator risers and boxes at all direction changes.
- Please show public utility easements for all lots.
- All City sidewalks must be a minimum of 5 feet in width.
- Sidewalks adjacent to parked cars must be 6 feet in width. An alternative here is to use curb stops.
- Please use detail C-5.1.9.1 for the special street section. The detail shown appears to

be very old.

- For utility locations, please use detail C-1.2.4.
- Plan and profile sheets must be included for all utilities to be maintained by the City.
- The grading plan must include street and curb grades.
- Please include a typical lot drainage detail and add a note stating that each home will have a separate grading and drainage plan as part of the home construction submittal.
- An erosion control plan must be included with the construction drawings.
- Please include applicable standard details with the plan set.
- For all new pavement sections, type 2 asphalt concrete is required. Type 3 is for patches and overlays.
- Please show the sight lines for the landscape plans. Sight lines cannot be blocked. It appears some trees may affect the sight distance at street corners.
- The final map must be tied to at least two accepted control points.
- Sewer, domestic water, and fire flow capacity studies will be required which address the effect on existing utilities. None of the submitted studies addressed existing facilities.
- The water main cannot be connected to the 12" main in Little Lane, as it is part of the Arsenic Treatment System. The 8" must be extended from the west to tie into the existing from the south. See CCMC 12.01.210D.
- Sewer and water usage calculations for these reports must be based on the total number of units. The sewer calculations seem to be based on 41 units, not 154 units.
- Water calculations must be based on this 8" main, not the 12" main.
- If the project is done in phases, areas that are not part of the present construction must be protected so the vegetation remains.
- The drainage study must address 100 year off-site flows from the north and the capacity of existing downstream facilities.
- Where are the calculations for the capacities of the detention basins?
- Section 5.2 of the report says that the hydraulic calculations show a significantly smaller 5 year and 100 year volume than the proposed flows, but I can't seem to find the appropriate calculations. Please address.

These comments are based on very general plans. All applicable code requirements will apply whether mentioned in this letter or not.

Building Division:

1. The 2009 IECC will change by state statue during the upcoming year. All applications received after June 2016 have to be designed to the 2012 International Energy Conservation Code.
2. Permit values will be based upon $112.65 living and $43.33 for Utility. This is the ICC current data table from the Building Journal as of February 2015. The data table changes every February.

3. The Building Department can record a Master; the first application will be submitted clearly identifying the master and options. All truss and engineering for those options have to be submitted. The second submittal will be the application with site plan detailing options selected. The site plan would have to show house location with selected options, drainage, utilities, easement, and access, finish grade and finish floor height. The second submit application will be 80 percent of the permit fee.

4. All projects and improvements must be performed in accordance with Nevada State Revised Statutes (NRS) 623 & 624 and Carson City Municipal Code (CCMC) 15.05.020.

5. Improvements, Repairs, Replacement, and Alterations must comply with 2012 International Residential Code for Town Home Construction, Adopted International Energy Conservation Code, and 2012 Northern Nevada Amendments.

Fire Department:

1. Project must comply with the 2012 IFC and Northern Nevada Fire Code amendments.

2. Street radius turns have changed on plans from what was submitted on CSM 16-005. Submittal for TSM 16-023 is not acceptable and must be changed to 30' inside radius and 50' outside radius turns.

3. Due to street width, no on street parking will be allowed. There must be either red curb or fire lane signs posted.

4. Hydrants and road improvements must be in place prior to bringing combustible materials on building sites.

5. Phasing of the hydrants and roads will be allowed but they must be in place as required by the IFC for each building project.

6. Hydrants must be installed at locations per Appendix C of the 2012 IFC.

7. Prior to the issuance of the building permit for the 31st dwelling unit, a secondary access road must be provided per IFC 107.1

Environmental Control: Required compliance with CCMC Title 12.06 and Appendix 18 Division 15.5, and all applicable codes found in Chapters 7 and 10 of the 2012 Uniform Plumbing Code.

Health Department: No concerns.

Parks and Recreation: Comments received regarding CSM 16-005.

1. This project will be subject to the collection of Residential Construction Tax, per CCMC Chapter 15.60 - Residential Construction Tax and NRS 278.4983/Assembly Bill 25, effective May, 2015.

2. The Unified Pathways Master Plan identifies an off-street, paved, and shared path along the north side of Little Lane. Our department, as part of the City's conditions for the project, will require the path's installation during the project's first phase.

3. The Parks and Recreation Master Plan identifies on page A-16 that in Neighborhood #13 (where the project is located) there is a need for a neighborhood park. It is our department's understanding that the City will require the establishment of the road alignment for Parkland Avenue as a condition of approval for the project. This will separate a 2.5 to 3.0 acre parcel from the larger tract of property to the east. This small parcel is an ideal location and the right size for a small neighborhood park and our department would like to discuss the acquisition and/or donation of this property with the current land owners. The City is looking for only a willing seller and if acquiring the land is even a remote possibility, our department would like to discuss with the developer and

current property owner that during the project's parcel map process a separate parcel be created for this 2.5 to 3.0 acre piece of land.

4. On pages 6-7 and 6-8 of the Parks and Recreation Master Plan, the +/-30 acres of property on the north side of Little Lane was one site that was considered in Carson City for a future community park. This particular site did not evaluate well as a community park location due to its the proximity of Mills Park and the potential duplication of service areas. Our department believes a neighborhood park would be a better land use within this residential area.

5. The City will not be responsible for the maintenance of any drainage/open space areas and the common landscape areas within the development.

School District: No comments received.

Nevada Department of Transportation: minimal impact on NDOT infrastructure.

VARIANCE FINDINGS: Staff recommends approval of the Variance request based on the findings below and the information contained in the attached reports and documents subject to the recommended conditions of approval, and further substantiated by the applicant's written justification. Note these findings do not address the variance for the rear building setback as that variance request has been withdrawn. In making findings for approval, the Planning Commission must consider:

a. That because of special circumstances applicable to the subject property, including shape, size, topography or location of surrounding, the strict application of the zoning ordinance would deprive the subject property of privileges enjoyed by other properties in the vicinity or under identical zone classification;

The proposed development, although correctly described as single family attached, is very similar to a multifamily residential development, also an allowed use in the MFA zoning district. The subdivision of land is allowing each unit to be under individual ownership, whereas an apartment complex would all each unit to be rented.

The subdivision of land, and the "zero lot line" design is resulting in the inability to meet the required minimum lot size and lot dimensions. Had this been an apartment complex with no subdivision of land but a similar dwelling unit design and configuration, there would be no change to the existing lot size or lot dimensions.

In terms of the driveway approach, the applicant is suggesting a seven foot long driveway as opposed to a 20 foot long drive. This will preclude parking on the driveway. The applicant is proposing a two car garage, and seventy four guest spaces. Note that due to the width of the roadway, parking on the roadways will not be permitted.

Division 2 of the Development Standards required two spaces per dwelling unit, as well as one additional off-street parking space per two units in cases where on-street parking is prohibited. The applicant has proposed 74 guest parking spaces in addition to the two garage spaces provided. This is consistent with the provisions of Section 2.2 of the Development Standards.

The provisions of garages is driving the need for individual driveways. Again, had this been an apartment complex, uncovered parking could have been utilized to meet the

parking requirement. The garage is an attractive amenity to the property owner. Given the provision of guest parking resulting in compliance with the total parking requirement, the driveway will not be necessary to accommodate parking demand.

b. That the granting of the application is necessary for the preservation and enjoyment of substantial property rights of the applicant;

As noted, the applicant is proposing a fairly unique product. The impacts are primarily on site as driveways are off of the internal roadway system, and the lot size and dimensions will primarily impact only those who also live in this development.

c. That the granting of the application will not, under the circumstances of the particular case, adversely affect to a material degree the health or safety of person residing or working in the neighborhood of the subject property and will not be materially detrimental to the public welfare or materially injurious to property or improvements in the neighborhood of the subject property.

As noted, the requested variances will impact primarily other residents in the development in terms of not meeting required lot sizes and dimensions and, driveway length. With the withdrawal of the variance for the rear setback, staff finds the request will not adversely affect the neighborhood.

TENTATIVE MAP FINDINGS: Staff recommends approval of the Tentative Subdivision Map based on the findings below and in the information contained in the attached reports and documents, pursuant to CCMC 17.05 (Tentative Maps); 17.07 (Findings) and NRS 278.349, subject to the recommended conditions of approval, and further substantiated by the applicant's written justification. In making findings for approval, the Planning Commission and Board of Supervisors must consider:

1. Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal.

The development is required to comply with all applicable environmental and health laws concerning water and air pollution and disposal of solid waste.

2. The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision.

Water supplied to the development will meet applicable health standards. Carson City's water supply will not be exceeded by final approval of this development.

3. The availability and accessibility of utilities.

All utilities are available in the area to serve this development.

4. The availability and accessibility of public services such as schools, police protection, transportation, recreation and parks.

The project is located within an existing neighborhood that is served by existing schools, sheriff protection, transportation facilities and parks. The proposed subdivision will not overburden these services.

5. ***Access to public lands. Any proposed subdivision that is adjacent to public lands shall incorporate public access to those lands or provide an acceptable alternative.***

The proposed subdivision is located within a developed area of Carson City that is not adjacent to public lands. Access is not required in this case.

6. ***Conformity with the zoning ordinance and land use element of the City's Master Plan.***

The proposed subdivision is consistent with the Master Plan for permitted primary uses in the High Density Residential (HDR) land use designation. Primary uses in this land use area include apartments, condominiums, townhomes, fourplexes and duplexes.

7. ***General conformity with the City's Master plan for streets and highways.***

The proposed subdivision conforms to the City's master plan for streets.

8. ***The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.***

Per the City's Traffic Development Standards, two points of access are required. To meet this requirement, the applicant proposes the dedication and construction of Parkland Avenue. With the dedication and construction of Parkland Avenue, the second point of access can be realized, thus creating compliance.

9. ***The physical characteristics of the land such as flood plains, earthquake faults, slope and soil.***

The physical characteristics of the site do not preclude the development as proposed.

10. ***The recommendations and comments of those entities reviewing the subdivision request pursuant to NRS 278.330 thru 278.348, inclusive.***

The recommendations of reviewing departments and other entities have been incorporated into the conditions of approval for the proposed subdivision, as applicable.

11. ***The availability and accessibility of fire protection including, but not limited to, the availability and accessibility of water and services for the prevention and containment of fires including fires in wild lands.***

The project is located within an existing neighborhood that is served by fire protection services in the area. Adequate water is provided in the area to meet fire demands, and the project will be required to install additional fire hydrants and meet required fire flows to meet current standards. Proposed on-site turning radii will not accommodate fire access, and will need to be modified so as to demonstrate compliance with Fire Department requirements as part of the improvement plans.

12. ***Recreation and trail easements.***

The Unified Pathways Master Plan identifies an off-street, paved, and shared path along the northside of Little Lane. The conditions of approval recommend the installation of this improvement.

Attachments

Site Aerial Photo
City and State Comments
Public Correspondence
Tentative Map Application (TSM-16-023)
Variance Applicant (VAR-16-024)


Arbor Villas

April 18, 2016

TSM-16-023

Please add comment #7 based on the new information:

1. Project must comply with the 2012 IFC and Northern Nevada Fire Code amendments.
2. Street radius turns have changed on plans from what was submitted on CSM 16-005. Submittal for TSM 16-023 is not acceptable and must be changed to 30' inside radius and 50' outside radius turns.
3. Due to street width, no on street parking will be allowed. There must be either red curb or fire lane signs posted.
4. Hydrants and road improvements must be in place prior to bringing combustible materials on building sites.
5. Phasing of the hydrants and roads will be allowed but they must be in place as required by the IFC for each building project.
6. Hydrants must be installed at locations per Appendix C of the 2012 IFC.

7. Prior to the issuance of the 31st building permit, a secondary access road must be provided per IFC 107.1

Please note comment #2. I spoke with Drew Motter from Manhard last week regarding this issue but haven't heard anything back.

Dave Ruben
Fire Marshal
Carson City Fire Department
777 S. Stewart Street
Carson City, NV 89701

Direct 775-283-7153
Main 775-887-2210
FAX 775-887-2209

Hope Sullivan

From: Dave Ruben
Sent: Wednesday, April 20, 2016 1:20 PM
To: Hope Sullivan; Stephen Pottey
Subject: RE: Arbor Villas

Works for me. Thanks!

From: Hope Sullivan
Sent: Wednesday, April 20, 2016 10:34 AM
To: Stephen Pottey; Dave Ruben
Subject: Arbor Villas

Guys:
Below is how I wrote the condition. Please advise of changes.

Thanks.

12. Before the building permit for the 31st dwelling unit is issued, the secondary access must be constructed connecting to Parkland. This must consist of a minimum of a half-street improvement with a minimum width of 27 feet including a 5 foot sidewalk, 2 foot curb and gutter, and a 20 foot wide pavement section.

Hope

MEMORANDUM

DATE: April 6, 2015

TO: Susan Pansky and Kathe Green – Planning

FROM: Rory Hogen – Engineering

RE: TSM 16-023 Tentative Subd. Map for Arbor Villas Subd.
Engineering Text for Planning Commission Staff Report

The following text is offered for inclusion in the Planning Commission staff report for the above referenced land use proposal:

GENERAL: The Engineering Division has considered the elements of NRS 278.349, the Carson City Municipal Code and the Carson City Development Standards in its review of the tentative map described above.

This recommendation for 'approval with conditions' from the Engineering Division is based on conceptual level analysis that indicates the development as proposed will currently meet or will meet with concurrent improvements, prior to final map approval, Nevada Revised Statutes, the Carson City Municipal Code and the Carson City Development Standards. With the request for final approval of any and all phases, detailed engineering analysis addressing the following issues and recommending system improvements will be submitted to the Engineering Division.

FINDINGS: The Conceptual Findings by the Engineering Division are:

(a) *Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal;*
The development is required to comply with all applicable environmental and health laws concerning water and air pollution and disposal of solid waste.

(b) *The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision;*
Water supplied to the development will meet applicable health standards. Carson City's water supply capability will not be exceeded by final approval of this development.

(c) *The availability and accessibility of utilities;*
All other utilities are available in the area to serve this development.

(d) *General conformity with the governing body's master plan of streets and highways;*
It appears that access will be acceptable after Parkland St improvements are completed. Parkland must be completed before any certificate of occupancy is issued.

(e) *The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision;*
In general, the development will not cause adverse impacts to the existing street system.

(f) *Physical characteristics of the land such as floodplain, slope and soil.*
The physical characteristics of the area do not preclude the development as proposed.

RECOMMENDATION: If the tentative map is approved, the Engineering Division has the following recommended conditions of approval for the project:

A. Specific Conditions to be included in the Design of the Improvement Plans:

1. In accordance with CCDS 12.10 and 12.11.10, pavement sections shall be based on subgrade strength values determined by Resistance (R) Value or California Bearing Ratio (CBR) as shown in the Soils Engineering Report. Refer to CCDS Division 17 for soils report requirements. In no case shall the proposed pavement section be less than the minimum section prescribed in standard drawing C-5.1.9 and C-5.1.9.1.
2. Storm drainage facility improvements shall be designed in accordance with CCDS Division 14. A Technical Drainage Study is required with submittal of Improvement Plans in accordance with CCDS 14.9 through 14.10.

B. Conditions to be Completed Prior to Submitting for Construction Permit or Final Map

1. Final improvement plans for the development shall be prepared in accordance with CCDS Division 19 and the Standard Specifications and Details for Public Works Construction, as adopted by Carson City.
2. The applicant shall obtain a dust control and stormwater pollution prevention permit from the Nevada Division of Environmental Protection (NDEP). The site grading must incorporate proper dust control and erosion control measures.

C. General Conditions

1. Prior to the recordation of the final map for any phase of the project, the improvements associated with said phase must either be constructed and approved by the City, or the specific performance of said work secured by providing the City with a proper surety in

the amount of one hundred fifty percent (150 %) of the engineer's estimate. In either case, upon acceptance of the improvements by the City, the developer shall provide the City with a proper surety in the amount of ten percent (10 %) of the engineer's estimate to secure the Developers obligation to repair defects in workmanship and materials which may appear in the work within one year of acceptance by the City.

DISCUSSION BULLETS: The following discussion is offered within Engineering Division areas of purview relative to the proposed Tentative Map:

- All public water mains will require locator risers and boxes at all direction changes.
- Please show public utility easements for all lots.
- All City sidewalks must be a minimum of 5 feet in width.
- Sidewalks adjacent to parked cars must be 6 feet in width. An alternative here is to use curb stops.
- Please use detail C-5.1.9.1 for the special street section. The detail shown appears to be very old.
- For utility locations, please use detail C-1.2.4.
- Plan and profile sheets must be included for all utilities to be maintained by the City.
- The grading plan must include street and curb grades.
- Please include a typical lot drainage detail and add a note stating that each home will have a separate grading and drainage plan as part of the home construction submittal.
- An erosion control plan must be included with the construction drawings.
- Please include applicable standard details with the plan set.
- For all new pavement sections, type 2 asphalt concrete is required. Type 3 is for patches and overlays.
- Please show the sight lines for the landscape plans. Sight lines cannot be blocked. It appears some trees may affect the sight distance at street corners.
- The final map must be tied to at least two accepted control points.
- Sewer, domestic water, and fire flow capacity studies will be required which address the effect on existing utilities. None of the submitted studies addressed existing facilities.
- The water main cannot be connected to the 12" main in Little Lane, as it is part of the Arsenic Treatment System. The 8" must be extended from the west to tie into the existing from the south. See CCMC 12.01.210D.
- Sewer and water usage calculations for these reports must be based on the total number of units. The sewer calculations seem to be based on 41 units, not 154 units.
- Water calculations must be based on this 8" main, not the 12" main.
- If the project is done in phases, areas that are not part of the present construction must be protected so the vegetation remains.
- The drainage study must address 100 year off-site flows from the north and the capacity of existing downstream facilities.

- Where are the calculations for the capacities of the detention basins?
- Section 5.2 of the report says that the hydraulic calculations show a significantly smaller 5 year and 100 year volume than the proposed flows, but I can't seem to find the appropriate calculations. Please address.

These comments are based on very general plans. All applicable code requirements will apply whether mentioned in this letter or not.

March 28, 2016

TSM-16-023

Building has no additional comments from CSM-16-005

Shawn Keating CBO
"There's no use talking about the problem unless you talk about the solution"
Building Official
Carson City Community Development Department
Web page http://www.carson.org/index.aspx?page=172
skeating@carson.org
Office 775-887-2310 X 7052
Fax 775-887-2202
Cell 775-230-6623

March 23, 2016

Major Project Review Committee

Re: # TSM – 16 - 023

Dear Kathe,

After initial plan review the Carson City Environmental Control Authority (ECA), a Division of Carson City Public Works Department (CCPW), has the following requirements per the Carson City Municipal Code (CCMC) and the Uniform Plumbing Code (UPC) for the TSM – 16-023 Little Lane request:

1. ECA has no specific comments other than project will need to meet all applicable codes found in Title 12.06 and Appendix 18 Division 15.5 of the Carson City Municipal Code (CCMC) and all applicable codes found in Chapters 7 and 10 of the 2012 Uniform Plumbing Code (UPC).

Please notify Mark Irwin if you have any questions regarding these comments, I can be reached at 775-283-7380.

Sincerely;

Mark Irwin
Environmental Control Officer 3

c: Kelly Hale, Environmental Control Supervisor

April 12, 2016

SUP-16-018
Health and Human Services has no concerns with the application as submitted.

SUP-16-019
Health and Human Services has no concerns with the application as submitted.

SUP 16-021
Health and Human Services has no concerns with the application as submitted.

VAR-16-022
Health and Human Services has no concerns with the application as submitted.

TSM-16-023
Health and Human Services has no concerns with the application as submitted.

VAR-16-024
Health and Human Services has no concerns with the application as submitted.

Dustin Boothe, MPH, REHS
Carson City Health and Human Services
900 E. Long St.
Carson City, NV 89706
(775) 887-2190 ext. 7220

dboothe@carson.org

April 11, 2016

TSM-16-023 Arbor Villas

Please find the following comments on TSM-16-023 Arbor Villas from Transportation staff:

- Staff appreciates the applicant's responsiveness to providing a road connection to Parkland Avenue and a pedestrian connection to Country Village Drive
- Due to the recent action and discussion by the Board to impose a unit development fee on the Lompa Ranch Development, what is the expectation for this development regarding whether or not a similar fee or impact fee will be enacted

Please contact us with any questions.

Thanks,

Dirk

Dirk Goering, AICP
Transportation Planner
Carson City Public Works Department/
Carson Area Metropolitan Planning Organization
3505 Butti Way
Carson City, NV 89701
Ph: 775-283-7431
Fx: 775-887-2112

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

District II
310 Galletti Way
Sparks, Nevada 89431
(775) 834-8300 FAX (775) 834-8319

March 28, 2016

BRIAN SANDOVAL
Governor

RUDY MALFABON, P.E., *Director*

Carson City
Planning Division
108 E. Proctor St
Carson City, NV 89706

TSM-16-023
Arbor Villas
APN: 004-221-13 Little Lane

Attention: Ms. Kathe Green, Assistant Planner

Dear Ms. Green:

I have reviewed the request for the proposed creation of 147 single-family attached units with a request to vary driveway approach length, parcel dimensions and setbacks (Little Lane).

This request are outside of NDOT jurisdiction and appear to have minimal impact on NDOT infrastructure. Thank you for the opportunity to review this development proposal. NDOT reserves the right to incorporate further changes and/or comments as the design review advances. Please feel free to contact me at (775)834-8309, if you have any further questions or comments.

Sincerely,

DocuSigned by:
Jae Pullen
DC8D2FB6D946439...

3/28/2016

Jae Pullen, PE, PTOE
Traffic Engineer

cc: Thor Dyson, District Engineer
File

Carson City Planning Commission
Planning Division
108 E. Proctor St.
Carson City, Nevada 89701

April 19, 2016

RE: File No. TSM-16-023; Tentative Subdivision Map
File No. VAR-16-024; Variance

Dear Commission Chair Esswein and Commissioners Sattler, Owens, Castro, Salerno, Green, and Monroy,

My name is Ella Davis and I live on 711 Cottonwood Dr. I am writing in regards to my opposition to the Arbor Villas development proposed by the Andersen Family and Carson City Planning Manager, Hope Sullivan.

My husband and I moved our family to Carson City in 1965, when we purchased our home on Cottonwood Dr. It was the third home built in our Mountain Vista subdivision. The neighborhood has been quiet with little traffic for over 50 years. The proposed subdivision has no consideration for the existing 1-story neighborhood, its long-time residents, and the peace and views they have enjoyed.

The proposal surrounds the existing neighborhood with high density development, additional traffic and noise, and threatens our life-style. The traffic from Arbor Village on Parkland to 5th St. will cause a burden to those existing homes on Parkland and add additional traffic on already busy 5th St. The increased density requested through a Variance should be rejected as it is inconsistent with existing zoning and allowed density.

Arbor Villas adjoins the Tanglewood Apartment development to the west. When Tanglewood was developed in 1978, it affected three single family residences and adjustments were made. The homes affected were granted an additional 10' of property to their exiting parcels and the apartments adjoining properties to the north were made one-story. Tanglewood was developed as Condominiums for sale as individual units. After two years, they could not be sold and were rezoned and rented as apartments.

The density of Arbor Villas is not consistent with the adjoining Tanglewood Apartments or our Mountain Vista subdivision. I am asking that the density be reduced and development restricted to one-story attached homes rather than two-story. I have included exhibits labeled Options 1, 2, and 3 in order of preference.
Option 1 requests 24 units along the backyards of homes located on Cedar St., Cottonwood Dr., and Parkland Ave. be removed and the additional units be one-story with all exits routed to Little Lane.
Option 2 requests all units be one-story with all exits routed to Little Lane.
Option 3 requests 24 units along the backyards of homes located on Cedar St., Cottonwood Dr., and Parkland Ave. be removed and additional units remain with all exits routed to Little Lane.

Whatever is approved, there are several unanswered questions. Our property valued will be affected when backing a wall of apartments. Windows will be facing into the backyards of one-story homes; we will have no more privacy. Where are the school buses going to pick up students? What kind of barrier will be built between the existing homes and Arbor Villas? How far will the development be set back from existing homes?

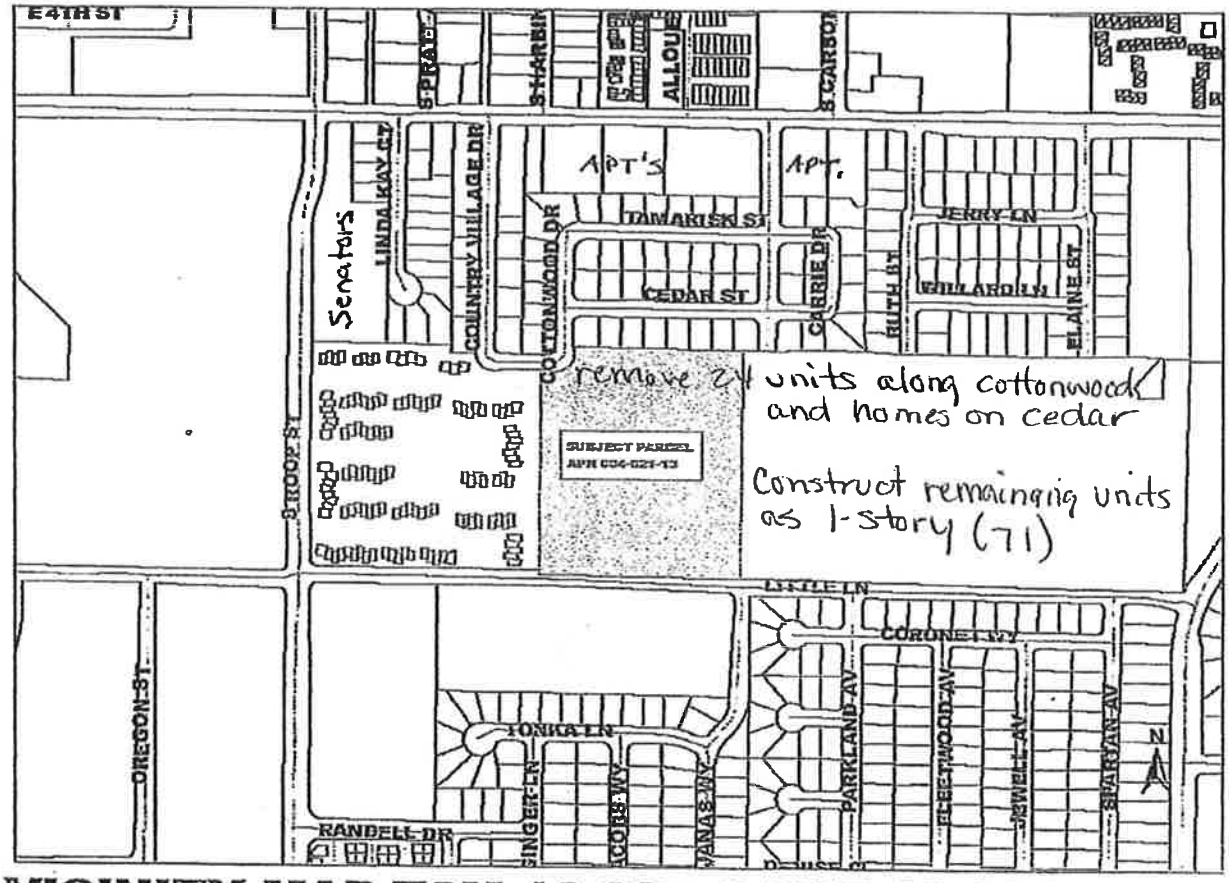
Your attention and consideration is appreciated. Please reject the Arbor Villas Plan as proposed. Thank you.

Sincerely,

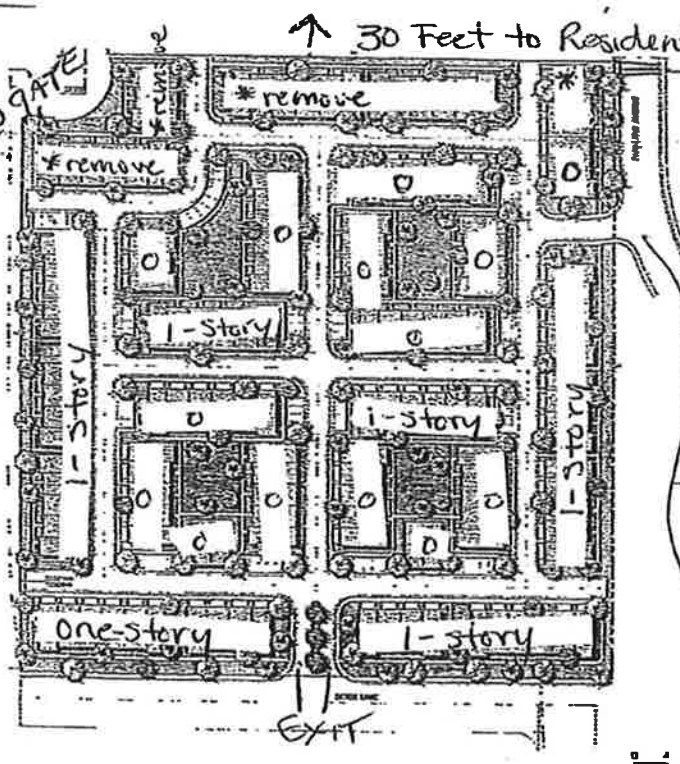
Ella Davis
711 Cottonwood Dr.
Carson City, NV 89704
775-882-3887

Ella Davis

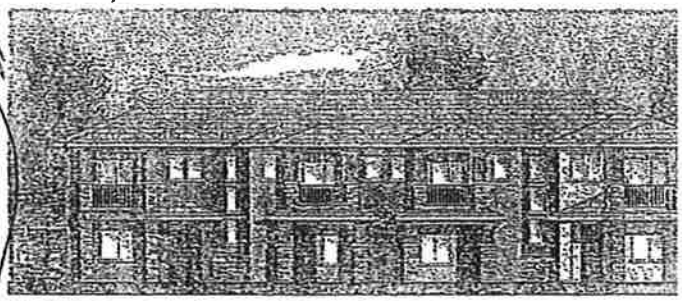
OPTION #1



VICINITY MAP TSM-16-023 & VAR-16-024



emergency exit only to 5th St
2 Little Lane exits
Ø Parkland exits to 5th st.

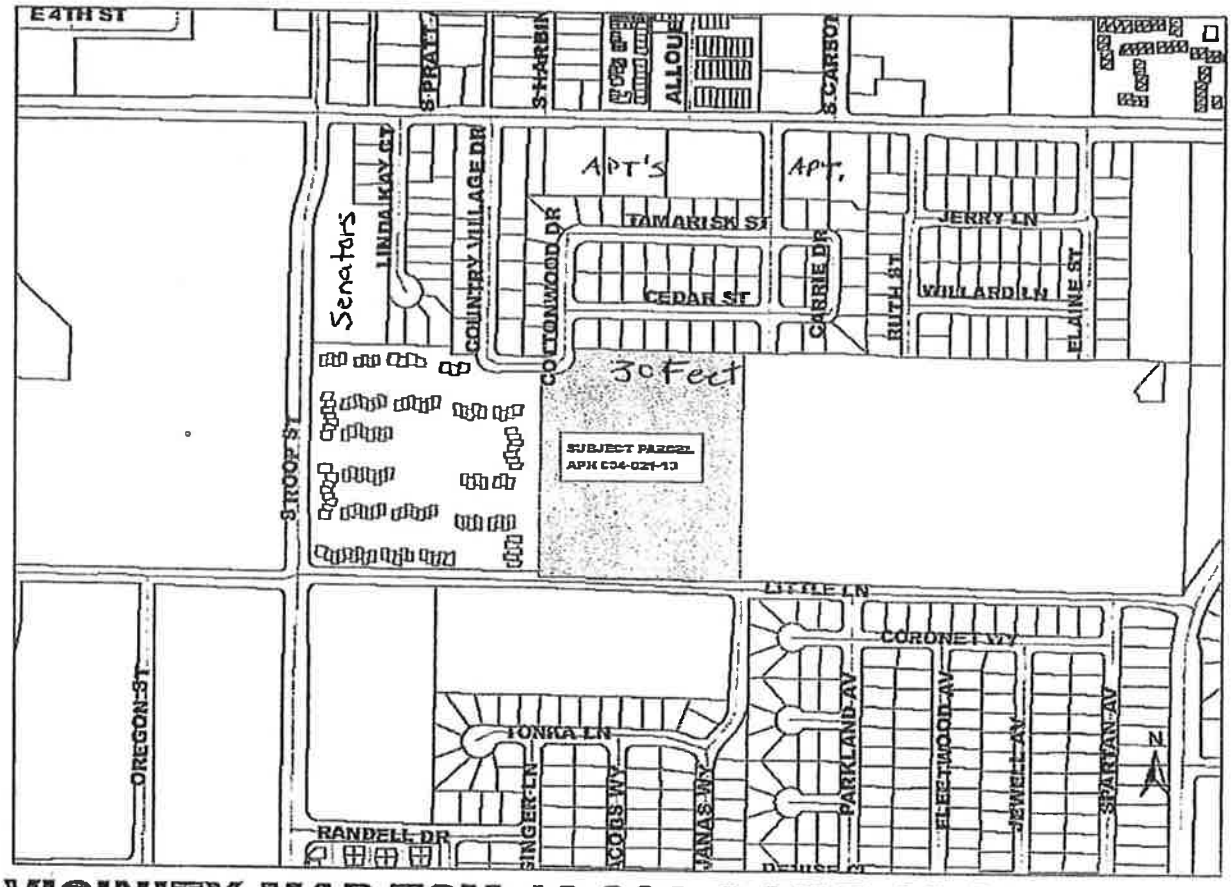


* Remove 24 units

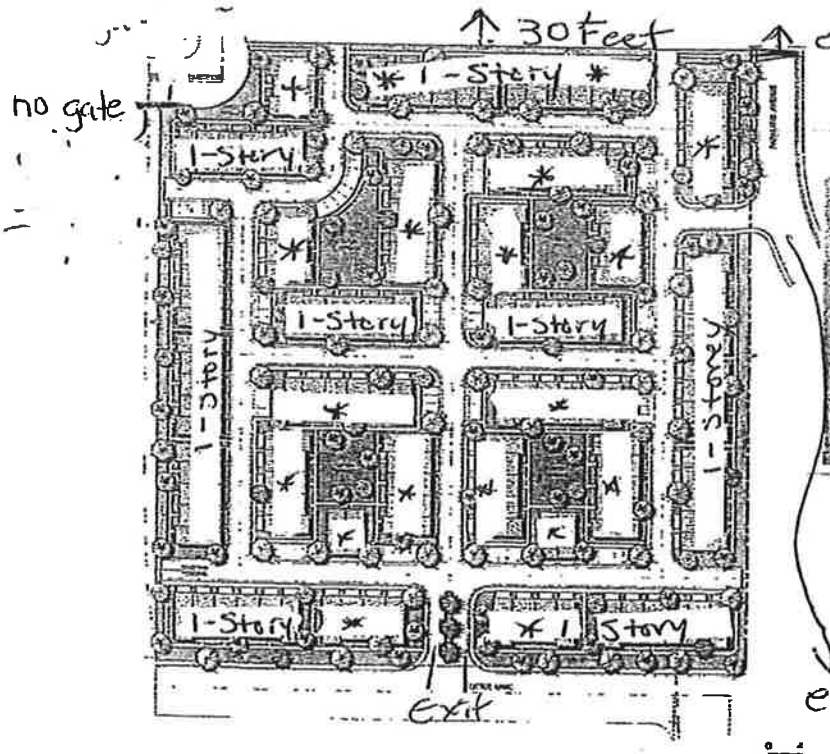
O 1-Story remaining un
(71 - 1-Story units)

exit

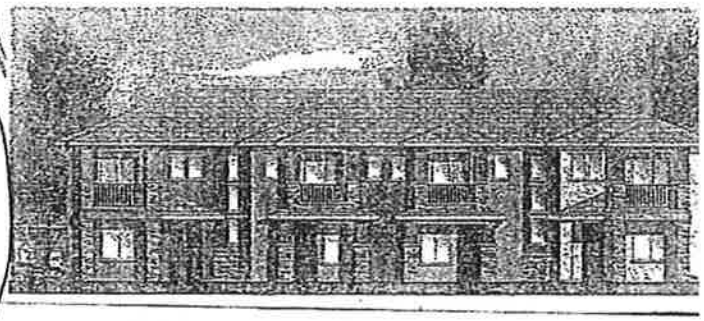
OPTION 2



VICINITY MAP TSM-16-023 & VAR-16-024



emergency only
2 little lane exits
Ø Parland to 5th except emergency

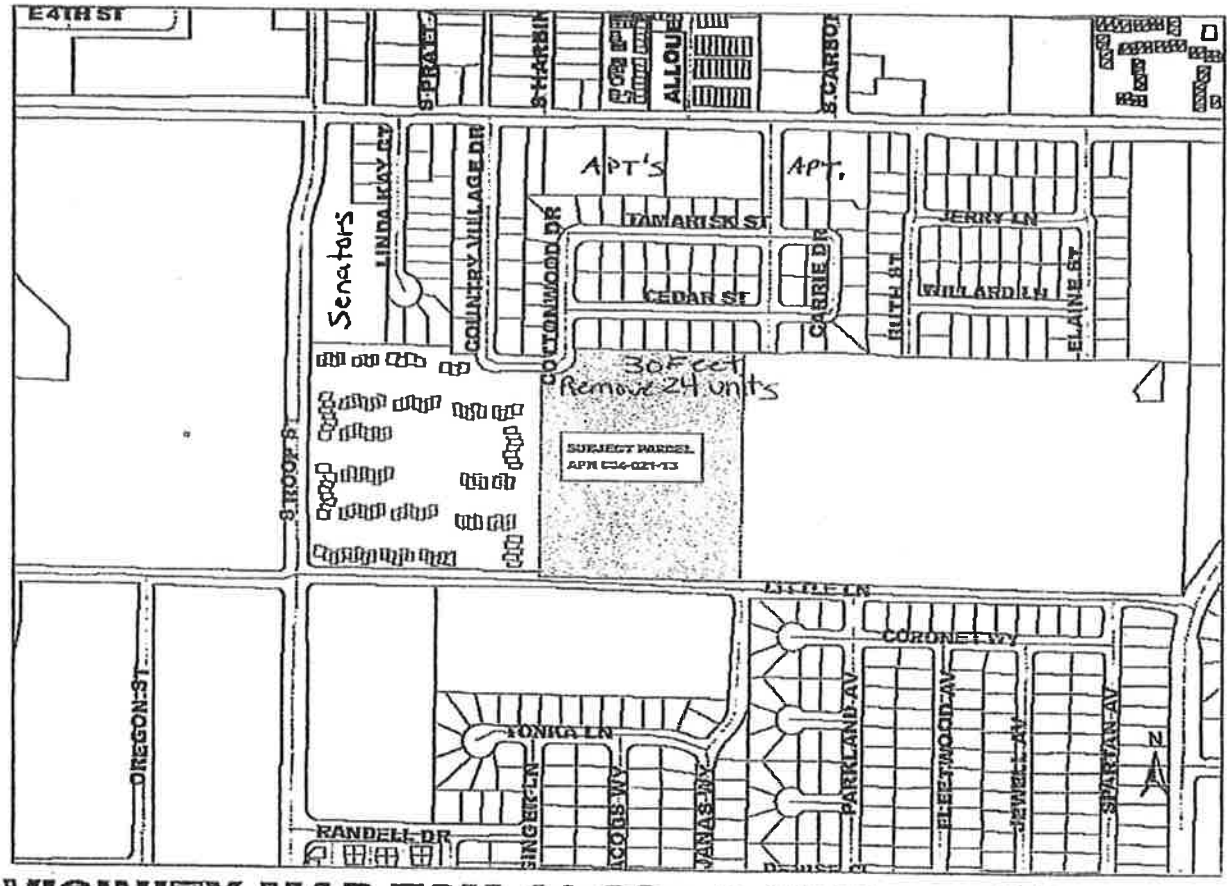


All one-Story *
½ the units.

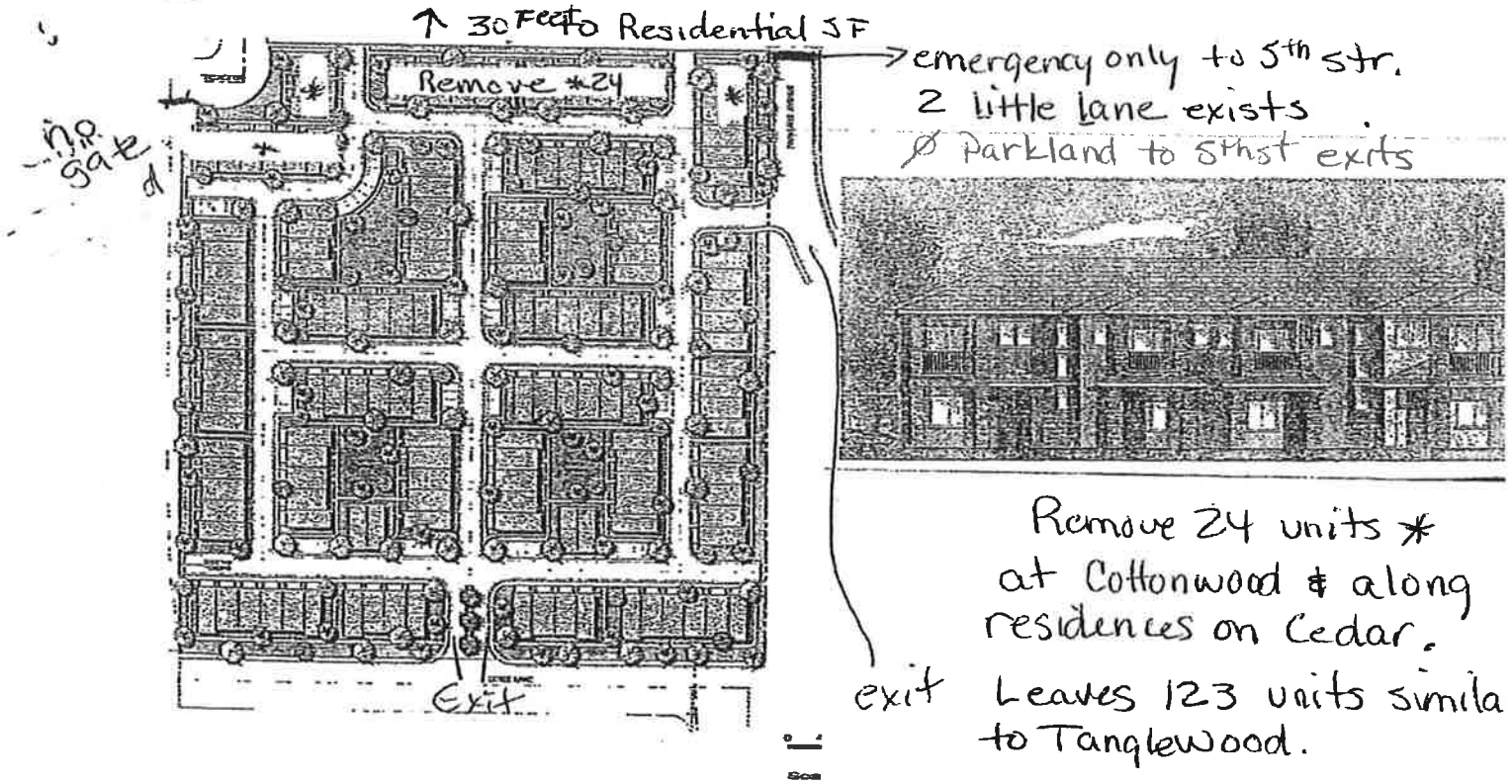
73 sf attached 1-Story

= Blends 1 story housing with existing residential. 31

OPTION 3



VICINITY MAP TSM-16-023 & VAR-16-024



Remove 24 units * at Cottonwood & along residences on Cedar.

Leaves 123 units simila to Tanglewood.

Hope Sullivan

From: Micheal Snyder <mpsnyder1@gmail.com>
Sent: Monday, April 18, 2016 9:54 PM
To: Hope Sullivan
Subject: Arbor Villas
Attachments: Easement to the south.pdf

Dear Hope,

I have been working away from home so my being home to receive this announcement is quite by chance.

I bought my home 12 years ago and have enjoyed the beautiful views of the Pinenuts and Job's Peak. I felt they were more valuable than the house.

With that said I knew this day was coming but not to this magnitude. It is ridiculous to think that a planner with the best interest for Carson City would even consider putting 147 families on a little over 10 acres.

I have attached a agreement that I was presented with at the time I was deciding to make this home purchase. It states the property owner of this area to the south of me would provide the 25 foot easement but then only single story structure and the 150 foot to a 2 story structure.

I will be out of town for your meeting but please put me on any list and advise me what I need to do to prevent this project from proceeding as designed, Thank You.

Mike

Micheal P. Snyder
1025 Cedar St.
Carson City, NV 89701-5025

H (775) 888-2033
M (605) 546-2272
W (916) 752-2618

February 14, 1978

TO WHOM IT MAY CONCERN:

In furtherance of negotiations and representations among certain homeowners in the Saliman Road and Roop Street area, specifically, that intended for the development of a planned unit development known as Tanglewood, the developer, Genco Industries agrees in consideration of no objection and cooperation from said homeowners to the following:

1. Genco Industries will deed twenty-five (25) feet of land to extend the south borders of all homeowners lots that are immediately adjacent to the Tanglewood planned unit development upon close of escrow between developer and seller.

2. The developer will cause to be moved the present utility easement with Sierra Pacific Power Company and Nevada Bell Telephone Company to the south a distance of twenty-five (25) feet and relocate all utilities underground as phases of the development herein proceed with construction. Should relocation of these utilities as referenced be possible on an earlier basis then developer will exercise every good effort to relocate them accordingly.

