Agenda Item No: 23.F

STAFF REPORT

Report To: Board of Supervisors **Meeting Date:** March 19, 2020

Staff Contact: Heather Ferris, Associate Planner

Agenda Title: For Possible Action: Discussion and possible action regarding a Tentative Subdivision Map (SUB-2020-0001) known as Silver View Townhomes, proposing to create 34 single family lots on a 2.75 acre parcel zoned Retail Commercial (RC), located at the northwest corner of Clearview Drive and Silver Sage Drive (APN 009-125-12). (Heather Ferris, hferris@carson.org)

Staff Summary: The applicant is requesting a Tentative Subdivision Map (SUB-2020-0001) to subdivide 2.75 acres into 34 single family lots ranging in size from 1,746 square feet to 2,160 square feet with an average size of 1,845 square feet, and a 0.78 acre common area parcel, as well as approximately 0.54 acres for an internal roadway. At its meeting of February 26, 2020, the Planning Commission reviewed the request and voted 7-0 to recommend approval of this map to the Board of Supervisors. The Board of Supervisors is authorized to approve a Tentative Subdivision Map.

Agenda Action: Formal Action / Motion **Time Requested:** 20 Minutes

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Proposed Motion
I move to approve the Tentative Subdivision Map based on the ability to make the required findings in the affirmative and subject to the conditions of approval recommended by the Planning Commission.

Board's Strategic Goal
Quality of Life

Previous Action
February 26, 2020: The Planning Commission recommended approval, subject to conditions of approval by a vote of 7-0.

Background/Issues & Analysis
At its meeting of February 26, 2020, the Planning Commission voted 7-0 to recommend approval subject to the conditions of approval as outlined in staff's memo dated March 5, 2020 (attached).

Please see the attached staff report to the Planning Commission with attachments for more detailed information regarding the proposed tentative map.

Applicable Statute, Code, Policy, Rule or Regulation
CCMC 17.07 and 17.05; NRS 278.330

Financial Information
Is there a fiscal impact? No

If yes, account name/number:

Is it currently budgeted? No

Explanation of Fiscal Impact:

Alternatives

1. Approve the request subject to alternative conditions of approval.

2. Deny the request.

Attachments:

SUB-2020-0001 (Silver View) Memo.pdf

SUB-2020-0001 2-26-20 PC Packet.pdf

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 MARCH 19, 2020

TO: Board of Supervisors

FROM: Heather Ferris, Associate Planner

DATE: March 5, 2020

SUBJECT: **SUB-2020-0001: Discussion and possible action regarding a Tentative Subdivision Map (SUB-2020-0001) known as Silver View Townhomes, proposing to create 34 single family lots on a 2.75 acre parcel zoned Retail Commercial (RC), located at the northwest corner of Clearview Drive and Silver Sage Drive (APN 009-125-12).**

At its meeting of February 26, 2020, the Planning Commission conducted a public hearing on the above referenced application and voted 7-0 to recommend approval of the tentative map subject to the following conditions of approval. Note condition #27 was modified at the Planning Commission meeting. The added language appears in bold and underlined. Language recommended for deletion is struck through.

RECOMMENDED CONDITIONS OF APPROVAL: Tentative Map

The following are conditions of approval required per CCMC 18.02.105.5:

1. All final maps shall be in substantial accord with the approved tentative map.

2. Prior to submittal of any final map, the development engineering department shall approve all on-site and off-site improvements. The applicant shall provide construction plans to the development engineering department 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. Lots not planned for immediate development shall be left undisturbed and mass grading and clearing of natural vegetation shall not be allowed. Any and all grading shall comply with city standards. A grading permit from the Nevada Division of Environmental Protection shall be obtained prior to any grading. Noncompliance with this provision shall cause a cease and desist order to halt all grading work.

4. All lot areas and lot widths shall meet the zoning requirements approved as part of this tentative map with the submittal of any final map.