3. Developer will trench and backfill underground utility lines to individual homes provided homeowners have paid for transformers and utility lines and have made available open access to said property within thirty (30) days after developer has notified them in writing that it is prepared to proceed with said trenching and backfilling.

4. Developer will provide a twenty-five (25) foot buffer strip between the new established property line of homeowners and the north row of any units which will be of a one (1) story nature.

5. Developer will provide at least a one hundred and fifty (150) foot buffer from the original north line of said property to any proposed two (2) story unit.

6. Developer will eliminate all swimming pools in the project in order to conserve water.

7. Developer will not provide residents of the planned unit development any new access to roads in the present three (3) home subdivisions bordering to the north and will discourage any such use with natural barriers wherever possible.

FRED COOPER PROMISED THAT GENCO [?] WILL PAY ALL COSTS FOR HOOK-UP OF UTILITIES FOR HOMEOWNERS [illegible] IN EXCESS OF ($300.00) THREE HUNDRED DOLLARS. FEB. 15TH, 1978 AT 9 [illegible]

TSM-16-023
VAR-16-024

To Carson City Planning Commission

Re: Proposed condos

The proposed construction of condos on a plot of land between Little Lane and East Fifth Street would be a detriment to the neighborhood. The homes that border the north side of this plot would suffer a severe financial loss. This neighborhood already has enough multi family units. It is a quiet area with the only traffic to and from the area homes.

The homes on the north side of this proposed development have a great view of Job's Peak and the mountains to the south. With the construction of two story buildings, this view would no longer exist and along with it, the privacy of the back yards. This would have a negative impact on property values.

As a long time resident of this neighborhood (forty eight years) I strongly urge the Carson City Planning Commission to reject this proposal. There would be no objection to single story, single family homes.

Thank you for consideration in this matter.

Charles Muller
1123 Cedar St.
Carson City, Nv. 89701
775-220-6242
oldpaint85us@sbcglobal.net

Carson City Planning Division

108 E. Proctor Street
Carson City, Nevada 89701
(775) 887-2180
www.carson.org
www.carson.org/planning

February 10, 2016

Mr. Chris Baker
Manhard Consulting
3476 Executive Pointe Way
Carson City, NV 89706

SUBJECT: CSM-16-005 – Conceptual Subdivision Map Review
Little Lane
154 Single-family attached residential lots

REVIEW DATE: February 1, 2016

SITE INFORMATION:

APN: 004-021-13

Project Size: 10.31 acres

Master Plan Designation: High Density Residential (HDR)

Zoning: Multi-Family Apartments (MFA)

The following is a summary of the comments provided from City staff at the Conceptual Review meeting held on February 1, 2016, regarding the proposed Little Lane Subdivision.

PLANNING DIVISION – Contact Susan Dorr Pansky, Planning Manager

1. An application for a Tentative Subdivision Map must be submitted in accordance with the Carson City Municipal Code, Section 17.05, Tentative Maps, in order to subdivide the property as proposed on the Conceptual Map. As presented, the proposed development does not require any Special Use Permits or Variances.

The Tentative Subdivision Map application must include or address the following items:

2. Although single family attached residential units are proposed, because the project is located in the Multi-Family Apartment zoning district, it is required that the application demonstrate how the proposed project meets Carson City Development Standards, Division 1.17 – Multi-Family Apartment Development Standards as follows:

   The following standards are intended to establish minimum standards for residential development within the Multi-Family Apartment (MFA) zoning district.

   1. Maximum permitted density:

      a. For one-bedroom or studio units, one unit per 1,200 square feet of area.

b. *For two or more bedroom units, one unit per 1,500 square feet of area.*

2. *Maximum building height: 45 feet.*

3. *Setbacks:*

   a. *Front yard: 10 feet, plus an additional 10 feet for each story above two stories; minimum driveway approach from property line to garage doors is 20 feet.*

   b. *Side yard: 10 feet for external project boundaries; minimum 10 feet between residential structures for internal setbacks. Where a side yard is adjacent to a single-family zoning district, an additional 10 feet is required for each story above one story.*

   c. *Street side yard: 10 feet, plus an additional 5 feet for each story above two stories; minimum driveway approach from property line to garage doors is 20 feet.*

   d. *Rear yard: 20 feet. Where a rear yard is adjacent to a single-family zoning district, an additional 10 feet is required for each story above one story.*

4. *Required parking: Two spaces per dwelling unit; and in compliance with the Development Standards Division 2, Parking and Loading.*

5. *Open Space:*

   a. *A minimum of 150 square feet per dwelling unit of common open space must be provided. For projects of 10 or more units, areas of common open space may only include contiguous landscaped areas with no dimension less than 15 feet, and a minimum of 100 square feet per unit of the common open space area must be designed for recreation, which may include but not be limited to picnic areas, sports courts, a softscape surface covered with turf, sand or similar materials acceptable for use by young children, including play equipment and trees,_with no dimension less than 25 feet.*

   b. *A minimum of 100 square feet of additional open space must be provided for each unit either as private open space or common open space.*

   c. *Front and street side yard setback areas may not be included toward meeting the open space requirements.*

6. *Landscaping. Landscaping shall comply with the Development Standards Division 3, Landscaping.*

5. Please provide the proposed building elevation drawings including proposed heights of buildings.

6. Please ensure that the required two parking spaces for each attached residential unit is clearly shown on the Tentative Map and show driveways for each unit as well.

7. Please make sure that sidewalks are clearly identified on the Tentative Map. On the Conceptual Map several departments mistook the setback area for sidewalks on the street side.

8. Please show proposed cluster mail box locations. It is recommended to meet with the post office before submittal of the Tentative Map to establish appropriate locations for mailboxes.

8. Please provide details of any perimeter fencing.

9. Please provide a conceptual level landscaping plan as a part of the Tentative Subdivision Map application.

10. It is recommended to meet with the School District address a bus stop location to serve the development or identify the nearest school bus stop that would serve the development.

ENGINEERING DIVISION – Contact Stephen Pottéy, Project Manager

This Division has completed a review of the above referenced project.

Based on our review, the following comments are offered:

1. Any engineering work done on this project must be wet stamped and signed by an engineer licensed in Nevada. This will include site, grading, utility and erosion control plans as well as standard details.

2. All construction work must be to Carson City Development Standards (CCDS) and meet the requirements of the Carson City Standard Details.

3. Fresh water must be used for dust control. Contact our Public Works Dept. at 887-2355.

4. New electrical service must be underground.

5. A full Conceptual Drainage Study must be submitted to address drainage issues with the Tentative Subdivision map. See Carson City Development Standards (CCDS) section 14 for more information.

6. A sealed traffic study must be submitted with the Tentative Map. Please see section 12 of CCDS.

7. A sealed sewer, water and fire flow study must be submitted with the Tentative Map. Please see section 15 of CCDS.

8. This project will need a Storm Water Pollution Prevention Permit from Nevada Division of Environmental Protection.

9. This project will need a Surface Area Disturbance Permit from Nevada Division of Environmental Protection.

10. A sealed Geotechnical Report for the whole site should be submitted with the Tentative Map.

11. Street lighting requirements of Section 12 of CCDS must be met.

12. A dust palliative will need to be applied to areas that will be left disturbed for an extended period of time.

13. A 10' wide multi-purpose pedestrian path must be shown entering the development from Country Village Drive on the Tentative Map.

14. The Little Lane street profile to the west, with curb, gutter, and bike lane, must be extended to the east property line.

15. All other new streets must have sidewalks shown along one side of the street in the tentative map, with the exception of Parkland Ave, which must have sidewalks on both sides.

16. Due to the length of the driveways, parking will not be allowed in the driveways. Proper signage will be required, and must be shown in building permit submittals.

17. Street cross section must match Carson City detail C-5.1.9.1 for Special Roadway Sections for Urban Streets with the exception that sidewalk will only be required on one side.

18. The subdivision entrance width and radii must be decreased. The wide entrance with large radii curb returns encourages higher speeds, and is thus not bike or pedestrian friendly.

19. FEMA flood zone maps for Carson City are in the process of being updated. This update may affect the subject parcel.

These comments are based on a very general site plan and do not indicate a complete review. All pertinent requirements of Nevada State Law, Carson City Code, and Carson City Development Standards will still apply whether mentioned in this letter or not.

BUILDING DIVISION – Contact Shawn Keating, Chief Building Official

1. The 2009 IECC will change by state statue during the upcoming year. All applications received after June 2016 have to be designed to the 2012 International Energy Conservation Code.

2. Permit values will be based upon $112.65 living and $43.33 for Utility. This is the ICC current data table from the Building Journal as of February 2015. The data table changes every February.

3. Our Department can record a Master; the first application will be submitted clearly identifying the master and options. All truss and engineering for those options have to be submitted. The second submittal will be the application with site plan detailing options selected. The site plan would have to show house location with selected options, drainage, utilities, easement, and access, finish grade and finish floor height. The second submit application will be 80 percent of the permit fee.

4. All projects and improvements must be performed in accordance with Nevada State Revised Statutes (NRS) 623 & 624 and Carson City Municipal Code (CCMC) 15.05.020.

5. Improvements, Repairs, Replacement, and Alterations must comply with 2012 International Residential Code for Town Home Construction, Adopted International Energy Conservation Code, and 2012 Northern Nevada Amendments.

FIRE DEPARTMENT – Contact Dave Ruben, Fire Marshal

1. The project must comply with the 2012 IFC and Northern Nevada Fire Code amendments.

2. Due to street width, no on street parking will be allowed. There must be either red curb or fire lane signs posted.

3. Hydrants and road improvements must be in place prior to bringing combustible materials on building sites. Phasing of the hydrants and roads will be allowed but they must be in place as required by the IFC for each building project.

4. Hydrants must be installed at locations per Appendix C of the 2012 IFC.

PARKS AND RECREATION DEPARTMENT – Contact Vern Krahn, Park Planner

1. This project will be subject to the collection of Residential Construction Tax, per CCMC Chapter 15.60 - Residential Construction Tax and NRS 278.4983/Assembly Bill 25, effective May, 2015.

2. The Unified Pathways Master Plan identifies an off-street, paved, and shared path along the north side of Little Lane. Our department, as part of the City's conditions for the project, will require the path's installation during the project's first phase.

3. The Parks and Recreation Master Plan identifies on page A-16 that in Neighborhood #13 (where the project is located) there is a need for a neighborhood park. It is our department's understanding that the City will require the establishment of the road alignment for Parkland Avenue as a condition of approval for the project. This will separate a 2.5 to 3.0 acre parcel from the larger tract of property to the east. This small parcel is an ideal location and the right size for a small neighborhood park and our department would like to discuss the acquisition and/or donation of this property with the current land owners. The City is looking for only a willing seller and if acquiring the land is even a remote possibility, our department would like to discuss with the developer and current property owner that during the project's parcel map process a separate parcel be created for this 2.5 to 3.0 acre piece of land.

4. On pages 6-7 and 6-8 of the Parks and Recreation Master Plan, the +/-30 acres of property on the north side of Little Lane was one site that was considered in Carson City for a future community park. This particular site did not evaluate well as a community park location due to its the proximity of Mills Park and the potential duplication of service areas. Our department believes a neighborhood park would be a better land use within this residential area.

5. The City will not be responsible for the maintenance of any drainage/open space areas and the common landscape areas within the development.

HEALTH DEPARTMENT – Contact Dustin Boothe, Division Manager

No comments received.

ENVIRONMENTAL CONTROL – Contact Mark Irwin, Environmental Control Officer

No comments.

Thank you for your Conceptual Map submittal. If you have further questions, please contact the Planning Division at (775) 887-2180, or contact the applicable department staff member as listed below.

Planning Division –
Susan Dorr Pansky, Planning Manager
(775) 283-7076
Email: spansky@carson.org

Engineering Division –
Stephen Pottéy, Project Manager
(775) 887-2300
Email: spottey@carson.org

Building Division –
Shawn Keating, Chief Building Official
(775) 887-2310
Email: skeating@carson.org

Fire Prevention –
Dave Ruben, Fire Marshal
(775) 283-7153
Email: druben@carson.org

Health Department –
Dustin Boothe, Division Manager
(775) 283-7220
Email: dboothe@carson.org

Environmental Control Division –
Mark Irwin, Environmental Control Officer
(775) 283-7380
Email: mirwin@carson.org

Sincerely,
Community Development Department, Planning Division

Susan Dorr Pansky, AICP

cc: Conceptual Review Committee
File CSM-16-005

Attachments:
Relevant Pages from Carson City Parks and Recreation Master Plan

6.3.3 Opportunities

There are currently a number of vacant tracts of land within Carson City large enough to be considered for Community parks. Each is evaluated below:

- Undeveloped portions of Edmonds Sports Complex—The freeway will cut off a portion of Edmonds, but it will still have undeveloped areas that could become a Community park. Although relatively central to Carson City in the east/west dimension, it is somewhat south of the core area of the community. This land is already in City ownership. It will not have direct, convenient Freeway access, and Freeway crossings will make it a little difficult to access from neighborhoods to the northwest.
- Undeveloped land on Little Lane—This relatively large tract of land on the north side of Little Lane is relatively flat, surrounded by residential development and very central to the city. But it is only 1/2 mile south of Mills Park and significantly duplicates its service area. The fact that it is in private ownership, with relatively high densities surrounding suggests that it may be somewhat expensive to acquire.
- BLM property on Arrowhead Drive combined with additional unused Airport land west of Goni Road—The BLM manages an 80-acre parcel that spans both sides of Arrowhead Drive, northwest of the airport, all of which would make an excellent community park. The eastern 40 acres of this BLM property are currently used (under a patent/lease) as a milling site. The City may not be able to acquire the eastern 40 acres until it is no longer leased for private use. The land is gently sloping to the south, but has excellent views of the City. It could be combined with unused airport land to the southeast (flight patterns make it unusable for development purposes). The BLM parcel is central to the city in an east/west direction and could serve the northern quadrant of the community. It will have relatively good access from new Freeway exits. It may be possible to acquire the BLM parcel through the Recreation & Public Purposes (R&PP) process. A no- or low- cost-lease may be possible from the Airport Authority.
- Lompa Ranch property—Perhaps the largest vacant parcel in Carson City is the Lompa Ranch. It is adjacent to Carson High School and they could have joint uses. However, there are a number of considerations that make the Lompa property less suitable for a Community park:

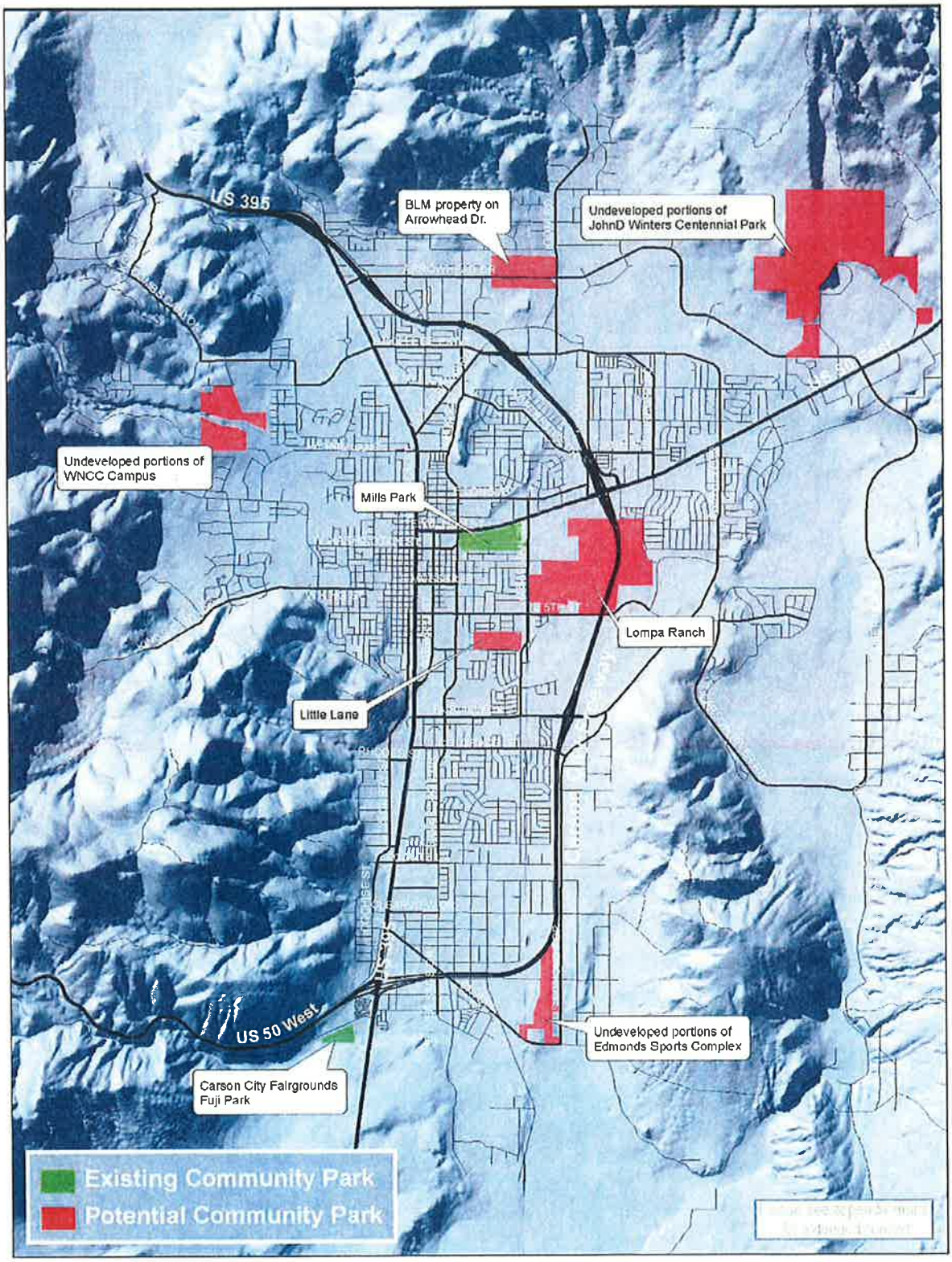
  - It is relatively close to Mills Park.
  - Its visibility from the Freeway suggests a value as a commercial use.
  - Private ownership will increase the cost of acquisition

- Portions of the WNCC campus—As the WNCC campus continues to expand, there is growing interest in providing sports fields for student use. It may be possible to joint venture with the College to develop a Community park with sports facilities shared between the college and the city. However, the negative factors are that the campus location is not central or accessible from a significant portion of the city, and there are major practical challenges to shared uses with a college program—the demands for use will be concurrent rather than complementary.
- Undeveloped portions of JohnD Winters Centennial Park—There are portions of JohnD Winters Centennial Park large enough to serve Community park functions, but they have rolling, steeper terrain and are not particularly close to, or accessible from, residential areas.

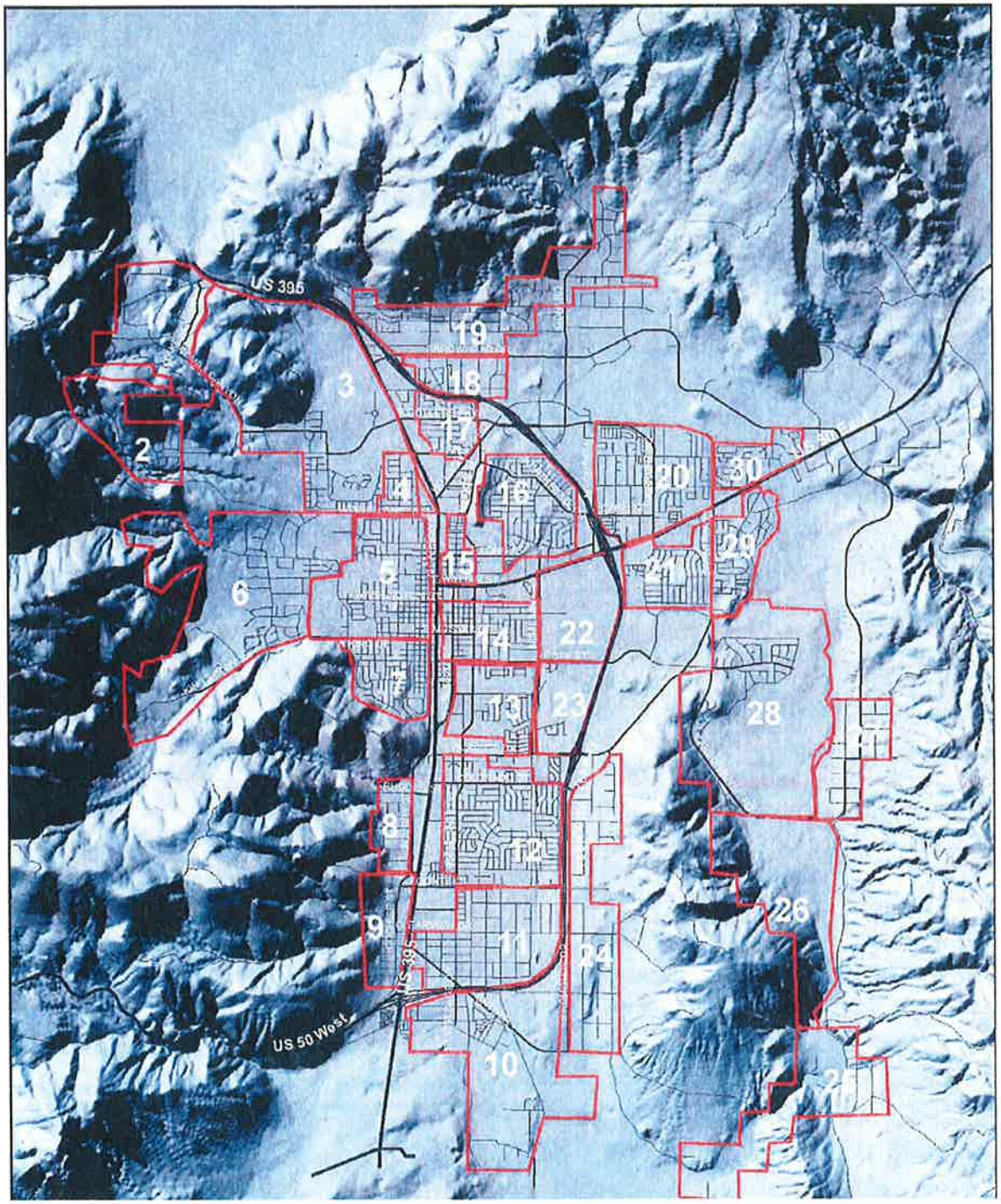
6.3.4 Implementation Strategies

1. Priorities for a third Community park for the city are:

   A. Arrowhead Drive/Airport parcel
   B. Improve undeveloped portions of Edmonds Sports Complex as a Community park



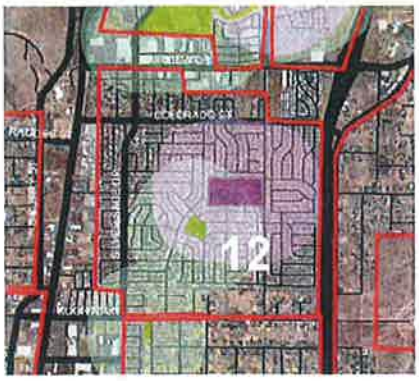
Existing Community Parks and Potential Community Park Sites.



Neighborhood Boundaries.

12

Park:	Sonoma Park
Type:	Traditional
Size:	5 acres
Notes:	34% of population within walking distance of Park
School:	Seeliger Elementary School 60% of population within walking distance of School



Observations:	This central Carson City neighborhood is predominantly single family and relatively built-out. It is served by Sonoma Park and Seeliger Elementary. There are a few undeveloped tracts of land in the SE (and somewhat underserved) quadrant of the neighborhood, on the north side of Koontz Lane.
Survey:	Q19: Moderate support (46%) for additional Neighborhood parks. Q17: 65% support the general addition of Neighborhood parks, with 57% support for Natural parks.
Implementation Strategies:	Focus on improvements to Seeliger Elementary School to better serve a Neighborhood park function.

13

Park:	Governors Field and Linear Park
Type:	Sports Complex and Natural
Size:	22 acres
Notes:	62% of population within walking distance of Park
School:	None

Observations:	This southern portion of this neighborhood is within walking distance of Governors Field, and a portion of the Linear Park trail system. Governors Field is not a true neighborhood park, but does provide open space and some recreation facilities including play equipment. Fremont Elementary is close by, but on the other side of busy Saliman Road (neighborhood 23). In general the neighborhood has a high concentration of apartments, and therefore a relatively high density. Large tracts on either side of Little Lane have the potential to be developed at similarly high densities, creating a need for more Neighborhood facilities.
Survey:	Q19: There is a moderate desire for a Neighborhood park (44%). Q17: A similar proportion of respondents (45%) supported a general addition of Neighborhood parks, with a 60% support for Natural parks.
Implementation Strategies:	Develop at least one Neighborhood park in the northern portion of this neighborhood. Options include: A) two smaller parks (4 to 5 acres) on the north and south sides of Little Lane; B) 6-acre park south side of Little Lane;

Carson City Planning Division
108 E. Proctor Street· Carson City NV 89701
Phone: (775) 887-2180 • E-mail: planning@carson.org

FOR OFFICE USE ONLY:

FILE # TPUD – 16 -

TENTATIVE MAP FOR A PUD

APPLICANT	PHONE #
Capstone Communities	775-657-8600
MAILING ADDRESS, CITY, STATE, ZIP	
9441 Double Diamond Parkway #14, Reno, NV 89521	
ENGINEER	**PHONE #**
Manhard Consulting	775-882-5630
MAILING ADDRESS, CITY, STATE, ZIP	
3476 Executive Pointe Way, Carson City, NV 89706	
EMAIL ADDRESS	
cbaker@manhard.com	
PROPERTY ADDRESS, CITY, STATE, ZIP	
Little Lane, Carson City, NV 89706	
PRESENT ZONING	**APN(S)**
Multi-Family Apartment	004-021-13

STATE FEES: See checklist. Submit the two state checks at the time of initial application submittal.

FEE: **$3,450.00** + noticing fee + CD containing application digital data (all to be submitted once the application is deemed complete by staff)

SUBMITTAL PACKET
See checklist (fill out checklist and return to staff with the application packet)

Application Reviewed and Received By:

_____

REQUEST: In accordance with the provisions of Title 17 of the Carson City Municipal Code, application is hereby made for a Planned Unit Development on property situated at:
Little Lane, Carson City, NV 89706, APN 004-021-13

The required modifications to Carson City's Land Use Regulations are as follows:
No modifications are requested at this time. This plan was designed in accordance with MFA zoning regulations

ACKNOWLEDGMENT OF APPLICANT: (a) I certify that the foregoing statement are true and correct to the best of my knowledge and belief; (b) I agree to fulfill all conditions established by the Board of Supervisors.

_____ _____
Applicant's Signature Date

PROPERTY OWNER'S AFFIDAVIT

I, _____, being duly deposed, do hereby affirm that I am the record owner of the subject property, and that I have knowledge of, and I agree to, the filing of this application.

_____ _____ _____
Signature Address Date

Use additional page(s) if necessary for other names.

STATE OF NEVADA)
COUNTY)

On _____, 20____, personally appeared before me, a notary public, _____, personally known (or proved) to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he/she executed the foregoing document.

_____
Notary Public

NOTE: In order to avoid unnecessary time delays in processing your develop project, it is important that it be as complete as possible when submitted. A checklist is available to assist you and your engineer. If you have further questions regarding your application, please call the Planning Division at 775-887-2180.

Carson City Planning Division
108 E. Proctor Street· Carson City NV 89701
Phone: (775) 887-2180 • E-mail: planning@carson.org

FILE # VAR – 16 -

APPLICANT	PHONE #
Capstone Communities	775-657-8600

MAILING ADDRESS, CITY, STATE, ZIP
9441 Double Diamond Parkway #14, Reno, NV 89521

EMAIL ADDRESS

PROPERTY OWNER	PHONE #
Andersen Family Associates	

MAILING ADDRESS, CITY, STATE, ZIP
P.O. Box 1746, Carson City, NV 89702

EMAIL ADDRESS

APPLICANT AGENT/REPRESENTATIVE	PHONE #
Manhard Consulting	775-882-5630

MAILING ADDRESS, CITY, STATE, ZIP
3476 Executive Pointe Way, Carson City, NV 89706

EMAIL ADDRESS
cbaker@manhard.com

FOR OFFICE USE ONLY:

CCMC 18.02

VARIANCE

FEE: $2,150.00 + noticing fee

SUBMITTAL PACKET

- ☐ 8 Completed Application Packets (1 Original + 7 Copies)
- ☐ Application Form
- ☐ Written Project Description
- ☐ Site Plan
- ☐ Building Elevation Drawings and Floor Plans
- ☐ Proposal Questionnaire With Both Questions and Answers Given, supporting documentation
- ☐ Applicant's Acknowledgment Statement
- ☐ Documentation of Taxes Paid-to-Date (1 copy)
- ☐ CD containing application digital data (all to be submitted once application is deemed complete by staff)

Application Reviewed and Received By:

_____

Submittal Deadline: See attached PC application submittal schedule.
Note: Submittals must be of sufficient clarity and detail such that all departments are able to determine if they can support the request. Additional information may be required.

Project's Assessor Parcel Number(s):	Street Address	ZIP Code
004-021-13	Little Lane, Carson City, NV	89706

Project's Master Plan Designation	Project's Current Zoning	Nearest Major Cross Street(s)
High Density Residential	Multi-Family Apartment	S. Roop Street

Briefly describe your proposed project: (Use additional sheets or attachments if necessary). In addition to the brief description of your project and proposed use, provide additional page(s) to show a more detailed summary of your project and proposal.
In accordance with Carson City Municipal Code (CCMC) Section: 18.08.025, or Development Standards, Division _____, Section _____, a request to allow a variance as follows:
In accordance with CCMC Section 18.08.025, a variance request is necessary to reduce required front and side yard setbacks for a new development.

PROPERTY OWNER'S AFFIDAVIT

I,_____, being duly deposed, do hereby affirm that I am the record owner of the subject property, and that I have knowledge of, and I agree to, the filing of this application.

_____ _____ _____
Signature Address Date

Use additional page(s) if necessary for other names.

STATE OF NEVADA)
COUNTY)

On_____, 2____, _____, personally appeared before me, a notary public, personally known (or proved) to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he/she executed the foregoing document.

_____
Notary Public

NOTE: If your project is located within the historic district, airport area, or downtown area, it may need to be scheduled before the Historic Resources Commission, the Airport Authority, and/or the Redevelopment Authority Citizens Committee prior to being scheduled for review by the Planning Commission. Planning Division personnel can help you make the above determination.

VARIANCE APPLICATION QUESTIONNAIRE

PLEASE TYPE OR PRINT IN BLACK INK ON SEPARATE SHEETS AND ATTACH TO YOUR APPLICATION

State law requires that the Planning Commission and possibly the Board of Supervisors consider and support the questions below with facts in the record. These are called "FINDINGS". Since staff's recommendation is based on the adequacy of your findings, you need to complete and attach the Proposal Questionnaire with as much detail as possible to ensure that there is adequate information supporting your proposal.

The questionnaire lists the findings in the exact language found in the Carson City Municipal Code (CCMC), then follows this with a series of questions seeking information to support the findings.

(On an attached sheet, list each question, read the explanation, then write your answer in your own words.)

Answer the questions as completely as possible so that you provide the Commission and possibly the Board of Supervisors with the details that they need to consider your project. Please keep in mind that approval of a variance will **not** be considered on the basis of an economic hardship. If the question does not apply to your situation, explain why. BEFORE A VARIANCE CAN BE GRANTED, FINDINGS FROM A PREPONDERANCE OF EVIDENCE MUST INDICATE THAT THE FACTS SUPPORTING THE PROPOSED REQUEST ARE INCORPORATED INTO YOUR APPLICATION.

GENERAL REVIEW OF PERMITS

Source: CCMC 18.02.085. (1) The Planning Commission and possibly the Board of Supervisors, in reviewing and judging the merit of a proposal for a variance, shall direct its considerations to, and find that the following conditions and standards are met:

FINDINGS

Question 1. Describe the special circumstances or conditions applying to the property under consideration which exist making compliance with the provisions of this title difficult and a cause of hardship to, and abridgment of a property right of the owner of the property; and describe how such circumstances or conditions do not apply generally to other properties in the same land use district and explain how they are not self-imposed.

Explanation A. Think about your situation and state what is different about your property that makes your variance request necessary. Is it the topography, the design, size, etc. of your parcel, and why can you not redesign your project to fit within code requirements? Please understand that a "self-imposed" or "financial" hardship is not considered adequate reason for granting of a variance.

Question 2. Explain how granting of the variance is necessary to do justice to the applicant or owner of the property without extending any special privilege to them.

Explanation A. State how the granting of your variance request may or may not result in actual damage to nearby properties or prejudice by your neighbors in a precedent-setting situation. State why your project will not be harmful to the public health, safety and general welfare.

Question 3. Explain how the granting of the variance will not result in material damage or prejudice to the other properties in the vicinity nor be detrimental to the public health, safety and general welfare.

If there is any other information that would provide a clearer picture of your proposal that you would like to add for presentation to the Planning Commission and Board, please be sure to include the information.

The following acknowledgment and signature are to be on the response to the questionnaire prepared for the project. Please type the following, signed statement at the end of your application.

ACKNOWLEDGMENT OF APPLICANT

I certify that the foregoing statements are true and correct to the best of my knowledge and belief. I agree to fully comply with all conditions as established by the Planning Commission/ Board of Supervisors. I am aware that this permit becomes null and void if the use is not initiated within one year of the date of the Planning Commission/Board of Supervisors approval; and I understand that this permit may be revoked for violation of any of the conditions of approval. I further understand that approval of this application does not exempt me from all City Code requirements.

Applicant's Signature	Print Name	Date

Manhard CONSULTING LTD

ARBOR VILLAS

CARSON CITY, NEVADA

EXISTING HYDROLOGY DISPLAY

SHEET 2 OF 3

TENTATIVE MAP & VARIANCE

FOR

ARBOR VILLAS

Prepared For:

Capstone Communities

9441 Double Diamond Parkway #14

Reno, NV 89503

Prepared By:

Manhard CONSULTING

3476 Executive Pointe Way,
Suite 12

Carson City, NV 89706

March 2016

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

PROJECT LOCATION

The proposed project site is a +/-10.31 acre parcel (004-021-13) located north of Little Lane between South Roop Street and South Saliman Road.

Figure 1: Project Location

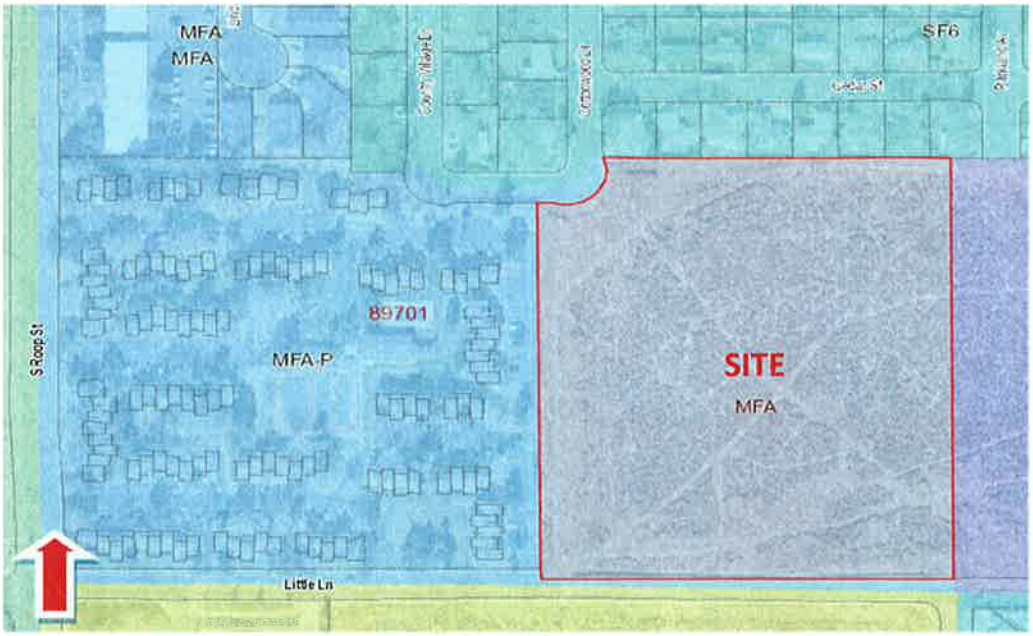
EXISTING SITE CONDITIONS

The proposed project site has a current master plan designation of High Density Residential (HDR) and a current zoning designation of Multi-Family Apartment (MFA). The proposed project site is currently vacant. The parcel is designated by FEMA as located in the Zone X shaded flood zone.

EXISTING MASTER PLAN & ZONING DESIGNATIONS

Figure 2: Existing Master Plan Designation (http://ccaps.org/publicgis/)

Figure 3: Existing Zoning Designation (http://ccaps.org/publicgis/)



SURROUNDING PROPERTIES

Table 1: Surrounding Property Designations

Location	Master Plan Designation	Zoning Designation	Current Land Use
North	Medium Density Residential	SF6	Residential
South	High Density Residential	NB	Vacant
East	High Density Residential	MFD	Vacant
West	High Density Residential	MFA -PUD	Multi Family

APPLICATION REQUEST

The enclosed application is a request for the following;

- A Tentative Map to create 147 single family attached units on a +/-10.31 acre site
- A Variance to Division 1.17(3)(a) which requires a minimum driveway approach of twenty (20) feet
- A Variance to Division 1.13 (3)(d) which requires a minimum rear yard setback of 30 feet for a multiple story building
- A Variance to CCMC 18.04.190 Site Development Standards MFA Zoning District which requires a minimum parcel size of 6,000 square feet and a minimum lot width of 60 feet and depth of 150 feet

PROJECT DESCRIPTION

Arbor Villas is proposed to be a single family attached subdivision comprised of a 147 residential units located on +/-10.31 acres with primary access off Little Lane and secondary access provided by the proposed off-site extension of Parkland Avenue. The development includes a rear entry garage product with individual units attached in small groupings of two to six units, with each unit being separated by a fire wall. The units have two and three bedrooms and range in size from 1,217 square feet to 1,419 square feet. The building footprints have a minimum width of 19 feet 11 inches and a minimum depth of 46 feet 1 ½ inches. The buildings will be two stories with a max height of +/- 30 feet. Each unit includes a private two car garage with 70 additional guest stalls dispersed throughout the development. Arbor Villas contains a public street section in accordance with CCMC and provides sidewalk on one side. Additional pedestrian connections are included through a private sidewalk network located in each individual courtyard and around the perimeter of the site. The site is proposed to be screened with a six foot capped wood fence on both the west and north sides (See figure 6: Preliminary Fencing Detail).

Figure 4: Preliminary Site & Landscape Plan

Figure 5: Preliminary Elevations & Floor Plans

Arbor Villas

CAPSTONE COMMUNITIES

Rear Elevation

Arbor Villas

CAPSTONE COMMUNITIES

Right Elevation

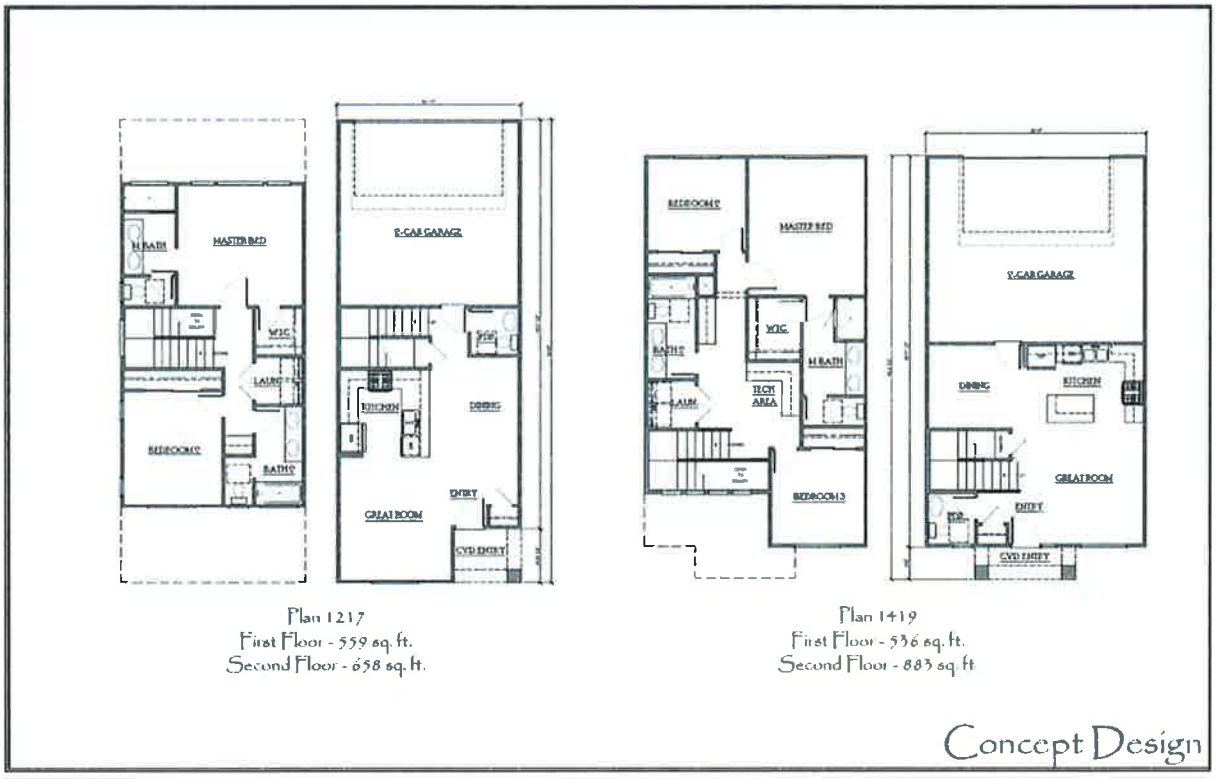


Figure 6: Preliminary Fencing Detail

Figure 7: Proposed Cluster Mailboxes

PARKING

Table 2: Parking Calculation

Parking will be provided via individual two car garages and off street guest parking spaces within the community.

Parking Requirement	Units	Required Parking	Provided Residential Parking	Provided Guest Parking
2 stalls/unit	147	294	294	75
Totals		**294**	**294**	**394**

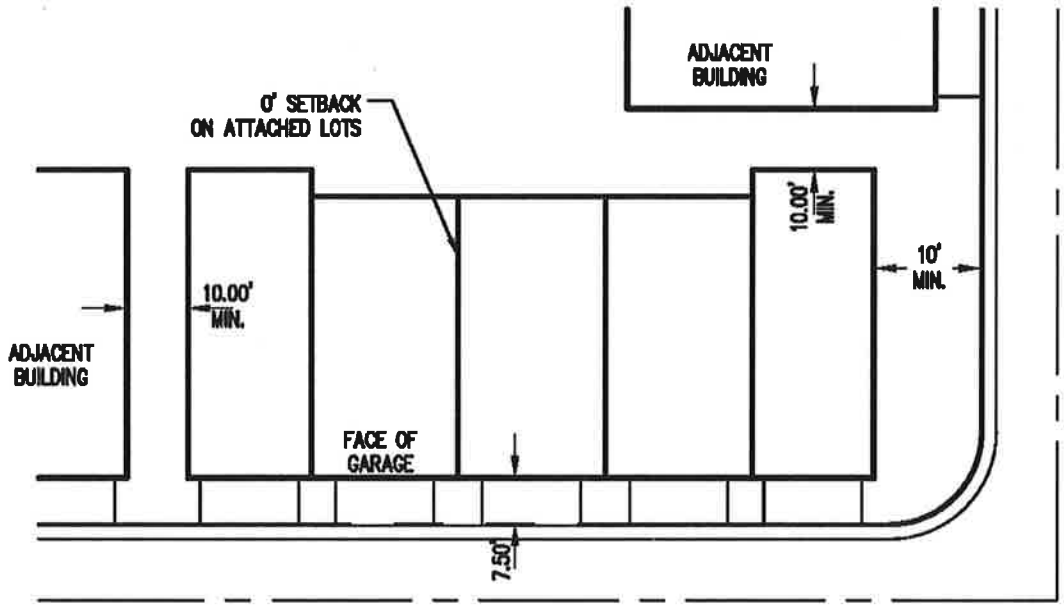
TRAFFIC

Table 3: Trip Generation

Land Use	Units	ADT	AM Peak Hour			PM Peak Hour		
			IN	OUT	Total	In	OUT	Total
Single Family Homes	*154	1,466	29	87	116	97	57	154

* Traffic Study was based on the conceptual plan unit count

Figure 8: Proposed Setbacks



TYPICAL LOT SETBACKS

VARIANCE REQUESTS

Three variances are requested as part of this project, one to reduce the minimum driveway approach from property line to garage door from 20 feet to 7.5 feet and another to reduce the minimum required lot size, width and depth. An additional variance is requested to reduce the minimum rear yard setback adjacent to a single-family zoning district from 30 feet for a two-story building to 20 feet.

The reduction in the garage setback allows for a rear loaded product design which in turn, in accordance with the Carson City Master Plan, provides a more visually appealing exterior streetscape. The driveway approaches will not be utilized for parking and signage will be provided indicating such. In addition to the variance, the applicant requests a waiver of the required 10 foot side yard setback in accordance with CCMC 108.04.190 Additional Requirements or Allowances (3) which states, *"Side setback may be waived if 2 adjacent structures are connected by a parapet firewall"*.

The reduction in the minimum required lot size, width and depth is required because the individual footprints of the buildings will actually delineate each for sale lot, with the remainder of the property being comprised of common area. The proposed minimum lot area is 1,005 square feet with a minimum width of 19 feet 11 inches and a minimum depth of 46 feet 1 ½ inches.

The reduction of the minimum rear yard setback adjacent to a single-family zoning district is also requested to match requirements for similar projects of this size and scope. Currently the project has rear setbacks of 20 feet adjacent to a single-family zoning district, but the additional story of the units requires an additional 10 feet for the setback. If the zoning for this lot was Single Family 6 Acre rather than Mixed Family Apartments, the minimum rear setbacks would only need to be 10 feet. The proposed residences located on this parcel will be sold as single family units and therefore a reduced rear setback would be applicable in this circumstance. Additionally, if the project was created as Planned Unit Development rather than a subdivision, the rear yard setback would not be required to follow the requirement of 30 feet.

MULTI-FAMILY APARTMENT DEVELOPMENT STANDARDS

In accordance with Carson City Development Standards for Division 1.17, the proposed project meets requirements in the following areas.

1. **Maximum permitted density:**

   b. For two (2) or more bedroom units, one (1) unit per one thousand five hundred (1,500) square feet of area.

Total Site Area	Maximum Density	Actual Density
449,104 sf	299 units (1 per 1500 sf)	147 units (1 per 3055 sf)

2. **Maximum building height: Forty-five (45) feet**

   The buildings will be two-stories with a height of 28 feet, 6 inches which is well below the maximum building height of 45 feet.

3. **Setbacks:**

   a. **Front yard: Ten (10) feet, plus an additional ten (10) feet for each story above two (2) stories; minimum driveway approach from property line to garage doors is twenty (20) feet.**

   The front yard setback is ten (10) feet from adjacent buildings. A variance is requested for a reduction to the garage setbacks from twenty (20) feet to 7.5 feet in order to accommodate a rear-loaded product design. Further details can be found in the variance request for this project.

   b. **Side yard: Ten (10) feet for external project boundaries; minimum ten (10) feet between residential structures for internal setbacks. Where a side yard is adjacent to a single-family zoning district, an additional ten (10) feet is required for each story above one (1) story.**

   A waiver is requested for a reduction to the side yard setbacks in accordance with CCMC 18.04.190 Additional Requirements or Allowances (3) which states, "Side setback may be waived if 2 adjacent structures are connected by a parapet firewall". Further details can be found in the variance request for this project.

   c. **Street side yard: Ten (10) feet, plus an additional five (5) feet for each story above two (2) stories; minimum driveway approach from property line to garage doors is twenty (20) feet.**

   The side street setbacks of the buildings are ten (10) feet.

   d. **Rear yard: Twenty (20) feet. Where a rear yard is adjacent to a single-family zoning district, an additional ten (10) feet is required for each story above one (1) story.**

   The minimum setback requirement for rear yards adjacent to the single-family zoning is thirty (30) feet. A variance is requested to reduce this requirement to twenty (20) feet without requiring an additional ten (10) feet for the two story residential units.

4. **Required parking: Two (2) spaces per dwelling unit; and in compliance with the Development Standards Division 2, Parking and Loading.**

   Table 2: Parking Calculations included in this document indicates the required parking is 294 parking stalls and a guest parking requirement of 74 guest stalls. The site meets the parking requirement of 294 parking stalls with 75 guest stalls available. Two car garages are used for residences and off-street guest parking stalls are available within the condominium units.

5. **Open Space:**

   a) **A minimum of one hundred fifty (150) square feet per dwelling unit of common open space must be provided. For projects of ten (10) or more units, areas of common open space may only include contiguous landscaped areas with no dimension less than fifteen (15) feet, and a minimum of one hundred (100) square feet per unit of the common open space area must be designed for recreation, which may include but not be limited to picnic areas, sports courts, a softscape surface covered with turf, sand or similar materials acceptable for use by young children, including play equipment and trees, with no dimension less than twenty-five (25) feet.**

      The landscape plan (Figure 4 and Appendix B) included in this document demonstrates the open space requirement is met by common open space included in between the center parcels of the development. This open space requirement is 22,050 square feet (150 square feet for 147 units). The requirement is met by the four open space areas in between the central units totaling 68,588 square feet. Additional open space can be found adjacent to the properties in the exterior. More information can be found within the site plan enclosed in this document.

   b) **A minimum of one hundred (100) square feet of additional open space must be provided for each unit either as private open space or common open space.**

      An additional 14,700 square feet of open space is required for the 147 units. The existing open space is 68,588. When the previous open space requirement in part a. is subtracted, the open space requirement is still exceeded.

   c) **Front and street side yard setback areas may not be included toward meeting the open space requirements.**

      Front and street side yards are not included with these open space calculations.

6. **Landscaping. Landscaping shall comply with the Development Standards Division 3, Landscaping.**

   A landscape plan (Figure 4 & Appendix B) that complies with all applicable Division 3 Development Standards is included in this document.

HYDROLOGY

The existing flow discharges in a southeasterly direction and ultimately is conveyed in an existing storm drain system in Little Lane and routed in an easterly direction. The proposed drainage model utilizes routing of the peak flows through proposed storm drain and detention facilities. The runoff is collected in catch basins and detention facilities and routed toward the proposed storm drain system in Parkland and the existing storm drain system in Little Lane. All drainage from the sub-basins will be contained in the lot swales and the roadway and will travel to the catch basins or the detention basins.

WATER SUPPLY

Two connection points to the existing water system are being utilized for this project. One connection point occurs on Little Lane to the south of the project site and the other occurs on Parkland Avenue. At these points, a proposed 8" water main will connect to an existing stub and looped around the subject property and eventually connecting to the other existing 8" water main. The Arbor Villas development will be served by the 8" water main that creates a water system loop for the project.

SEWER IMPACT

Sewage flow from Arbor Villas will be conveyed via public 8" diameter PVC SDR-35 sewer mains to the collection point (manhole) located at the entrance of the development. The sanitary sewer main within the development flows south to the connection of the existing 15-inch sanitary sewer located in Little Lane. All of the mains within the proposed subdivision are located within the rights-of-way of the local roadways.

MASTER PLAN FINDINGS

Consistent with the Master Plan Land Use Map in location and density

The project site has a Master Plan designation of High Density Residential which requires a density of 8-36 dwellings per acre. The proposed project has a density of 14 dwelling units per acre, well within the required range. Additionally, the proposed single family attached units are a consistent with the existing neighborhood's character.

Promote variety and visual interest through the incorporation of varied lot sizes and building styles and colors, garage orientation and other features (6.1b).

The proposed project incorporates the use of a rear load single family attached product which provides visual interest to the project's exterior streetscape. The project also will incorporates a variety of building materials and color palates to ensure variety.

Maintain and enhance roadway connections and networks consistent with the Transportation Master Plan (11.2c)

As part of this project, one third of the future extension of Parkland Avenue will be constructed as an off-site improvement. This off-site improvement will ensure the future roadway extension of Parkland Avenue is completed with any future adjacent development.

Provide a variety of housing models and densities within the urbanized area appropriate to the development size, location and surrounding neighborhood context.

The proposed development will introduce a new housing type to the urbanized area providing consumers with a variety of housing choices in the single family market.

TENTATIVE MAP FINDINGS NRS 278.349 (3)

Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal

All environmental health laws and regulations regarding water, air pollution and waste disposal will be incorporated into the proposed project.

The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision

Water will be provided by Carson City and conform to the applicable health standards and fulfill quantity requirements for residences.

The availability and accessibility of utilities

Public utilities are currently available, or are proposed to be extended, to serve the proposed project.

The availability and accessibility of public services such as schools, police protection, transportation, recreation and parks

Educational requirements will be met by the Carson City School District. Police services will be provided by the Carson City Sheriff's Department. The Regional Transportation Commission is responsible for transportation in and around the project area. Carson City Parks Department will provide recreational and parks services.

Conformity with the zoning ordinances and master plan, except that if any existing zoning ordinance is inconsistent with the master plan, the zoning ordinance takes precedence

The proposed project is in conformance with the master plan designation of High Density Residential and the current zoning designation is Multi-Family Apartments.

General conformity with the governing body's master plan of streets and highways

The proposed project is in conformance with the Carson City streets and highways master plan. In addition, the project is providing off-site improvements to ensure the future extension of Parkland Avenue.

The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision

New public streets will be constructed within the subdivision to provide access to residences. This project also includes the construction of off-site improvements necessary to extend Parkland Avenue through the adjacent property.

Physical characteristics of the land such as floodplain, slope and soil

The existing topography on the site is fairly flat with slopes between 1% and 2%. This parcel is designated by FEMA as shaded Zone X area. Hydrologic analyses were performed to determine the conceptual peak discharge for the 5-year and 100-year peak flow events. The proposed detention facilities will be designed to accommodate peak flow events. A complete geotechnical investigation is also included as part of this request.

The recommendations and comments of those entities and persons reviewing the tentative map pursuant to NRS 278.330 to 278.3485, inclusive

All recommendations and comments provided during the review of this project will be incorporated where applicable.

The availability and accessibility of fire protection, including, but not limited to, the availability and accessibility of water and services for the prevention and containment of fires, including fires in wild lands

Fire hydrants and fire access to the proposed residential units will be in compliance with Carson City Fire Department recommendations.

The submission by the subdivider of an affidavit stating that the subdivider will make provision for payment of the tax imposed by chapter 375 of NRS and for compliance with the disclosure and recording requirements of subsection 5 of NRS 598.0923, if applicable, by the subdivider or any successor in interest.

Please accept the included Applicant Affidavit as acknowledgement of this finding.

VARIANCE FINDINGS CCMC 18.02.085 (1)

Describe the special circumstances or conditions applying to the property under consideration which exist making compliance with the provisions of this title difficult and a cause of hardship to, and abridgment of a property right of the owner of the property; and describe how such circumstances or conditions do not apply generally to other properties in the same land use district and explain how they are not self-imposed.

The property has a current zoning designation of MFA and the proposed product is a "for sale" single family attached unit thus driving the two variance requests. Although similar type projects have previously used the PUD process to gain such variances. Staff has determined that because of the limited requests, the variance process was appropriate for this development.

Explain how granting of the variance is necessary to do justice to the applicant or owner of the property without extending any special privilege to them.

Granting the requested variances will not extend any special privilege to the applicant the request to reduce the minimum lot size, including width and depth, is necessary to allow a "for sale" product type as oppose to a rental product. Granting the variance to allow for a reduction in the driveway approach will allow for an introduction of a unique product type which provides an upgraded exterior streetscape.

Explain how the granting of the variance will not result in material damage or prejudice to the other properties in the vicinity nor be detrimental to the public health, safety and general welfare.

Granting of the variances will not result in material damage or prejudice to the other properties in the vicinity. Properties in the area have had similar type variances allowed by utilizing the PUD entitlement process. It has been determined by staff that the proposed development process could include the two variance requests as opposed to utilizing the PUD process.

Manhard™
CONSULTING LTD

PRELIMINARY DRAINAGE STUDY REPORT

FOR

ARBOR VILLAS

CARSON CITY, NEVADA

Prepared for:

Capstone Communities
9441 Double Diamond Pkwy #14
Reno, Nevada 89521

Prepared by:

Manhard Consulting Ltd.
9850 Double R Boulevard
Suite 101
Reno, Nevada 89521

Project: CCICCNV01

Date: 3/17/16

Table of Contents

Appendices

List of Figures

List of Tables

1 INTRODUCTION

1.1 Purpose of Analysis

This report presents the data, hydrologic and hydraulic analyses, and conclusions of a preliminary technical drainage study performed for Arbor Villas to support the proposed development in Carson City, Nevada. In addition, in the interest of brevity and clarity, this report will defer to figures, tables, and the data and calculations contained in the appendices, whenever possible.

1.2 Project Location and Description

The Arbor Villas development is approximately 10.3 acres in size and is located in the southern portion of Carson City and is east of South Stewart Street, south of East 5th Street, west of South Saliman Road Drive, and north of Little Lane5. Formally, this site is situated within Section 17, Township 15 North, and Range 20 East of the Mount Diablo Meridian (refer to Figure 1, Vicinity Map). The project site is within the existing parcels 004-02-113.

1.3 Project Description

The Arbor Villas development is a proposed subdivision which consists of 147 residential units single-family residential units on a 10.31 acre parcel. The project site is currently zoned within the GC zoning district and has an approved tentative map P.U.D. through Carson City.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community-Panel Number 3200010092F, effective date January 19, 2014 the subject property is located in Shaded Zone X, which is located with the 500-year floodplain (Appendix A).

The purpose of this report is to analyze the existing and proposed conditions of the subject property based on the 5-year and 100-year peak flow events. The report contains the following sections: (1) Methodologies and Assumptions, (2) Existing Hydrology, (3) Proposed Hydrology, and (4) Conclusion.

2 METHODOLOGIES AND ASSUMPTIONS

2.1 Hydrologic Modeling Methods

Hydrologic analyses were performed to determine the peak discharge for the 5-year and 100-year peak flow events. *Autodesk Sanitary and Storm Analysis* (SSA) was used to perform a *Rational Method* analysis to model the hydrologic basins that contribute in the existing and proposed conditions.

Parameters for peak storm flow and runoff volume estimates presented herein were determined using the data and methodologies presented in the *Carson City Municipal Code, Division 14 – Storm Drainage* section. In instances where the Carson City Municipal Code, Division 14 (CCMC-14) was lacking information or specificity, the *Truckee Meadows Regional Drainage Design Manual (2009)* and/or the other appropriate sources and software user manuals were referenced.

For the existing and proposed on-site hydrologic conditions, the Rational Method was utilized in accordance with the CCMC-14. A minimum time of concentration of 10-minutes was used for all sub-basins for a conservative analysis.

The rainfall characteristics were modeled using the NOAA database (http://dipper.nws.noaa.gov/hdsc/pfds/sa/nv_pfds.html) to determine site specific depth of precipitation (Appendix A).

Rational Formula: **Q=CiA**
Q=Peak Discharge (cfs)
C=Runoff Coefficient (dimensionless)
i=Precipitation Intensity (in/hr)
A=Watershed Area (Acres)

2.2 Hydraulic Modeling Methods

Hydraulic analyses were performed using the associated hydrologic data to provide the estimates of the elevation of floods for the selected recurrence intervals. Water-surface elevations were computed in SSA using hydrodynamic routing. Hydrodynamic routing solves the complete Saint Venant equations throughout the drainage network and includes modeling of backwater effects, flow reversal, surcharging, looped connections, and pressure flow. Hydrodyanmic routing provides a formulation for channels and pipes, including translation and attenuation effects.

3 EXISTING HYDROLOGIC CONDITIONS

3.1 Existing On-Site Drainage

The existing hydrologic analysis was based on the fact that the site was previously disturbed and the existing hydrologic sub-basin was delineated based on the property line.

For the existing catchment a time of concentration (Tc) and the Rational Method coefficients were selected, taking into consideration the catchment characteristics, which include catchment area and land cover. A 5-year intensity of 1.46 in/hr and 100-year intensity of 3.53 in/hr were used. Table 1 and Figure 2 summarize the characteristics of on-site catchment of the study area. Reference Appendix B for the existing conditions Rational Method analysis. Reference Figure 2 (Existing Hydrologic Conditions) in the map pocket for existing hydrology drainage map and the associated hydrologic sub-area.

Table 1 – Existing Conditions Rational Method Model Summary for the Arbor Villas, Carson City, Nevada.

Sub-Basin	Area (Ac.)	Rational Method Coefficient (C_5/C_{100})	Time of Concentration (min)	Rainfall Intensity (I_5/I_{100}) (in/hr)	5-Year Peak Flows (cfs)	100-Year Peak Flows (cfs)
X-01	10.31	0.30/0.50	15.00	1.46/3.53	2.54	14.95
TOTAL	**10.31**	-----	-----	-----	**2.54**	**14.95**

The 5-year and 100-year peak flows from on-site catchment in the existing condition are 2.54 cfs and 14.95cfs, respectively. The existing flow discharges in a southeasterly direction and ultimately is conveyed in an existing stormdrain system in Little Lane and routed in an easterly direction.

4 PROPOSED HYDROLOGIC CONDITIONS

4.1 Proposed On-Site Drainage

The sub-areas took into account the proposed on-site flows that affect the site. The associated calculated 5-year and 100-year peak flows can be found in Table 2 and Figure 3, the detention facility can be referenced in Tables 3 and Appendix C. Both pipe sizes and catch basins have been sized to accommodate the proposed flows. Reference Figure 3 in the map pocket for the associated hydrologic sub-areas and the proposed catch basins. A 5-year intensity of 1.46 in/hr and 100-year intensity of 3.53 in/hr were used. All drainage for the basins will be contained in swales and the roadway and will travel to the catch basins. From the catch basins, the flow will be routed through the proposed storm drain system. Refer to Appendix C, *Proposed Conditions Hydrologic Analysis* for all data and supporting calculations using the Rational Method.

Assumption:
Manhard Consulting made the assumption that the peak flows from Arbor Villas would be conveyed to the existing stormdrain system prior to the peak flows form the upstream basins; therefore, the hydraulic model was terminated at the point where the proposed system connects to the existing system.

Table 2 – Proposed Conditions Rational Method Model Summary for the Arbor Villas Project, Carson City, Nevada.

Sub-Basin	Area (Ac.)	Rational Method Coeffieient (C_5/C_{100})	Time of Concentration (min)	Rainfall Intensity (I_5/I_{100}) (in/hr)	5-Year Peak Flows (cfs)	100-Year Peak Flows (cfs)
BASIN-01	0.73	0.60/0.78	10.00	1.46/3.53	0.64	2.01
BASIN-02	0.72	0.60/0.78	10.00	1.46/3.53	0.63	1.98
BASIN-03	0.85	0.60/0.78	10.00	1.46/3.53	0.74	2.34
BASIN-04	0.17	0.88/0.93	10.00	1.46/3.53	0.22	0.56
BASIN-05	0.53	0.88/0.93	10.00	1.46/3.53	0.68	1.74
BASIN-06	0.17	0.88/0.93	10.00	1.46/3.53	0.22	0.56
BASIN-07	0.55	0.88/0.93	10.00	1.46/3.53	0.70	1.81
BASIN-08	0.92	0.33/0.59	10.00	1.46/3.53	0.44	1.92
BASIN-09	0.73	0.60/0.78	10.00	1.46/3.53	0.64	2.01
BASIN-10	0.73	0.38/0.63	10.00	1.46/3.53	0.40	1.62
BASIN-11	0.23	0.88/0.93	10.00	1.46/3.53	0.27	0.76
BASIN-12	0.15	0.88/0.93	10.00	1.46/3.53	0.19	0.49
BASIN-13	0.67	0.36/0.61	10.00	1.46/3.53	0.35	1.44
BASIN-14	0.20	0.60/0.78	10.00	1.46/3.53	0.17	0.55
BASIN-15	0.54	0.74/0.85	10.00	1.46/3.53	0.58	1.62
BASIN-16	0.82	0.35/0.60	10.00	1.46/3.53	0.42	1.74
BASIN-17	0.22	0.60/0.78	10.00	1.46/3.53	0.19	0.61
BASIN-18	0.42	0.74/0.86	10.00	1.46/3.53	0.45	1.28
BASIN-19	0.51	0.74/0.86	10.00	1.46/3.53	0.55	1.55
BASIN-20	0.45	0.60/0.78	10.00	1.46/3.53	0.39	1.24
TOTAL	**10.31**	-----	-----	-----	**8.87**	**27.83**

5 HYDRAULIC ANALYSIS

5.1 Proposed Drainage Conditions

The hydraulic model utilized routing of the peak flows through proposed storm drain and the detention facilities. The runoff is collected in catch basins and detention facilities and routed toward the proposed storm drain system in Parkland and the existing storm drain system in Little Lane. All drainage from the sub-basins will be contained in the lot swales and the roadway and will travel to the catch basins or the detention basins.

5.2 Detention

According to the existing and proposed hydrologic analysis, the existing 5-year and 100-year condition flows are 2.54 cfs and 14.95 cfs, respectively. The proposed 5-year and 100-year condition flows are 8.87 cfs and 27.83 cfs. However, according to hydraulic analysis, the proposed 5-year and 100-year off-site discharges are 2.65 cfs and 11.35 cfs, respectively. Therefore, according to CCMC-14, the proposed civil improvements will create a decrease in

the 5-year peak flow runoff of 0.11 cfs increase and decrease in the 100-year peak flow runoff of 3.60 cfs. The 5-year peak flow increase is due to the basin located directly adjacent to Little Lane which are not routed to the proposed detention facilities.

6 CONCLUSION

6.1 Regulations and Master Plans

The proposed improvements and the analyses presented herein are in accordance with drainage regulations presented in *Carson City Municipal Code, Division 14 – Storm Drainage* section. In instances where the Carson City Municipal Code, Division 14 (CCMC-14) was lacking information or specificity, the *Truckee Meadows Regional Drainage Design Manual (2009)* and/or the other appropriate sources and software user manuals were referenced.

6.2 Impacts to Adjacent Properties

The performance of the proposed project improvements, roadways, detention/retention, and storm water conveyance facilities, once constructed, will not adversely impact upstream or downstream properties adjacent to this site. The development of this site for the uses proposed will significantly decrease downstream storm flow runoff rates, volumes, velocities, depths, and will not influence floodplain boundaries.

6.3 Standards of Practice

This study was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable professional engineers practicing in this and similar localities.

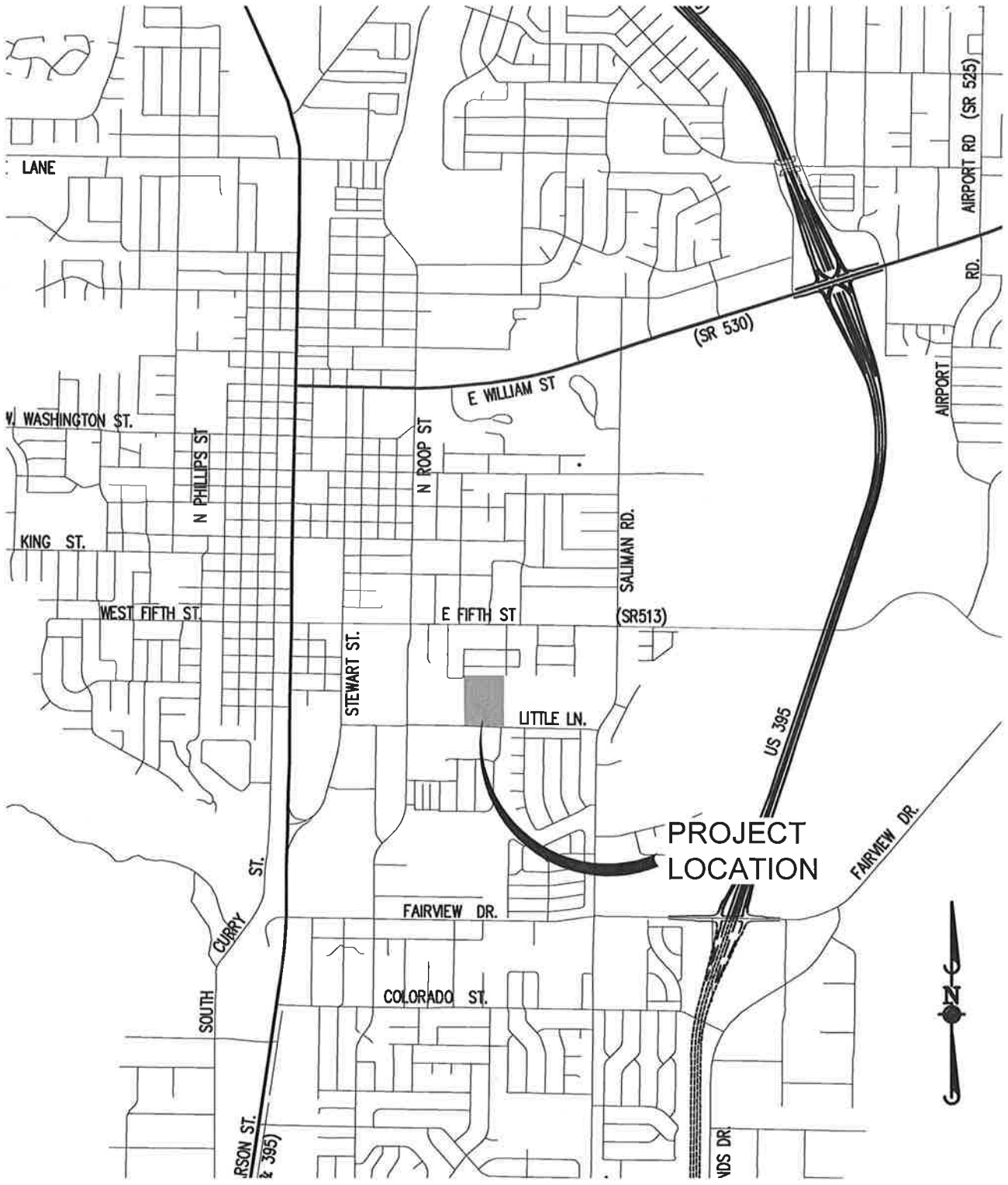


FIGURE 1

Manhard CONSULTING LTD
9850 Double R Blvd, Suite 101, Reno, NV 89521 tel : (775) 746-3500 fax : (775) 746-3520 www.manhard.com
Civil Engineers · Surveyors · Water Resources Engineers · Water & Wastewater Engineers
Construction Managers · Environmental Scientists · Landscape Architects · Planners

ARBOR VILLAS
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.:	AWM
DRAWN BY:	AWM
DATE:	3/16/2016
SCALE:	N.T.S.

SHEET 1 OF 1

APPENDIX A
SUPPORTING DATA

MAP SCALE 1" = 500'

250 0 500 1000 FEET METE

NFIP

PANEL 0092F

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CARSON CITY, NEVADA
INDEPENDENT CITY

PANEL 92 OF 275
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARSON CITY	320001	0092	F

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

MAP NUMBER
3200010092F

MAP REVISED
FEBRUARY 19, 2014

Federal Emergency Management Agency

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

NOAA Atlas 14, Volume 1, Version 5
Location name: Carson City, Nevada, US*
Latitude: 39.1584°, Longitude: -119.7568°
Elevation: 4645 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.14 (0.984-1.36)	1.43 (1.24-1.69)	1.91 (1.63-2.26)	2.36 (2.02-2.81)	3.12 (2.57-3.71)	3.80 (3.04-4.55)	4.63 (3.58-5.59)	5.62 (4.16-6.89)	7.19 (5.02-8.99)	8.59 (5.71-11.0)
10-min	0.870 (0.750-1.03)	1.09 (0.936-1.28)	1.45 (1.24-1.72)	1.80 (1.53-2.14)	2.38 (1.96-2.82)	2.90 (2.32-3.46)	3.53 (2.72-4.25)	4.28 (3.17-5.24)	5.47 (3.82-6.85)	6.54 (4.35-8.34)
15-min	0.720 (0.620-0.852)	0.900 (0.776-1.06)	1.20 (1.03-1.42)	1.49 (1.26-1.76)	1.96 (1.62-2.33)	2.40 (1.91-2.86)	2.92 (2.25-3.52)	3.54 (2.62-4.33)	4.52 (3.16-5.66)	5.40 (3.60-6.89)
30-min	0.486 (0.418-0.574)	0.604 (0.524-0.716)	0.808 (0.692-0.958)	1.00 (0.852-1.19)	1.32 (1.09-1.57)	1.61 (1.29-1.93)	1.96 (1.52-2.37)	2.38 (1.76-2.92)	3.04 (2.13-3.81)	3.64 (2.42-4.64)
60-min	0.301 (0.259-0.355)	0.374 (0.324-0.443)	0.500 (0.429-0.593)	0.620 (0.528-0.735)	0.818 (0.674-0.971)	0.998 (0.798-1.19)	1.22 (0.938-1.47)	1.47 (1.09-1.81)	1.88 (1.32-2.36)	2.25 (1.50-2.87)
2-hr	0.204 (0.182-0.234)	0.253 (0.225-0.290)	0.322 (0.284-0.368)	0.384 (0.336-0.438)	0.478 (0.406-0.548)	0.560 (0.466-0.650)	0.654 (0.529-0.768)	0.768 (0.600-0.914)	0.964 (0.720-1.19)	1.15 (0.826-1.45)
3-hr	0.163 (0.146-0.183)	0.202 (0.182-0.228)	0.254 (0.227-0.286)	0.296 (0.262-0.333)	0.356 (0.310-0.403)	0.408 (0.348-0.465)	0.465 (0.389-0.536)	0.539 (0.441-0.631)	0.658 (0.522-0.801)	0.773 (0.597-0.975)
6-hr	0.113 (0.102-0.126)	0.141 (0.127-0.158)	0.175 (0.157-0.196)	0.202 (0.180-0.226)	0.239 (0.210-0.269)	0.268 (0.232-0.303)	0.297 (0.253-0.340)	0.331 (0.276-0.383)	0.381 (0.309-0.448)	0.424 (0.337-0.508)
12-hr	0.074 (0.066-0.083)	0.093 (0.083-0.105)	0.117 (0.104-0.132)	0.136 (0.120-0.153)	0.162 (0.141-0.183)	0.181 (0.156-0.207)	0.201 (0.171-0.232)	0.222 (0.185-0.259)	0.250 (0.202-0.297)	0.271 (0.216-0.328)
24-hr	0.049 (0.045-0.054)	0.062 (0.056-0.068)	0.078 (0.071-0.085)	0.091 (0.083-0.100)	0.109 (0.099-0.120)	0.124 (0.111-0.136)	0.139 (0.124-0.153)	0.155 (0.136-0.171)	0.176 (0.153-0.197)	0.193 (0.166-0.218)
2-day	0.029 (0.026-0.033)	0.037 (0.033-0.041)	0.047 (0.042-0.053)	0.055 (0.050-0.062)	0.067 (0.059-0.075)	0.076 (0.067-0.086)	0.086 (0.075-0.097)	0.096 (0.083-0.109)	0.110 (0.094-0.126)	0.121 (0.102-0.140)
3-day	0.022 (0.019-0.024)	0.027 (0.024-0.031)	0.035 (0.031-0.039)	0.041 (0.037-0.046)	0.050 (0.044-0.056)	0.057 (0.050-0.064)	0.064 (0.056-0.073)	0.072 (0.062-0.082)	0.083 (0.070-0.096)	0.092 (0.077-0.107)
4-day	0.018 (0.016-0.020)	0.022 (0.020-0.025)	0.029 (0.026-0.032)	0.034 (0.030-0.038)	0.041 (0.036-0.047)	0.047 (0.041-0.054)	0.054 (0.046-0.061)	0.060 (0.052-0.069)	0.070 (0.059-0.081)	0.077 (0.064-0.090)
7-day	0.012 (0.010-0.013)	0.015 (0.013-0.017)	0.019 (0.017-0.022)	0.023 (0.020-0.026)	0.028 (0.024-0.031)	0.031 (0.028-0.036)	0.036 (0.031-0.040)	0.040 (0.034-0.045)	0.046 (0.039-0.053)	0.051 (0.042-0.059)
10-day	0.009 (0.008-0.010)	0.011 (0.010-0.013)	0.015 (0.013-0.017)	0.018 (0.016-0.020)	0.021 (0.019-0.024)	0.024 (0.021-0.027)	0.027 (0.023-0.030)	0.030 (0.026-0.034)	0.034 (0.029-0.039)	0.037 (0.031-0.043)
20-day	0.006 (0.005-0.006)	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.011 (0.009-0.012)	0.013 (0.011-0.014)	0.014 (0.013-0.016)	0.016 (0.014-0.018)	0.017 (0.015-0.020)	0.019 (0.017-0.022)	0.021 (0.018-0.024)
30-day	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.011 (0.009-0.012)	0.012 (0.010-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.016)	0.016 (0.013-0.018)
45-day	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.009-0.012)	0.011 (0.010-0.013)
60-day	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.009 (0.008-0.010)

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

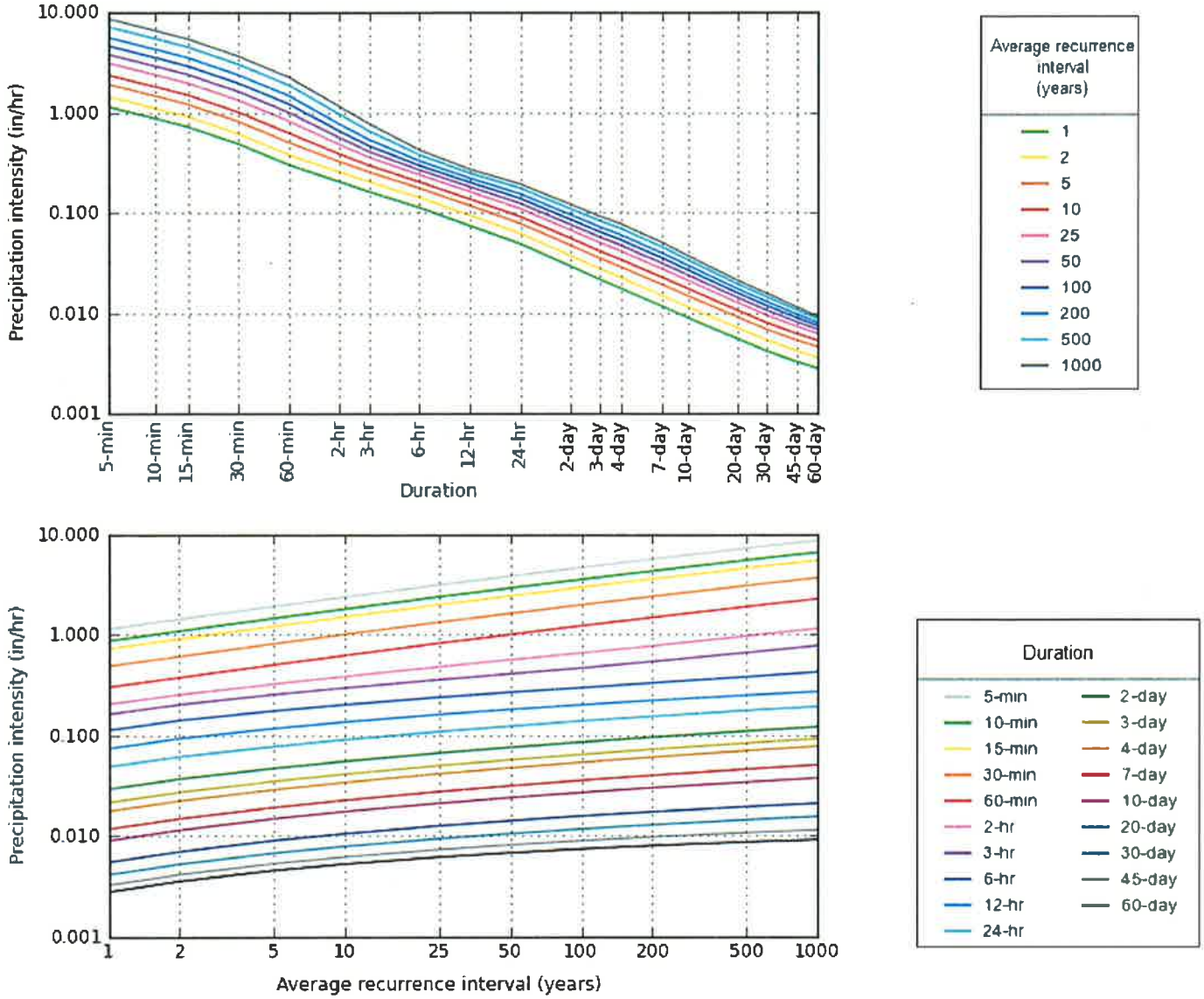
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.1584°, Longitude: -119.7568°



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Thu Mar 17 00:09:22 2016

Back to Top

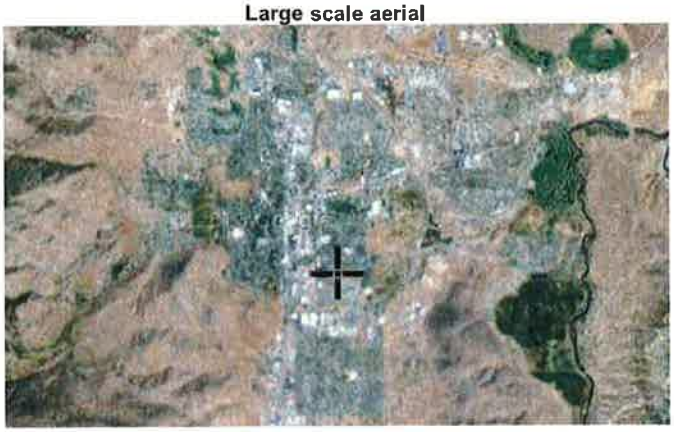
Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial



APPENDIX B
EXISTING CONDITIONS HYDROLOGICAL ANALYSIS
5-YEAR AND 100-YEAR OUTPUT DATA TABLES

Project Description

File Name	Ex-5Year.SPF
Description	Arbor Villas Development
	Carson City, Nevada
	Preliminary Drainage Study
	Existing 5-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Jan 22, 2016	00:00:00
End Analysis On	Jan 23, 2016	00:00:00
Start Reporting On	Jan 22, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	1
Nodes	1
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	0
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	5 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	10.31	0.2000	0.30	0.06	0.61	2.45	0 00:15:00

Project Description

File Name	Ex-100Year.SPF
Description	Arbor Villas Development
	Carson City, Nevada
	Preliminary Drainage Study
	Existing 100-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Jan 22, 2016	00:00:00
End Analysis On	Jan 23, 2016	00:00:00
Start Reporting On	Jan 22, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	1
Nodes	1
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	0
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	10.31	0.5000	0.73	0.36	3.73	14.95	0 00:15:00

APPENDIX C
PROPOSED CONDITIONS HYDROLOGICAL ANALYSIS
5-YEAR AND 100-YEAR OUTPUT DATA TABLES

Project Description

File Name	Prop-5Year.SPF
Description	Arbor Villas Development Carson City, Nevada Preliminary dralnage Study proposed 100-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 16, 2016	00:00:00
End Analysis On	Mar 17, 2016	00:00:00
Start Reporting On	Mar 16, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	20
Nodes	40
Junctions	19
Outfalls	1
Flow Diversions	0
Inlets	16
Storage Nodes	4
Links	39
Channels	0
Pipes	39
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	5 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	BASIN-01	0.73	0.6000	0.24	0.15	0.11	0.64	0 00:10:00
2	BASIN-02	0.72	0.6000	0.24	0.15	0.10	0.63	0 00:10:00
3	BASIN-03	0.85	0.6000	0.24	0.15	0.12	0.74	0 00:10:00
4	BASIN-04	0.17	0.8800	0.24	0.21	0.04	0.22	0 00:10:00
5	BASIN-05	0.53	0.8800	0.24	0.21	0.11	0.68	0 00:10:00
6	BASIN-06	0.17	0.8800	0.24	0.21	0.04	0.22	0 00:10:00
7	BASIN-07	0.55	0.8800	0.24	0.21	0.12	0.70	0 00:10:00
8	BASIN-08	0.92	0.3300	0.24	0.08	0.07	0.44	0 00:10:00
9	BASIN-09	0.73	0.6000	0.24	0.15	0.11	0.64	0 00:10:00
10	BASIN-10	0.73	0.3800	0.24	0.09	0.07	0.40	0 00:10:00
11	BASIN-11	0.23	0.8000	0.24	0.19	0.04	0.27	0 00:10:00
12	BASIN-12	0.15	0.8800	0.24	0.21	0.03	0.19	0 00:10:00
13	BASIN-13	0.67	0.3600	0.24	0.09	0.06	0.35	0 00:10:00
14	BASIN-14	0.20	0.6000	0.24	0.15	0.03	0.17	0 00:10:00
15	BASIN-15	0.54	0.7400	0.24	0.18	0.10	0.58	0 00:10:00
16	BASIN-16	0.82	0.3500	0.24	0.09	0.07	0.42	0 00:10:00
17	BASIN-17	0.22	0.6000	0.24	0.15	0.03	0.19	0 00:10:00
18	BASIN-18	0.42	0.7400	0.24	0.18	0.08	0.45	0 00:10:00
19	BASIN-19	0.51	0.7400	0.24	0.18	0.09	0.55	0 00:10:00
20	BASIN-20	0.45	0.6000	0.24	0.15	0.07	0.39	0 00:10:00

Project Description

File Name	Prop-100Year.SPF
Description	Arbor Villas Development Carson City, Nevada Preliminary Drainage Study Proposed 100-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 16, 2016	00:00:00
End Analysis On	Mar 17, 2016	00:00:00
Start Reporting On	Mar 16, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	20
Nodes	40
Junctions	19
Outfalls	1
Flow Diversions	0
Inlets	16
Storage Nodes	4
Links	39
Channels	0
Pipes	39
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	BASIN-01	0.73	0.7800	0.59	0.46	0.34	2.01	0 00:10:00
2	BASIN-02	0.72	0.7800	0.59	0.46	0.33	1.98	0 00:10:00
3	BASIN-03	0.85	0.7800	0.59	0.46	0.39	2.34	0 00:10:00
4	BASIN-04	0.17	0.9300	0.59	0.55	0.09	0.56	0 00:10:00
5	BASIN-05	0.53	0.9300	0.59	0.55	0.29	1.74	0 00:10:00
6	BASIN-06	0.17	0.9300	0.59	0.55	0.09	0.56	0 00:10:00
7	BASIN-07	0.55	0.9300	0.59	0.55	0.30	1.81	0 00:10:00
8	BASIN-08	0.92	0.5900	0.59	0.35	0.32	1.92	0 00:10:00
9	BASIN-09	0.73	0.7800	0.59	0.46	0.34	2.01	0 00:10:00
10	BASIN-10	0.73	0.6300	0.59	0.37	0.27	1.62	0 00:10:00
11	BASIN-11	0.23	0.9300	0.59	0.55	0.13	0.76	0 00:10:00
12	BASIN-12	0.15	0.9300	0.59	0.55	0.08	0.49	0 00:10:00
13	BASIN-13	0.67	0.6100	0.59	0.36	0.24	1.44	0 00:10:00
14	BASIN-14	0.20	0.7800	0.59	0.46	0.09	0.55	0 00:10:00
15	BASIN-15	0.54	0.8500	0.59	0.50	0.27	1.62	0 00:10:00
16	BASIN-16	0.82	0.6000	0.59	0.35	0.29	1.74	0 00:10:00
17	BASIN-17	0.22	0.7800	0.59	0.46	0.10	0.61	0 00:10:00
18	BASIN-18	0.42	0.8600	0.59	0.51	0.21	1.28	0 00:10:00
19	BASIN-19	0.51	0.8600	0.59	0.51	0.26	1.55	0 00:10:00
20	BASIN-20	0.45	0.7800	0.59	0.46	0.21	1.24	0 00:10:00

APPENDIX D
HYDRAULIC ANALYSES
DETENTION CALCUALTIONS

Project Description

File Name	Prop-5Year.SPF
Description	Arbor Villas Development Carson City, Nevada Preliminary drainage Study proposed 100-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 16, 2016	00:00:00
End Analysis On	Mar 17, 2016	00:00:00
Start Reporting On	Mar 16, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	20
Nodes	40
Junctions	19
Outfalls	1
Flow Diversions	0
Inlets	16
Storage Nodes	4
Links	39
Channels	0
Pipes	39
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	5 year(s)

Storage Nodes

Storage Node : POND-01

Input Data

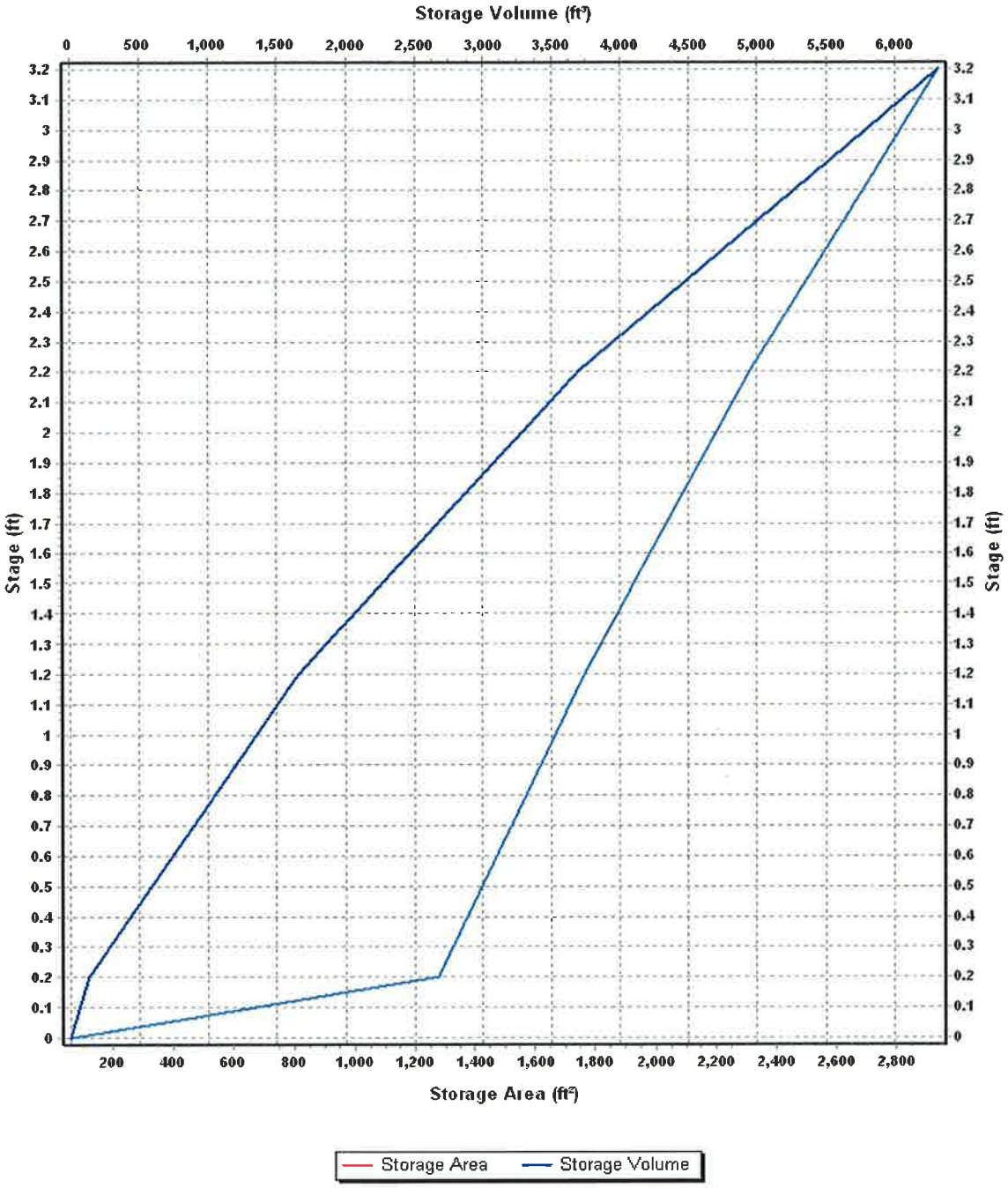
Invert Elevation (ft)	4646.80
Max (Rim) Elevation (ft)	4650.00
Max (Rim) Offset (ft)	3.20
Initial Water Elevation (ft)	4646.80
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	2938.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-01