5. With the submittal of any final maps, the applicant shall provide evidence to the planning and community development department from the health and fire departments indicating the agencies' concerns or requirements have been satisfied. Said correspondence shall

be included in the submittal package for any final maps, and shall include approval by the fire department of all hydrant locations.

6. The following note shall be placed on all final maps stating:
"These parcels are subject to Carson City's growth management ordinance and all property owners shall comply with provisions of said ordinance."

7. Placement of all utilities shall be underground within the subdivision. Any existing overhead facilities shall be relocated prior to the submittal of final maps.

8. The applicant must sign and return the notice of decision for conditions for approval within 10 days of receipt of notification after the board of supervisors meeting. If the notice of decision is not signed and returned within 10 days, then the item will be rescheduled for the next planning commission meeting for further consideration.

9. 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 department 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.

10. The applicant shall adhere to all city standards and requirements for water and sewer systems, grading and drainage, and street improvements.

11. The applicant shall obtain a dust control permit from the Nevada Division of Environmental Protection. The site grading must incorporate proper dust control and erosion control measures.

12. A detailed storm drainage analysis, water system analysis, and sewer system analysis shall be submitted to the development engineering department prior to approval of a final map.

13. Prior to the recordation of the final map for any phase of the project, the improvements associated with the project must either be constructed and approved by Carson City, or the specific performance of said work secured, by providing the city with a proper surety in the amount of 150 percent 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 appear in the work within 1 year of acceptance by the city.

14. A "will serve" letter from the water and wastewater utilities shall be provided to the Nevada Health Division prior to approval of a final map.

15. The district attorney shall approve any CC&R's prior to recordation of the first final map.

Other Conditions of Approval:

16. All construction and improvements must meet the requirements of Carson City Standard Details, including, but not limited to:

a. Gas and electric utilities must be shown on construction drawings. A typical detail must be provided with the construction drawings showing separation requirements are being met per Nevada Division of Environmental Protection and City Detail C-1.2.5 and C-1.2.4.
b. The water main in Clearview Drive must be extended along the frontage to connect into Silver Sage Drive. It is suspected that an existing valve was buried near the dead end of the water main west of the project. The valve must be exposed and a new riser installed. If no valve can be found a new one must be installed. The new patch over the water main will need to extend to the newly installed curb and gutter.
c. An ADA access ramp must be installed at the corner of Silver Sage Drive and Clearview Drive.

17. Storm drainage must be designed to surface drain wherever practicable. Any storm drain utilities outside of the roadway must be privately owned and maintained.

18. The internal streets must be privately owned and maintained and must meet Carson City standards for street sections.

19. A blanket Pubic Utility and Access easement must be created over all internal streets. This will need to be shown on construction drawing as well as the final map.

20. A sampling tap must be included in a common area of the project near one of the entrances.

21. The site improvement plans shall indicate fire hydrant locations in compliance with International Fire Code Appendix C, Table C102.1.

22. No on-street parking is allowed. “No Parking-Fire Lane” signs must be installed every 50 feet on both sides of the street.

23. As part of the site improvement permit, the applicant must provide a landscape plan demonstrating compliance with the Development Standards in Division 3.

24. Carson City is a nationally recognized Bee City USA. As a result, the applicant shall use approximately 50% pollinator friendly plant material for any required landscaping on the project site.

25. The applicant is required to incorporate “best management practices” into their construction documents and specifications to reduce the spread of noxious weed.

26. All aspects of the building must be included within the boundaries of the lot. The required internal setbacks shall be as follows:

Front - 10 feet to the house and 20 feet to the garage
Side - 0 feet (interior units) and 1.5 feet (exterior units)
Rear - 10 feet minimum
Periphery Boundary- 10 feet minimum along the northern and western boundaries; and 30 feet along the southern and eastern boundaries.

These setbacks shall be stated on the final map as well as the CC&Rs.