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	60	0.000
0.2	1280.6	134.06
1.2	1761.3	1655.01
2.2	2313.9	3692.61
3.2	2938.6	6318.86

Storage Area Volume Curves



Storage Node : POND-01 (continued)

Output Summary Results

Peak Inflow (cfs)	0.63
Peak Lateral Inflow (cfs)	0.63
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4647.19
Max HGL Depth Attained (ft)	0.39
Average HGL Elevation Attained (ft)	4647.18
Average HGL Depth Attained (ft)	0.38
Time of Max HGL Occurrence (days hh:mm)	0 00:20
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-02

Input Data

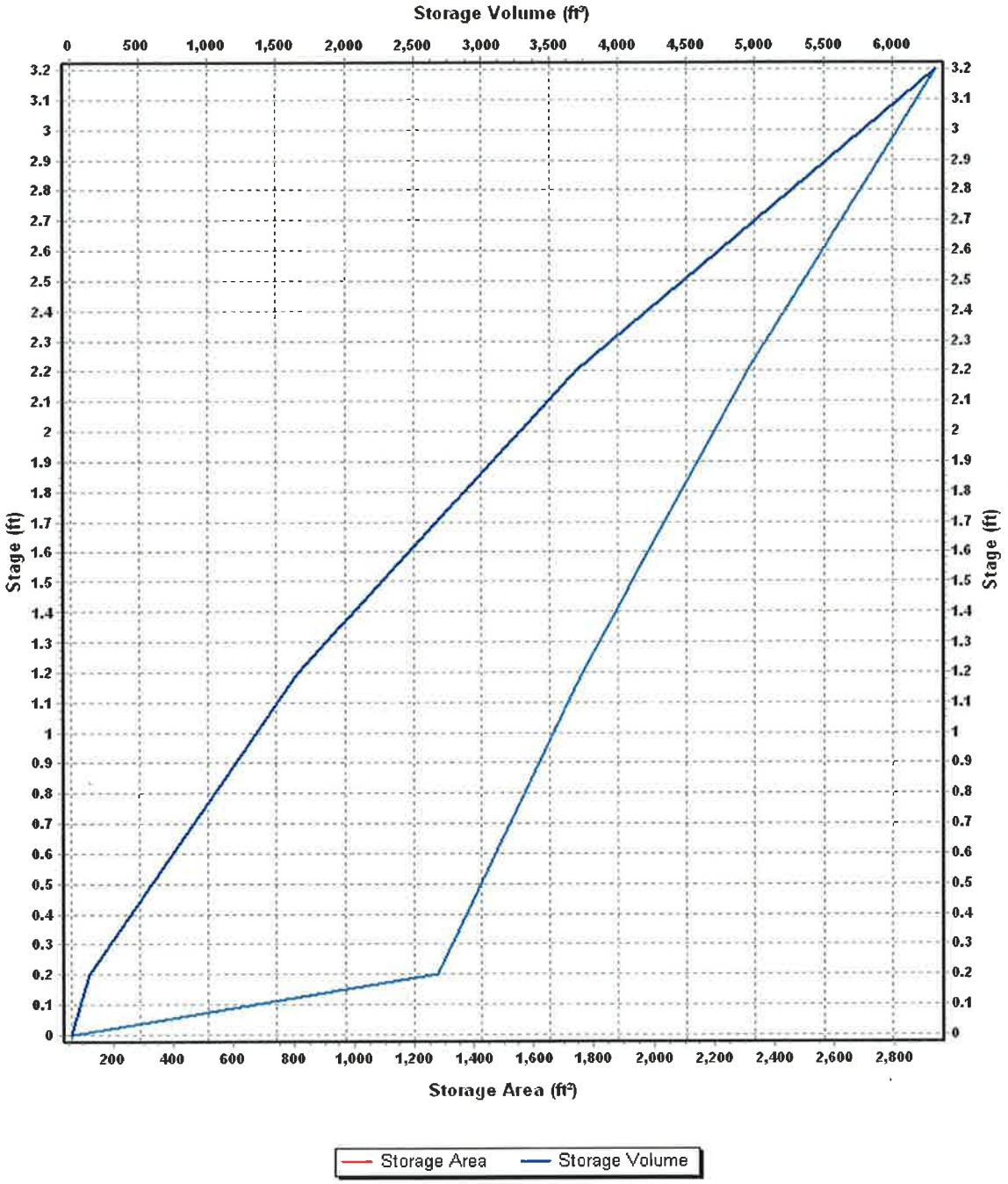
Invert Elevation (ft)	4646.80
Max (Rim) Elevation (ft)	4650.00
Max (Rim) Offset (ft)	3.20
Initial Water Elevation (ft)	4646.80
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	2938.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-02

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	60	0.000
0.2	1280.6	134.06
1.2	1761.3	1655.01
2.2	2313.9	3692.61
3.2	2938.6	6318.86

Storage Area Volume Curves



Storage Node : POND-02 (continued)

Output Summary Results

Peak Inflow (cfs)	0.40
Peak Lateral Inflow (cfs)	0.40
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4647.08
Max HGL Depth Attained (ft)	0.28
Average HGL Elevation Attained (ft)	4647.08
Average HGL Depth Attained (ft)	0.28
Time of Max HGL Occurrence (days hh:mm)	0 00:20
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-03

Input Data

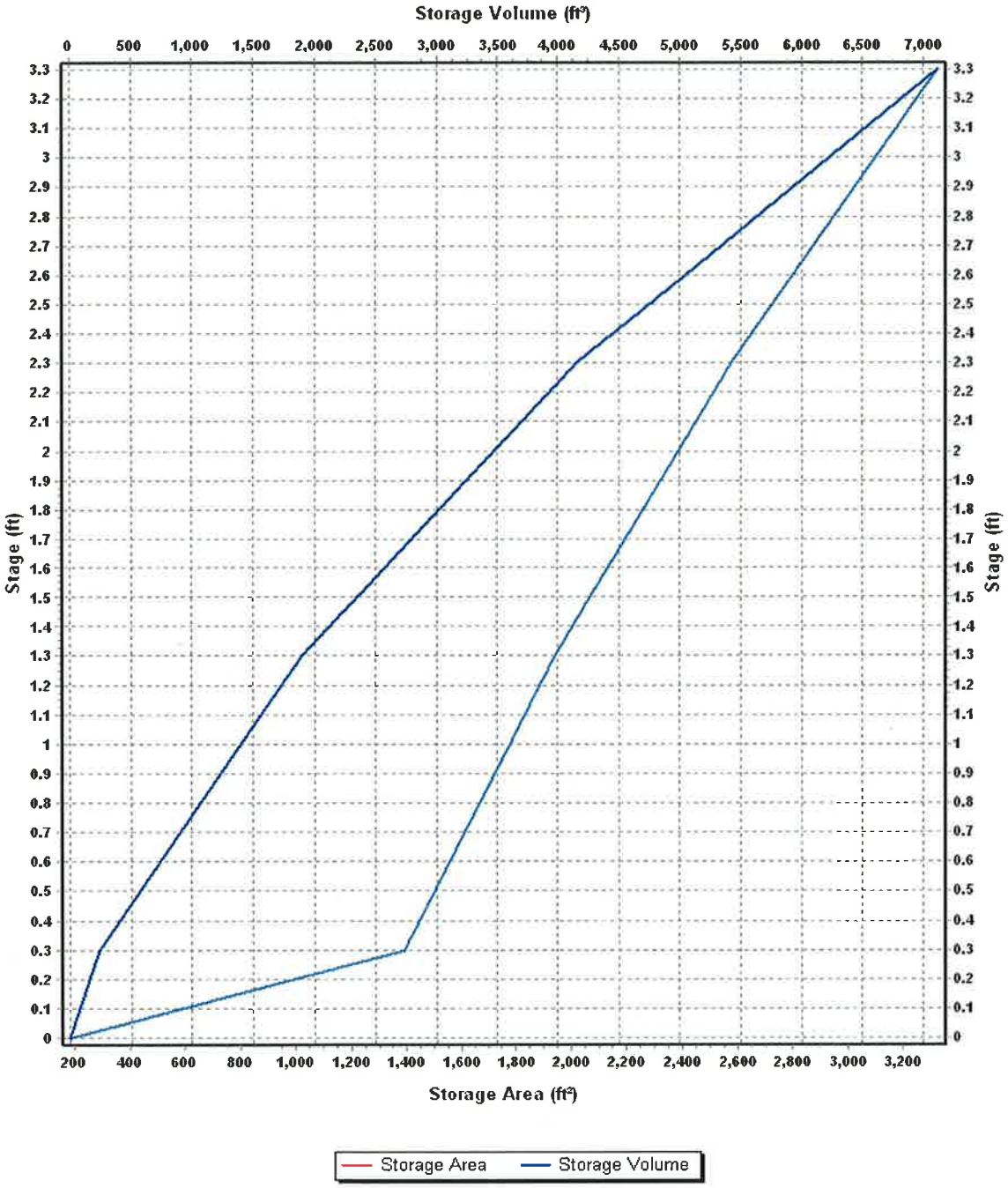
Invert Elevation (ft)	4647.70
Max (Rim) Elevation (ft)	4651.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	4647.70
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	3325.70
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-03

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	184.5	0.000
0.3	1393.9	236.76
1.3	1938.5	1902.96
2.3	2579.0	4161.71
3.3	3325.7	7114.06

Storage Area Volume Curves



Storage Node : POND-03 (continued)

Output Summary Results

Peak Inflow (cfs)	1.34
Peak Lateral Inflow (cfs)	0.35
Peak Outflow (cfs)	0.03
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4648.38
Max HGL Depth Attained (ft)	0.68
Average HGL Elevation Attained (ft)	4648.37
Average HGL Depth Attained (ft)	0.67
Time of Max HGL Occurrence (days hh:mm)	0 01:09
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-04

Input Data

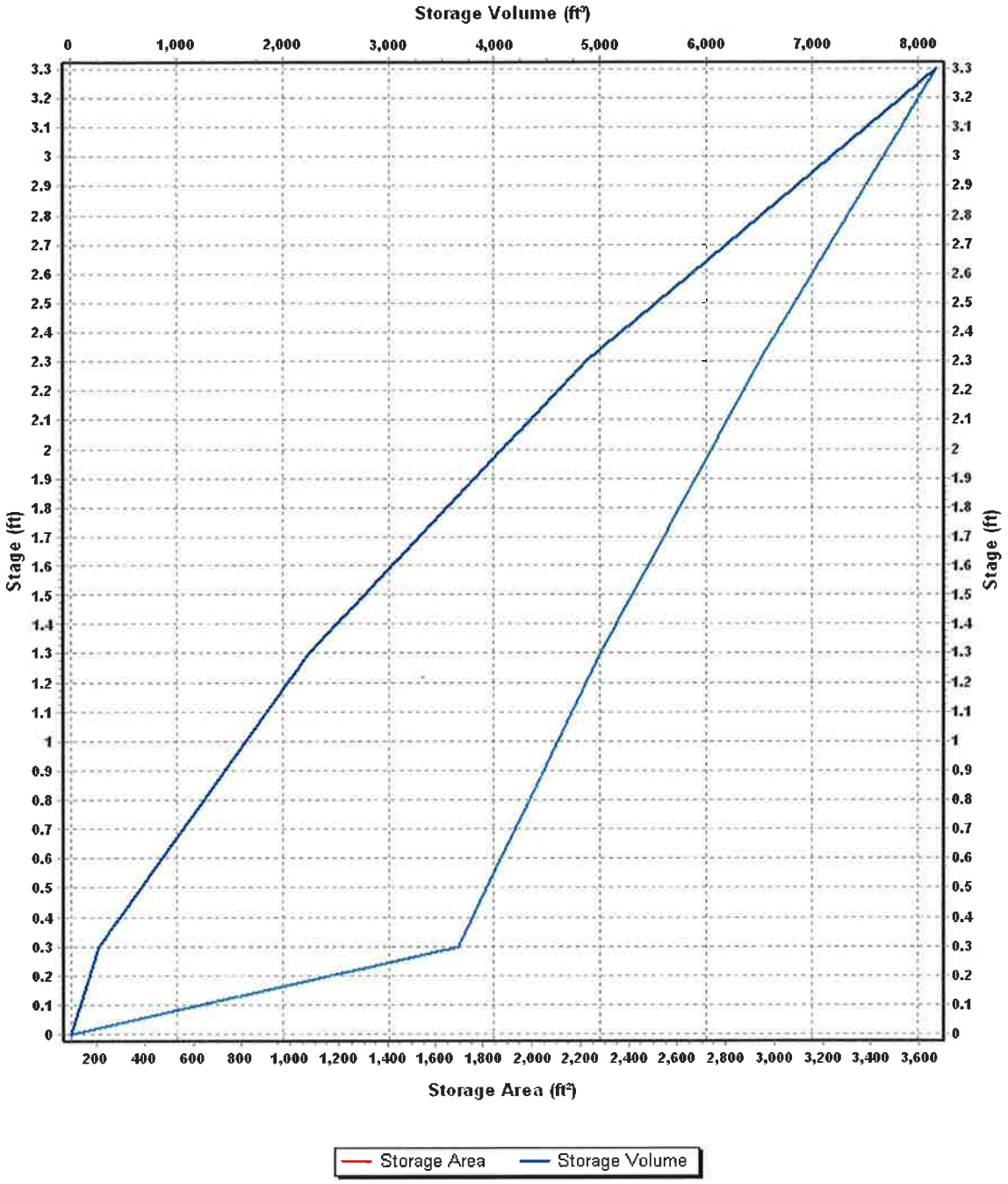
Invert Elevation (ft)	4647.70
Max (Rim) Elevation (ft)	4651.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	4647.70
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	3367.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-04

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	96.5	0.000
0.3	1692.7	268.38
1.3	2279.1	2254.28
2.3	2937.8	4862.73
3.3	3667.6	8165.43

Storage Area Volume Curves



Storage Node : POND-04 (continued)

Output Summary Results

Peak Inflow (cfs)	1.93
Peak Lateral Inflow (cfs)	0.42
Peak Outflow (cfs)	0.13
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4648.41
Max HGL Depth Attained (ft)	0.71
Average HGL Elevation Attained (ft)	4648.41
Average HGL Depth Attained (ft)	0.71
Time of Max HGL Occurrence (days hh:mm)	0 00:32
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name	Prop-100Year.SPF
Description	Arbor Villas Development Carson City, Nevada Preliminary Drainage Study Proposed 100-year Peak Event

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 16, 2016	00:00:00
End Analysis On	Mar 17, 2016	00:00:00
Start Reporting On	Mar 16, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	20
Nodes	40
Junctions	19
Outfalls	1
Flow Diversions	0
Inlets	16
Storage Nodes	4
Links	39
Channels	0
Pipes	39
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	BASIN-01	0.73	0.7800	0.59	0.46	0.34	2.01	0 00:10:00
2	BASIN-02	0.72	0.7800	0.59	0.46	0.33	1.98	0 00:10:00
3	BASIN-03	0.85	0.7800	0.59	0.46	0.39	2.34	0 00:10:00
4	BASIN-04	0.17	0.9300	0.59	0.55	0.09	0.56	0 00:10:00
5	BASIN-05	0.53	0.9300	0.59	0.55	0.29	1.74	0 00:10:00
6	BASIN-06	0.17	0.9300	0.59	0.55	0.09	0.56	0 00:10:00
7	BASIN-07	0.55	0.9300	0.59	0.55	0.30	1.81	0 00:10:00
8	BASIN-08	0.92	0.5900	0.59	0.35	0.32	1.92	0 00:10:00
9	BASIN-09	0.73	0.7800	0.59	0.46	0.34	2.01	0 00:10:00
10	BASIN-10	0.73	0.6300	0.59	0.37	0.27	1.62	0 00:10:00
11	BASIN-11	0.23	0.9300	0.59	0.55	0.13	0.76	0 00:10:00
12	BASIN-12	0.15	0.9300	0.59	0.55	0.08	0.49	0 00:10:00
13	BASIN-13	0.67	0.6100	0.59	0.36	0.24	1.44	0 00:10:00
14	BASIN-14	0.20	0.7800	0.59	0.46	0.09	0.55	0 00:10:00
15	BASIN-15	0.54	0.8500	0.59	0.50	0.27	1.62	0 00:10:00
16	BASIN-16	0.82	0.6000	0.59	0.35	0.29	1.74	0 00:10:00
17	BASIN-17	0.22	0.7800	0.59	0.46	0.10	0.61	0 00:10:00
18	BASIN-18	0.42	0.8600	0.59	0.51	0.21	1.28	0 00:10:00
19	BASIN-19	0.51	0.8600	0.59	0.51	0.26	1.55	0 00:10:00
20	BASIN-20	0.45	0.7800	0.59	0.46	0.21	1.24	0 00:10:00

Storage Nodes

Storage Node : POND-01

Input Data

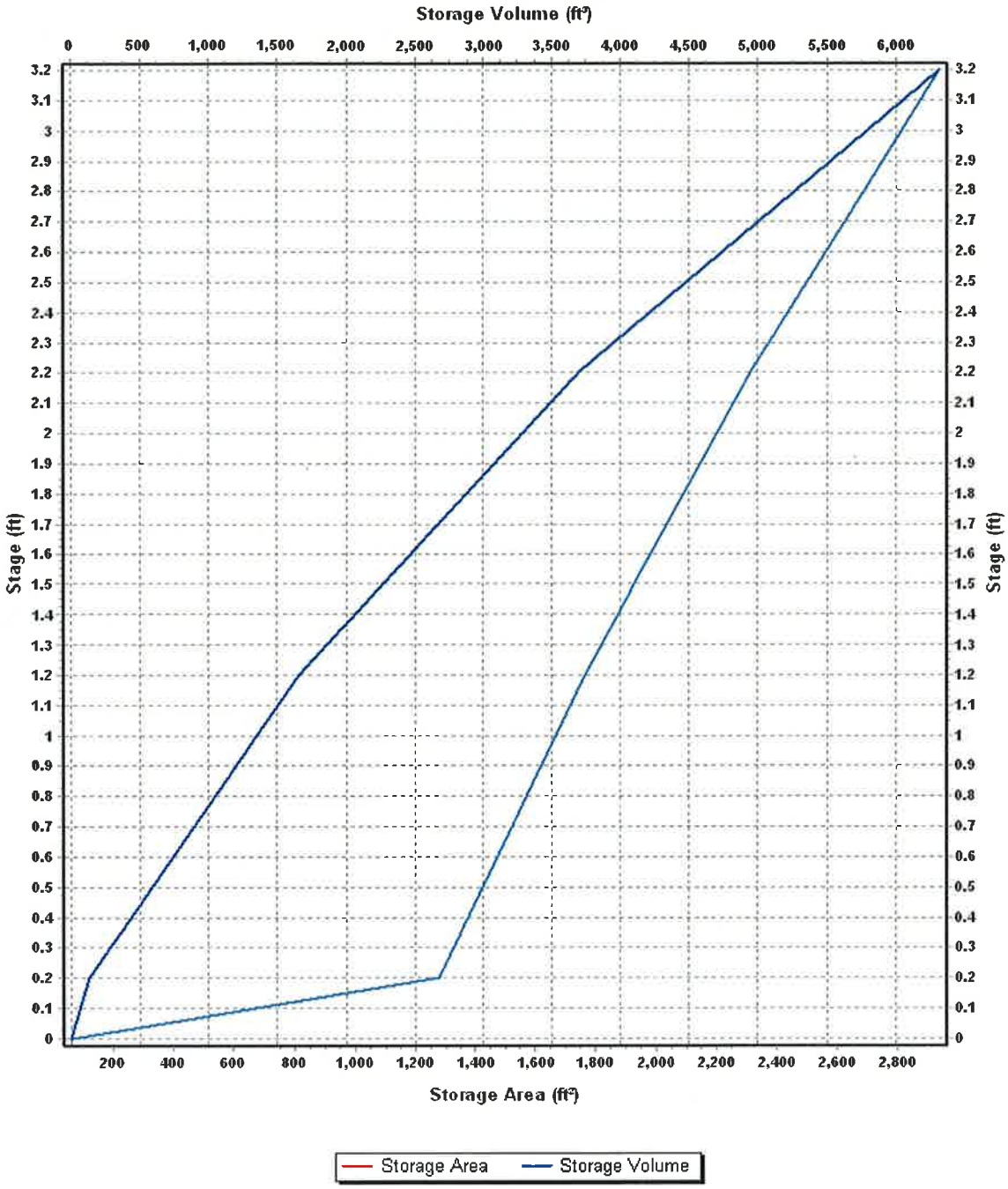
Invert Elevation (ft)	4646.80
Max (Rim) Elevation (ft)	4650.00
Max (Rim) Offset (ft)	3.20
Initial Water Elevation (ft)	4646.80
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	2938.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-01

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	60	0.000
0.2	1280.6	134.06
1.2	1761.3	1655.01
2.2	2313.9	3692.61
3.2	2938.6	6318.86

Storage Area Volume Curves



Storage Node : POND-01 (continued)

Output Summary Results

Peak Inflow (cfs)	2.00
Peak Lateral Inflow (cfs)	2.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4647.73
Max HGL Depth Attained (ft)	0.93
Average HGL Elevation Attained (ft)	4647.73
Average HGL Depth Attained (ft)	0.93
Time of Max HGL Occurrence (days hh:mm)	0 00:20
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-02

Input Data

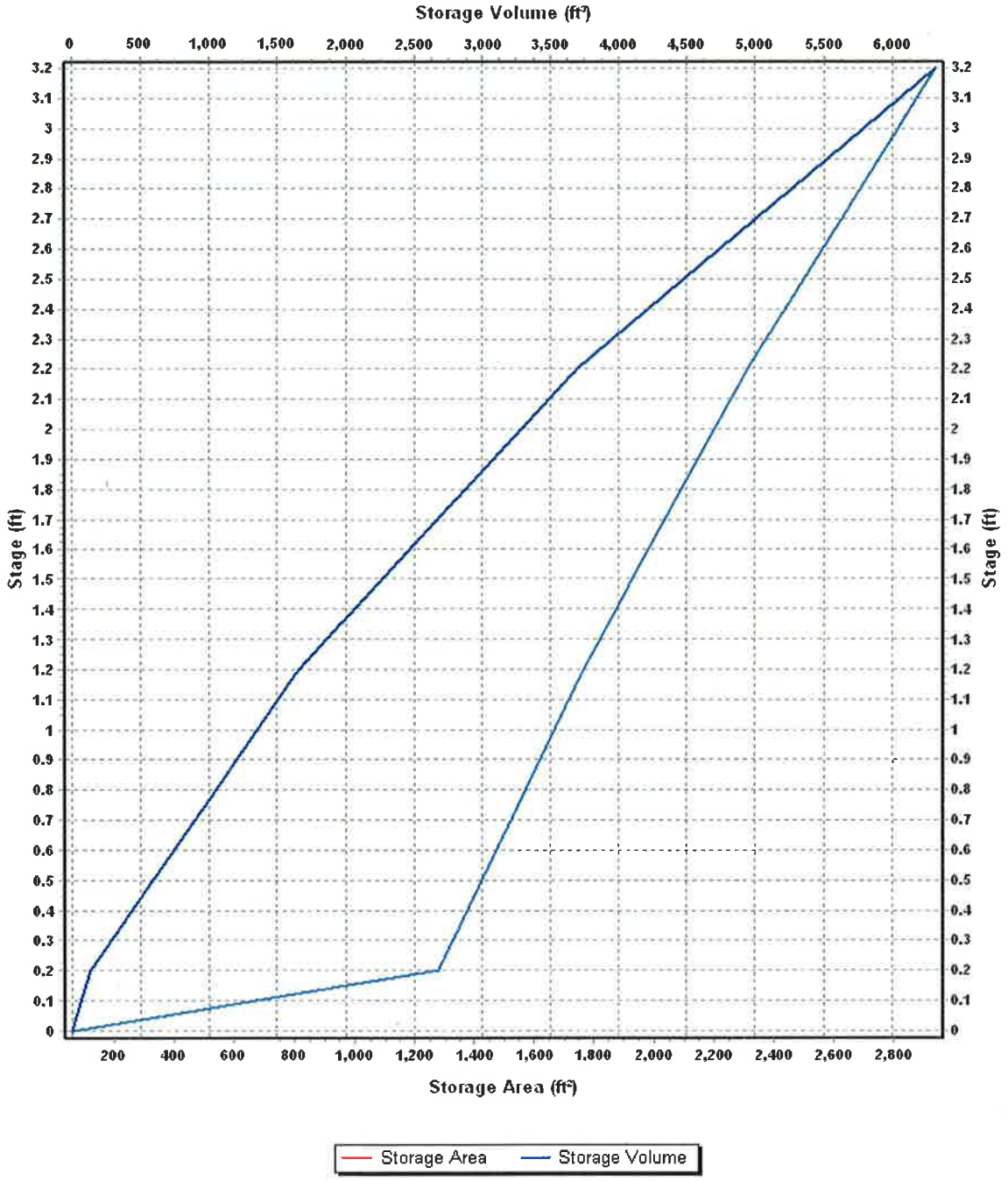
Invert Elevation (ft)	4646.80
Max (Rim) Elevation (ft)	4650.00
Max (Rim) Offset (ft)	3.20
Initial Water Elevation (ft)	4646.80
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	2938.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-02

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	60	0.000
0.2	1280.6	134.06
1.2	1761.3	1655.01
2.2	2313.9	3692.61
3.2	2938.6	6318.86

Storage Area Volume Curves



Storage Node : POND-02 (continued)

Output Summary Results

Peak Inflow (cfs)	1.61
Peak Lateral Inflow (cfs)	1.61
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4647.59
Max HGL Depth Attained (ft)	0.79
Average HGL Elevation Attained (ft)	4647.58
Average HGL Depth Attained (ft)	0.78
Time of Max HGL Occurrence (days hh:mm)	0 00:20
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-03

Input Data

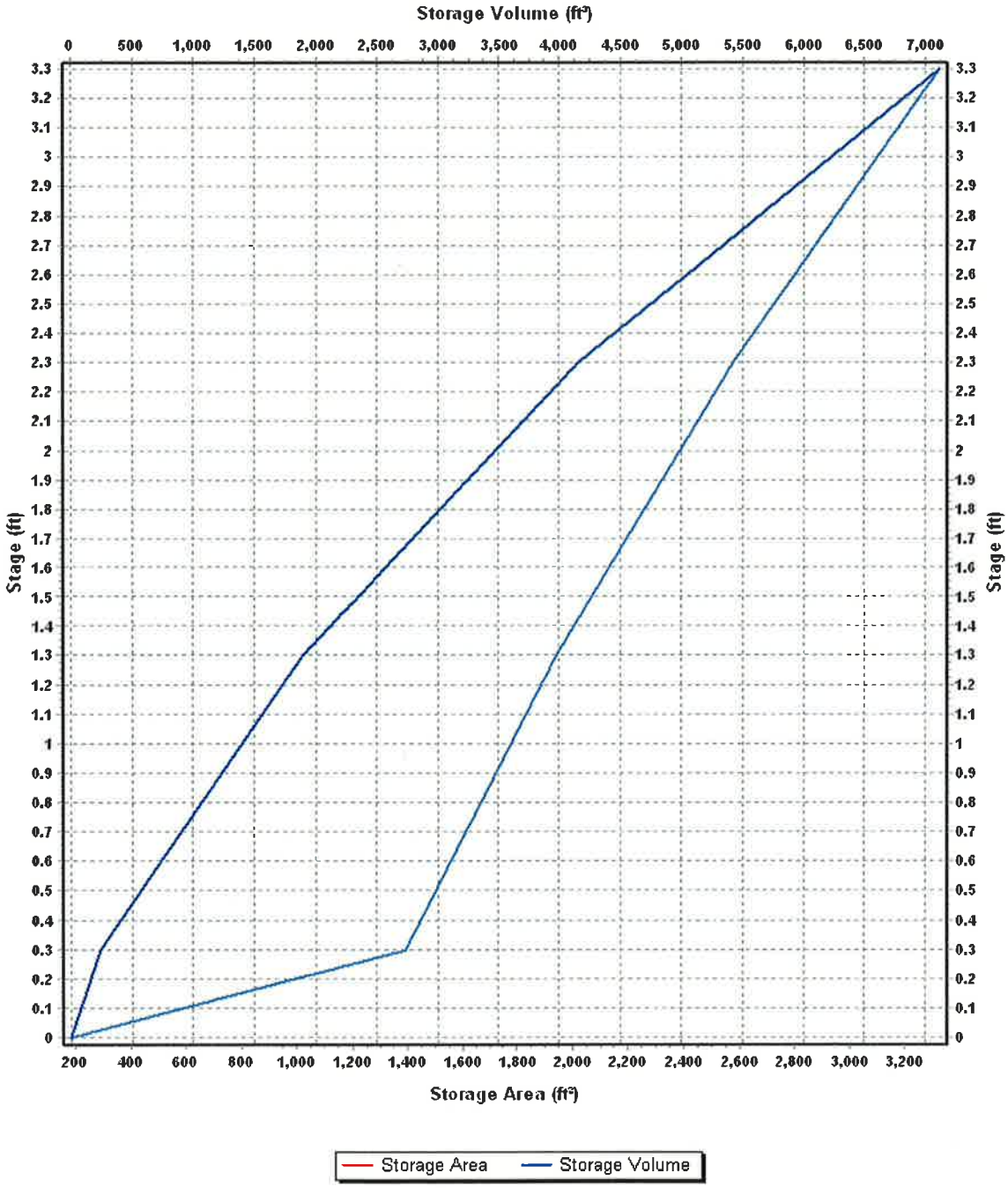
Invert Elevation (ft)	4647.70
Max (Rim) Elevation (ft)	4651.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	4647.70
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	3325.70
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-03

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	184.5	0.000
0.3	1393.9	236.76
1.3	1938.5	1902.96
2.3	2579.0	4161.71
3.3	3325.7	7114.06

Storage Area Volume Curves



Storage Node : POND-03 (continued)

Output Summary Results

Peak Inflow (cfs)	4.13
Peak Lateral Inflow (cfs)	1.43
Peak Outflow (cfs)	0.29
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4649.16
Max HGL Depth Attained (ft)	1.46
Average HGL Elevation Attained (ft)	4649.01
Average HGL Depth Attained (ft)	1.31
Time of Max HGL Occurrence (days hh:mm)	0 00:19
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : POND-04

Input Data

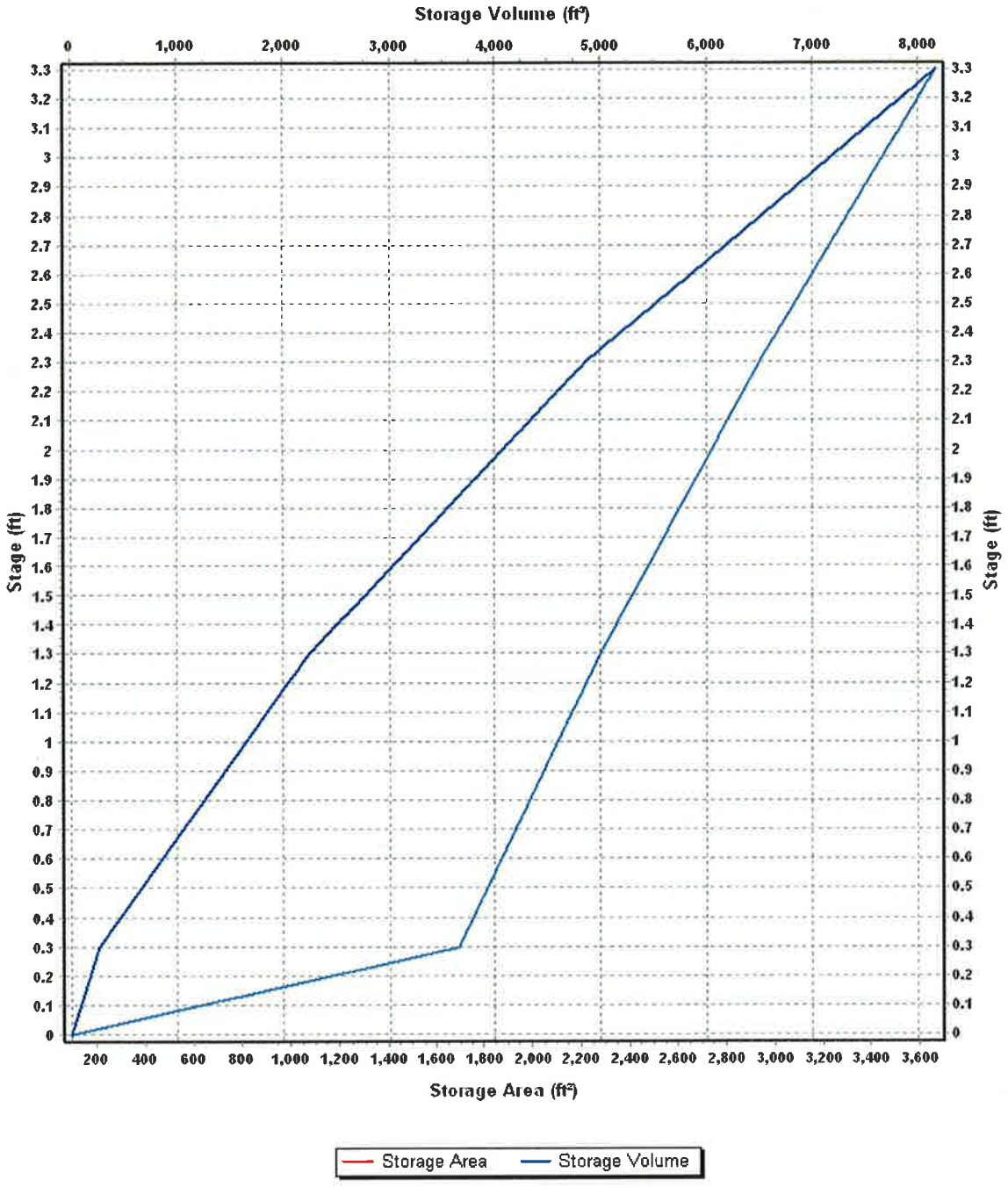
Invert Elevation (ft)	4647.70
Max (Rim) Elevation (ft)	4651.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	4647.70
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	3367.60
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : POND-04

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	96.5	0.000
0.3	1692.7	268.38
1.3	2279.1	2254.28
2.3	2937.8	4862.73
3.3	3667.6	8165.43

Storage Area Volume Curves



Storage Node : POND-04 (continued)

Output Summary Results

Peak Inflow (cfs)	5.82
Peak Lateral Inflow (cfs)	1.73
Peak Outflow (cfs)	0.90
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	4649.31
Max HGL Depth Attained (ft)	1.61
Average HGL Elevation Attained (ft)	4649.01
Average HGL Depth Attained (ft)	1.31
Time of Max HGL Occurrence (days hh:mm)	0 00:18
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Manhard™
CONSULTING LTD

PRELIMINARY SEWER REPORT

FOR

ARBOR VILLAS

CARSON CITY, NEVADA

Prepared for:

Capstone Communities
9441 Double Diamond Pkwy #14
Reno, Nevada 89521

Prepared by:

Manhard Consulting Ltd.
9850 Double R Boulevard
Suite 101
Reno, Nevada 89521

Project: CCICCNV01

Date: 3/17/16

Table of Contents

Appendices

1 INTRODUCTION

1.1 Purpose of Analysis

This report represents a detailed analysis of the proposed sanitary sewer system for the Arbor Villas. The purpose of this analysis is to establish peak flow rates and evaluate proposed sanitary sewer sizes for the subject property.

1.2 Project Location and Description

The Arbor Villas development is approximately 10.3 acres in size and is located in the southern portion of Carson City and is east of South Stewart Street, south of East 5th Street, west of South Saliman Road Drive, and north of Little Lane5. Formally, this site is situated within Section 17, Township 15 North, and Range 20 East of the Mount Diablo Meridian (refer to Figure 1, Vicinity Map). The project site is within the existing parcels 004-021-13.

Figure 2, the Sewer Main Layout, illustrates the location and orientation of the project and its proposed lots and roadway locations.

1.3 Project Description

The Arbor Villas Development is a proposed subdivision which consists of 147 single-family residential units. The project site is currently zoned within the GC zoning district and has an approved tentative map P.U.D. through Carson City.

2 PROPOSED ALIGNMENT AND QUANTITY OF SERVICE

2.1 Project Wastewater Collection System

Sewage flow from Arbor Villas will be conveyed via public 8" diameter PVC SDR-35 sewer mains to the collection point (manhole) located at the entrance of the development. The sanitary sewer main within the development flows south to the connection of the existing 15-inch sanitary sewer located in Little Lane. All of the mains within the proposed subdivision are located within the rights-of-way of the local roadways. The proposed sizes and locations of the sanitary sewers can be found on the *Sanitary Sewer Plan*, which is included in this report.

The minimum and maximum proposed slopes used within this development are 0.40% and 1.60%, respectively. These slopes have been checked to ensure that they are within the Carson City required velocity of 2 fps and 10 fps during the peak flow condition.

2.2 Estimated Peak Sewage Flows

Calculations for the design of the sewer system were performed in accordance with Chapter 10, Section 11.243 of the Recommended Standards for Wastewater Facilities, 2004 Edition and Division 15, Section 15.3.2 of the Carson City Development Standards and Carson City's Sewer Flow Monitoring Analysis (CCSFMA). According to CCSFMA, the actual per capita

flow ranges from 125 – 150 gal/cap/day with a peaking factor ranging from 3.5 – 3.8. For this analysis, the flow factors used in the calculations are 2.5 capita per dwelling unit for a single-family residential lot and 150 gal/cap/day to calculate average daily flow. A peaking factor of 3.8 is then applied to the daily average flow to compute the peak flow used in the design of the sanitary sewer. Complete peak flow calculations for Arbor Villas are included within this report. This analysis is considered to be conservative based on the CCSMA results. The following table summarizes the results of the calculations of the peak daily flows for the residential subdivision:

Units	Capita/DU	GPD/ Capita	Peaking Factor	Peak Flow (gpd)	Peak Flow (cfs)
41	2.5	150	3.80	209,475	0.32
			Total	**209,475**	**0.32**

2.3 Proposed Sewer Mains

Basic normal depth calculations for the proposed 8-inch and 10-inch sewer mains were done using open-channel pipe flow theory, the Manning's Formula, and *Bentley FlowMaster® V8i®* (*FlowMaster*) software. A Manning's Coefficient of 0.013 (assuming PVC pipe material) was used in all of these calculations. The *FlowMaster* worksheets that demonstrate these calculations are included within this report (Appendix A).

Per Carson City Development Standards, sewer mains are considered at capacity when peak flow is at d/D=0.75 (Div. 15, Section 15.3.2.a.). In addition, the minimum velocity of 2 fps and the maximum velocity of 10 fps are required design conditions (Div 15, Section 15.3.2.e.). The *FlowMaster* calculations included within this report demonstrate that the various velocities of PVC sewer pipe at a d/D of 75% at the minimum and maximum slopes mentioned above are within the requirements for Carson City. The velocity of an 8-inch sewer main is 2.48 fps for a minimum pipe slope of 0.40% and 2.77 fps for a maximum pipe slope of 0.50%. All of the calculated velocities described above are within the Carson City required ranged of 2 fps to 10 fps. These velocity calculations can be found in the *FlowMaster* calculations included within this report.

In addition to evaluating the sewer velocities within this development, this report also analyzes maximum capacity within the proposed sewer pipes. As described above, the peak flow within the sewer main must remain at or below a normal depth of 75%. As shown in the *FlowMaster* calculations included within this report, an 8-inch PVC sewer at 0.40% can convey 450,420 gpd (0.70 cfs) at a maximum depth of 75%. Therefore, each individual neighborhood can be served by an 8-inch sewer system because the maximum sewer loading for the largest neighborhood, Arbor Villas, is 209,475 gpd (0.32 cfs), which is less than the maximum allowed capacity of an 8-inch sewer. The size and locations of the proposed sanitary sewers mentioned above can be found on the *Sanitary Sewer Plan*, which is included in this report.

3 CONCLUSION

The 8-inch sanitary sewer mains proposed herein will adequately serve the project as planned. The attached *FlowMaster* worksheets calculates the maximum capacity of the proposed 8-inch sewer mains at a minimum slope of 0.40% in accordance with the

requirements of Carson City. The 8-inch sewers at 0.40% have a capacity of 450,420 gpd (0.70 cfs) at a maximum depth of 75%, which will be able to adequately serve Arbor Villas.

The proposed sanitary sewerage system within this report for the Arbor Villas development has adequate capacity to carry the subject property's peak sewage flow in conformance with the guidelines outlined in the Carson City Development Standards and the Recommended Standards for Wastewater Facilities.

SANITARY SEWER CALCULATIONS FOR ARBOR VILLAS

The following calculations were performed in accordance with Chapter 10, Section 11.243 of the Recommended Standards for Wastewater Facilities, 2004 ed. (Ten-States Standards), and the Carson City Development Standards:

2.5 capita/dwelling unit
150 gal/capita/day

The site will consist of 147 dwelling units; therefore the following equations are used:

Average flow = num. of dwellings * capita/dwelling * GPCD

Average flow = 147 * 2.5 * 150 = 55,125 gpd = 0.09 cfs

Peak flow = Average flow * peaking factor

Peaking Factor = $(18 + P^{1/2}) / (4+P^{1/2})$ where P = population in thousands (i.e. dwelling units x 3.5 divided by 1,000). Maximum peaking factor is 4.0. However, according CCSFMA a peaking factor of 3.8 is acceptable.

Calculated peaking factor = 3.80

Peak flow = 55,125 * 3.8 = 209,475 gpd = 0.32 cfs

The design shall be for the peak flow; therefore the design flow is 0.32 cfs.

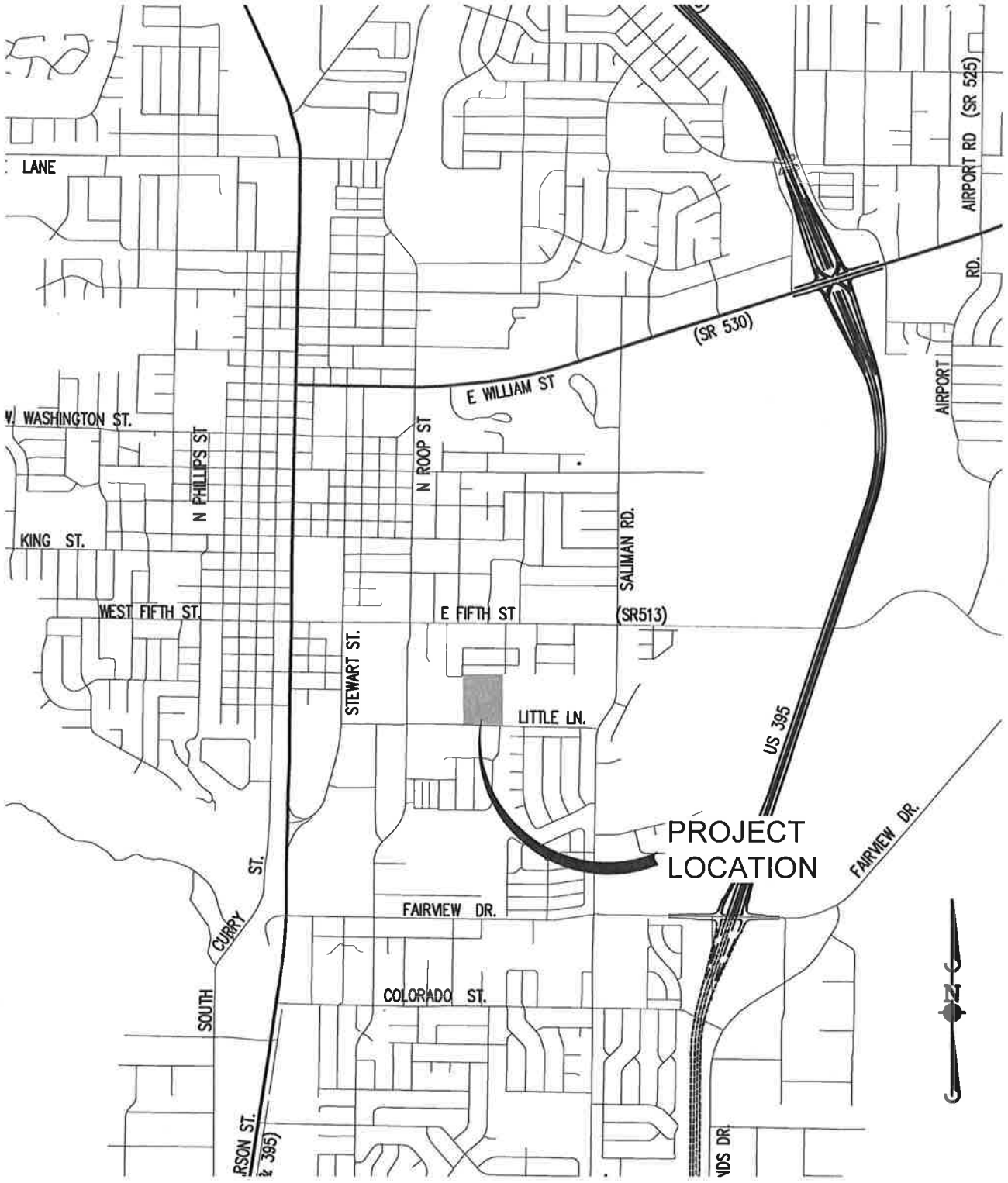


FIGURE 1

Manhard CONSULTING LTD
9850 Double R Blvd, Suite 101, Reno, NV 89521 tel: (775) 746-3500 fax: (775) 746-3520 www.manhard.com
Civil Engineers · Surveyors · Water Resources Engineers · Water & Wastewater Engineers
Construction Managers · Environmental Scientists · Landscape Architects · Planners

ARBOR VILLAS
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.:	AWM
DRAWN BY:	AWM
DATE:	3/16/2016
SCALE:	N.T.S.

SHEET 1 OF 1

Dwg Name: P:\Cciccnv01\dwg\Eng\Final Drawings\Tentative Map\1 - Title Sheet.dwg Updated By: SJividen 17:28

APPENDIX A

FlowMaster Flow Data

Worksheet for 8" Sewer at 0.40%

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Normal Depth	6.00	in
Diameter	8.00	in

Results

Discharge	0.70	ft³/s
Flow Area	0.28	ft²
Wetted Perimeter	1.40	ft
Hydraulic Radius	2.41	in
Top Width	0.58	ft
Critical Depth	4.73	in
Percent Full	75.0	%
Critical Slope	0.00773	ft/ft
Velocity	2.48	ft/s
Velocity Head	0.10	ft
Specific Energy	0.60	ft
Froude Number	0.63	
Maximum Discharge	0.82	ft³/s
Discharge Full	0.76	ft³/s
Slope Full	0.00333	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer at 0.40%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.00	in
Critical Depth	4.73	in
Channel Slope	0.00400	ft/ft
Critical Slope	0.00773	ft/ft

Worksheet for 8" Sewer at 0.50%

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	6.00	in
Diameter	8.00	in

Results

Discharge	0.78	ft^3/s
Flow Area	0.28	ft^2
Wetted Perimeter	1.40	ft
Hydraulic Radius	2.41	in
Top Width	0.58	ft
Critical Depth	5.01	in
Percent Full	75.0	%
Critical Slope	0.00810	ft/ft
Velocity	2.77	ft/s
Velocity Head	0.12	ft
Specific Energy	0.62	ft
Froude Number	0.70	
Maximum Discharge	0.92	ft^3/s
Discharge Full	0.85	ft^3/s
Slope Full	0.00416	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer at 0.50%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.00	in
Critical Depth	5.01	in
Channel Slope	0.00500	ft/ft
Critical Slope	0.00810	ft/ft

PRELIMINARY WATER MAIN ANALYSIS REPORT

FOR

ARBOR VILLAS

CARSON CITY, NEVADA

Prepared for:

Capstone Communities
9441 Double Diamond Pkwy #14
Reno, Nevada 89521

Prepared by:

Manhard Consulting Ltd.
9850 Double R Boulevard
Suite 101
Reno, Nevada 89521

Project: CCICCNV01

Date: 3/17/16

Table of Contents

Appendices
Appendix A

List of Figures
Figure 1 – Vicinity Map
Figure 2 – Water Main Layout

List of Tables
Table 1 – Arbor Villas Pressure Summary

1 INTRODUCTION

1.1 Purpose of Analysis

This report represents a detailed analysis of the proposed water main system for the Arbor Villas. The report describes the water system and the criteria used for design. The purpose of this analysis is to establish the adequacy of the proposed water main pipe diameters and layout to meet the needs of the development.

1.2 Project Location and Description

The Arbor Villas development is approximately 10.3 acres in size and is located in the southern portion of Carson City and is east of South Stewart Street, south of East 5th Street, west of South Saliman Road Drive, and north of Little Lane5. Formally, this site is situated within Section 17, Township 15 North, and Range 20 East of the Mount Diablo Meridian (refer to Figure 1, Vicinity Map). The project site is within the existing parcels 004-021-13.

Figure 2, the Water Main Layout, illustrates the location and orientation of the project and its proposed lots and roadway locations.

1.3 Project Description

The Arbor Villas Development is a proposed subdivision which consists of 147 single-family residential units. The project site is currently zoned within the GC zoning district and has an approved tentative map P.U.D. through Carson City. For purposes of this water main analysis the average lot size for this development is taken to be approximately 1,200 sf.

1.4 Methodologies

The Arbor Villas water main analysis was analyzed using WaterGEMS, which employs the Hazen-Williams Method to determine headloss. The Hazen-Williams formula uses a pipe carrying capacity factor (C) based on piping materials. For the Arbor Villas analysis a C-value of 150 was used to model the proposed water main system.

2 PROPOSED ALIGNMENT AND QUANTITY OF SERVICE

2.1 Project Water Main System

Two connection points to the existing water system are being utilized for this project. One connection point occurs on Little Lane to the south of the project site and the other occurs on Parkland Avenue. At these points, a proposed 8" water main will connect to an existing stub and looped around the subject property and eventually connecting to the other existing 8" water main. The Arbor Villas development will be served by 8" water main that creates a water system loop for the project (refer to Figure 2, *Water Main Layout*).

2.2 Water Main Analysis

The average per lot demand (1.0 gpm/unit) used in the analysis of the water main system.and NAC 445A.66735. A maximum day demand factor of 2.0 was applied to the average day demand to obtain the maximum day demand (per *Tentative Addendum*). The peak hour demand was calculated by applying a 1.5 global demand multiplier to the maximum day demands. In a separate analysis, a 1500 gpm fire flow requirement was applied to the farthest hydrant in the system from the connection points. This 1500 gpm fire flow requirement was obtained from Section B105 and Table B105.1 of the 2012 International Fire Code. As a conservative analysis, it was assumed that all of the irrigation zones were active at the same time.

The following table provides the high and low pressures that were calculated using WaterGEMS (refer to Appendix B for WaterGEMS output) for each demand condition:

Table 1: Arbor Villas Pressure Summary

Condition	High Pressure (psi)	Low Pressure (psi)
Max Day	103	101
Peak Hour	102	101
Fire Flow (farthest hydrant)	100	83

The maximum day demand low pressure of 103 psi is above the NAC minimum of 40 psi. The peak hour demand low pressure is above the minimum of 64 psi listed in the *Carson City Development Standards*. The pressure for the various scenarios can be found in the WaterGEMS output included in Appendix B of this report. The fire flow low pressures indicated in the table above are well above the NAC minimum requirement of 20 psi. The pressure at the hydrant H-2 can be found in the WaterGEMS output included in Appendix B of this report.

3 CONCLUSION

The analysis of the water system shows that the pipe sizes and layouts within the Arbor Villas Development are adequately designed to meet the demands of the development. The WaterGEMS analysis shows that the pressures are greater than the minimum requirement and below the maximum requirement for Carson City and the NAC requirements. The Arbor Villas Development is in compliance and meets the minimum pressures per NAC 445A.6711 during maximum day, peak hour, and fire flow conditions.

WATER DEMAND CALCULATIONS FOR ARBOR VILLAS

Number of units = 41
Average per lot demand = 1.0 gpm/lot
Maximum day demand factor = 2.0
Peak hour global demand multiplier = 1.5

Average demand = 147*1.0 = 147.0 gpm
Maximum day demand = 147*2.0 = 294.0 gpm
Peak hour demand = 294*1.5 = 441.0 gpm

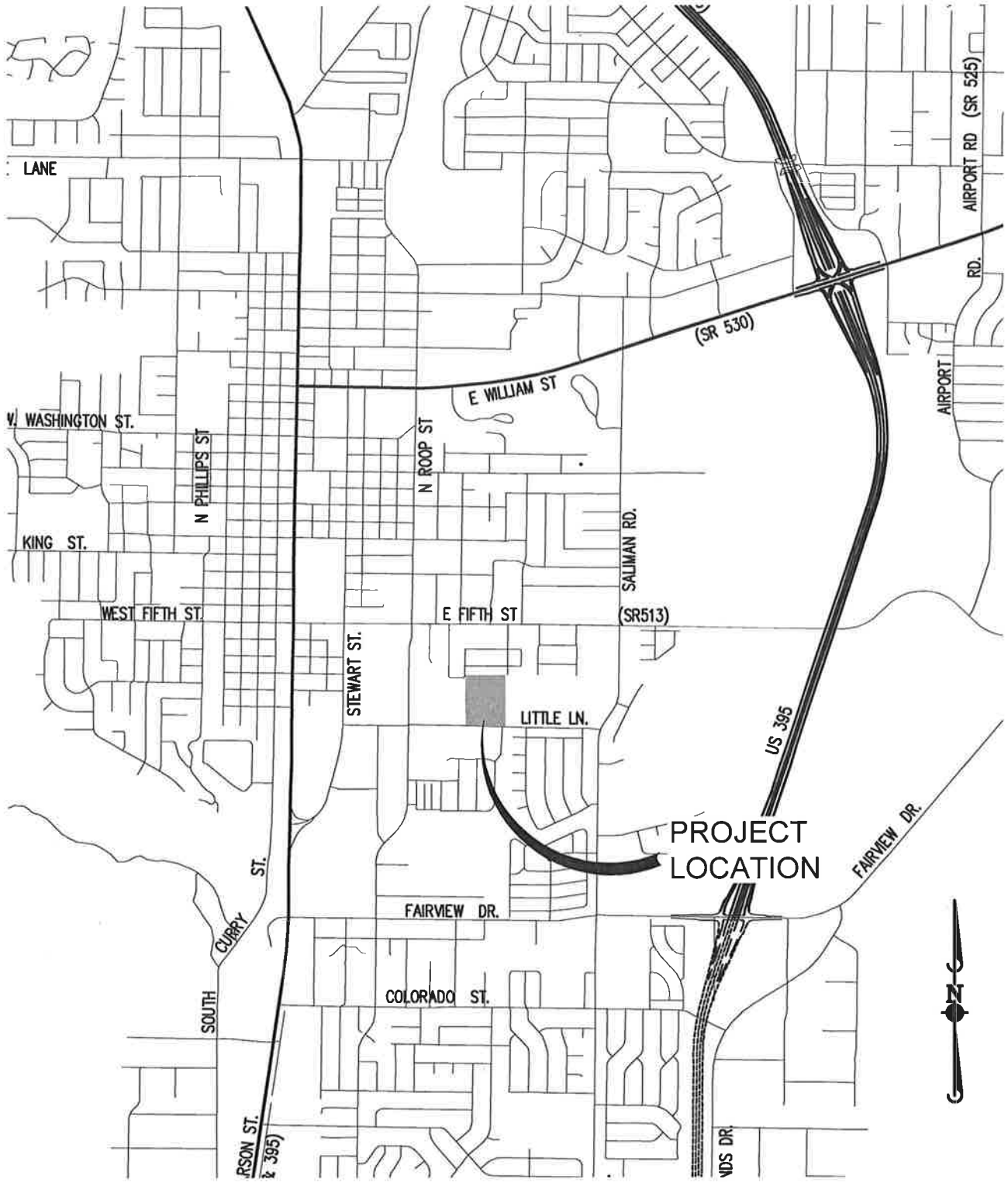
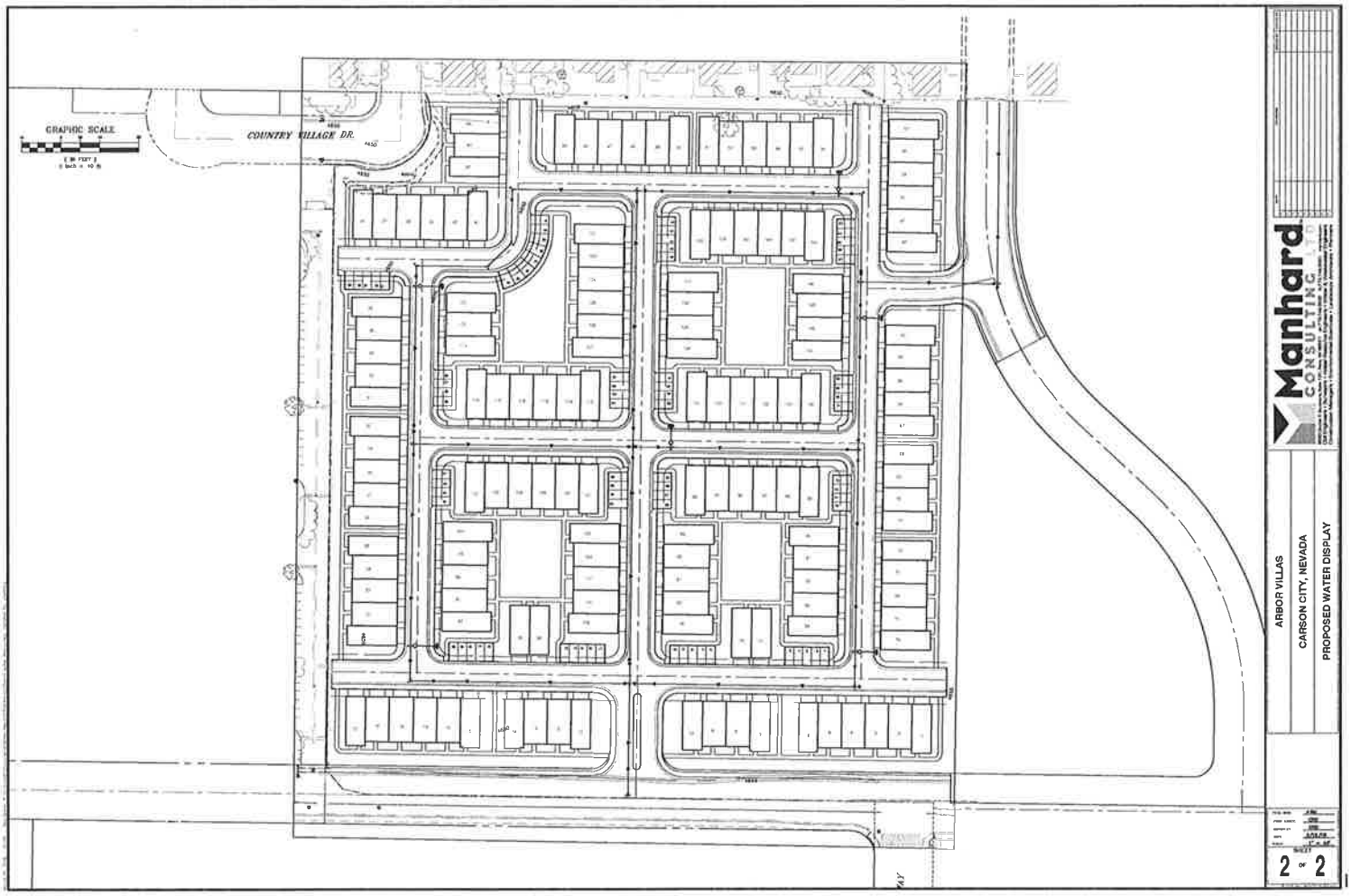


FIGURE 1

Manhard CONSULTING LTD
9850 Double R Blvd, Suite 101, Reno, NV 89521 tel: (775) 746-3500 fax: (775) 746-3520 www.manhard.com
Civil Engineers · Surveyors · Water Resources Engineers · Water & Wastewater Engineers
Construction Managers · Environmental Scientists · Landscape Architects · Planners

ARBOR VILLAS		
CARSON CITY, NEVADA		
VICINITY MAP		
PROJ. MGR.: AWM	SHEET	
DRAWN BY: AWM	1 OF 1	
DATE: 3/16/2016		
SCALE: N.T.S.		

Dwg Name: P:\Cciccnv01\dwg\Eng\Final Drawings\Tentative Map\1 - Title Sheet.dwg Updated By: SJviden 17:28



Manhard CONSULTING

ARBOR VILLAS

CARSON CITY, NEVADA

PROPOSED WATER DISPLAY

SHEET 2 OF 2

APPENDIX A

Scenario Summary Report
Scenario: ADD

Scenario Summary	
ID	94
Label	ADD
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	ADD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	<I> AVERAGE DAY
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Zone	Elevation (ft)
J-1	0	101	4,879.97	ARBOR VILLAS	4,646.00
J-2	10	101	4,879.90	ARBOR VILLAS	4,646.50
J-3	10	101	4,879.89	ARBOR VILLAS	4,646.50
J-4	16	101	4,879.88	ARBOR VILLAS	4,645.56
J-5	14	102	4,879.87	ARBOR VILLAS	4,645.17
J-6	0	101	4,879.87	ARBOR VILLAS	4,646.26
J-7	5	101	4,879.87	ARBOR VILLAS	4,645.45
J-8	5	102	4,879.87	ARBOR VILLAS	4,644.98
J-9	5	101	4,879.87	ARBOR VILLAS	4,645.56
J-10	9	101	4,879.87	ARBOR VILLAS	4,646.74
J-11	5	102	4,879.87	ARBOR VILLAS	4,645.18
J-12	10	101	4,879.88	ARBOR VILLAS	4,645.56
J-13	10	101	4,879.89	ARBOR VILLAS	4,645.74
J-14	8	101	4,879.89	ARBOR VILLAS	4,646.03
J-15	10	101	4,879.89	ARBOR VILLAS	4,645.87
J-16	0	101	4,879.90	ARBOR VILLAS	4,645.41
J-17	6	101	4,879.91	ARBOR VILLAS	4,645.63
J-18	10	102	4,879.89	ARBOR VILLAS	4,645.29
J-19	8	101	4,879.89	ARBOR VILLAS	4,645.87
J-20	0	101	4,879.98	ARBOR VILLAS	4,645.71
J-21	6	103	4,879.89	ARBOR VILLAS	4,642.23

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-1	40	6.0	Ductile Iron	130.0	77	0.87	0.03
P-2	117	6.0	Ductile Iron	130.0	77	0.87	0.07
P-3	241	6.0	Ductile Iron	130.0	20	0.23	0.01
P-4	263	6.0	Ductile Iron	130.0	18	0.20	0.01
P-5	127	6.0	Ductile Iron	130.0	23	0.26	0.01
P-6	56	6.0	Ductile Iron	130.0	9	0.10	0.00
P-7	33	6.0	Ductile Iron	130.0	9	0.10	0.00
P-8	74	6.0	Ductile Iron	130.0	4	0.04	0.00
P-9	21	6.0	Ductile Iron	130.0	-1	0.01	0.00
P-10	161	6.0	Ductile Iron	130.0	-6	0.07	0.00
P-11	205	6.0	Ductile Iron	130.0	-15	0.17	0.01
P-12	37	6.0	Ductile Iron	130.0	-20	0.23	0.00
P-13	223	6.0	Ductile Iron	130.0	-30	0.34	0.02
P-14	229	6.0	Ductile Iron	130.0	16	0.18	0.01
P-15	36	6.0	Ductile Iron	130.0	6	0.07	0.00
P-16	207	6.0	Ductile Iron	130.0	-2	0.02	0.00
P-17	133	6.0	Ductile Iron	130.0	-25	0.29	0.01
P-18	37	6.0	Ductile Iron	130.0	-25	0.29	0.00
P-19	89	6.0	Ductile Iron	130.0	39	0.44	0.02
P-20	24	6.0	Ductile Iron	130.0	29	0.33	0.00
P-21	204	6.0	Ductile Iron	130.0	21	0.24	0.01
P-22	138	6.0	Ductile Iron	130.0	-70	0.80	0.08
P-23	33	6.0	Ductile Iron	130.0	-70	0.80	0.02
P-24	39	6.0	Ductile Iron	130.0	-7	0.08	0.00
P-25	190	6.0	Ductile Iron	130.0	-13	0.15	0.00

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-26	28	6.0	Ductile Iron	130.0	0	0.00	0.00
P-27	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-28	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-29	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-30	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-31	26	6.0	Ductile Iron	130.0	0	0.00	0.00

Scenario Summary Report
Scenario: MDD

Scenario Summary	
ID	95
Label	MDD
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	MDD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MAX DAY
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Zone	Elevation (ft)
J-1	0	101	4,879.91	ARBOR VILLAS	4,646.00
J-2	20	101	4,879.64	ARBOR VILLAS	4,646.50
J-3	20	101	4,879.59	ARBOR VILLAS	4,646.50
J-4	32	101	4,879.55	ARBOR VILLAS	4,645.56
J-5	28	101	4,879.52	ARBOR VILLAS	4,645.17
J-6	0	101	4,879.52	ARBOR VILLAS	4,646.26
J-7	10	101	4,879.52	ARBOR VILLAS	4,645.45
J-8	10	101	4,879.52	ARBOR VILLAS	4,644.98
J-9	10	101	4,879.52	ARBOR VILLAS	4,645.56
J-10	18	101	4,879.52	ARBOR VILLAS	4,646.74
J-11	10	101	4,879.54	ARBOR VILLAS	4,645.18
J-12	20	101	4,879.55	ARBOR VILLAS	4,645.56
J-13	20	101	4,879.61	ARBOR VILLAS	4,645.74
J-14	16	101	4,879.61	ARBOR VILLAS	4,646.03
J-15	20	101	4,879.61	ARBOR VILLAS	4,645.87
J-16	0	101	4,879.65	ARBOR VILLAS	4,645.41
J-17	12	101	4,879.66	ARBOR VILLAS	4,645.63
J-18	20	101	4,879.60	ARBOR VILLAS	4,645.29
J-19	16	101	4,879.59	ARBOR VILLAS	4,645.87
J-20	0	101	4,879.93	ARBOR VILLAS	4,645.71
J-21	12	103	4,879.59	ARBOR VILLAS	4,642.23

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-1	40	6.0	Ductile Iron	130.0	153	1.74	0.09
P-2	117	6.0	Ductile Iron	130.0	153	1.74	0.27
P-3	241	6.0	Ductile Iron	130.0	41	0.46	0.05
P-4	263	6.0	Ductile Iron	130.0	36	0.41	0.04
P-5	127	6.0	Ductile Iron	130.0	46	0.52	0.03
P-6	56	6.0	Ductile Iron	130.0	18	0.20	0.00
P-7	33	6.0	Ductile Iron	130.0	18	0.20	0.00
P-8	74	6.0	Ductile Iron	130.0	8	0.09	0.00
P-9	21	6.0	Ductile Iron	130.0	-2	0.02	0.00
P-10	161	6.0	Ductile Iron	130.0	-12	0.14	0.00
P-11	205	6.0	Ductile Iron	130.0	-30	0.34	0.02
P-12	37	6.0	Ductile Iron	130.0	-40	0.46	0.01
P-13	223	6.0	Ductile Iron	130.0	-60	0.68	0.09
P-14	229	6.0	Ductile Iron	130.0	32	0.36	0.03
P-15	36	6.0	Ductile Iron	130.0	12	0.14	0.00
P-16	207	6.0	Ductile Iron	130.0	-4	0.04	0.00
P-17	133	6.0	Ductile Iron	130.0	-51	0.58	0.04
P-18	37	6.0	Ductile Iron	130.0	-51	0.58	0.01
P-19	89	6.0	Ductile Iron	130.0	78	0.89	0.06
P-20	24	6.0	Ductile Iron	130.0	58	0.66	0.01
P-21	204	6.0	Ductile Iron	130.0	42	0.48	0.04
P-22	138	6.0	Ductile Iron	130.0	-141	1.60	0.27
P-23	33	6.0	Ductile Iron	130.0	-141	1.60	0.07
P-24	39	6.0	Ductile Iron	130.0	-15	0.17	0.00
P-25	190	6.0	Ductile Iron	130.0	-27	0.31	0.02

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-26	28	6.0	Ductile Iron	130.0	0	0.00	0.00
P-27	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-28	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-29	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-30	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-31	26	6.0	Ductile Iron	130.0	0	0.00	0.00

Scenario Summary Report
Scenario: MDD PLUS FF

Scenario Summary	
ID	96
Label	MDD PLUS FF
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	MDD PLUS FF
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MAX DAY
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Zone	Elevation (ft)
J-1	0	100	4,877.31	ARBOR VILLAS	4,646.00
J-2	20	96	4,869.39	ARBOR VILLAS	4,646.50
J-3	20	96	4,868.25	ARBOR VILLAS	4,646.50
J-4	32	95	4,864.13	ARBOR VILLAS	4,645.56
J-5	28	91	4,856.48	ARBOR VILLAS	4,645.17
J-6	0	90	4,853.29	ARBOR VILLAS	4,646.26
J-7	10	89	4,851.42	ARBOR VILLAS	4,645.45
J-8	10	88	4,847.29	ARBOR VILLAS	4,644.98
J-9	10	87	4,846.12	ARBOR VILLAS	4,645.56
J-10	18	89	4,851.70	ARBOR VILLAS	4,646.74
J-11	10	93	4,859.19	ARBOR VILLAS	4,645.18
J-12	20	93	4,860.57	ARBOR VILLAS	4,645.56
J-13	20	97	4,869.39	ARBOR VILLAS	4,645.74
J-14	16	97	4,869.39	ARBOR VILLAS	4,646.03
J-15	20	97	4,869.43	ARBOR VILLAS	4,645.87
J-16	0	97	4,870.49	ARBOR VILLAS	4,645.41
J-17	12	97	4,870.78	ARBOR VILLAS	4,645.63
J-18	20	97	4,868.74	ARBOR VILLAS	4,645.29
J-19	16	96	4,868.22	ARBOR VILLAS	4,645.87
J-20	0	101	4,878.20	ARBOR VILLAS	4,645.71
J-21	12	98	4,868.44	ARBOR VILLAS	4,642.23

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-1	40	6.0	Ductile Iron	130.0	953	10.81	2.69
P-2	117	6.0	Ductile Iron	130.0	953	10.81	7.92
P-3	241	6.0	Ductile Iron	130.0	225	2.56	1.13
P-4	263	6.0	Ductile Iron	130.0	432	4.91	4.12
P-5	127	6.0	Ductile Iron	130.0	894	10.15	7.65
P-6	56	6.0	Ductile Iron	130.0	866	9.83	3.18
P-7	33	6.0	Ductile Iron	130.0	866	9.83	1.87
P-8	74	6.0	Ductile Iron	130.0	856	9.72	4.13
P-9	21	6.0	Ductile Iron	130.0	846	9.60	1.17
P-10	161	6.0	Ductile Iron	130.0	-664	7.53	5.58
P-11	205	6.0	Ductile Iron	130.0	-682	7.73	7.49
P-12	37	6.0	Ductile Iron	130.0	-692	7.85	1.38
P-13	223	6.0	Ductile Iron	130.0	-712	8.07	8.82
P-14	229	6.0	Ductile Iron	130.0	-4	0.05	0.00
P-15	36	6.0	Ductile Iron	130.0	-24	0.27	0.00
P-16	207	6.0	Ductile Iron	130.0	-40	0.45	0.04
P-17	133	6.0	Ductile Iron	130.0	-299	3.39	1.06
P-18	37	6.0	Ductile Iron	130.0	-299	3.39	0.30
P-19	89	6.0	Ductile Iron	130.0	530	6.01	2.04
P-20	24	6.0	Ductile Iron	130.0	510	5.79	0.52
P-21	204	6.0	Ductile Iron	130.0	494	5.61	4.09
P-22	138	6.0	Ductile Iron	130.0	-841	9.54	7.42
P-23	33	6.0	Ductile Iron	130.0	-841	9.54	1.80
P-24	39	6.0	Ductile Iron	130.0	-227	2.57	0.18
P-25	190	6.0	Ductile Iron	130.0	-239	2.71	0.99

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-26	28	6.0	Ductile Iron	130.0	0	0.00	0.00
P-27	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-28	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-29	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-30	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-31	26	6.0	Ductile Iron	130.0	-1,500	17.02	4.05

FlexTable: Hydrant Table

Label	Lateral Length (ft)	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	20	4,651.12	ARBOR VILLAS	0	4,859.19	90
H-3	20	4,651.02	ARBOR VILLAS	0	4,869.39	94
H-4	20	4,650.83	ARBOR VILLAS	0	4,870.49	95
H-5	20	4,650.41	ARBOR VILLAS	0	4,868.22	94
H-6	20	4,650.17	ARBOR VILLAS	0	4,868.44	94
H-7	20	4,650.75	ARBOR VILLAS	1,500	4,842.07	83

Scenario Summary Report
Scenario: PHD

Scenario Summary	
ID	97
Label	PHD
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	PHD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	PEAK HOUR
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Zone	Elevation (ft)
J-1	0	101	4,879.81	ARBOR VILLAS	4,646.00
J-2	30	101	4,879.24	ARBOR VILLAS	4,646.50
J-3	30	101	4,879.14	ARBOR VILLAS	4,646.50
J-4	48	101	4,879.05	ARBOR VILLAS	4,645.56
J-5	42	101	4,878.98	ARBOR VILLAS	4,645.17
J-6	0	101	4,878.98	ARBOR VILLAS	4,646.26
J-7	15	101	4,878.98	ARBOR VILLAS	4,645.45
J-8	15	101	4,878.98	ARBOR VILLAS	4,644.98
J-9	15	101	4,878.98	ARBOR VILLAS	4,645.56
J-10	27	100	4,878.98	ARBOR VILLAS	4,646.74
J-11	15	101	4,879.03	ARBOR VILLAS	4,645.18
J-12	30	101	4,879.05	ARBOR VILLAS	4,645.56
J-13	30	101	4,879.18	ARBOR VILLAS	4,645.74
J-14	24	101	4,879.18	ARBOR VILLAS	4,646.03
J-15	30	101	4,879.18	ARBOR VILLAS	4,645.87
J-16	0	101	4,879.26	ARBOR VILLAS	4,645.41
J-17	18	101	4,879.29	ARBOR VILLAS	4,645.63
J-18	30	101	4,879.16	ARBOR VILLAS	4,645.29
J-19	24	101	4,879.14	ARBOR VILLAS	4,645.87
J-20	0	101	4,879.86	ARBOR VILLAS	4,645.71
J-21	18	102	4,879.14	ARBOR VILLAS	4,642.23

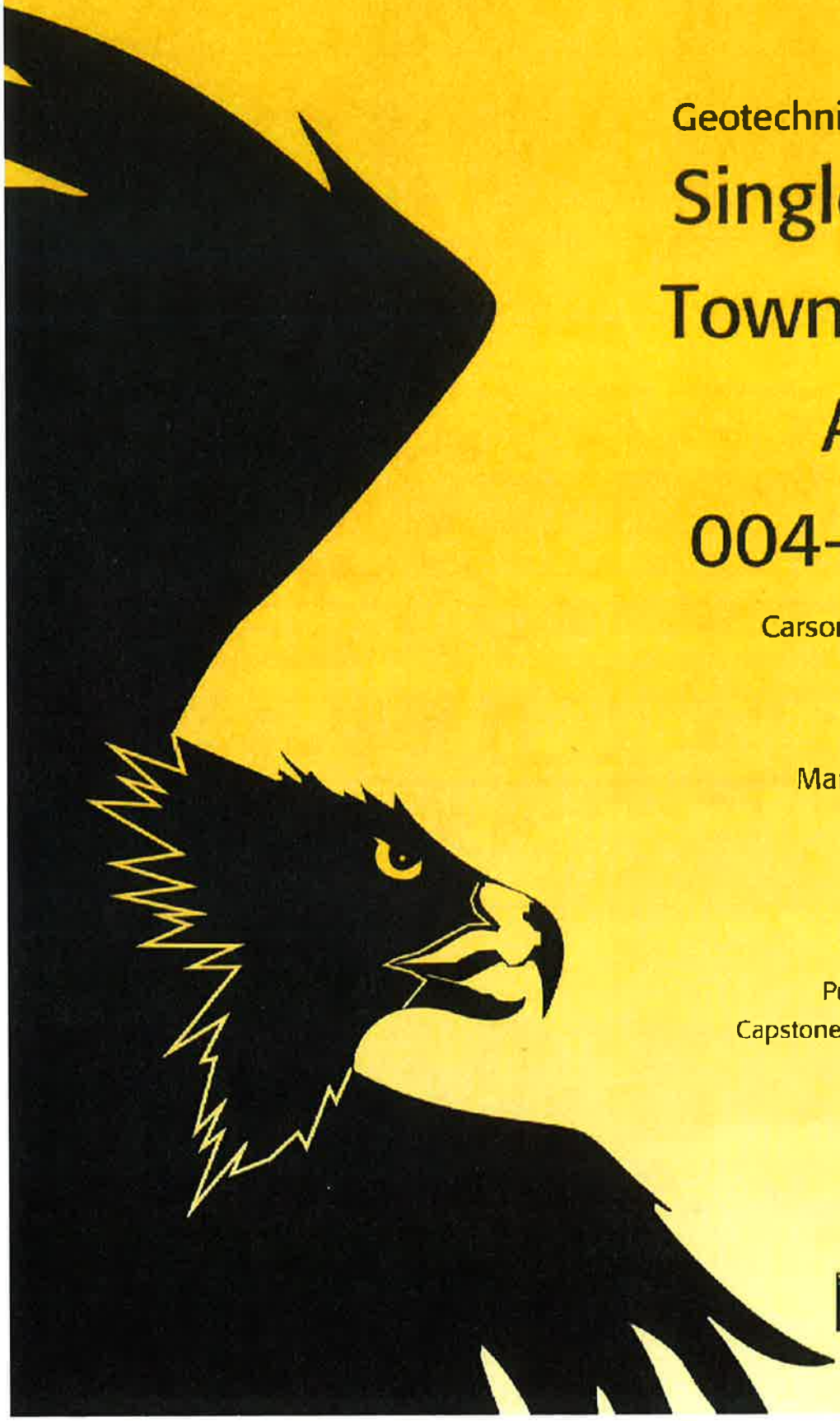
FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-1	40	6.0	Ductile Iron	130.0	230	2.61	0.19
P-2	117	6.0	Ductile Iron	130.0	230	2.61	0.57
P-3	241	6.0	Ductile Iron	130.0	61	0.70	0.10
P-4	263	6.0	Ductile Iron	130.0	54	0.61	0.09
P-5	127	6.0	Ductile Iron	130.0	69	0.78	0.07
P-6	56	6.0	Ductile Iron	130.0	27	0.30	0.00
P-7	33	6.0	Ductile Iron	130.0	27	0.30	0.00
P-8	74	6.0	Ductile Iron	130.0	12	0.13	0.00
P-9	21	6.0	Ductile Iron	130.0	-3	0.04	0.00
P-10	161	6.0	Ductile Iron	130.0	-18	0.21	0.01
P-11	205	6.0	Ductile Iron	130.0	-45	0.51	0.05
P-12	37	6.0	Ductile Iron	130.0	-60	0.68	0.01
P-13	223	6.0	Ductile Iron	130.0	-90	1.02	0.19
P-14	229	6.0	Ductile Iron	130.0	48	0.55	0.06
P-15	36	6.0	Ductile Iron	130.0	18	0.21	0.00
P-16	207	6.0	Ductile Iron	130.0	-6	0.07	0.00
P-17	133	6.0	Ductile Iron	130.0	-76	0.87	0.08
P-18	37	6.0	Ductile Iron	130.0	-76	0.87	0.02
P-19	89	6.0	Ductile Iron	130.0	117	1.33	0.12
P-20	24	6.0	Ductile Iron	130.0	87	0.99	0.02
P-21	204	6.0	Ductile Iron	130.0	63	0.72	0.09
P-22	138	6.0	Ductile Iron	130.0	-211	2.40	0.57
P-23	33	6.0	Ductile Iron	130.0	-211	2.40	0.14
P-24	39	6.0	Ductile Iron	130.0	-22	0.25	0.00
P-25	190	6.0	Ductile Iron	130.0	-40	0.46	0.04

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-26	28	6.0	Ductile Iron	130.0	0	0.00	0.00
P-27	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-28	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-29	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-30	22	6.0	Ductile Iron	130.0	0	0.00	0.00
P-31	26	6.0	Ductile Iron	130.0	0	0.00	0.00

Black Eagle Consulting, Inc.



Geotechnical Investigation

Single Family Townhomes - APN 004-021-13

Carson City, Nevada

March 4, 2016

Prepared for
Capstone Communities LLC

Black Eagle Consulting, Inc.
Geotechnical & Construction Services

Mr. Mike Branson
Capstone Communities LLC
9441 Double Diamond Parkway #14
Reno, NV 89521

March 4, 2016
Project No.: 1487-05-1

L

RE: Geotechnical Investigation
Single Family Townhomes - APN 004-021-13
Carson City, Nevada

Dear Mr. Branson:

Black Eagle Consulting, Inc. is pleased to present the results of our geotechnical investigation for the above-referenced project. Our investigation consisted of research, field exploration, laboratory testing, and engineering analysis to allow formulation of geotechnical conclusions and recommendations for design and construction of this residential project.

We understand the project will consist of the design and construction of approximately 154 single-family townhomes. The townhomes will be multi-story, wood-framed structures supported by Portland cement concrete (PCC) shallow footings and will have PCC slab-on-grade floors at the ground level. Asphalt concrete paved drives and parking lots will be constructed throughout the project site to provide access throughout the development. A system of PCC curbs, gutters, and sidewalks is also anticipated. It is expected that all improvements will be private except where project egress enters Little Lane.

The soil profile consists of a surficial layer of fine-grained to clay soils through approximately 4 feet beneath the ground surface underlain by complexly interbedded sands, silts and clays. The surficial fine-grained and clay soils are poor foundation materials due to their low strength characteristics and potential for shrink-swell movements with moisture fluctuation. These clay and fine-grained soils should be separated via 1.5 feet of structural fill (includes any base section) from footings, slabs, and pavements.

We appreciate having the opportunity to work with you on this project. If you have any questions regarding the content of the attached report, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.

PROFESSIONAL ENGINEER - STATE OF NEVADA
PANCHALINGAM VIMALARAJ
Exp. 6-30-16
CIVIL
No. 19732

Vimal P. Vimalaraj, P.E.
Engineering Division Manager

Jeff Wilbrecht, P.E.
Project Engineer

Copies to: Addressee (4 copies, PDF)
JW:PV:cjr

Table of Contents

Table of Contents

Tables

Plates

Appendices

Introduction

Presented herein are the results of Black Eagle Consulting, Inc.'s (BEC's) geotechnical investigation, laboratory testing, and associated geotechnical design recommendations for the proposed townhome residential development to be located near Little Lane in Carson City, Nevada. These recommendations are based on surface and subsurface conditions encountered in our explorations and on details of the proposed project as described in this report. The objectives of this study were to:

1. Determine general soil and groundwater conditions pertaining to design and construction of the proposed townhomes.
2. Provide recommendations for design and construction of the project as related to these geotechnical conditions.

The area covered by this report is shown on Plate 1 (Plot Plan). Our investigation included field exploration, laboratory testing, and engineering analysis to determine the physical and mechanical properties of the various on-site materials. Results of our field exploration and testing programs are included in this report and form the basis for all conclusions and recommendations.

The services described above were conducted in accordance with the BEC Professional Geotechnical Agreement dated October 23, 2015, that was signed by Mr. Mike Branson, President of Capstone Communities LLC.

Project Description

The site to host the proposed townhome development consists of a roughly rectangular parcel of approximately 10.2 acres located in Carson City, Nevada. The subject parcel is assigned assessor's parcel number 004-021-13. The site is entirely contained in Section 17, Township 15 North, Range 20 East, Mount Diablo Meridian. The parcel is bordered to the north by an existing residential subdivision, to the east by a vacant parcel, to the south by Little Lane, and to the west by an existing apartment/townhome development. The property is presently undeveloped land with a network of undeveloped road and paths that traverse the site. Access to the site is obtained from Little Lane.

Limited details of the project are known at the time of this report. We understand the project will consist of the design and construction of approximately 154 single-family townhomes. The townhomes will be multi-story, wood-framed structures supported by Portland cement concrete (PCC) shallow footings and will have PCC slab-on-grade floors at the ground level. Asphalt concrete paved drives and parking lots will be constructed throughout the project site to provide access throughout the development. A system of PCC curbs, gutters, and sidewalks is also anticipated. It is expected that all improvements will be private except where project egress enters Little Lane.

Utilities will be extended to the site from existing underground sources along Little Lane and along the western portion of the site.

A grading plan is unavailable at the time of this investigation. However, from discussions with the project civil engineer, Manhard Consulting, Ltd., and because the site is essentially flat, it is estimated that minimal cuts and fills (less than 3 feet) will be required to provide the necessary surface drainage across the property.

Site Conditions

Existing Structures

The project site consists of undeveloped land crisscrossed by several undeveloped roads (dirt tracks). Along the western border of the site is a raised roadbed constructed with an estimated 2 to 3 feet of fill.

Site Conditions

Within the elevated roadway is an existing natural gas pipeline. Along the southern border of the parcel, adjacent to Little Lane, is an approximate 4-foot-deep by 8-foot-wide drainage swale.

The existing dirt tracks exhibit large depressions and promote ponding of water, such that most were impassible during site exploration. Bicycle (BMX style) riders and dirt bike riders have constructed several jump tracks throughout the area and use the area extensively for recreation.

The site has also been subject to uncontrolled dumping. Minor piles of landscaping and concrete debris are present in addition to other piles of garbage that include mattresses and televisions. Much of this material is located adjacent to the perimeter paths on the western and northern sides of the parcel. This trash and debris material is estimated to be less than 50 cubic yards.

Topography

The site exhibits very low gradients and slopes at less than 0.5 percent towards the southeast. Vertical relief within the parcel is generally less than 3 to 4 feet within the undisturbed portions of the site; the fill associated with the natural gas line increases the vertical relief a few feet. Areas of the project site that are not disturbed exhibit a high elevation within the northwestern portion of the site of around 4,650 feet above mean seal level to low elevations of around 4,647 feet in the southeastern portion of the site.

Vegetation

The site is densely populated by sagebrush up to 5 feet tall. Minor areas have been stripped and grasses have regrown.

Exploration

Test Pits

The proposed townhome site was explored on February 15, 2016, by excavating 11 test pits using a rubber-tracked Kubota® KX 91-3 mini-excavator. Locations of the test pits are shown on Plate 1. The maximum depth of exploration was 10 feet below the existing ground surface. Bulk samples for index testing were collected from the trench wall sides at specific depths in each soil horizon. Pocket penetrometer testing was performed in exposed, fine-grained soil strata to assess in-place, unconfined compressive strength for evaluating trench stability. The depth to groundwater was measured at the time of exploration. The test pits were backfilled immediately after exploration. Backfill was loosely placed and the area re-graded to the extent possible with equipment on hand.

Test Pit Exploration

Material Classification

A geologist examined and identified all soils in the field in accordance with American Society for Testing and Materials [ASTM] D 2488. During test pit exploration, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada laboratory for testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing, as described in the **Laboratory Testing** section. Logs of the test pits are presented as Plate 2 (Test Pit Logs), and a USCS chart has been included as Plate 3 (USCS Soil Classification Chart).

Laboratory Testing

All soils testing performed in the BEC soils laboratory is conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards.

Grain Size Analysis

Index Tests

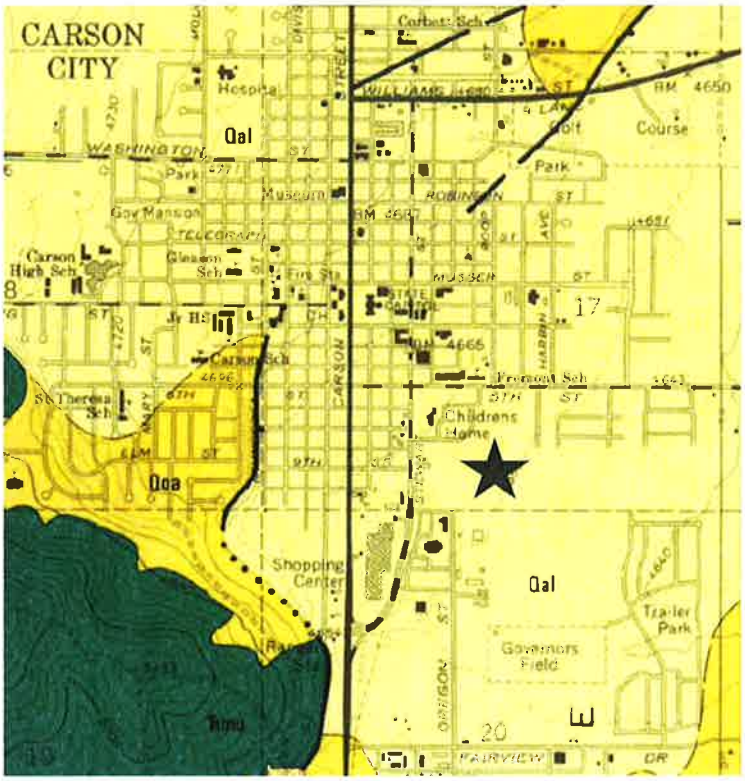
Samples of each significant soil type were analyzed to determine their in-situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). The results of these tests are shown on Plate 4 (Index Test Results). Test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate. Classification in this manner provides an indication of the soil's mechanical properties and can be correlated with published charts (Bowles, 1996; Naval Facilities Engineering Command [NAVFAC], 1986a and b) to evaluate bearing capacity, lateral earth pressures, and settlement potential.