27. At the time of recordation of the final map, a private Home Owner's Association (HOA) or similar entity must be formed to provide maintenance for internal privately owned and maintained streets, common area, and landscaping (including landscaping within the right-of-way). **Private** ~~M~~**m**aintenance must be described in the CC&Rs. ~~Maintenance must include snow removal, repair, reconstruction, parking enforcement, etc.~~ **The City will not maintain these facilities.**

28. The Tentative Subdivision Map is only approved if the applicant obtains approval from the Planning Commission for the concurrent application LU-2020-0001- A Special Use Permit for a residential use in a non-residential district.

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF FEBRUARY 26, 2020

FILE NO: LU-2020-0001& SUB-2020-0001 AGENDA ITEM: E.4 & E.5

STAFF CONTACT: Heather Ferris, Associate Planner

AGENDA TITLE:

LU-2020-0001: For Possible Action: Discussion and possible action regarding a request for a Special Use Permit for a 34-unit townhome development on property zoned Retail Commercial (RC), located on the northwest corner of Clearview Drive and Silver Sage Drive, APN 009-125-12.

SUB-2020-0001: For Possible Action: Discussion and possible action regarding a request for a Tentative Subdivision Map to create 34 single family lots on a 2.75 acre parcel zoned Retail Commercial (RC) known as Silver View Townhomes, located on the northwest corner of Clearview Drive and Silver Sage Drive, APN 009-125-12.

Summary: The applicant is proposing a 34-unit townhome development on property zoned Retail Commercial (LU-2020-0001). Carson City Municipal Code (CCMC) 18.04.130.03 allows for single family dwellings in the RC zoning district with a Special Use Permit, subject to meeting the supplemental standards for residential development in a non-residential district as outlined in Carson City Development Standards (CCDS) 1.18. The applicant is also proposing a Tentative Subdivision Map to create 34 single family lots (SUB-2020-0001). The lots will range in size from 1,746 square feet to 2,160 square feet with an average size of 1,845 square feet. The Planning Commission has the authority to approve the Special Use Permit. The Board of Supervisors is authorized to approve a Tentative Subdivision Map, following recommendation from the Planning Commission.

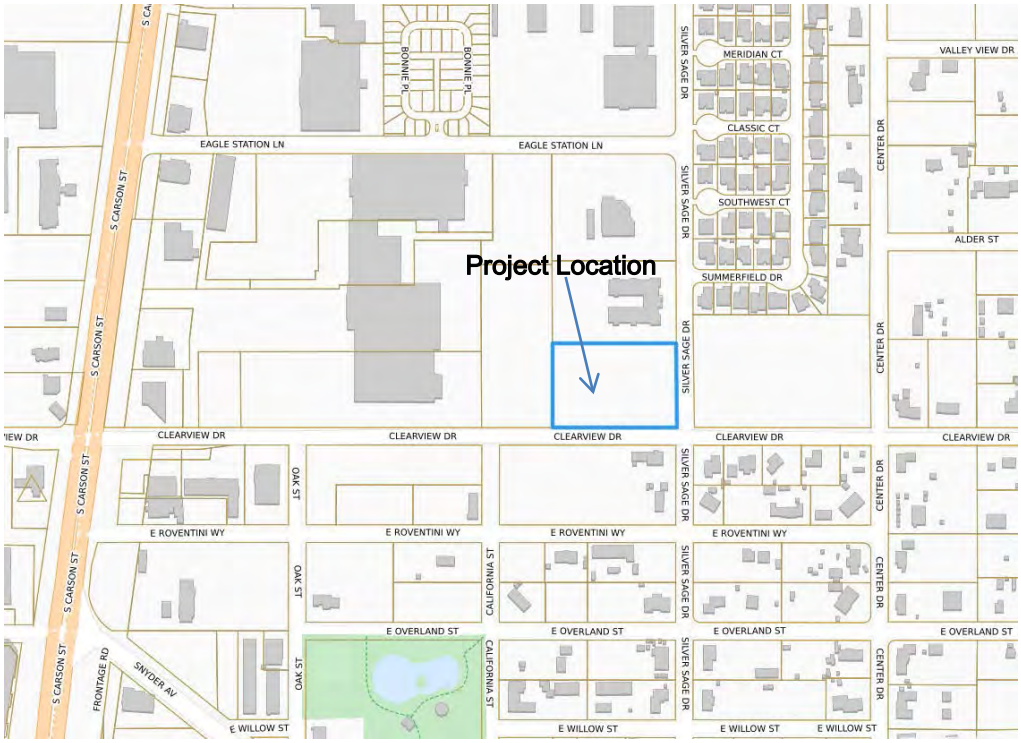
RECOMMENDED MOTION LU-2020-0001:

"I move to approve Special Use Permit LU-2020-0001 based on the ability to make the required findings and subject to the conditions of approval."

RECOMMENDED MOTION SUB-2020-0001:

"I move to recommend to the Board of Supervisors, approval of Tentative Subdivision Map SUB-2020-0001 based on the ability to make the required findings and subject to the conditions of approval."

VICINITY MAP:



RECOMMENDED CONDITIONS OF APPROVAL: Special Use Permit (LU-2020-0001)

1. All development shall be substantially in accordance with the plans presented to the Planning Commission.
2. All on and off-site improvements shall conform to city standards and requirements.
3. The use for which this permit is approved shall commence within 12 months of the date of final approval. A single, 1 year extension of time must be requested in writing to the planning and community development department 30 days prior to the 1 year expiration date. Should this permit not be initiated within 1 year and no extension granted, the permit shall become null and void.
4. The applicant must sign and return the notice of decision for conditions of approval within 10 days of receipt of notification. If the notice of decision is not signed and returned within 10 days, then the item will be rescheduled for the next planning commission meeting for further considerations.

RECOMMENDED CONDITIONS OF APPROVAL: Tentative Map

The following are conditions of approval required per CCMC 18.02.105.5:

1. All final maps shall be in substantial accord with the approved tentative map.
2. Prior to submittal of any final map, the development engineering department shall approve all on-site and off-site improvements. The applicant shall provide construction plans to the development engineering department 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. Lots not planned for immediate development shall be left undisturbed and mass grading and clearing of natural vegetation shall not be allowed. Any and all grading shall comply with city standards. A grading permit from the Nevada Division of Environmental Protection shall be obtained prior to any grading. Noncompliance with this provision shall cause a cease and desist order to halt all grading work.

4. All lot areas and lot widths shall meet the zoning requirements approved as part of this tentative map with the submittal of any final map.

5. With the submittal of any final maps, the applicant shall provide evidence to the planning and community development department from the health and fire departments indicating the agencies' concerns or requirements have been satisfied. Said correspondence shall be included in the submittal package for any final maps, and shall include approval by the fire department of all hydrant locations.

6. The following note shall be placed on all final maps stating:
"These parcels are subject to Carson City's growth management ordinance and all property owners shall comply with provisions of said ordinance."

7. Placement of all utilities shall be underground within the subdivision. Any existing overhead facilities shall be relocated prior to the submittal of final maps.

8. The applicant must sign and return the notice of decision for conditions for approval within 10 days of receipt of notification after the board of supervisors meeting. If the notice of decision is not signed and returned within 10 days, then the item will be rescheduled for the next planning commission meeting for further consideration.

9. 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 department 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.

10. The applicant shall adhere to all city standards and requirements for water and sewer systems, grading and drainage, and street improvements.

11. The applicant shall obtain a dust control permit from the Nevada Division of Environmental Protection. The site grading must incorporate proper dust control and erosion control measures.

12. A detailed storm drainage analysis, water system analysis, and sewer system analysis shall be submitted to the development engineering department prior to approval of a final map.

13. Prior to the recordation of the final map for any phase of the project, the improvements associated with the project must either be constructed and approved by Carson City, or the specific performance of said work secured, by providing the city with a proper surety in the amount of 150 percent 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 appear in the work within 1 year of acceptance by the city.