Chemical Tests

Chemical testing was performed on representative samples of site foundation soils to evaluate the site materials' potential to corrode steel and PCC in contact with the ground. The samples were tested for pH, resistivity, redox potential, soluble sulfates, and sulfides. The results of the chemical tests are shown on Appendix A (Chemical Test Results). Chemical testing was performed by Sierra Environmental Monitoring of Reno, Nevada.

Geologic and General Soil Conditions

The site lies in an area mapped by the Nevada Bureau of Mines and Geology (NBMG) as Quaternary Age *Alluvial-plain deposits of Eagle Valley* (Trexler, 1977). The NBMG describes these soils as *yellowish-brown to gray, unbedded to poorly bedded, poorly to moderately sorted, fine silty sand, sandy silt, granular muddy coarse sand, and minor sandy gravel. Underlies broad surfaces of low gradient.* The soils encountered during site exploration are consistent with the geologic map.



Geologic Map

The site materials include fill soils within an undeveloped, and slightly raised, roadway on the western parcel boundary. Fill materials are generally silty sand. The native soils consist of a surficial layer of sandy silt to clayey sand soils about 2 to 4 feet thick; underlain by silty to clayey sand from 3 to 6 feet beneath the ground surface; and interbedded silt, clay, and sand to the maximum depth of exploration, about 10 feet beneath the ground surface.

The existing fill material at the site is located within an embankment that creates a slightly raised and undeveloped roadway along the western parcel boundary. This roadway shares a similar alignment to the existing natural gas line, delineated on Plate 1, which deterred test pit exploration in this area. The embankment is estimated to be 2 to 3 feet thick. Materials within the side slopes of the fill consist of silty sand. They are described as dark brown, moist, and loose, with an estimated 30 percent low plasticity fines and up to 10 percent gravel up to 1 inch in diameter. Isolated areas of dumped concrete debris and organic debris were observed in this area but do not appear to be a part of the embankment.

The surficial (approximately 0 to 3 feet below the ground surface) soils are sandy silt, silty sand and clayey sand. They are described as dark brown, moist, medium dense or stiff, and contain 30 to 53 percent non-plastic to

medium plasticity fines with trace amounts of fine gravel. The intermediate depth (approximately 3 to 6 feet below the ground surface) silty sand and clayey sand soils are described as light brown to light gray with orange mottling (the degree of mottling within this soil profile increases with depth), moist to very moist, medium dense, and contain 15 to 38 percent non-plastic to medium plasticity fines and up to 5 percent gravel up to 1 inch in diameter. The deeper soils consist of lean clay, silt, and silty sand soils that are described as light gray to tan to olive with strong orange mottling, very moist to wet, medium dense or firm to very stiff, and contain an estimated 35 to 80 percent low to medium plasticity fines.

Groundwater was encountered at depths of 7 to 9 feet beneath the existing ground surface throughout the site. Below a 4-foot depth, the soils exhibit orange mottling that increases with depth, indicating the previous elevation of high groundwater level to be relatively shallow. The Carson City area has been subject to several years of drought conditions, and the observed groundwater levels are most likely lower due to this drought. Shallower groundwater conditions are expected to return due to spring snowmelt and increased precipitation compared to the recent drought conditions.

Geologic Hazards

Seismicity

Much of the western United States is a region of moderate to intense seismicity related to movement of crustal masses (plate tectonics). By far, the most seismically active regions, outside of Alaska, are in the vicinity of the San Andreas Fault system of western California. Other seismically active areas include the Wasatch Front in Salt Lake City, Utah, which forms the eastern boundary of the Basin and Range physiographic province, and the eastern front of the Sierra Nevada Mountains, which is the western margin of the province. The Carson City area lies along the eastern base of the Sierra Nevadas, within the western extreme of the Basin and Range. It must be recognized that there are probably few regions in the United States not underlain at some depth by older bedrock faults. Even areas within the interior of North America have a history of strong seismic activity.

Carson City lies within an area with a high potential for strong earthquake shaking. Seismicity within the Carson City area is considered about average for the western Basin and Range Province (Ryall and Douglas, 1976). It is generally accepted that a maximum credible earthquake in this area would be in the range of magnitude 7 to 7.5 along the frontal fault system of the Eastern Sierra Nevadas. The most active segment of this fault system in the Carson City area is the Genoa fault, located at the base of the mountains some 2.5 miles west of the project.

Faults

The published geologic hazards map (Trexler and Bell, 1979) shows several Late Pleistocene and Holocene Age faults located approximately 0.5 to 1.5 miles from the site. The nearest faults are Late Pleistocene in age and are located approximately 0.5 to 0.75 miles west and north of the project site, respectively. The nearest Holocene age faults are located approximately 1.2 to 1.5 miles south and northwest of the site, respectively.

The Nevada Earthquake Safety Council (NESC, 1998) has developed and adopted the criteria for evaluation of Quaternary age earthquake faults. *Holocene Active Faults* are defined as those with evidence of movement within the past 10,000 years (Holocene time). Those faults with evidence of displacement during the last 130,000 years are termed *Late Quaternary Active Faults*. A *Quaternary Active Fault* is one that has moved within the last 1.6 million years. An *Inactive Fault* is a fault *without recognized activity within Quaternary time* (last 1.6 million years). Holocene Active Faults normally require that occupied structures be set back a minimum of 50 feet (100-foot-wide zone) from the ground surface fault trace. An *Occupied Structure* is considered a building, as defined by the *International Building Code (IBC), which is expected to have a human occupancy rate of more than 2,000 hours per year* (International Code Council [ICC], 2012).

The setback from Quaternary Active Faults is left to the judgment of the geologist/engineer; however, no *Critical Facility* is permitted to be placed over the trace of a Late Quaternary Active Fault. A *Critical Facility* is defined as *a*

building or structure that is considered critical to the function of the community or the project under consideration. Examples include, but are not limited to, hospitals, fire stations, emergency management operations centers and schools.

Based on the geologic map, the faults in the vicinity of the project are *Holocene Active Faults* and *Late Quaternary Active Faults*. However, because no faults are mapped as passing through or adjacent to the site, no fault setback or further investigation is necessary for this project.

Ground Motion and Liquefaction

Mapping by the United States Geological Survey (USGS, 2016) indicates that there is a 2 percent probability that a *bedrock* ground acceleration of 0.933g will be exceeded in any 50-year interval. Only localized amplification of ground motion would be expected during an earthquake.

Detailed liquefaction analysis is beyond BEC's scope of work for this investigation. The site area is underlain by fine-grained, poorly consolidated, sandy soils with a shallow groundwater table (about 7 to 9 feet). The Eagle Valley area of Carson City has long been suspected of having some liquefaction potential. Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event as cyclic shear stresses cause excessive pore water pressure between the soil grains. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) lying below the groundwater table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic settlements of large civil structures.

The soil profile encountered within the site through 10 feet depth consists of predominantly fine-grained and clay soils with greater than 35 percent low to medium plasticity fines and interbedded layers of medium dense silty sand soils that will have a low potential for liquefaction. However, based on our experience within the general area (Eagle Valley) of the project site, soil profiles beneath 10 feet depth are expected to include relatively thin layers of loose to medium dense sandy soils with a relatively low percentage of non-plastic fines that can liquefy for a design earthquake. Where a non-liquefiable, near-surface deposit is present (including soil layers above groundwater table) and the deeper, potentially liquefiable layers are relatively thin, the surface manifestation of liquefaction-induced settlement and associated differential settlements will generally be within tolerable levels for lightly loaded, wood-framed residential structures.

Flood Plains

The Federal Emergency Management Agency (FEMA) has identified the site as lying in Stippled Zone X, Other Flood Areas, *areas of 0.2 percent annual chance flood; areas of 1 percent annual chance flood with average depths less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood* (FEMA, 2014).

Other Geologic Hazards

A moderate potential for dust generation is present if grading is performed in dry weather. Clay soils exist across the project site as interbedded soil lenses. No other geologic hazards were identified.

Discussion and Recommendations

General Information

The site is geotechnically suitable to host the proposed townhome development provided the following geotechnical and construction recommendations are incorporated into the project design and followed during construction. The native materials encountered within the property are predominantly fine-grained soils. The low gradient across the site has allowed ponding of water, resulting in localized areas of soft, wet surface soils at the time of our exploration. A grading plan for the townhouse development is not available at the time of this investigation; however, it is our understanding that grading for the project will include minimal cut and fill to provide positive drainage away from improvements.

The soil profile consists of a surficial layer of fine-grained to clay soils through approximately 4 feet beneath the ground surface underlain by complexly interbedded sands, silts and clays. The surficial fine-grained and clay soils are poor foundation materials due to their low strength characteristics and potential for shrink-swell movements with moisture fluctuation; as such, separation from structural improvements will be required, as described in the **Site Preparation** section. The existing fill material within the raised roadway along the western parcel boundary, as well as localized areas of trash and debris that exist throughout the parcel, will require mitigation, as also discussed within the **Site Preparation** section. Groundwater is present at depths of approximately 7 feet beneath the ground surface, and deep utility installation will likely require dewatering, as described in the **Trenching, Excavation and Utility Backfill** section.

The recommendations provided herein, and particularly under **Site Preparation, Mass Grading, Foundation,** and **Quality Control**, are intended to minimize risks of structural distress related to consolidation or expansion of native soils and/or structural fills. These recommendations, along with proper design and construction of the structure and associated improvements, work together as a system to improve overall performance. If any aspect of this system is ignored or is poorly implemented, the performance of the project will suffer. Sufficient quality control should be performed to verify that the recommendations presented in this report are followed.

Structural areas referred to in this report include all areas of buildings, concrete slabs and asphalt pavements, as well as pads for any minor structures. The term engineer, as presented below, pertains to the civil or geological engineer that has prepared the geotechnical engineering report for the project or who serves as a qualified geotechnical professional on behalf of the owner.

All compaction requirements presented in this report are relative to ASTM D 1557. For the purposes of this project:

- Fine-grained soils are defined as those with more than 35 percent by weight passing the number 200 sieve, and a plastic index lower than 15.
- Clay soils are defined as those with more than 30 percent passing the number 200 sieve, and a plastic index greater than 15.
- Granular soils are those not defined by the above criteria.

Any evaluation of the site for the presence of surface or subsurface hazardous substances is beyond the scope of this investigation. When suspected hazardous substances are encountered during routine geotechnical investigations, they are noted in the exploration logs and immediately reported to the client. No such substances were revealed during our exploration.

Site Preparation

All vegetation shall be stripped and grubbed from structural areas and removed from the site. A stripping depth of 0.2 to 0.3 feet is anticipated. Sagebrush and associated roots greater than ½ inch in diameter shall be removed, where necessary, to a minimum depth of 12 inches below finished grade. Resulting excavations shall be backfilled with structural fill compacted to 90 percent relative compaction.

The test pits were excavated by mini-excavator at the approximate locations shown on Plate 1. Locations were determined in the field by approximate means. All test pits were backfilled upon completion of the field portion of our study, and the backfill was compacted to the extent possible with equipment on hand. However, the backfill was not compacted to the requirements presented herein under **Mass Grading**. If structures, concrete flatwork, pavement, utilities or other improvements are to be located in the vicinity of any of the test pits, the backfill should be removed and recompacted in accordance with the requirements contained in this report. Failure to properly compact backfill could result in excessive settlement of improvements located over test pits.

Fine-grained and clay soils were found to exist from the ground surface through depths of 10 feet below the ground surface. These soils were classified as moist to wet, firm to very stiff (medium dense), and as exhibiting low to medium plasticity. Laboratory testing performed on these materials determined the clay soils exhibit plasticity indices on the order of 12, indicative of low expansion potential (Nelson and Miller, 1992). Fine-grained soils are considered unsuitable to directly support project improvements because of their low strength characteristics, particularly with moisture level increases.

Structural improvements shall be separated from all fine-grained and clay soils by structural fill following Table 1 (Required Thickness of Structural Fill between Fine-Grained/Clay Soils and Improvements).

TABLE 1 - REQUIRED THICKNESS OF STRUCTURAL FILL BETWEEN FINE-GRAINED/CLAY SOILS AND IMPROVEMENTS	
Improvement	**Minimum Separation**
Footings	1.5 feet
Interior Floor Slabs[1]	1.5 feet
Exterior Concrete Slabs, including Curbs, Gutters, Sidewalks[1]	1.5 feet
Asphalt Pavements	1.5 feet[2]

[1] Includes aggregate base section.
[2] Alternative separation requirements for asphalt pavements from native fine-grained and clay soils are included in the **Asphalt Concrete Pavement Design** section.

During our exploration, fine-grained and clay soils were found to exist across the ground surface through an average depth of about 2.5 feet, but ranged from less than 1.5 feet to as much as 4 feet. Fine-grained and clay soils also exist as interbedded lenses within the deeper strata. Any over-excavation shall be backfilled with structural fill to footing grade, or to subgrade for pavements and slabs. The required separation may be achieved by any combination of site filling or over-excavation and replacement. The width of over-excavation shall extend laterally from the edge of footings, concrete slabs or asphalt pavements at least one-half the depth of the over-excavation.

Fine-grained and clay soils to be left in place and covered with fill shall be moisture-conditioned to 2 to 4 percent over optimum for a minimum depth of 12 inches. This moisture level will significantly decrease the magnitude of shrink-swell movements in the upper foot of material. The high moisture content must be maintained by periodic surface wetting, or other methods, until the surface is covered by at least 1 lift of fill. If allowed to dry out, subsequent expansion or settlement of fine-grained soils beneath foundations and floor slabs could significantly exceed the design criteria set forth previously.

No documentation regarding inspection or testing of the placement of fill materials (located along the gas line alignment in the western portion of the site) under the supervision of a geotechnical professional exist. As a result these materials will require mitigation consisting of removal through a depth such that no more than 12 inches remains. The resulting surface shall then be scarified through 12 inches, moisture conditioned to near optimum, and densified to at least 90 percent relative compaction.

All areas to receive structural fill or structural loading shall be densified to at least 90 percent relative compaction.

The surficial fine-grained and clay soils are of low permeability, such that ponding of water existed at the time of exploration. The native site soils are highly moisture sensitive; if allowed to become over-optimum moisture content, they will be impossible to compact. If project scheduling and weather allow, it may be possible to moisture condition these soils by scarifying the top 12 inches of subgrade and allowing it to air-dry to near-

optimum moisture prior to compaction. Where this procedure is ineffective or where construction schedules preclude delays, mechanical stabilization will be necessary.

Mechanical stabilization may be achieved by over-excavation and/or placement of an initial 12- to 18-inch-thick lift of 12-inch-minus, 3-inch-plus, well graded, angular rock fill. The more angular and well graded the rock is, the more effective it will be. This fill shall be densified with large equipment, such as a self-propelled sheeps-foot or a large loader, until no further deflection is noted. Additional lifts of rock may be necessary to achieve adequate stability. The use of a separator geotextile will prevent mud from pumping up between the rocks, thereby increasing rock-to-rock contact and decreasing the required thickness of stabilizing fill. The separator geotextile shall meet or exceed the following minimum properties presented in Table 2 (Minimum Required Properties for Separator Geotextile).

TABLE 2 - MINIMUM REQUIRED PROPERTIES FOR SEPARATOR GEOTEXTILE	
Trapezoid Strength (ASTM D 4533)	80 x 80 lbs.
Puncture Strength (ASTM D 4833)	500 lbs.
Grab Tensile Strength/Elongation (ASTM D 4632)	200 x 200 @ 50 %

As an alternate to rock fill, a geotextile/gravel system may be used for stabilization. Aggregate base (*Standard Specifications for Public Works Construction* [*SSPWC*], 2012), Class C or D drain rock (*SSPWC*, 2012), or pit run gravels shall be placed above the geotextile. Regardless of which alternate is selected, a test section is recommended to determine the required thickness of stabilization.

Trenching, Excavation, and Utility Backfill

The test pits were excavated using a small mini-excavator with moderate to difficult effort, such that conventional medium-sized backhoes or excavators should operate with relative ease during construction. In general, the sidewalls of test pits were stable during excavation.

Temporary trenches with near-vertical sidewalls should be stable to a depth of approximately 4 feet. Temporary trenches are defined as those that will be open for less than 24 hours. Excavations to greater depths will require shoring or laying back of sidewalls to maintain adequate stability. Regulations contained in Part 1926, Subpart P, of Title 29 of the Code of Federal Regulations (CFR, 2010) require that temporary sidewall slopes be no greater than those presented in Table 3 (Maximum Allowable Temporary Slopes).

TABLE 3 - MAXIMUM ALLOWABLE TEMPORARY SLOPES	
Soil or Rock Type	**Maximum Allowable Slopes[1] for Deep Excavations less than 20 Feet Deep[2]**
Stable Rock	Vertical (90 degrees)
Type A[3]	3H:4V (53 degrees)
Type B	1H:1V (45 degrees)
Type C	3H:2V (34 degrees)
Notes:	
[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off. [2] Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer. [3] A short-term (open 24 hours or less) maximum allowable slope of 1H:2V ([horizontal to vertical] 63 degrees) is allowed in excavation in Type A soils that are 12 feet or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet in depth shall be 3H:4V (53 degrees).	

The State of Nevada, Department of Industrial Relations, Division of Occupational Safety and Health Administration (OSHA) has adopted and strictly enforces these regulations, including the classification system and the maximum slopes. In general, Type A soils are cohesive, non-fissured soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. Type B are cohesive soils with an unconfined compressive strength between 0.5 and 1.5 tsf. Type C soils have an unconfined compressive strength below 0.5 tsf. Numerous additional factors and exclusions are included in the formal definitions. The client, owner, design engineer, and contractor shall refer to Appendix A and B of Subpart P of the previously referenced Federal Register for complete definitions and requirements on sloping and benching of trench sidewalls. Appendices C through F of Subpart P apply to requirements and methodologies for shoring.

On the basis of our exploration, the site soils are predominately Type B. Native sandy soils with non-plastic fines and soils beneath the groundwater table shall be considered Type C. Any area in question shall be considered Type C unless specifically examined by the engineer during construction. All trenching shall be performed and stabilized in accordance with local, state, and OSHA standards.

Utility Trench Backfill

In general, bedding and initial backfill 12 inches over the pipe will require import and shall conform to the requirements of the utility having jurisdiction. Bedding and initial backfill shall be densified to at least 90 percent relative compaction. Native granular soil will provide adequate final backfill, and shall be placed in maximum 8-inch-thick loose lifts that are densified to a minimum of 90 percent relative compaction in all structural areas.

Dewatering

Groundwater was encountered at depths of 7 to 9 feet during exploration and could rise following wet winters. Excavations below the groundwater table will likely require dewatering. Below the waterline, bedding and backfill shall consist of compacted drain rock graded in accordance with the requirements for Class C drain backfill presented in the Carson City *SSPWC* (*SSPWC*, 2012). When drain rock is used as trench backfill, it shall be considered a rock backfill (greater than 30 percent retained on the ¾-inch sieve) and shall be placed in maximum 12-inch-thick loose lifts, with each lift densified by at least 5 complete passes with approved compaction equipment and until no deflection is observed. A separator geotextile (Table 2) shall be placed between the drain rock and any native soil backfill.

Mass Grading

The topographic gradient across the site is minimal, such that mass grading activities will primarily include grading of roadways to subgrade elevation and raising building pads to host townhomes. The native surficial materials will be predominantly fine-grained and clay soils. Native fine-grained and clay soils shall be placed as fill only in nonstructural areas.

The site will be developed densely with townhomes, parking areas, and walking paths, such that few non-structural areas will be available to dispose of excess fine-grained soils. In effect, project economics will require importing structural fill for footings, slabs, pavements and sidewalks, and potentially exporting native fine-grained and clay soils. We recommend imported structural fill satisfy the specifications presented in Table 4 (Guideline Specification for Imported Structural Fill).

TABLE 4 - GUIDELINE SPECIFICATION FOR IMPORTED STRUCTURAL FILL

Sieve Size	**Percent by Weight Passing**	
4 Inch	100	
3/4 Inch	70 – 100	
No. 40	15 – 70	
No. 200	5 – 20	
Percent Passing No. 200 Sieve	**Maximum Liquid Limit**	**Maximum Plastic Index**
5 – 10	50	20
11 – 20	40	15

These recommendations are intended as guidelines to specify a readily available, prequalified material. Adjustments to the recommended limits can be provided to allow the use of other granular, non-expansive material. Any such adjustments must be made and approved by the engineer, in writing, prior to importing fill to the site.

Any structural fill on this project shall be placed in maximum 8-inch-thick loose lifts, each densified to at least 90 percent relative compaction. Nonstructural fill shall be densified to at least 85 percent relative compaction to minimize consolidation and erosion. This is particularly important for yard areas because soil consolidation can cause water to pond in the drainage swales. Loose yard fill also allows water to infiltrate the backfill rather than flowing to the swale. Grading shall not be performed with or on frozen soils.

Seismic Design Parameters

The 2012 *IBC* (ICC, 2012), adopted by Carson City, requires a detailed soils evaluation to a depth of 100 feet to develop appropriate soils criteria. However, the code states that a Site Class D may be used as a default value when the soil properties are not known in sufficient detail to determine the soil profile type. The Site Class D soil profile is for stiff soils with a shear velocity between 600 and 1,200 feet per second, or with an N (Standard Penetration Test [SPT]) value between 15 and 50, or an undrained shear strength between 1,000 and 2,000 pounds per square foot (psf). Based on our experience and the geology at the APN 004-021-13 site, it is our opinion that the default Site Class D is appropriate. With that assumption, the recommended seismic design criteria are presented in Table 5 (Seismic Design Criteria Using 2012 *International Building Code*).

TABLE 5 - SEISMIC DESIGN CRITERIA USING 2012 *INTERNATIONAL BUILDING CODE* (USGS, 2016)	
Approximate Latitude	39.159
Approximate Longitude	-119.758
Spectral Response at Short Periods, S_s, percent of gravity	233.2
Spectral Response at 1-Second Period, S_1, percent of gravity	82.8
Site Class	D
Occupancy Category	II
Site Coefficient F_a, decimal	1.00
Site Coefficient F_v, decimal	1.50
Site Adjusted Spectral Response at Short Periods, S_{MS}, percent of gravity	233.2
Site Adjusted Spectral Response at Long Periods, S_{M1}, percent of gravity	124.2
Design Spectral Response at Short Periods, S_{DS}, percent of gravity	155.4
Design Spectral Response at Long Periods, S_{D1}, percent of gravity	82.8

Foundation

The near-surface fine-grained soils are poor foundation soils, such that footings should not bear directly in these materials. The most economical method of foundation support lies in spread footings bearing on structural fill.

Individual column footings and continuous wall footings underlain by a minimum of 1.5 feet of granular native soil or structural fill can be designed for a net maximum allowable bearing pressure of 2,500 psf, and should have minimum footing widths of 24 and 12 inches, respectively. The net allowable bearing pressure is the pressure at the base of the footing in excess of the adjacent overburden pressure. This allowable bearing value should be used for dead plus ordinary live loads. Ordinary live loads are that portion of the design live load which will be present during the majority of the life of the structure. Design live loads are loads which are produced by the use and occupancy of the building, such as by moveable objects, including people or equipment, as well as snow loads. This bearing value may be increased by one-third for total loads. Total loads are defined as the maximum load imposed by the required combinations of dead load, design live loads, snow loads, and wind or seismic loads.

With this allowable bearing pressure, total foundation movements of approximately ¾ inch should be anticipated. Differential movement between footings with similar loads, dimensions, and base elevations should not exceed two-thirds of the values provided above for total movements. The majority of the anticipated movement will occur during the construction period as loads are applied.

Lateral loads, such as wind or seismic, may be resisted by passive soil pressure and friction on the bottom of the footing. The recommended coefficient of base friction is 0.42 and has been reduced by a factor of 1.5 on the ultimate soil strength. Design values for active and passive equivalent fluid pressures are 38 and 400 psf per foot of depth, respectively. These design values are based on spread footings bearing on and backfilled with structural fill. All exterior footings should be placed a minimum 2 feet below adjacent finished grade for frost protection.

If loose, soft, wet, or disturbed soils are encountered at the foundation subgrade, these soils should be removed to expose undisturbed structural fill material, and the resulting over-excavation backfilled with compacted structural fill. The base of all excavations should be dry and free of loose soils at the time of concrete placement.

Subsidence and Shrinkage

Subsidence of about 0.1 feet should be anticipated from construction traffic. Native soils excavated and recompacted in fills should experience quantity shrinkage of approximately 10 to 15 percent. In other words, 1 cubic yard of excavated native soil will generate about 0.85 to 0.9 cubic yards of fill at 90 percent relative compaction.

Slope Stability and Erosion Control

There are no major cut or fill slopes planned for this project. Dust potential at this site will be moderate during dry periods. Temporary (during construction) and permanent (after construction) erosion control will be required for all disturbed areas. The contractor shall prevent dust from being generated during construction in compliance with all applicable city, county, state, and federal regulations. The contractor shall submit an acceptable dust control plan to the controlling jurisdiction prior to starting site preparation or earthwork. Project specifications should include an indemnification by the contractor of the owner and engineer for any dust generation during the construction period. The owner will be responsible for mitigation of dust after accepting the project.

In order to minimize erosion and downstream impacts to sedimentation from this site, best management practices with respect to stormwater discharge shall be implemented.

Site Drainage

Adequate surface drainage shall be provided so moisture is directed away from structures.

Foundation backfill shall be thoroughly compacted to decrease permeability and reduce the potential for irrigation and stormwater to migrate below the floor slab. The ponding of water on finished grade or at the edge of pavements shall be prevented by grading the site in accordance with *IBC* (ICC, 2012) requirements.

Concrete Slabs

All concrete slabs shall be directly underlain by imported, 1-inch-minus, granular material with a minimum R-value of 60. Type 2, Class B, aggregate base (*SSPWC*, 2012) is the preferred alternate, although other materials may be acceptable for non-dedicated improvements. Base material shall be a minimum of 4 inches beneath curbs, gutters, sidewalks, floor slabs, and private flatwork. Any curbs and gutters along streets dedicated to Carson City shall be underlain by a minimum 6 inches of Type 2, Class B aggregate base (*SSPWC*, 2012). All base courses shall be densified to at least 95 percent relative compaction.

Final design of the floor slab shall be performed by the project structural engineer. Any interior concrete slab-on-grade floors shall be a minimum of 4 inches thick. Floor slab reinforcement, as a minimum, shall consist of No. 3 reinforcing steel placed on 24-inch-centers in each direction or flat sheets of 6x6, W4.0xW4.0 welded wire mesh (WWM). Rolls of WWM are not recommended for use since vertically centered placement of rolled WWM within a floor slab is difficult to achieve. All reinforcing steel and WWM shall be centered in the floor slab through the use of concrete dobies or an approved equivalent.

The Carson City area is a region with exceptionally low relative humidity. As a consequence, concrete flatwork is prone to excessive shrinking and curling. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of concrete and result in cracking, curling, and the spalling of slabs. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute (ACI, 2008) and this report. Special considerations shall be given to concrete placed and cured during hot or cold weather temperatures, low humidity conditions, and windy conditions such as are common in the Carson Valley area.

Proper control joints and reinforcement shall be provided to minimize any damage resulting from shrinkage, as discussed below. In particular, crack-control joints shall be installed on maximum 10-foot-centers and shall be installed to a minimum depth of 25 percent of the slab thickness. Saw-cuts, zip strips, and/or trowel joints are acceptable; however, saw-cut joints must be installed as soon as initial set allows and prior to the development of internal stresses that will result in a random crack pattern. If trowel joints are used in the main living area floor slab, they will need to be grouted over prior to installation of floor coverings.

Concrete shall not be placed on frozen in-place soils.

Any interior concrete slab-on-grade floors will require a moisture barrier system. Installation shall conform to the specifications provided for a Class B vapor restraint (ASTM E 1745-97). The vapor barrier shall consist of placing a 10-mil-thick StegoRap® vapor barrier or an approved equal directly on a properly prepared subgrade surface. A 4-inch-thick layer of aggregate base shall be placed over the vapor barrier and compacted with a vibratory plate.

The base layer that overlies the moisture barrier membrane shall remain compacted and a uniform thickness maintained during the concrete pour, as its intended purpose is to facilitate even curing of the concrete and minimize curling of the slab. Extra attention shall be given during construction to ensure that rebar reinforcement and equipment do not damage the integrity of the vapor barrier. Care must be taken so that concrete discharge does not scour the base material from the vapor barrier. This can be accomplished by maintaining the discharge hose in the concrete and allowing the concrete to flow out over the base layer.

Asphalt Concrete

Asphalt Concrete Pavement Design

Paved areas subject to residential traffic within the townhome development shall consist of 3 inches of asphalt concrete underlain by 6 inches of Type 2, Class B, aggregate base (*SSPWC*, 2012) supported by 12 inches of structural fill providing separation from the native fine-grained and clay soils. As an alternate, the aggregate base section can be increased to 12 inches, eliminating the structural fill separation requirement discussed in the **Site Preparation** section. All aggregate base beneath asphalt pavements shall be densified to at least 95 percent relative compaction.

Pavement Maintenance

Asphalt concrete pavements have been designed for a standard 20-year life expectancy as detailed above. Due to the local climate and available construction aggregates, a 20-year performance life requires diligent maintenance. Between 15 and 20 years after initial construction (average 17 years), major rehabilitation (structural overlay or reconstruction) is often necessary if maintenance has been lax. To achieve maximum performance life, maintenance must include regular crack sealing, seal coats, and patching as needed. Crack filling is commonly necessary every year or at least every other year. Seal coats, typically with a Type II slurry seal, are generally needed every 3 to 6 years, depending on surface wear. Failure to provide thorough maintenance will significantly reduce pavement design life and performance.

Corrosion Potential

Metal Pipe Design Parameters

Laboratory testing was performed to evaluate the corrosion potential of the soils with respect to metal pipe in contact with the ground. The results of the laboratory testing indicate that the site foundation soils exhibit low corrosion potential (American Water Works Association [AWWA], 1999). As a result, metal pipe in contact with the ground will not require corrosion protection.

Portland Cement Concrete Mix Design Parameters

Soluble sulfate content has been determined for representative samples of the site foundation soils. The sulfate was extracted from the soil at a 10:1 water to soil ratio in order to assure that all soluble sodium sulfate was dissolved. The results are reported in milligrams of sulfate per kilogram of soil and can be directly converted to percent by dividing by 10,000. The percent sulfate in the soil is used to determine the sulfate exposure Class (S) from the information presented in Table 6 (Sulfate Exposure Class).

TABLE 6 - SULFATE EXPOSURE CLASS*

			Water-Soluble Sulfate (SO_4) in Soil, Percent by Weight	Dissolved Sulfate (SO_4) in Water, ppm
S Sulfate	Not Applicable	S0	$SO_4 < 0.10$	$SO_4 < 150$
	Moderate	S1	$0.10 \leq SO_4 < 0.20$	$150 \leq SO_4 < 1,500$ Seawater
	Severe	S2	$0.20 \leq SO_4 \leq 2.00$	$1,500 \leq SO_4 \leq 10,000$
	Very Severe	S3	$SO_4 > 2.00$	$SO_4 > 10,000$

*From Table 4.2.1 Exposure Categories and Classes. ACI 318, *Buildings Code and Comments.*

The results of the testing (Appendix A) indicate that concrete in contact with the site foundation soils should be designed for Class S0 Sulfate exposure. Therefore, Type II cement can be used for all concrete work.

Anticipated Construction Problems

Depending on the season of construction, soft, wet surface soils may make it difficult for construction equipment to travel and operate. Relatively shallow groundwater may make trenching difficult unless adequate dewatering activities are performed prior to utility installation.

Quality Control

All plans and specifications should be reviewed for conformance with this geotechnical report and approved by the engineer prior to submitting them to the building department for review.

The recommendations presented in this report are based on the assumption that sufficient field testing and construction review will be provided during all phases of construction. We should review the final plans and specifications to check for conformance with the intent of our recommendations. Prior to construction, a pre-job conference should be scheduled to include, but not be limited to, the owner, architect, civil engineer, general contractor, earthwork and materials subcontractors, building official, and engineer. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to and reviewed by the engineer.

During construction, we should have the opportunity to provide sufficient on-site observation of preparation and grading, over-excavation, fill placement, foundation installation, and paving. These observations would allow us to verify that the geotechnical conditions are as anticipated and that the contractor's work is in conformance with the approved plans and specifications.

Homeowner's Responsibilities

The developer of this project will mitigate potentially expansive soils in driveways and exterior concrete walkways during construction. The homeowner is responsible to mitigate potentially expansive clay soils below any addition flatwork installed by the homeowner (e.g., concrete and/or paver stone walkways, concrete patios, etc.). Such mitigation would include over-excavating clay soils to a minimum depth of 2 feet below the flatwork and backfilling the over-excavation with granular, non-expansive material.

The developer will finish grade the lot to prevent ponding of water adjacent to structural improvements and provide drainage away from the structure in accordance with local building codes. If the homeowner alters the drainage present at the time of sale, either by landscaping and/or making improvements on the lot, he/she must provide drainage way from the structure in accordance with local building codes. If positive drainage is not provided by the homeowner, differential movement of structural improvements could be experienced and result in cracking of interior walls and foundations.

The site is located in an area with active earthquakes in relatively close proximity. While the potential for ground rupture is minimal and liquefaction-induced settlement at the surface is low, the site does lie within a seismically active region with a high potential for ground shaking. The recurrence interval for earthquakes along the major active faults in the region is generally thought to be in the range of 1,000 years or more. The most recent earthquakes in northern Nevada, however, have occurred along lesser-known faults that seem to represent tectonic plate boundary motion. Approximately 85 percent of this motion is taken up along the San Andreas Fault in California, but as much as 15 percent of the plate motion appears to be occurring along numerous, smaller strike-slip faults in western Nevada. The realization that plate boundary faulting extends so far inland is relatively recent, such that the probable recurrence intervals and magnitudes of the consequent earthquakes are unknown. For this reason, and the general high potential for ground shaking in this area, homebuyers should be advised to consider purchasing earthquake insurance. Typically such insurance is of very low cost but has such a high deductible that it is only beneficial during a very large-scale seismic event.

Standard Limitations Clause

This report has been prepared in accordance with generally accepted geotechnical practices. The analyses and recommendations submitted are based on field exploration performed at the locations shown on Plate 1. This report does not reflect soils variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary. We recommend our firm be retained to perform construction observation in all phases of the project related to geotechnical factors to ensure compliance with our recommendations.

Equilibrium water level readings were made on the date shown on Plate 2. Fluctuations in the water table may occur due to rainfall, temperature, seasonal runoff or adjacent irrigation practices. Construction planning should be based on assumptions of possible variations in the water table.

Townhome residential construction results in a complex composite of steel, PCC, lumber and soils. Each element responds differently to loading and, as a consequence, minor cracking and distortion can occur. Such cracking and distortion is not in and of itself evidence of the structure failing to meet a reasonable standard or level of performance, but rather typical of new residential construction. Repair of such conditions is considered aesthetic in nature and not a structural defect.

This report has been produced to provide information allowing the architect or engineer to design the project. The owner is responsible for distributing this report to all designers and contractors whose work is affected by geotechnical aspects. In the event there are changes in the design, location, or ownership of the project from the time this report is issued, recommendations should be reviewed and possibly modified by the engineer. If the engineer is not granted the opportunity to make this recommended review, he or she can assume no responsibility for misinterpretation or misapplication of his or her recommendations or their validity in the event changes have been made in the original design concept without his or her prior review. The engineer makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of this agreement and included in this report.

References

American Concrete Institute (ACI), 2008, *ACI Manual of Concrete Practice: Parts 1 through 5.*

American Society for Testing and Materials (ASTM), 2015, *Soil and Rock (I and II),* Volumes 4.08 and 4.09.

American Water Works Association (AWWA), 1999, *American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems*, American Water Works Association ANSI/AWWA C105/A21.5-99 (Revision of ANSI/AWWA C105/A21.9-93).

Bowles, J. E., 1996, 5th ed., *Foundation Analysis and Design,* McGraw Hill.

Code of Federal Regulations (CFR), 2010, Title 29, Part 1926, Subpart P – Excavations.

Federal Emergency Management Agency (FEMA), 2014 (February 19, 2014), *Flood Insurance Rate Map 3200010092F. Carson City, Nevada.*

International Code Council (ICC), 2012, *International Building Code (IBC).*

Naval Facilities Engineering Command (NAVFAC), 1986a, *Foundations and Earth Structure;* Design Manual 7.2.

NAVFAC, 1986b, *Soil Mechanics,* Design Manual 7.1.

Nelson, John D. and Debora J. Miller, 1992, *Expansive Soils: Problems and Practice in Foundation and Pavement Engineering*, John Wiley and Sons, Inc., New York.

Nevada Earthquake Safety Council (NESC), November 1998, "Guidelines for Evaluating Potential Surface Fault Rupture/Land Subsidence Hazards in Nevada (*Revision 1*)," http://www.nbmg.unr.edu/nesc/guidelines.htm.

Ryall, A. and B. M. Douglas, 1976, *Regional Seismicity,* Reno Folio: Nevada Bureau of Mines and Geology.

Standard Specifications for Public Works Construction (SSPWC), 2012 (Washoe County, Sparks-Reno, Carson City, Yerington, Nevada).

Trexler, Dennis T., 1977, Nevada Bureau of Mines and Geology, *Geologic Map 1Aq - Carson City Folio.*

Trexler, Dennis T. and John W. Bell, 1979, *Earthquake Hazards*, Nevada Bureau of Mines and Geology, *Geologic Map 1Ai - Carson City Folio.*

United States Geological Survey (USGS), 2016, *Earthquake Hazards Program Using 2008 US Seismic Hazard Maps*. Online at http://earthquake.usgs.gov/designmaps/us/application.php, accessed February 2016.

PLATES

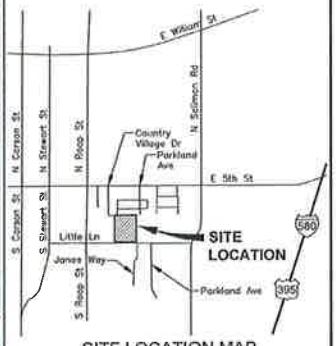
SCALE: 1"=120'
(APPROXIMATE)

LEGEND

TP-01 APPROXIMATE TEST PIT LOCATION

NOTES

1. BASE MAP PROVIDED BY GOOGLE EARTH, INC. AND MANHARD CONSULTING (TOPO).



SITE LOCATION MAP
N.T.S.

Black Eagle Consulting, Inc.
Geotechnical & Construction Services
1345 Capital Boulevard, Suite A
Reno, Nevada 89502-7140
Telephone: 775/329-6690
Facsimile: 775/329-7788

CAPSTONE COMMUNITIES

PLOT PLAN

SINGLE FAMILY TOWNHOMES (APN 004-021-13)

CARSON CITY, NEVADA

Project No.
1487-05-1

Plate 1

LOG OF TEST PIT TP-01

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
							Depth to Ground Water: 7.75 ft. Comments: N 4337904 E 261720 UTM NAD83
A					1	SM	**Silty Sand (Fill)** Dark brown, moist, loose, with an estimated 30% non-plastic to low plasticity fines and 70% fine to coarse sand.
					2	SM	Less than 5% of the total soil mass (tsm) consists of minor organics and occasional debris including metal scraps.
B			13.9	10	3		**Silty Sand** Light brown, moist, medium dense, with an estimated 25% non-plastic to low plasticity fines and 75% fine to medium sand.
					4	SC	
					5		**Clayey Sand** Light brown to olive with orange mottling, moist, medium dense, with 38% low plasticity fines, 61% fine to coarse sand, and 1% fine gravel.
C		1.0-1.5			6	CL	**Sandy Lean Clay** Light gray to tan with orange mottling, moist to very moist, stiff, with an estimated 55% medium plasticity fines and 35% fine to medium sand.
					7		
D					8	SM	**Silty Sand** Light gray to tan, very moist to wet, medium dense, with an estimated 30% non-plastic fines and 70% fine to medium sand.
					9		
					10		

LOG OF TEST PIT TP-02

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
							Depth to Ground Water: 8.0 ft. Comments: N 4337891 E 261777 UTM NAD83
A			15.3	NP	1	ML	**Sandy Silt** Dark brown, moist, stiff, with 53% non-plastic fines and 47% fine to medium sand.
					2		Roots up to 1/2 inch in diameter present to 6 inches below the ground surface (bgs).
B					3	SC	**Clayey Sand** Brown with orange mottling, moist, medium dense, with an estimated 40% low to medium plasticity fines and 60% fine to coarse sand.
					4		
C					5	SM	**Silty Sand** Light brown with orange mottling, moist, medium dense, with an estimated 25% low plasticity fines and 75% fine to coarse sand.
					6		
					7	SM	**Silty Sand** Tan to brown with orange mottling, moist to very moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand.
D		1.0			8	CL	**Lean Clay with Sand** Olive with orange motting, very moist to wet, firm, with an estimated 80% medium plasticity fines and 20% fine to medium sand.
					9		
					10		

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7766

Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

LOG OF TEST PIT TP-03

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4647 (Topo)

Depth to Ground Water: 8.0 ft.
Comments: N 4337967 E 261763 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
					1	SM	**Silty Sand** Dark brown, moist, medium dense, with an estimated 40% non-plastic to low plasticity fines and 60% fine to medium sand.
A					2	SC	Roots up to 1/2 inch in diameter present to 6 inches bgs.
					3		**Clayey Sand** Brown to tan, moist, medium dense, with an estimated 25% low to medium plasticity fines and 75% fine to coarse sand.
					4		
					5	SM	**Silty Sand** Brown to tan, moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand.
					6		
					7		
B					8	SM	**Silty Sand** Olive to brown with orange mottling, very moist to wet, medium dense with an estimated 30% low plasticity fines and 70% fine to medium sand. Contains interbedded silt.
					9		
					10		

LOG OF TEST PIT TP-04

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4647 (Topo)

Depth to Ground Water: 8.5 ft.
Comments: N 4338016 E 261798 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
					1	SM	**Silty Sand** Dark brown, moist, medium dense, with an estimated 40% non-plastic to low plasticity fines and 60% fine to medium sand.
A					2	SC	Roots up to 1/2 inch in diameter present to 6 inches bgs.
B			10.7	12	3		**Clayey Sand** Brown to tan, moist, medium dense, with 28% medium plasticity fines, 69% fine to coarse sand, and 3% fine gravel.
					4	SM	
C					5		**Silty Sand** Tan, moist, medium dense, with an estimated 15% non-plastic fines, 80% fine to coarse sand, and 5% subangular gravel up to 3/8 inch in diameter. Decomposed granite sand.
					6	SM	
					7		**Silty Sand** Reddish brown to orange brown, moist, medium dense, with an estimated 15% non-plastic fines, 75% fine to coarse sand, and 10% subangular gravel up to 1-1/2 inches in diameter. Decomposed granite sand.
					8	SM	
					9		**Silty Sand** Light gray with orange mottling, very moist, medium dense, with an estimated 40% low plasticity fines and 60% fine to medium sand. Contains interbedded silt.
					10		

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7768

Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

LOG OF TEST PIT TP-05

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

Depth to Ground Water: 8.25 ft

Comments: N 4338046 E 261760 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
					1	SM	**Silty Sand** Dark brown, moist, medium dense, with an estimated 40% non-plastic to low plasticity fines and 60% fine to medium sand.
A			9.5	6	2	SC-SM	Roots up to 1/2 inch in diameter present to 6 inches bgs.
					3		**Silty, Clayey Sand** Brown, moist, medium dense, with 19% low plasticity fines, 77% fine to coarse sand, and 4% fine gravel.
B					4	SM	**Silty Sand** Tan, moist, medium dense, with an estimated 15% non-plastic fines, 80% fine to coarse sand, and 5% subangular gravel up to 3/8 inch in diameter. Decomposed granite sand.
					5	SM	**Silty Sand** Light gray to olive with orange mottling, moist to very moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to medium sand.
					6		
					7	SM	**Silty Sand** Light gray to olive with orange mottling, very moist to wet, medium dense, with an estimated 20% non-plastic to low plasticity fines and 80% fine to coarse sand. Very strong mottling.
					8 ▼		
					9		
					10		

LOG OF TEST PIT TP-06

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4649 (Topo)

Depth to Ground Water: 8.7 ft.

Comments: N 4338056 E 261689 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
A			15.1	9	1	SC	**Clayey Sand** Dark brown, moist, medium dense, with 40% low plasticity fines and 60% fine to medium sand.
					2	SC	A 3-inch-thick layer of topsoil and grasses is present in exploration area.
B					3		**Clayey Sand** Brown to tan, moist, medium dense with an estimated 30% low to medium plasticity fines and 70% fine to coarse sand.
					4	SM	**Silty Sand** Light brown to light gray with orange mottling, moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand. Very slight mottling.
					5		
					6		**Silty Sand** Light brown to light gray with orange mottling, very moist to wet, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand. Strong mottling.
					7	SM	
					8 ▼		
					9		
					10		

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7766

Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

LOG OF TEST PIT TP-07

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

Depth to Ground Water: 7.5 ft.
Comments: N 4338014 E 261714 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
A					1	SC	**Clayey Sand** Dark brown, moist, medium dense, with an estimated 40% low to medium plasticity fines and 60% fine to medium sand.
					2	SC	Roots up to 1/2 inch in diameter present to 6 inches bgs.
					3		**Clayey Sand** Brown to tan, moist, medium dense with an estimated 25% low plasticity fines and 75% fine to coarse sand.
B					4		**Silty Sand** Light brown to light gray with orange mottling, moist, medium dense, with an estimated 20% non-plastic fines, 75% fine to coarse sand, and 5% subangular gravel up to 3/8 inch in diameter. Decomposed granite sand.
					5	SM	
					6		**Silty Sand** Brown with orange mottling, very moist to wet, medium dense, with an estimated 10-15% non-plastic fines and 85-90% fine to coarse sand.
					7	SM	
					8		
					9		
					10		

LOG OF TEST PIT TP-08

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4649 (Topo)

Depth to Ground Water: 7.7 ft.
Comments: N 4338007 E 261658 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
A					1	SC	**Clayey Sand** Dark brown, moist, medium dense with an estimated 30% low plasticity fines and 70% fine to coarse sand.
B					2	SC	A 3-inch-thick layer of topsoil and grasses are present in exploration area.
					3		**Clayey Sand** Brown, moist, medium dense, with an estimated 25% low plasticity fines and 75% fine to coarse sand.
					4	SM	**Silty Sand** Light gray to light brown with orange mottling, moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand. Slight mottling.
					5		
C					6	SM	**Silty Sand** Light gray to light brown with orange mottling, very moist to wet, medium dense, with an estimated 35% non-plastic fines and 65% fine to coarse sand. Interbedded silty sand and sandy silt. Strong mottling.
					7		
					8	SM	**Silty Sand** Light gray to light brown with orange mottling, wet, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand.
					9		
					10		

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7766

Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

LOG OF TEST PIT TP-09

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

Depth to Ground Water: 7.9 ft.
Comments: N 4337976 E 261700 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
					1	SM	**Silty Sand** Dark brown, moist, medium dense, with an estimated 25% low plasticity fines and 75% fine to coarse sand.
					2	SM	Fine organics and roots up to 1/2 inch in diameter present to 6 inches bgs.
					3		**Silty Sand** Brown, moist, medium dense, with an estimated 20% low plasticity fines and 80% fine to coarse sand.
					4	SM	**Silty Sand** Brown to tan, moist, medium dense, with an estimated 15% non-plastic fines, 80% fine to coarse sand, and 5% subangular gravel up to 3/8 inch in diameter. Decomposed granite sand.
					5		
					6		**Silty Sand** Light brown to light gray with orange mottling, moist to wet, with an estimated 40% non-plastic to low plasticity fines and 60% fine to coarse sand. Interbedded silty sand and sandy silt.
					7	SM	
					8 ▼		
					9		
					10		

LOG OF TEST PIT TP-10

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

Depth to Ground Water: 7.5 ft.
Comments: N 4337956 E 261660 UTM NAD83

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
A			15.9	12	1	SC	**Clayey Sand** Dark brown, moist, medium dense, with 45% medium plasticity fines and 55% fine to medium sand. Very slight mottling.
					2		Fine organics and roots up to 1/2 inch in diameter present to 6 inches bgs.
					3		
					4	SM	**Silty Sand** Tan, moist, medium dense, with an estimated 20% non-plastic fines and 80% fine to coarse sand. No mottling.
					5		
					6	SM	**Silty Sand** Light gray to light brown with orange mottling, moist to wet, with an estimated 25% low plasticity fines and 75% fine to coarse sand. Interbedded fine and coarse silty sand.
					7 ▼		
					8		
					9		
					10		

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7766

Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

LOG OF TEST PIT TP-11

Date Excavated: 2/15/2016 Logged by: JP

Equipment: Kubota KX91-3 Surface Elevation (ft) 4648 (Topo)

Depth to Ground Water: 7.5 ft.
Comments:

SAMPLE NUMBER	SAMPLE	POCKET PEN. (tsf)	MOISTURE (%)	PI	DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION
A					1–3	SC	**Clayey Sand** Dark brown, moist, medium dense, with an estimated 40% low to medium plasticity fines and 60% fine to medium sand. Fine organics and roots up to 1/2 inch in diameter present to 12 inches bgs.
					3–5	SM	**Silty Sand** Tan, moist, medium dense, with an estimated 20% non-plastic to low plasticity fines and 80% fine to coarse sand. Decomposed granite sand.
B					6–7 ▼	ML	**Sandy Silt** Light gray to light brown with orange mottling, wet, firm, with an estimated 50% low plasticity fines and 50% fine to coarse sand. Interbedded silt and silty sand.
					8–10	SM	**Silty Sand** Light gray to light brown with orange mottling, wet, medium dense, with an estimated 30% non-plastic fines and 70% fine to coarse sand.

BEC-TP1 1487051.GPJ LAGNNN07.GDT 3/2/2016

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Phone: (775) 359-6600 Fax: (775) 359-7766

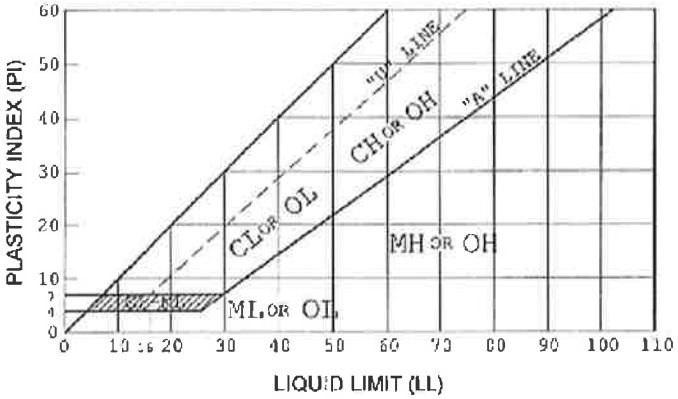
Capstone Communities
Single Family Townhomes APN 004-021-13
Carson City, NV 1487-05-1 Plate 2

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL MATERIAL				--	FILL MATERIAL, NON-NATIVE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

PLASTICITY CHART



FOR CLASSIFICATION OF FINE-GRAINED SOILS AND FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS

EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample		Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	# 4 to #200 sieve (4.75mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft;	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Telephone: (775) 359-6600
Fax: (775) 359-7766

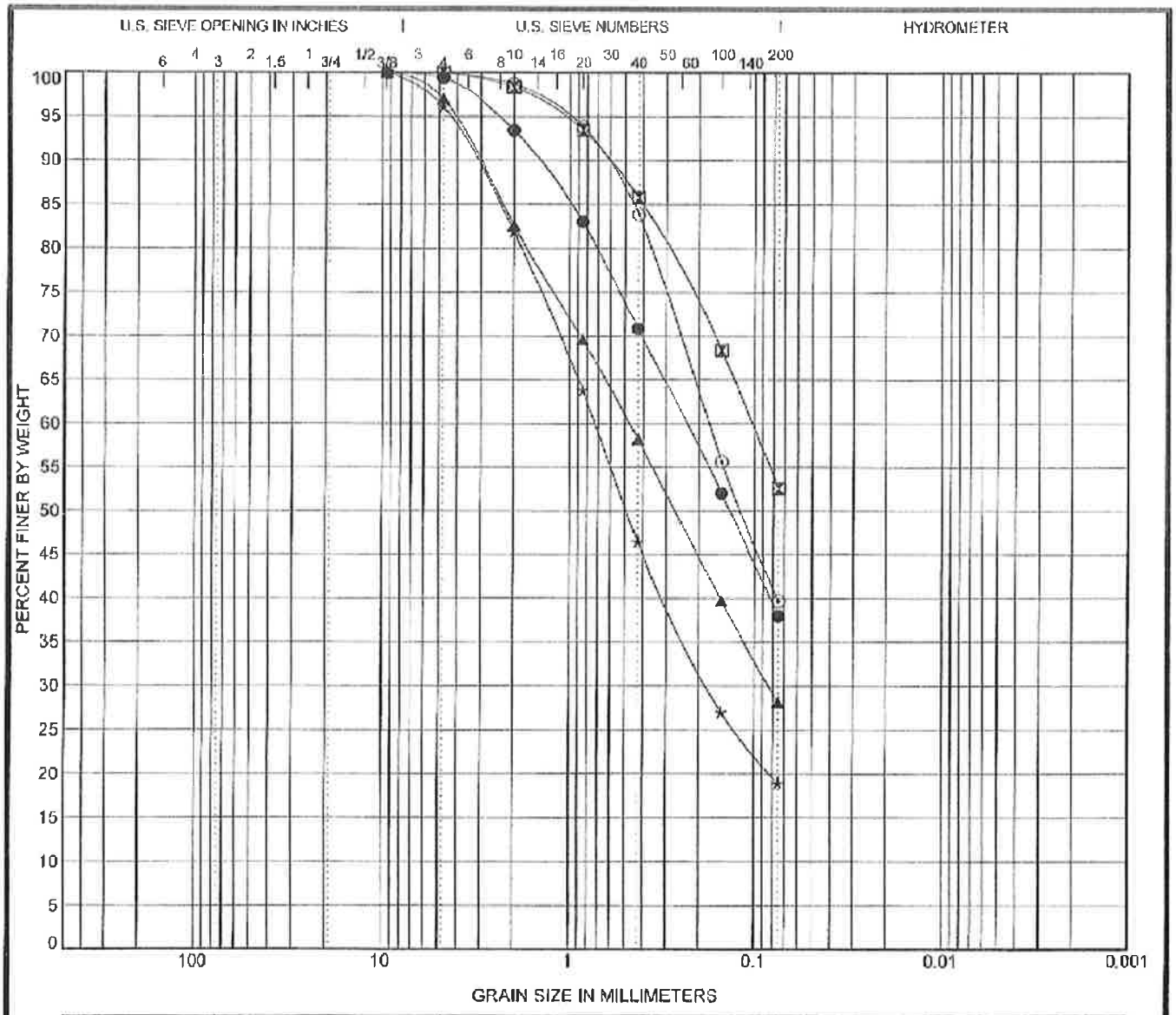
USCS Soil Classification Chart

Project: Single Family Townhomes APN 004-021-13

Location: Carson City, NV

Project Number: 1487-05-1 Plate: 3

USCS CHART 1487051.GPJ US LAB.GDT 2/23/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			USCS Classification	LL	PL	PI	Cc	Cu
●	TP-01	3.0'	CLAYEY SAND (SC)	32	22	10		
⊠	TP-02	0.0'	SANDY SILT (ML)	NP	NP	NP		
▲	TP-04	1.5'	CLAYEY SAND (SC)	30	18	12		
★	TP-05	2.0'	SILTY, CLAYEY SAND (SC-SM)	26	20	6		
⊙	TP-06	0.0'	CLAYEY SAND (SC)	27	18	9		

Specimen Identification			D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
●	TP-01	3.0'	9.5	0.233			13.9	0.6	61.4	38.0	
⊠	TP-02	0.0'	4.75	0.104			15.3	0.0	47.4	52.6	
▲	TP-04	1.5'	9.5	0.474	0.084		10.7	2.9	69.0	28.1	
★	TP-05	2.0'	9.5	0.73	0.176		9.5	3.8	77.3	18.9	
⊙	TP-06	0.0'	4.75	0.176			15.1	0.0	60.3	39.7	

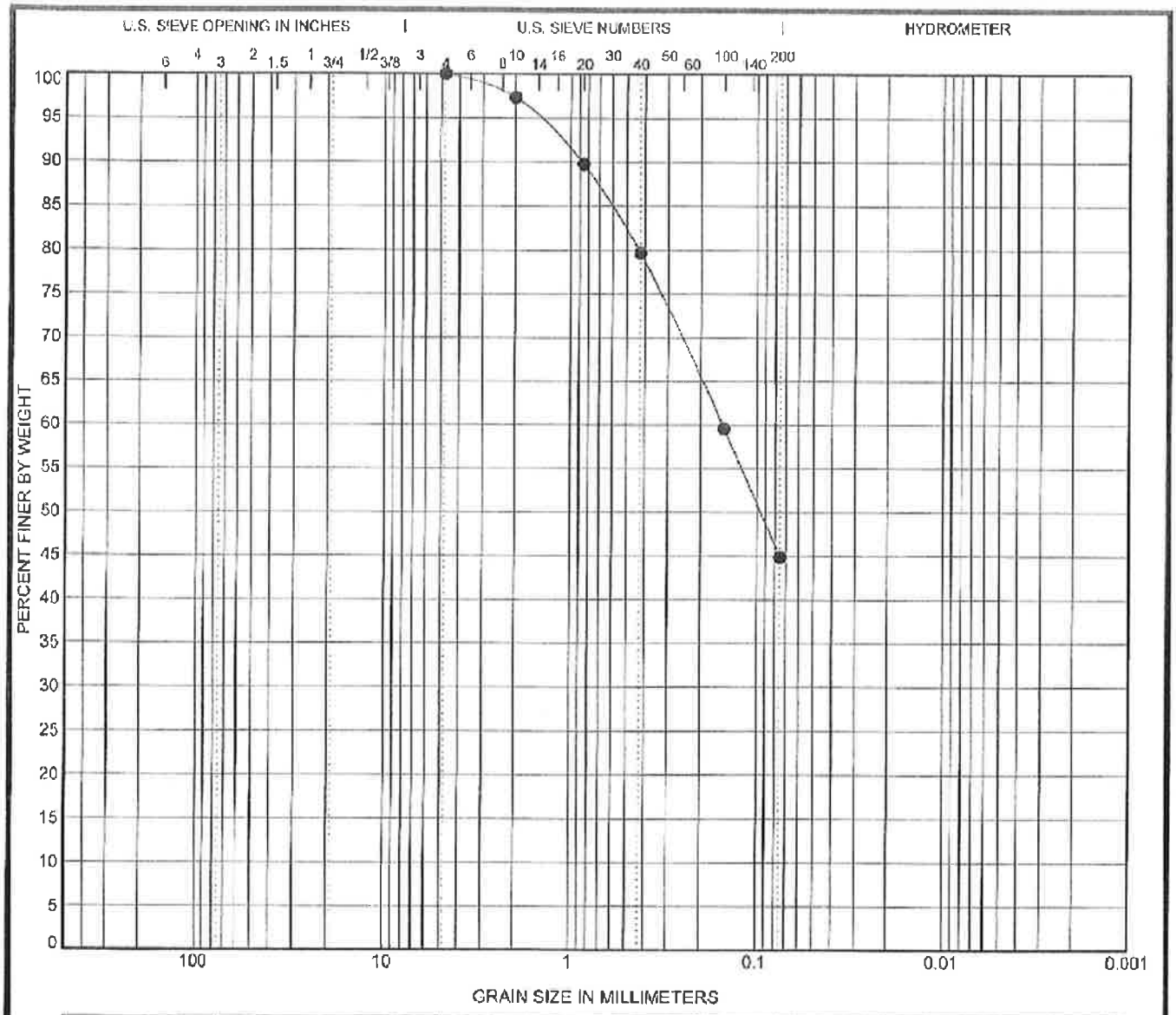
Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Telephone: (775) 359-6600
Fax: (775) 359-7766

GRAIN SIZE DISTRIBUTION

Project: Single Family Townhomes APN 004-021-13

Location: Carson City, NV

Project Number: 1487-05-1 Plate: 4a



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● TP-10	1.0'	CLAYEY SAND (SC)	30	18	12		

Specimen Identification		D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
● TP-10	1.0'	4.75	0.153			15.9	0.0	55.1	44.9	

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Telephone: (775) 359-6600
Fax: (775) 359-7766

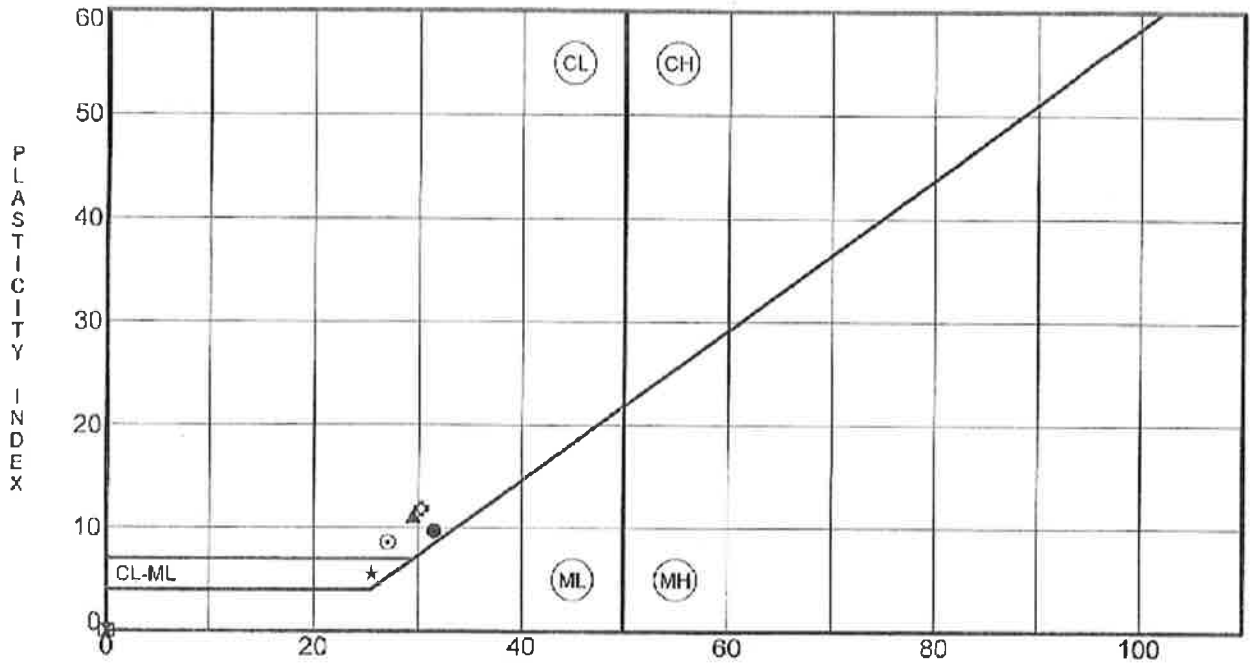
GRAIN SIZE DISTRIBUTION

Project: Single Family Townhomes APN 004-021-13

Location: Carson City, NV

Project Number: 1487-05-1 Plate: 4b

US GRAIN SIZE 1487051.GPJ US LAB.GDT 2/23/2016



Specimen Depth in Feet.

	Specimen Identification			LL	PL	PI	Fines	USCS Classification
●	TP-01	B	3.0'	32	22	10	38	CLAYEY SAND (SC)
⊠	TP-02	A	0.0'	NP	NP	NP	53	SANDY SILT (ML)
▲	TP-04	B	1.5'	30	18	12	28	CLAYEY SAND (SC)
★	TP-05	A	2.0'	26	20	6	19	SILTY, CLAYEY SAND (SC-SM)
⊙	TP-06		0.0'	27	18	9	40	CLAYEY SAND (SC)
✿	TP-10	A	1.0'	30	18	12	45	CLAYEY SAND (SC)

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Telephone: (775) 359-6600
Fax: (775) 359-7766

ATTERBERG LIMITS RESULTS

Project: Single Family Townhomes APN 004-021-13

Location: Carson City, NV

Project Number: 1487-05-1 Plate: 4c

APPENDIX A

CHEMICAL TEST RESULTS

Laboratory Report
Report ID: 146714

Sierra Environmental Monitoring

Black Eagle Consulting, Inc.
Attn: Jeff Wilbrecht
1345 Capital Blvd., Suite A
Reno, NV 89502-7140

Date: 3/1/2016
Client: BEC-100
Taken by: J. Wilbrecht
PO #:

Analysis Report

Laboratory Accreditation Number: NV-00015

Laboratory Sample ID	Customer Sample ID	Date Sampled	Time Sampled	Date Received
S201602-0724	1487-05-1 TP-02 A 0'	2/15/2016	10:00 AM	2/19/2016

Parameter	Method	Result	Units	Reporting Limit	Analyst	Date Analyzed	Data Flag
pH - Saturated Paste	SW-846 9045A	8.31	pH Units		Lax	2/22/2016	
pH - Temperature	SW-846 9045A	21.4	°C		Lax	2/22/2016	
Redox Potential	SM 2580 B	382	MV		Faulstich	2/29/2016	
Resistivity	EPA 120.1	6700	ohm cm		Lax	3/1/2016	
Sulfate - Ion Chromatography	EPA 300.0	5	mg/Kg	2	Mott	2/29/2016	
Sulfide	EPA 376.1	NEGATIVE	Pos/Neg	1	Faulstich	2/29/2016	

Data Flag Legend:

John Faulstich
Laboratory Director

1135 Financial Blvd.
Reno, Nv 89502-2348
Phone (775) 857-2400 Fax
(888) 398-7002
jnava@sem-analytical.com

Carly Wood
Quality Assurance Manager

Tentative Map for ARBOR VILLAS

Carson City, Nevada

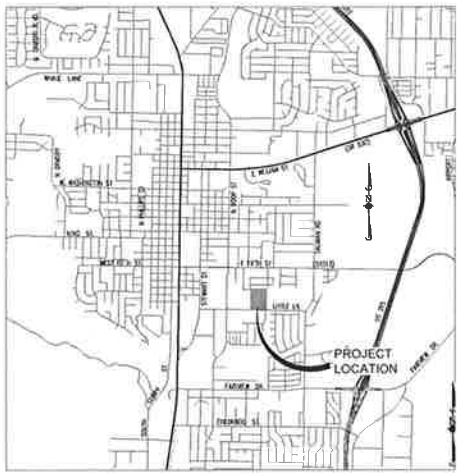
STANDARD SYMBOLS

EXISTING | PROPOSED

STORM SEWER
SANITARY SEWER
FORCEMAIN
WATER MAIN
GAS
ELECTRIC
TELEPHONE
SANITARY MANHOLE
SANITARY CLEANOUT
STORM MANHOLE
CATCH BASIN
HAY BALES
RIP RAP
FLARED END SECTION
HEADWALL
STREET LIGHT
INV/ INVERT BUBBLE
INV/ INVERT BUBBLE
HEADWALL INVERT BUBBLE
DITCH OR SWALE
DIRECTION OF FLOW
OVERFLOW RELIEF SWALE
1 FOOT CONTOURS
ROADWAY GRADE BREAK
CURB AND GUTTER
SIDEWALK
ACCESSIBLE CURB RAMP
PROPERTY LINE
SIGN
POWER POLE
GUY WIRE
GAS VALVE
MANHOLE
ELECTRICAL BOX
TELEPHONE PEDESTAL
CHAIN-LINK FENCE
TOP OF CURB ELEVATION
TOP OF WALL ELEVATION
FINISH GRADE ELEVATION
GROUND ELEVATION
FLOWLINE ELEVATION
EDGE OF PAVEMENT ELEVATION
ROCKERY WALL
RETAINING WALL
LANDSCAPE WALL
CLASS "A" MONUMENT

ABBREVIATIONS

Call before you Dig
1-800-227-2600



VICINITY MAP

N.T.S.

Manhard CONSULTING LTD

Civil Engineers • Surveyors • Water Resources Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

INDEX OF SHEETS

PROPERTY OWNER

ANDERSON FAMILY ASSOCIATES
P.O. BOX 1746,
CARSON CITY, NV 89702

PROJECT DEVELOPER

CAPSTONE COMMUNITIES, LLC
9441 DOUBLE DIAMOND PKWY #14
RENO, NV 89521

CIVIL ENGINEER

MANHARD CONSULTING, LTD.
9850 DOUBLE R BLVD., SUITE 101
RENO, NV 89521
CONTACT: ANDREW MOTTER
PHONE: (775)-746-3500

LANDSCAPE ARCHITECT

L.A. STUDIO NEVADA
1302 C STREET
SPARKS, NV 89431
CONTACT: RYAN HANSEN
PHONE: (775)-333-2223

BASIS OF BEARINGS

NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994 (NAD 83/94) AS SHOWN ON "2010 CARSON CITY CONTROL NETWORK" RECORD OF SURVEY MAP NO. 2749 RECORDED ON AUGUST 11, 2010 IN THE CARSON CITY RECORDERS OFFICE AS FILE NO. 403435. THE DIMENSIONS SHOWN HEREON ARE GROUND DISTANCES. COMBINED GRID TO GROUND SCALE FACTOR = 1.0002.

BASIS OF ELEVATION

ELEVATIONS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), AS TAKEN FROM CARSON CITY CONTROL POINT #CC036, WITH A PUBLISHED ELEVATION OF 4729.13 FEET. CONTROL POINT #CC036 IS DESCRIBED AS BEING A 2" DIAMETER BRASS DISK STAMPED "CC036 2010" LOCATED ON THE WEST SIDE OF SILVER SAGE DRIVE, 100 FEET+/- NORTH OF THE INTERSECTION OF SILVER SAGE DRIVE AND HORIZON DRIVE.

PROJECT LOCATION

THE PROPERTY LIES IN THE NE ¼ AND SE ¼ OF THE SE ¼ OF SECTION 29 TOWNSHIP 15N RANGE 20E.

PROJECT DATA

ASSESSOR PARCEL NUMBERS	-	004-021-13
TOTAL SITE AREA	-	449,104 SF
TOTAL LOT AREA	-	156,688 SF
TOTAL UNITS	-	147
AVERAGE LOT SIZE	-	1,066 SF
CURRENT ZONING	-	MFA
FEMA FLOOD HAZARD ZONE	-	SHADED ZONE X

ENGINEER'S STATEMENT

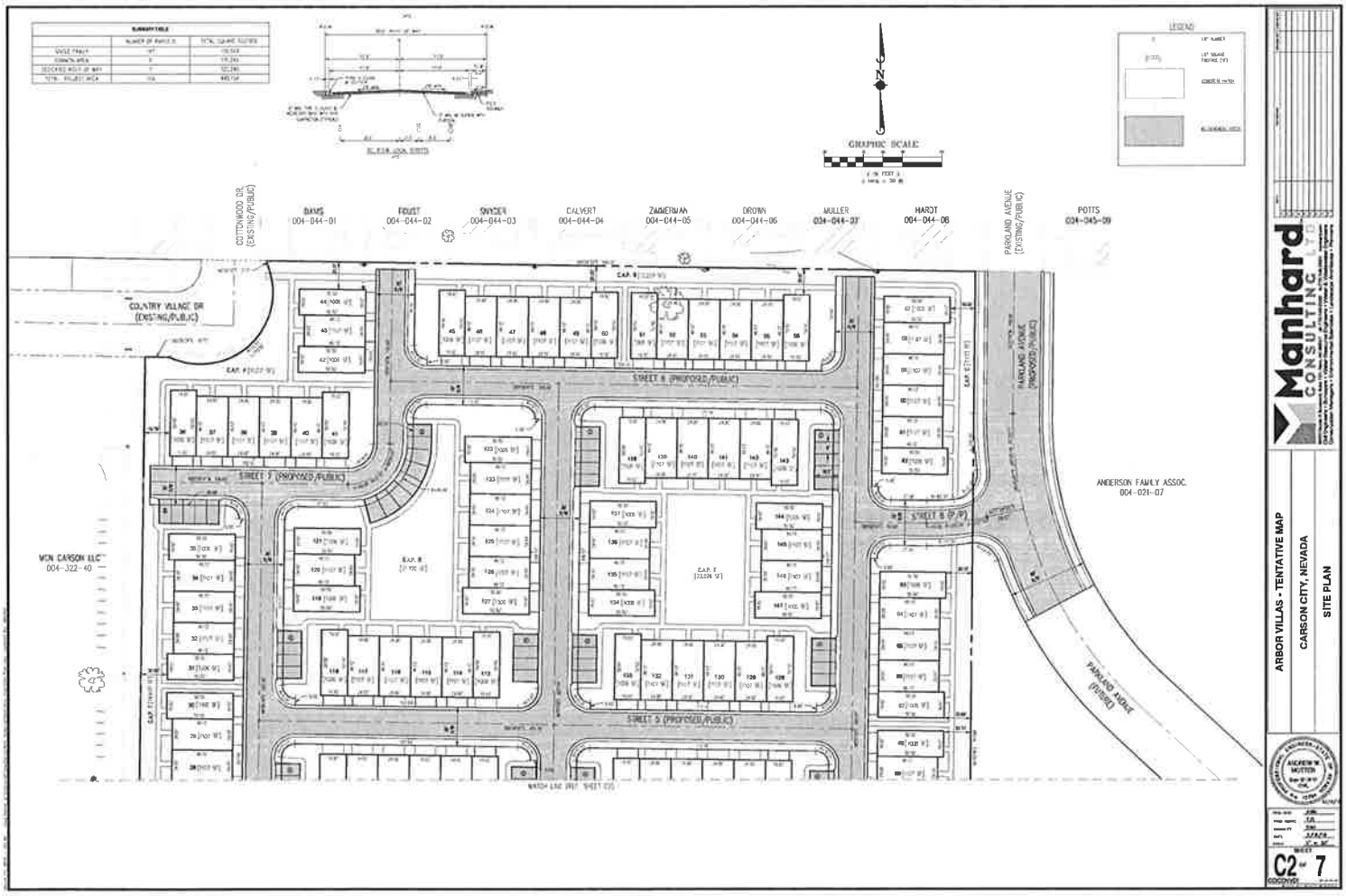
I, ANDREW W. MOTTER, DO HERBY CERTIFY THAT THIS MAP HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION AND WAS COMPLETED ON THIS 3RD DAY OF MARCH, 2018.

ANDREW W. MOTTER
MOTTER
CIVIL

ANDREW W. MOTTER | P.E.#13794

ARBOR VILLAS - TENTATIVE MAP
CARSON CITY, NEVADA
TITLE SHEET

SHEET C1 OF 7



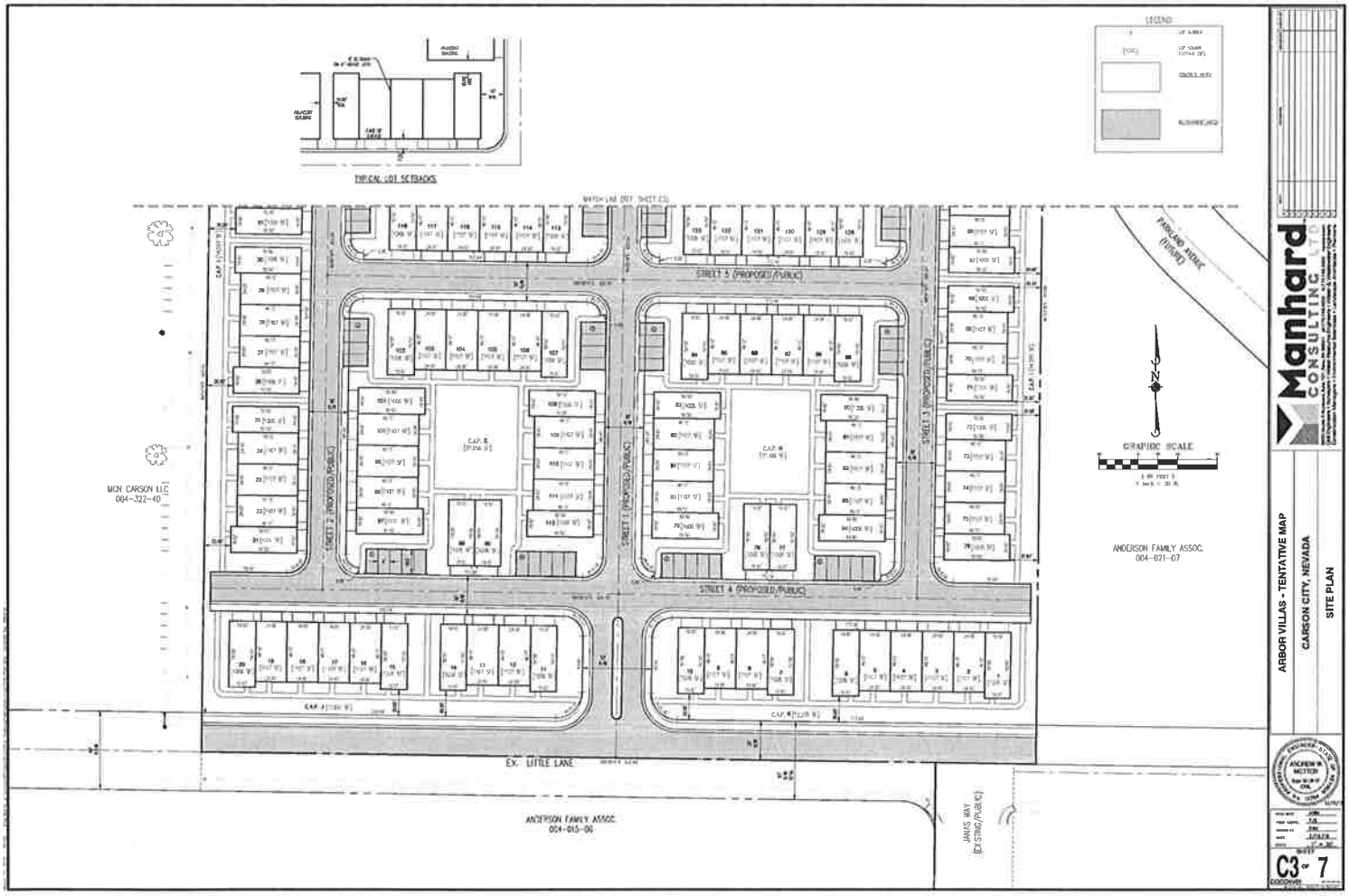
Manhard CONSULTING

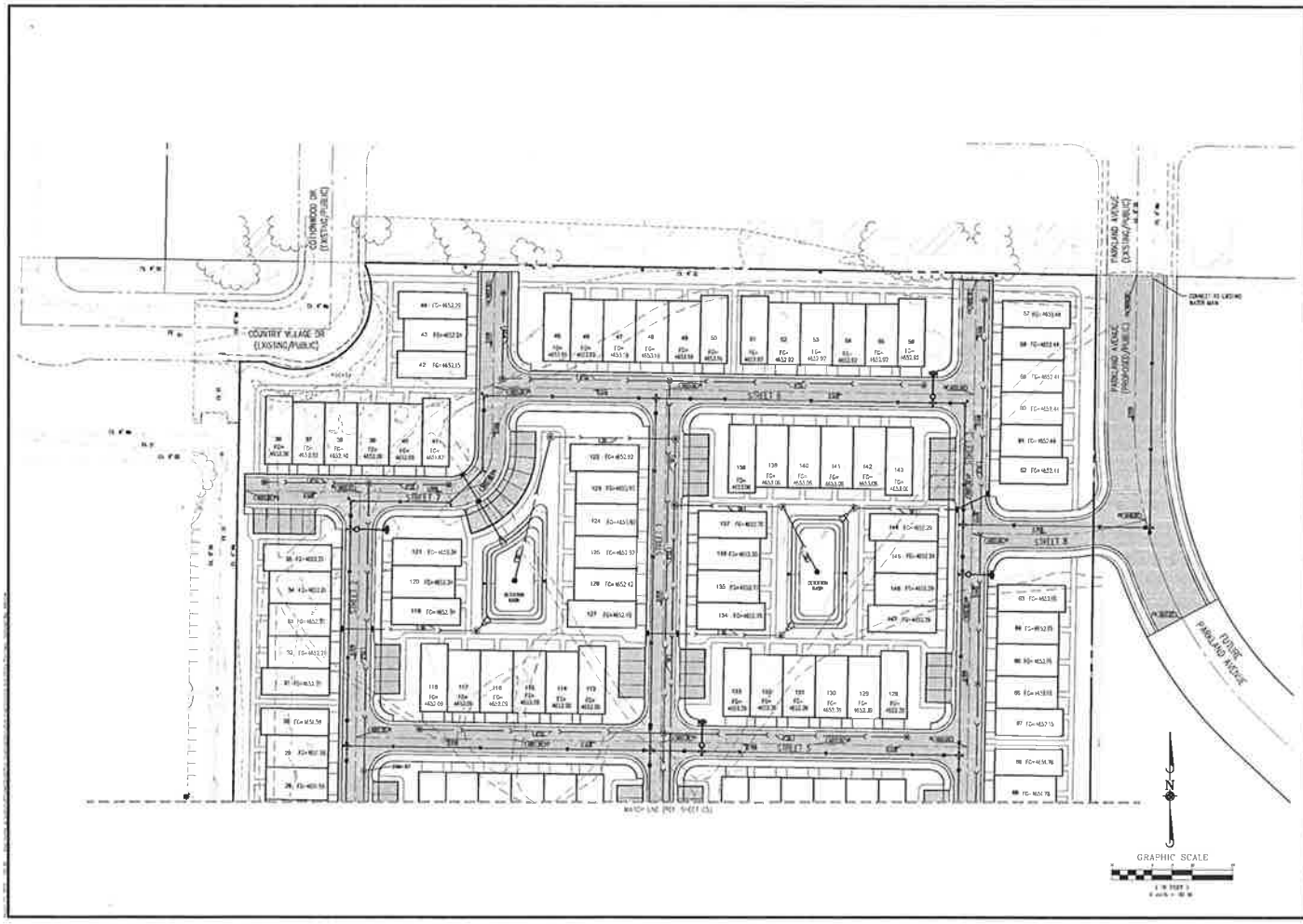
ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

SITE PLAN

SHEET C2 OF 7


TYPICAL LOT SETBACKS
LEGEND
MATCH LINE (SEE SHEET C3)
STREET 5 (PROPOSED/PUBLIC)
STREET 3 (PROPOSED/PUBLIC)
STREET 2 (PROPOSED/PUBLIC)
STREET 1 (PROPOSED/PUBLIC)
STREET 4 (PROPOSED/PUBLIC)
C.A.P. E
C.A.P. W
C.A.P. A
C.A.P. B
C.A.P. C
C.A.P. D
FAIRLAND AVENUE (PUBLIC)
GRAPHIC SCALE
MON CARSON LLC
004-322-40
ANDERSON FAMILY ASSOC.
004-021-07
EX. LITTLE LANE
ANDERSON FAMILY ASSOC.
004-015-06
JANAS WAY
(EXISTING/PUBLIC)
Manhard CONSULTING
ARBOR VILLAS - TENTATIVE MAP
CARSON CITY, NEVADA
SITE PLAN
C3 OF 7



Manhard CONSULTING

ARBOR VILLAS - TENTATIVE MAP

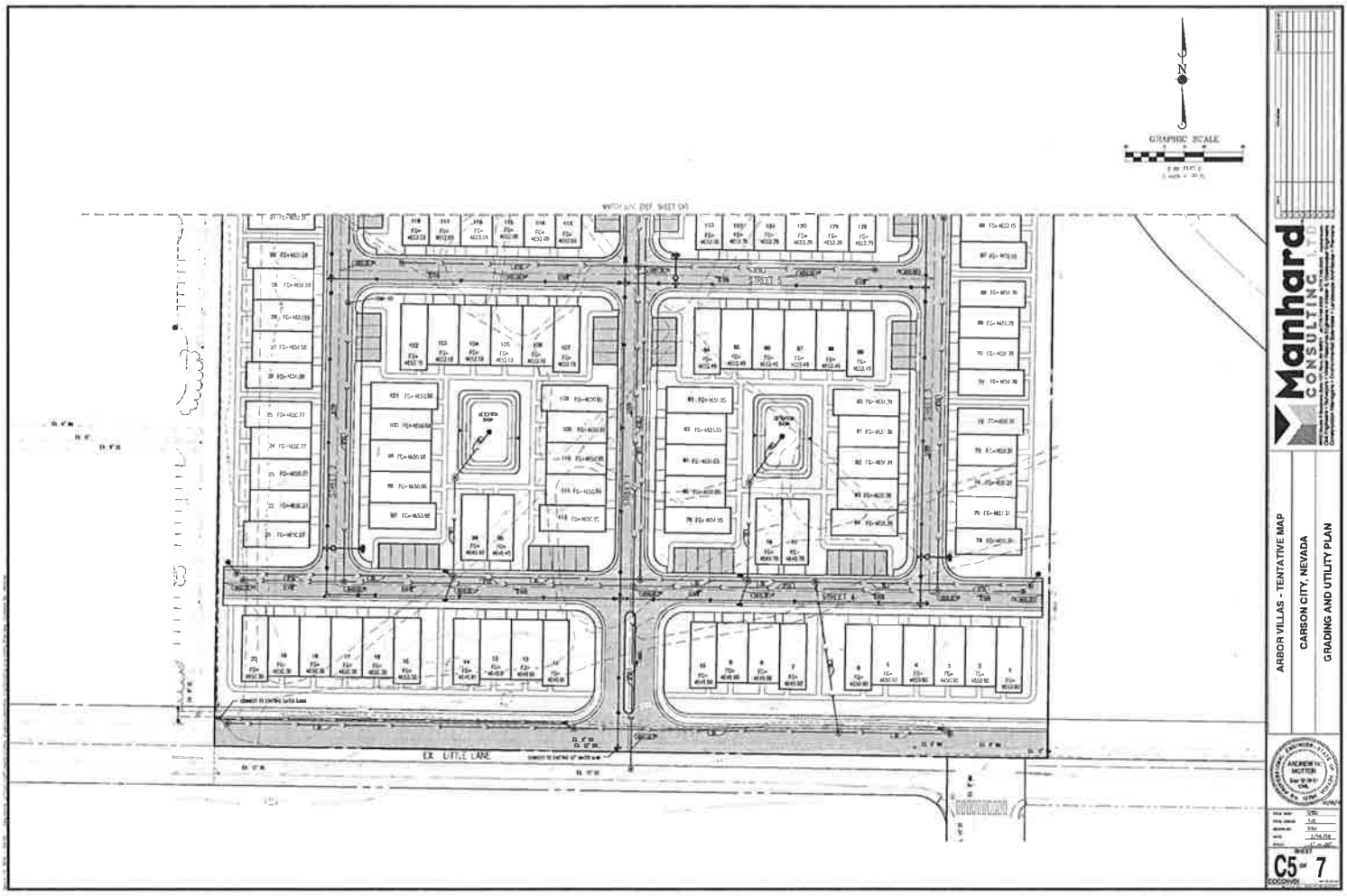
CARSON CITY, NEVADA

GRADING AND UTILITY PLAN

ANDREW M. MOTION

3/28/08

SHEET C4 OF 7



Manhard CONSULTING

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

GRADING AND UTILITY PLAN

SHEET C5 OF 7

Manhard CONSULTING

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

EROSION CONTROL PLAN

C6 OF 7

LANDSCAPE LEGEND

DECIDUOUS SHADE TREE
- PLATANUS X ACERIFOLIA 'BLOODGOOD'/LONDON PLANE
- QUERCUS RUBRA/NORTHERN RED OAK

FLOWERING ORNAMENTAL TREE
- ACER PLATANOIDES 'COLUMNAR'/COLUMNAR MAPLE
- CELTIS OCCIDENTALIS/COMMON HACKBERRY
- PYRUS CALLERYANA/FLOWERING PEAR

EVERGREEN TREE
- PICEA PUNGENS/BLUE SPRUCE
- PINUS NIGRA/AUSTRIAN PINE
- PINUS S. 'FASTIGIATA'/COLUMNAR WHITE PINE

SHRUB PLANTING BEDS
- BUXUS X 'GREEN MOUNTAIN'/BOXWOOD
- CORNUS SERICEA 'ISANTI'/RED TWIG DOGWOOD
- EUONYMUS FORTUNEI/WINTERCREEPER
- FORSYTHIA X INTERMEDIA /FORSYTHIA
- JUNIPERUS CHINENSIS/SPARTAN JUNIPER
- ROSA X GROUNDCOVER/RED GROUNDCOVER ROSE
- WEIGELA 'NANA VARIEGATA'/ROSE PINK WEIGELA

NOTES:
- DECIDUOUS TREES SHALL BE 2" CALIPER MINIMUM.
- EVERGREEN TREES SHALL BE 6 FT HEIGHT AND COMPRISE NO MORE THAN 40% OF THE TOTAL TREE COUNT
- SHRUBS: 5 GALLON MIN.
- PERENNIALS: 1 GALLON MIN.

GENERAL NOTES

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

2) FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL AND WATER REGIMES. ALL TREES WILL BE STAKED SO AS TO REMAIN UPRIGHT AND PLUMB FOLLOWING INSTALLATION. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1)

3) ALL PLANTER BEDS WILL RECEIVE 4" DEPTH OF MULCH WITH WEED CONTROL.

4) ALL LANDSCAPING WILL BE AUTOMATICALLY IRRIGATED UNLESS NOTED OTHERWISE ON THE PLAN. CONTAINER PLANTINGS WILL BE DRIP IRRIGATED. A REDUCED-PRESSURE-TYPE BACKFLOW PREVENTOR WILL BE PROVIDED ON THE IRRIGATION SYSTEM AS REQUIRED PER CODE.

LANDSCAPE DATA

SITE AREA: [illegible] ACRES
BUILDING AREA: 136,656 SF
SITE AREA EXCLUDING BUILDING: 292,447 SF

LANDSCAPE AREA REQUIRED: 58,490 SF
(20% OF SITE AREA EXCLUDING BLDG.)

LANDSCAPE AREA PROVIDED: [illegible] SF MINIMUM

TREES REQUIRED: 146 (1 PER 400 SF OF REQUIRED LANDSCAPE AREA)

THE FOLLOWING TREES SHALL BE INCLUDED AS PART OF THE REQUIRED TREE COUNT:
- 3 PARKING AREA TREES (1 PER 10 PARKING SPACES (25))
- 32 STREET TREES (1 PER 30 LINEAL FEET OF STREET FRONTAGE)
  - LITTLE LANE (625 LF)
  - PARKLAND AVE (210 LF)
  - COUNTRY VILLAGE DR. (125 LF)

TREES PROVIDED: 148

SHRUBS (MIN. REQUIRED): 876 (6 SHRUBS PER TREE)

0 40' 80' 120'
Scale In Feet

L.A. StudioNevada
The landscape architecture studio

Preliminary Landscape Plan
ARBOR VILLA'S
Capstone Communities

Sheet
L1
of
1

Tentative Map
for
ARBOR VILLAS
Carson City, Nevada

INDEX OF SHEETS

STANDARD SYMBOLS

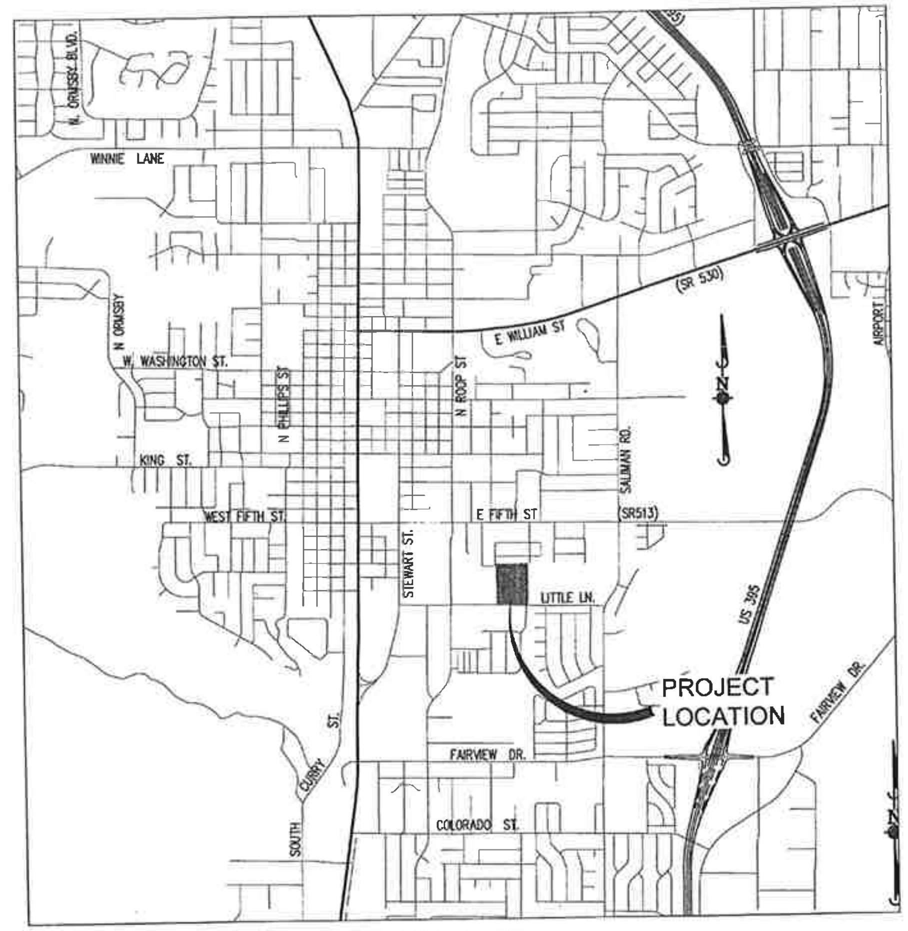
EXISTING / PROPOSED

- STORM SEWER
- SANITARY SEWER
- FORCEMAIN
- WATER MAIN
- GAS
- ELECTRIC
- TELEPHONE
- SANITARY MANHOLE
- SANITARY CLEANOUT
- STORM MANHOLE
- CATCH BASIN
- HAY BALES
- RIP RAP
- FLARED END SECTION
- HEADWALL
- STREET LIGHT
- RIM/ INVERT BUBBLE (795.2 RIM, 790.25 INV.)
- RIM/ INVERT BUBBLE (795.2 RIM, 790.25 INV. IN, 790.25 INV. OUT)
- HEADWALL INVERT BUBBLE (790.25 INV.)
- DITCH OR SWALE
- DIRECTION OF FLOW
- OVERFLOW RELIEF SWALE
- 1 FOOT CONTOURS (764 / 680)
- ROADWAY GRADE BREAK
- CURB AND GUTTER
- SIDEWALK
- ACCESSIBLE CURB RAMP
- PROPERTY LINE
- SIGN
- POWER POLE
- GUY WIRE
- GAS VALVE
- HANDHOLE
- ELECTRICAL BOX
- TELEPHONE PEDISTAL
- CHAIN-LINK FENCE
- TOP OF CURB ELEVATION (61.30 TC / 62.60 TC)
- TOP OF WALL ELEVATION (61.30 TW / 62.60 TW)
- FINISH GRADE ELEVATION (61.30 FG / 62.60 FG)
- GROUND ELEVATION (756.0 / 62.60 GR)
- FLOWLINE ELEVATION (62.60 FL)
- EDGE OF PAVEMENT ELEVATION (756.0 EX P / 62.60 EP)
- ROCKERY WALL
- RETAINING WALL
- LANDSCAPE WALL
- CLASS "A" MONUMENT

ABBREVIATIONS

AGG.	AGGREGATE GRAVEL	FES	FLARED END SECTION	PT	POINT OF TANGENCY
B.A.M.	BIT. AGG. MIXTURE	FF	FINISHED FLOOR	PVC	POLYVINYL CHLORIDE PIPE
B-B	BACK TO BACK	FL	FLOW LINE	PVI	POINT OF VERTICAL INTERSECTION
BC	BEGGINING OF CURB	FLG	FLANGE	P	PAVEMENT
BFC	BACK FACE OF CURB	FM	FORCE MAIN	R	RADIUS
BIT.	BITUMINOUS CONCRETE	FG	FINISH GRADE	RCP	REINFORCED CONCRETE PIPE
BM	BENCHMARK	GAS	GAS	ROW	RIGHT-OF-WAY
B.O.	BY OTHERS	GW	GUY WIRE	RR	RAILROAD
B/P	BOTTOM OF PIPE	HDWL	HEADWALL	SS	SANITARY SEWER
BVC	BEGINING OF VERTICAL CURVE	HH	HANDHOLE	SF	SQUARE FOOT
BW	BOTTOM OF WALL	HP	HIGH POINT	SHLD.	SHOULDER
CB	CATCH BASIN	HWL	HIGH WATER LEVEL	SL	STREET LIGHT
CL	CENTERLINE	HYD.	HYDRANT	SSMH	SANITARY SEWER MANHOLE
CMP	CORRUGATED METAL PIPE	INL	INLET	SD	STORM DRAIN
CNTRL	CONTROL	INV.	INVERT	SDMH	STORM DRAIN MANHOLE
CONC.	CONCRETE	I.E.	INVERT ELEVATION	STA.	STATION
CY	CUBIC YARD	IP	IRON PIPE	SY	SQUARE YARDS
D	DITCH	LP	LOW POINT	TBR	TO BE REMOVED
DIA.	DIAMETER	MAX.	MAXIMUM	T	TELEPHONE
DIP	DUCTILE IRON PIPE	MB	MAILBOX	TC	TOP OF CURB
DIWM	DUCTILE IRON WATER MAIN	MIN.	MINIMUM	T/P	TOP OF PIPE
DT	DRAIN TILE	MJ	MECHANICALLY RESTRAINED JOINT	TW	TOP OF WALL
E	ELECTRIC	NWL	NORMAL WATER LEVEL	TRANS	TRANSFORMER
EC	END OF CURVE	PC	POINT OF CURVE	VB	VALVE BOX
E-E	EDGE TO EDGE	PCC	POINT OF COMPOUND CURVE	VV	VALVE VAULT
ELEV.	ELEVATION	PI	POINT OF INTERSECTION	WL	WATER LEVEL
EP	EDGE OF PAVEMENT	PL	PROPERTY LINE	WM	WATER MAIN
EVC	END OF VERTICAL CURVE	PO	PUSH ON		
EX.	EXISTING	PP	POWER POLE		
F-F	FACE TO FACE	PROP.	PROPOSED		

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)



VICINITY MAP
N.T.S.

Manhard CONSULTING LTD
9850 Double R Blvd, Suite 101, Reno, NV 89521 tel: (775) 746-3500 fax: (775) 746-3520 www.manhard.com
Civil Engineers · Surveyors · Water Resources Engineers · Water & Wastewater Engineers
Construction Managers · Environmental Scientists · Landscape Architects · Planners

PROPERTY OWNER

ANDERSEN FAMILY ASSOCIATES
P.O. BOX 1746,
CARSON CITY, NV 89702

PROJECT DEVELOPER

CAPSTONE COMMUNITIES, LLC
9441 DOUBLE DIAMON PKWY #14
RENO, NV 89521

CIVIL ENGINEER

MANHARD CONSULTING, L.T.D.
9850 DOUBLE R BLVD., SUITE 101
RENO, NV 89521
CONTACT: ANDREW MOTTER
PHONE: (775)-746-3500
EMAIL: dbirchfield@manhard.com

LANDSCAPE ARCHITECT

L.A. STUDIO NEVADA
1552 C. STREET
SPARKS, NV 89431
CONTACT: RYAN HANSEN
PHONE: (775)-323-2223
EMAIL: ryan@lastudionevada.com

BASIS OF BEARINGS

NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994 (NAD 83/94) AS SHOWN ON "2010 CARSON CITY CONTROL NETWORK" RECORD OF SURVEY MAP NO. 2749 RECORDED ON AUGUST 11, 2010 IN THE CARSON CITY RECORDERS OFFICE AS FILE NO. 403435. THE DIMENSIONS SHOWN HEREON ARE GROUND DISTANCES. COMBINED GRID TO GROUND SCALE FACTOR = 1.0002.

BASIS OF ELEVATION

ELEVATIONS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), AS TAKEN FROM CARSON CITY CONRTOL POINT #CC036, WITH A PUBLISHED ELEVATION OF 4729.13 FEET. CONTROL POINT #CC036 IS DESCRIBED AS BEING A 2" DIAMETER BRASS DISK STAMPED "CC036 2010" LOCATED ON THE WEST SIDE OF SILVER SAGE DRIVE, 100 FEET±/- NORTH OF THE INTERSECTION OF SILVER SAGE DRIVE AND HORIZON DRIVE.

PROJECT LOCATION

THE PROPERTY LIES IN THE NE ¼ AND SE ¼ OF THE SE ¼ OF SECTION 29 TOWNSHIP 15N RANGE 20E.

PROJECT DATA

ASSESSOR PARCEL NUMBERS	-	004-021-13
TOTAL SITE AREA	-	449,104 SF
TOTAL LOT AREA	-	156,669 SF
TOTAL UNITS	-	147
AVERAGE LOT SIZE	-	1,066 SF
CURRENT ZONING	-	MFA
FEMA FLOOD HAZARD ZONE	-	SHADED ZONE X

ENGINEER'S STATEMENT

I, ANDREW W. MOTTER, DO HERBY CERTIFY THAT THIS MAP HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION AND WAS COMPLETED ON THIS 3RD DAY OF MARCH, 2016.

PROFESSIONAL ENGINEER · STATE OF NEVADA
ANDREW W. MOTTER
Exp 12-31-17
CIVIL
No. 13794
03/16/16

ANDREW W. MOTTER — P.E.#13794

TSM - 16 - 02
VAR - 16 - 024

RECEIVED
MAR 25 2016
CARSON CITY PLANNING DIVISION

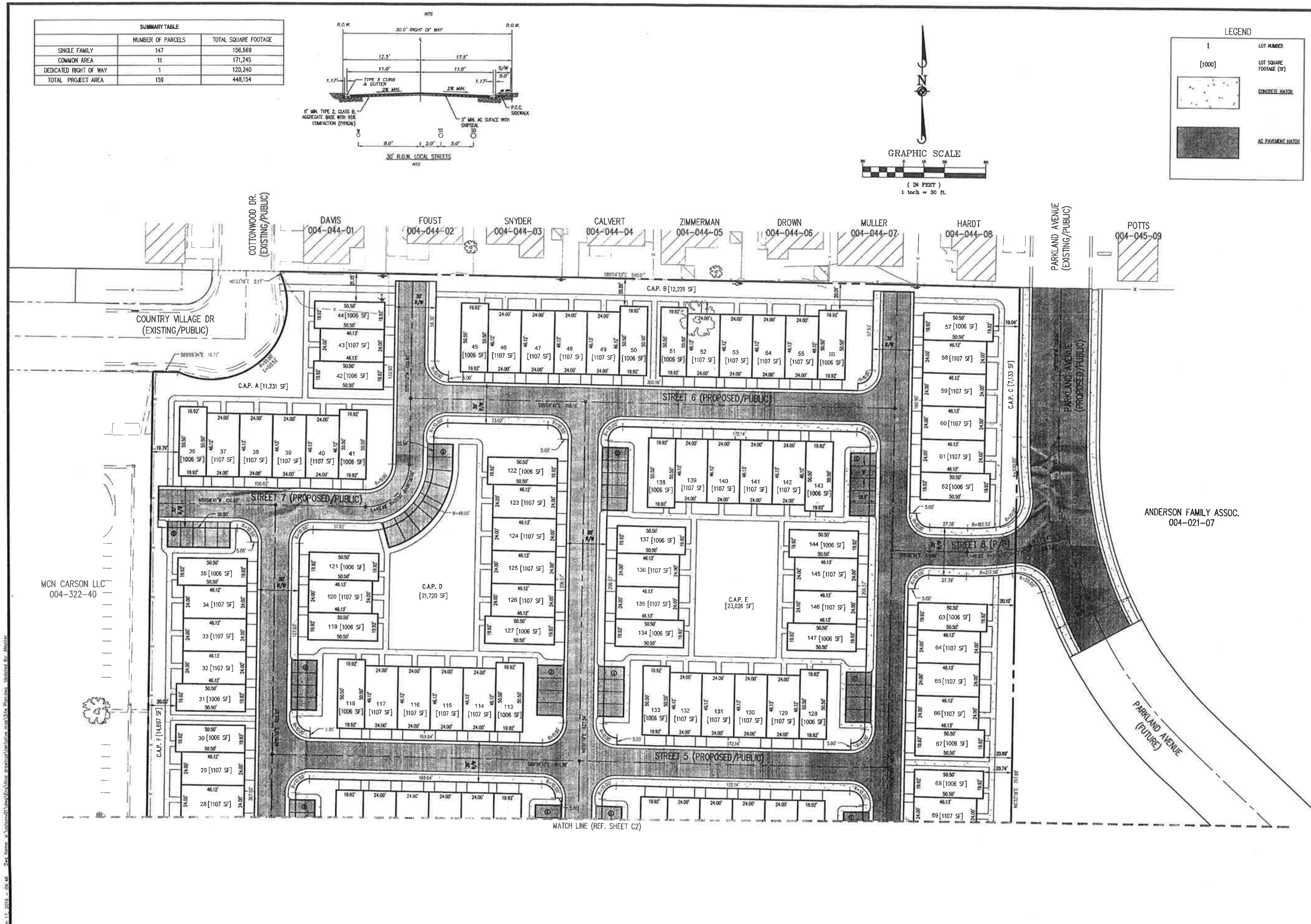
ARBOR VILLAS - TENTATIVE MAP
CARSON CITY, NEVADA
TITLE SHEET

Manhard CONSULTING LTD
3476 Executive Pointe Way, Suite 12, Carson City, NV 89706 ph: 775.882.5630 fx: 775.885.7266 manhard.com
Civil Engineers · Surveyors · Water Resource Engineers · Water & Wastewater Engineers
Construction Managers · Environmental Scientists · Landscape Architects · Planners

PROJ. MGR.:	AWM
PROJ. ASSOC.:	TJS
DRAWN BY:	SWJ
DATE:	3/16/2016
SCALE:	N.T.S.

SHEET C1 OF 7
CCICCNV01

SUMMARY TABLE		
	NUMBER OF PARCELS	TOTAL SQUARE FOOTAGE
SINGLE FAMILY	147	156,669
COMMON AREA	11	171,245
DEDICATED RIGHT OF WAY	1	120,240
TOTAL PROJECT AREA	159	448,154



Manhard CONSULTING LTD

Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

SITE PLAN

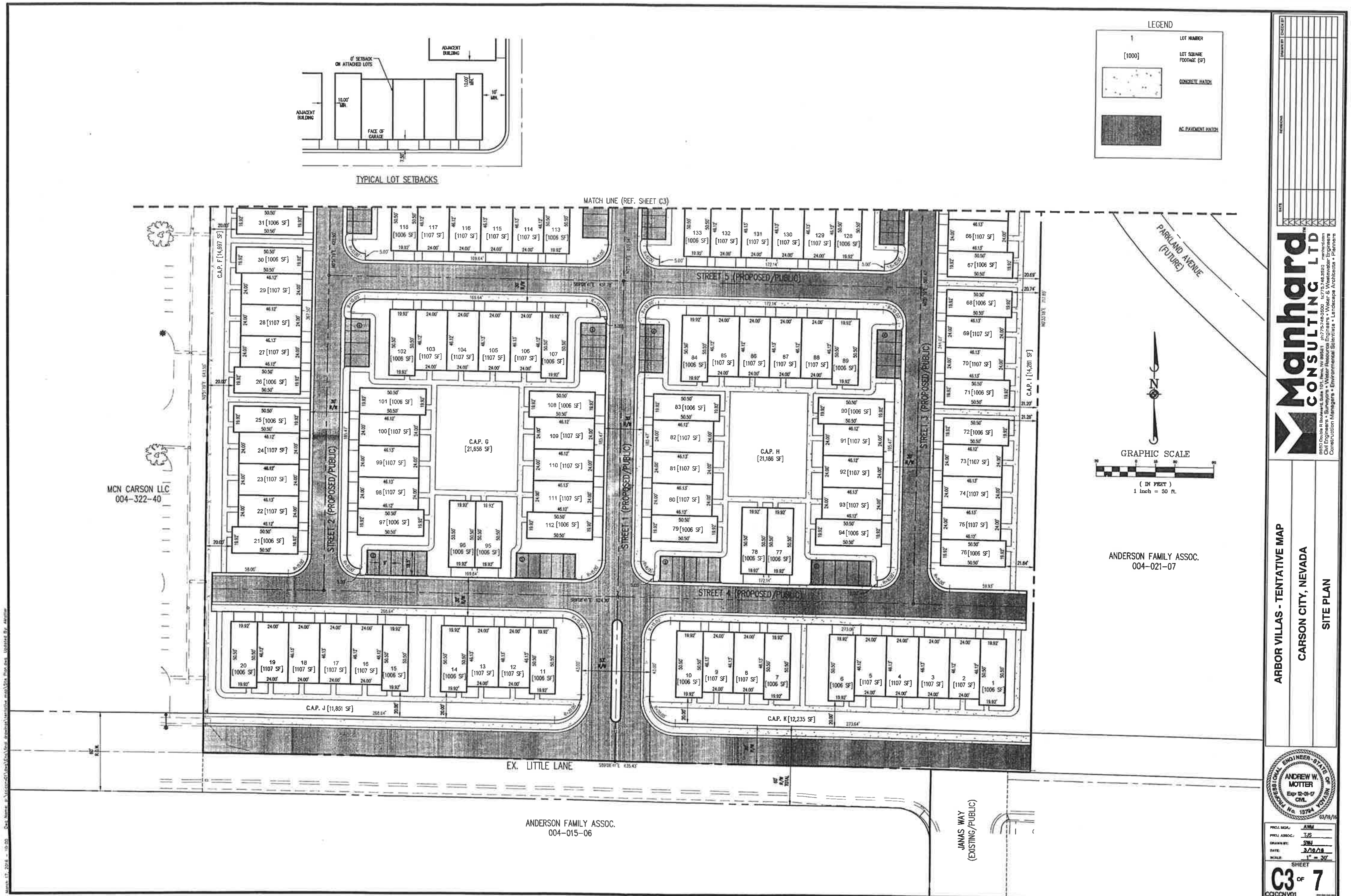
PROFESSIONAL ENGINEER - STATE OF NEVADA
ANDREW W. MOTTER
Exp 12-31-17
CIVIL
No. 13794

PROJ. MGR.:	AWM
PROJ. ASSOC.:	TJS
DRAWN BY:	SWJ
DATE:	3/16/16
SCALE:	1" = 30'

SHEET

C2 OF 7

CCICNV01


TYPICAL LOT SETBACKS
0' SETBACK ON ATTACHED LOTS
ADJACENT BUILDING
FACE OF GARAGE
LEGEND
LOT NUMBER
LOT SQUARE FOOTAGE (SF)
CONCRETE HATCH
AC PAVEMENT HATCH
MATCH LINE (REF. SHEET C3)
PARKLAND AVENUE (FUTURE)
STREET 5 (PROPOSED/PUBLIC)
STREET 2 (PROPOSED/PUBLIC)
STREET 1 (PROPOSED/PUBLIC)
STREET 3 (PROPOSED/PUBLIC)
STREET 4 (PROPOSED/PUBLIC)
C.A.P. G [21,656 SF]
C.A.P. H [21,186 SF]
C.A.P. F [14,697 SF]
C.A.P. I [14,261 SF]
C.A.P. J [11,851 SF]
C.A.P. K [12,235 SF]
MCN CARSON LLC
004-322-40
ANDERSON FAMILY ASSOC.
004-021-07
EX. LITTLE LANE
ANDERSON FAMILY ASSOC.
004-015-06
JANAS WAY (EXISTING/PUBLIC)
GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.
Manhard CONSULTING LTD
ARBOR VILLAS - TENTATIVE MAP
CARSON CITY, NEVADA
SITE PLAN
ANDREW W. MOTTER
No. 15794
SHEET
C3 OF 7

COTTONWOOD DR. (EXISTING/PUBLIC)

COUNTRY VILLAGE DR (EXISTING/PUBLIC)

PARKLAND AVENUE (EXISTING/PUBLIC)

CONNECT TO EXISTING WATER MAIN

FUTURE PARKLAND AVENUE

STREET 1

STREET 2

STREET 6

STREET 7

DETENTION BASIN

DETENTION BASIN

ROCKS

MATCH LINE (REF. SHEET C5)

GRAPHIC SCALE

(IN FEET)
1 inch = 30 ft.

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

GRADING AND UTILITY PLAN

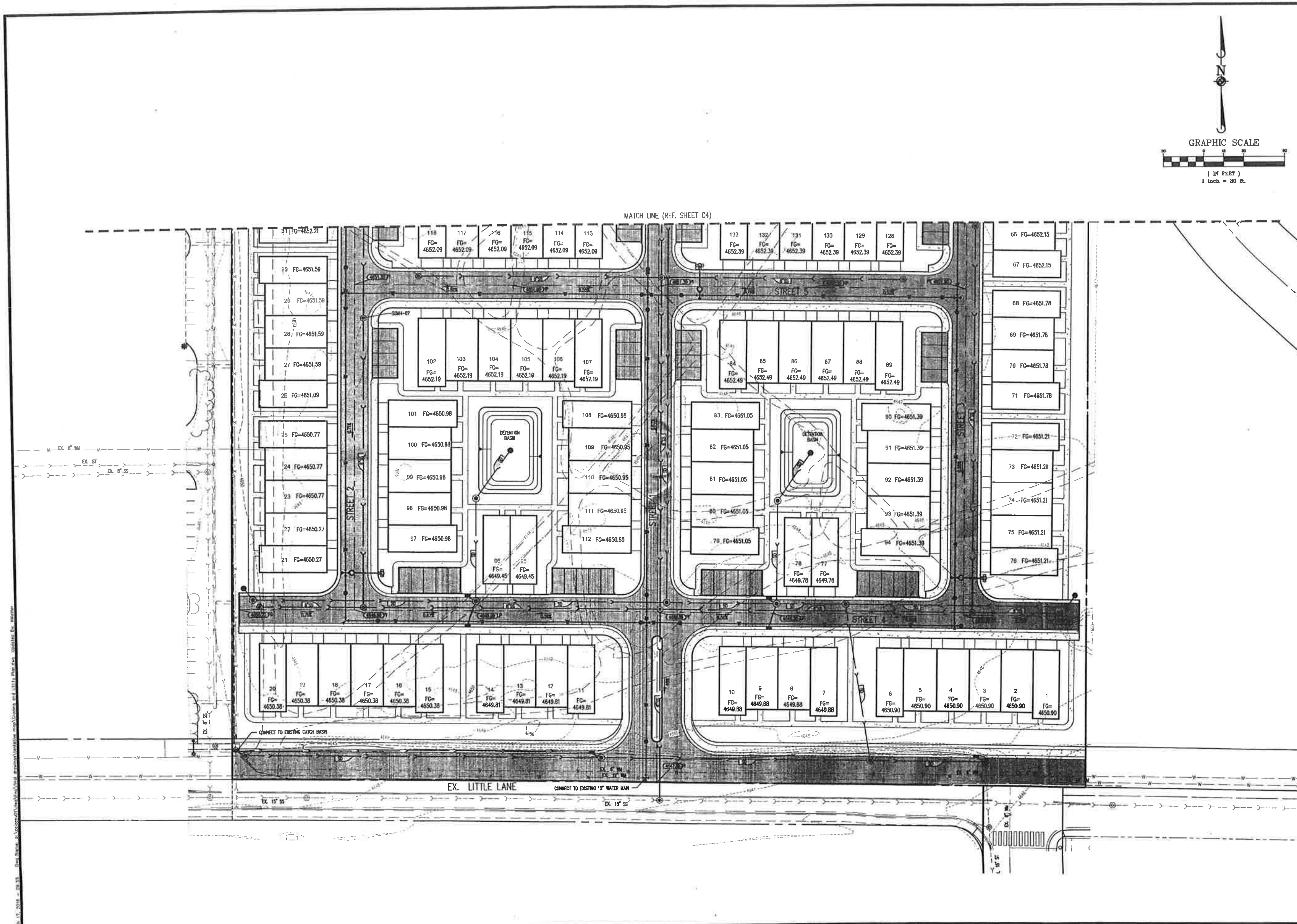
Manhard CONSULTING LTD

ANDREW W. MOTTER
Exp 12-06-17
CIVIL
No. 13794
STATE OF NEVADA
PROFESSIONAL ENGINEER
03/15/16

PROJ. MGR.: AWM
PROJ. ASSOC.: TJS
DRAWN BY:
DATE: 3/16/16
SCALE: 1" = 30'

SHEET C4 OF 7

CCICONV01



Manhard CONSULTING LTD

Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

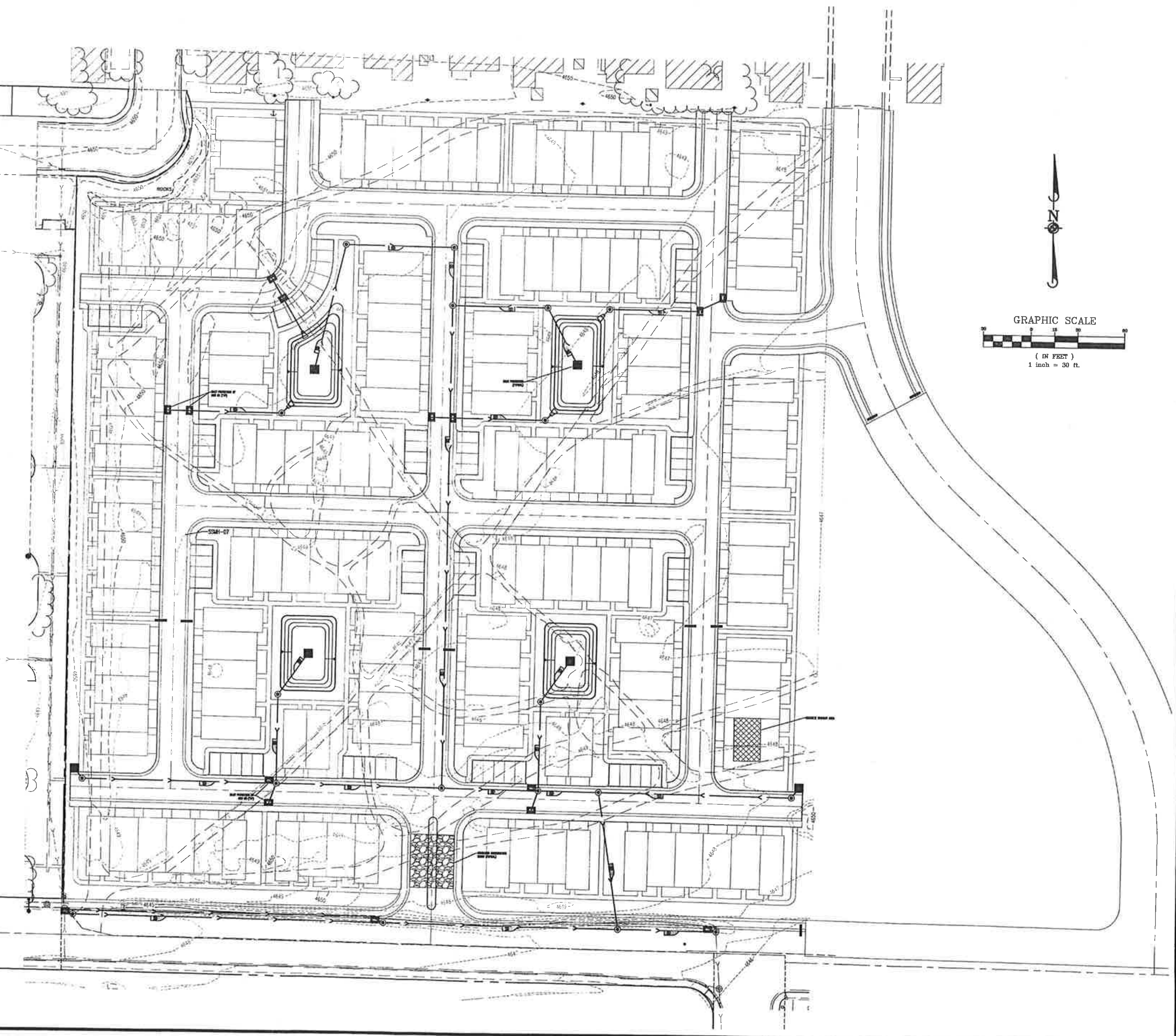
GRADING AND UTILITY PLAN

PROFESSIONAL ENGINEER - STATE OF NEVADA
ANDREW W. MOTTER
Exp 12-01-17
CIVIL
No. 13794

PROJ. MGR.:	AWM
PROJ. ASSOC.:	TJS
DRAWN BY:	SHJ
DATE:	3/16/16
SCALE:	1" = 30'

SHEET
C5 OF **7**

CCICCNV01



EROSION CONTROL NOTES

1. TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES TO BE CONSTRUCTED PRIOR TO OR CONCURRENT WITH ANY GRADING ACTIVITY.
2. INSTALL AND MAINTAIN TEMPORARY SILT CONTROL STRUCTURES AT EXISTING STORM DRAIN INLETS RECEIVING RUNOFF FROM THE CONSTRUCTION SITE.
3. EQUIPMENT AND VEHICLES SHALL NOT TRAVEL BEYOND THE LIMITS OF GRADING TO PREVENT TRACKING OF DIRT INTO TRAVEL WAY.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE PLACEMENT OF TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES. THE LAYOUT SHOWN ON THESE PLANS ARE INTENDED AS GENERAL GUIDELINE ONLY.
5. TEMPORARY BMPS SHALL COMPLY WITH THE TRUCKEE MEADOWS CONSTRUCTION SITE BEST MANAGEMENT PRACTICES HANDBOOK – JUNE 2008 UPDATE.
6. CONTRACTOR SHALL ENSURE THAT ACCESS TO AREAS NOT UNDER CONSTRUCTION IS MAINTAINED AT ALL TIMES.

EROSION CONTROL LEGEND

INLET PROTECTION LOCATIONS
GRAVEL BAGS AND/OR FIBER ROLLS SHALL BE USED FOR PROTECTION AT ALL LOCATIONS SPECIFIED ON THE PLANS. SILT SACKS SHALL BE USED IN CONJUNCTION WITH GRAVEL BAGS AT ALL STORM DRAIN INLETS IN PAVED AREAS. ALL PROTECTION MEASURES SHALL BE INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS.

GUTTER PROTECTION LOCATIONS
GRAVEL BAGS SHALL BE USED FOR PROTECTION AT ALL LOCATIONS SPECIFIED ON THE PLANS. ALL PROTECTION MEASURES SHALL BE INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS.

SILT FENCE

GRAVEL CONSTRUCTION ENTRANCE
GRAVEL CONSTRUCTION ENTRANCE SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF GRADING AND SHALL CONSIST OF 2-4" NOMINAL SIZE GRAVEL PLACED OVER AN AREA NO SMALLER THAN 15' WIDE, 30' LONG, AND 12" DEEP. ENTRANCE SPECIFICATIONS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. ENTRANCE SHALL BE REMOVED PRIOR TO PLACING BASE FOR PAVING.

CONCRETE WASHOUT AREA

Manhard CONSULTING LTD
3660 Double R Boulevard, Suite 101, Reno, NV 89521 ph:775-746-3500 fx:775-746-3520 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

ARBOR VILLAS - TENTATIVE MAP

CARSON CITY, NEVADA

EROSION CONTROL PLAN

PROFESSIONAL ENGINEER - STATE OF NEVADA
ANDREW W. MOTTER
Exp: 12-31-17
CIVIL
No. 15794
03/16/18

PROJ. MGR.:	AWM
PROJ. ASSOC.:	TJS
DRAWN BY:	
DATE:	3/17/18
SCALE:	1" = 40'

SHEET
C6 OF **7**
CCICCNV01

LANDSCAPE LEGEND

DECIDUOUS SHADE TREE
- PLATANUS X ACERFOLIA 'BLOODGOOD'/LONDON PLANE
- QUERCUS RUBRA/NORTHERN RED OAK

FLOWERING ORNAMENTAL TREE
- ACER PLATANOIDES 'COLUMNAR'/COLUMNAR MAPLE
- CELTIS OCCIDENTALIS/COMMON HACKBERRY
- PYRUS CALLERYANA/FLOWERING PEAR

EVERGREEN TREE
- PICEA PUNGENS/BLUE SPRUCE
- PINUS NIGRA/AUSTRIAN PINE
- PINUS S. 'FASTIGIATA'/COLUMNAR WHITE PINE

SHRUB PLANTING BEDS
- BUXUS X 'GREEN MOUNTAIN'/BOXWOOD
- CORNUS SERICEA 'ISANTI'/RED TWIG DOGWOOD
- EUONYMUS FORTUNEI/WINTERCREEPER
- FORSYTHIA X INTERMEDIA /FORSYTHIA
- JUNIPERUS CHINENSIS/SPARTAN JUNIPER
- ROSA X GROUNDCOVER/RED GROUNDCOVER ROSE
- WEIGELA 'NANA VARIEGATA'/ROSE PINK WEIGELA

NOTES:
- DECIDUOUS TREES SHALL BE 2" CALIPER MINIMUM.
- EVERGREEN TREES SHALL BE 6 FT. HEIGHT AND COMPRISE NO MORE THAN 40% OF THE TOTAL TREE COUNT.
- SHRUBS: 5 GALLON MIN.
- PERENNIALS: 1 GALLON MIN.

GENERAL NOTES

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

2) FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL, AND WATER REGIMES. ALL TREES WILL BE STAKED SO AS TO REMAIN UPRIGHT AND PLUMB FOLLOWING INSTALLATION. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1).

3) ALL PLANTER BEDS WILL RECEIVE 4" DEPTH OF MULCH WITH WEED CONTROL.

4) ALL LANDSCAPING WILL BE AUTOMATICALLY IRRIGATED UNLESS NOTED OTHERWISE ON THE PLAN. CONTAINER PLANTINGS WILL BE DRIP IRRIGATED. A REDUCED-PRESSURE-TYPE BACKFLOW PREVENTOR WILL BE PROVIDED ON THE IRRIGATION SYSTEM AS REQUIRED PER CODE.

LANDSCAPE DATA

SITE AREA: (449,104 SF) 10.31 ACRES
BUILDING AREA: 156,656 SF
SITE AREA EXCLUDING BUILDING: 292,447 SF

LANDSCAPE AREA REQUIRED: 58,490 SF
(20% OF SITE AREA EXCLUDING BLDG.)

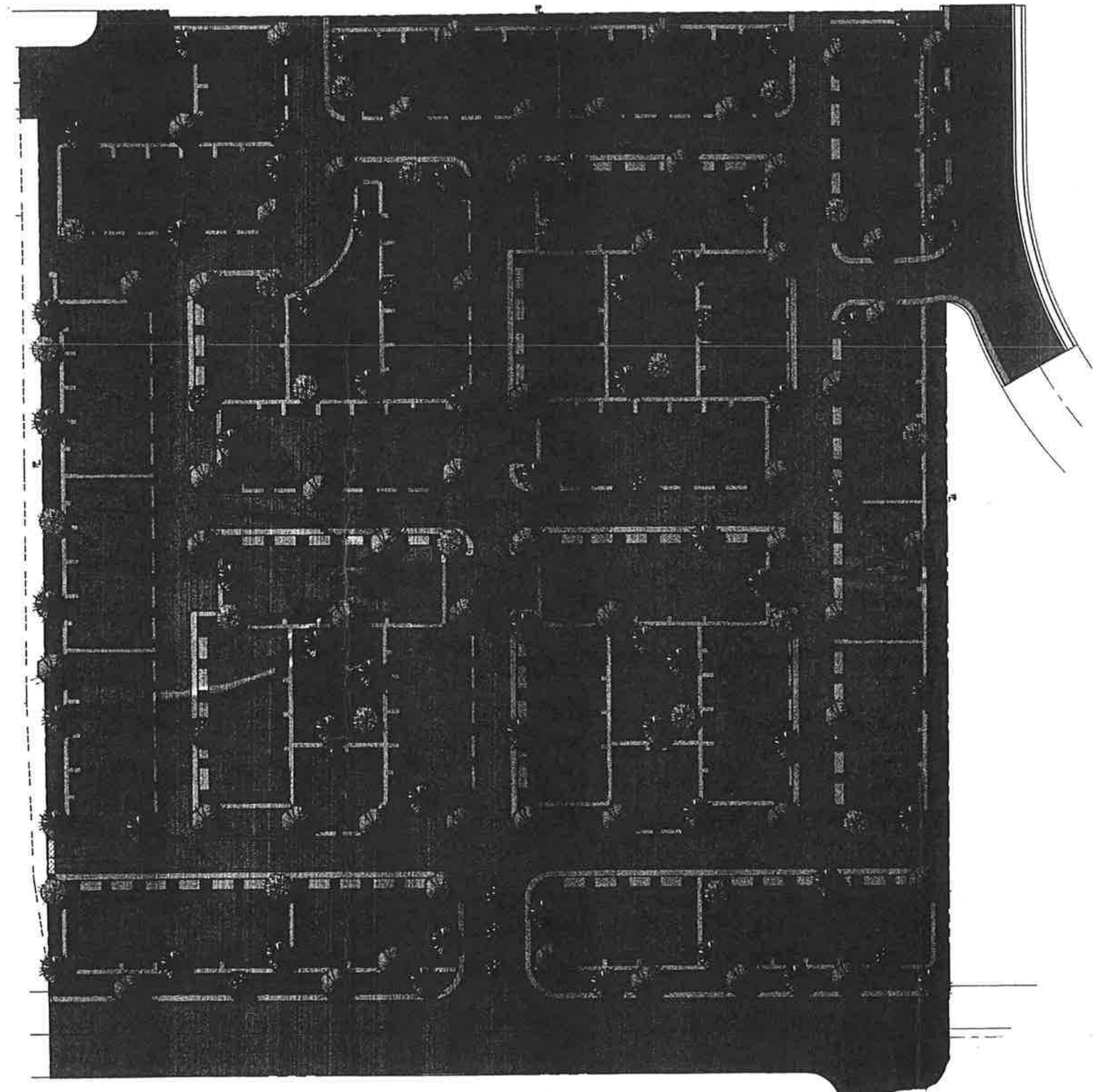
LANDSCAPE AREA PROVIDED: 58,490 SF MINIMUM

TREES REQUIRED: 146 (1 PER 400 SF OF REQUIRED LANDSCAPE AREA)

THE FOLLOWING TREES SHALL BE INCLUDED AS PART OF THE REQUIRED TREE COUNT:
- 8 PARKING AREA TREES (1 PER 10 PARKING SPACES (83)
- 32 STREET TREES (1 PER 30 LINEAL FEET OF STREET FRONTAGE)
  - LITTLE LANE (625 LF)
  - PARKLAND AVE. (210 LF)
  - COUNTRY VILLAGE DR. (125 LF)

TREES PROVIDED: 146

SHRUBS - MIN. REQUIRED: 876 (6 SHRUBS PER TREE)



0 40' 80' 120'

Scale In Feet

L.A. Studio Nevada
the landscape architecture studio

Preliminary Landscape Plan
ARBOR VILLA'S
Capstone Communities
Carson City, Nevada

No.	Revision Date

LA No.: [illegible]
Designed: [illegible]
Drawn: [illegible]
Checked: [illegible]
CAD File: [illegible]
Date: [illegible]

Sheet **L1** of 1

Carson City Planning Division
108 E. Proctor Street
Carson City, Nevada 89701
(775) 887-2180 – Hearing Impaired: 711
planning@carson.org
www.carson.org/planning

Late Info
F-4A F-4B
TSM-16-023
VAR-16-024

MEMO

TO: PLANNING COMMISSION
FROM: HOPE SULLIVAN, PLANNING MANAGER
DATE: APRIL 27, 2016
RE: VAR-16-024 & TSM-16-023: ARBOR VILLAS

Staff is recommending three modifications to the conditions of approval. These modifications are as follows. An explanation of the modifications proposed by the City Engineer are explained in the attached memo. The modification to Condition 18 is in recognition that the project may be phased.

Condition12, page 3:

12. Before the building permit for the 31st dwelling unit is issued, the secondary access must be constructed connecting to Parkland. This must ~~consist of a minimum of a half-street improvement with a minimum width of 27 feet including a 5 foot sidewalk, 2 foot curb and gutter, and a~~ meet International Fire Code requirements and a 20 foot wide pavement section. Before the building permit for the 74th dwelling unit is issued, the fully improved secondary access must be constructed as shown on the tentative map. Parcel map PM-16-041 is required to be updated to include; 1. An offer for dedication to Carson City for the property which includes the northern most one-third of the proposed extension of Parkland Ave (60 foot ROW) as shown on the tentative map and 2. A relocatable public utility and access easement for the remaining southernmost two-thirds of the proposed extension of Parkland Ave (60 foot ROW), to ensure the ultimate connectivity of the existing stub streets.

Condition 18, page 3

18. In accordance with NRS 278.360, a Final Map, prepared in accordance with the Tentative Map, for the entire area for which the Tentative Map has been approved, or the first of a series of final maps covering a portion of the approved tentative map, must be approved by the Board of Supervisors for recording within four years after the approval of a Tentative Map unless a longer time is provided for in an approved development agreement with the City.

Condition 3, page 4

3. The Improvement Plans shall include dedication of the right of way on the north side of Little Lane to meet the full 60 feet width. ~~an off-street, paved, and shared path along the north side of Little Lane consistent with the Unified Pathways Master Plan.~~ This

construction shall include a 5 foot sidewalk offset from the curb by 2 feet, a 2 foot buffer constructed to the approval of the Public Works Director, curb/gutter/drainage improvements, asphalt paving to tie with the existing edge of pavement, and striping for bike lanes in both directions.

CARSON CITY NEVADA
Consolidated Municipality and State Capital
PUBLIC WORKS

To: Hope Sullivan, Planning Manager

Community Development Department

From: Danny Rotter, Engineering Manager

Public Works Department

Dear Hope,

This memo is to modify some recommended conditions of approval of the Tentative Subdivision map named Arbor Villas TSM-16-023. The discussion below hopefully clarifies and summarizes staff's position on condition 12 of the subtitle "The following are general conditions of approval" (page 3 of your staff report) and condition 3 of the subtitle "The following shall be included in the design of the Improvement Plans" (page 4 of your staff report).

Regarding condition 12, Public Works and the Fire Department have identified the need for secondary access and connectivity to surround streets. The traffic report identifies connection to Parkland. The timing of the traffic impacts and the logistics of seeing that to completion didn't come across fully in our recommended condition. Please see below for the modified recommended condition:

12. Before the building permit for the 31st dwelling unit is issued, the secondary access must be constructed connecting to Parkland. This must ~~consist of a minimum of a half-street improvement with a minimum width of 27 feet including a 5 foot sidewalk, 2 foot curb and gutter, and a~~ meet International Fire Code requirements and a 20 foot wide pavement section. Before the building permit for the 74th dwelling unit is issued, the fully improved secondary access must be constructed as shown on the tentative map. Parcel map PM-16-041 is required to be updated to include; 1. An offer for dedication to Carson City for the property which includes the northern most one-third of the proposed extension of Parkland Ave (60 foot ROW) as shown on the tentative map and 2. A relocatable public utility and access easement for the remaining southernmost two- thirds of the proposed extension of Parkland Ave (60 foot ROW), to ensure the ultimate connectivity of the existing stub streets.

The Unified Pathways Master Plan considers an off street, paved and shared use path along Little Lane. These are typically 10 feet wide with a 3 foot buffer from any traffic. The goals of this category of path are to provide comfortable bike and pedestrian transportation in both directions to connect Saliman to Roop. The existing Little Lane to the west consists of 5 feet wide sidewalks adjacent to curbs with bike lanes in both directions. Some issues to overcome for installation of a 10' wide path are connecting to the existing bike paths, curb alignment and consistency for the corridor. With Little Lane as a collector, Parks and Public Works feel that the following condition meets the intent of the UPMP while working within the constraints of the existing conditions.

3505 Butti Way, Carson City, NV 89701 (775) 887-2355 FAX (775) 887-2112
Operations: Water, Sewer, Streets, Wastewater, Landfill, Environmental
Engineering, Transportation, Capital Projects

CARSON CITY NEVADA
Consolidated Municipality and State Capital
PUBLIC WORKS

3. The Improvement Plans shall include dedication of the right of way on the north side of Little Lane to meet the full 60 feet width. ~~an off-street, paved, and shared path along the north side of Little Lane consistent with the Unified Pathways Master Plan.~~ This construction shall include a 5 foot sidewalk offset from the curb by 2 feet, a 2 foot buffer constructed to the approval of the Public Works Director, curb/gutter/drainage improvements, asphalt paving to tie with the existing edge of pavement, and striping for bike lanes in both directions.

If there are any further questions, I will be happy to answer them at the Planning Commission meeting.

Thanks,

Danny Rotter, P.E.

3505 Butti Way, Carson City, NV 89701 (775) 887-2355 FAX (775) 887-2112
Operations: Water, Sewer, Streets, Wastewater, Landfill, Environmental
Engineering, Transportation, Capital Projects