14. A "will serve" letter from the water and wastewater utilities shall be provided to the Nevada Health Division prior to approval of a final map.

15. The district attorney shall approve any CC&R's prior to recordation of the first final map.

Other Conditions of Approval:

16. All construction and improvements must meet the requirements of Carson City Standard Details, including, but not limited to:
    a. Gas and electric utilities must be shown on construction drawings. A typical detail must be provided with the construction drawings showing separation requirements are being met per Nevada Division of Environmental Protection and City Detail C-1.2.5 and C-1.2.4.
    b. The water main in Clearview Drive must be extended along the frontage to connect into Silver Sage Drive. It is suspected that an existing valve was buried near the dead end of the water main west of the project. The valve must be exposed and a new riser installed. If no valve can be found a new one must be installed. The new patch over the water main will need to extend to the newly installed curb and gutter.
    c. An ADA access ramp must be installed at the corner of Silver Sage Drive and Clearview Drive.

17. Storm drainage must be designed to surface drain wherever practicable. Any storm drain utilities outside of the roadway must be privately owned and maintained.

18. The internal streets must be privately owned and maintained and must meet Carson City standards for street sections.

19. A blanket Pubic Utility and Access easement must be created over all internal streets. This will need to be shown on construction drawing as well as the final map.

20. A sampling tap must be included in a common area of the project near one of the entrances.

21. The site improvement plans shall indicate fire hydrant locations in compliance with International Fire Code Appendix C, Table C102.1.

22. No on-street parking is allowed. “No Parking-Fire Lane” signs must be installed every 50 feet on both sides of the street.

23. As part of the site improvement permit, the applicant must provide a landscape plan demonstrating compliance with the Development Standards in Division 3.

24. Carson City is a nationally recognized Bee City USA. As a result, the applicant shall use approximately 50% pollinator friendly plant material for any required landscaping on the project site.

25. The applicant is required to incorporate “best management practices” into their construction documents and specifications to reduce the spread of noxious weed.

26. All aspects of the building must be included within the boundaries of the lot. The required internal setbacks shall be as follows:

    Front - 10 feet to the house and 20 feet to the garage

Side - 0 feet (interior units) and 1.5 feet (exterior units)
Rear - 10 feet minimum
Periphery Boundary- 10 feet minimum along the northern and western boundaries; and 30 feet along the southern and eastern boundaries.

These setbacks shall be stated on the final map as well as the CC&Rs.

27. At the time of recordation of the final map, a private Home Owner's Association (HOA) or similar entity must be formed to provide maintenance for internal privately owned and maintained streets, common area, and landscaping (including landscaping within the right-of-way). Maintenance must be described in the CC&Rs. Maintenance must include snow removal, repair, reconstruction, parking enforcement, etc.

28. The Tentative Subdivision Map is only approved if the applicant obtains approval from the Planning Commission for the concurrent application LU-2020-0001- A Special Use Permit for a residential use in a non-residential district.

RECOMMENDED CONDITIONS OF APPROVAL: Special Use Permit (LU-2020-0001)

1. All development shall be substantially in accordance with the plans presented to the Planning Commission.
2. All on and off-site improvements shall conform to city standards and requirements.
3. The use for which this permit is approved shall commence within 12 months of the date of final approval. A single, 1 year extension of time must be requested in writing to the planning and community development department 30 days prior to the 1 year expiration date. Should this permit not be initiated within 1 year and no extension granted, the permit shall become null and void.
4. The applicant must sign and return the notice of decision for conditions of approval within 10 days of receipt of notification. If the notice of decision is not signed and returned within 10 days, then the item will be rescheduled for the next planning commission meeting for further considerations.

LEGAL REQUIREMENTS: CCMC 17.05 (Tentative Maps); CCMC 17.07 (Findings); CCMC 18.02.080 (Special Use Permit); 18.04.130.3 (Retail Commercial); (Development Standards 1.18 (Residential development standards in non-residential districts); NRS 278.330

MASTER PLAN DESIGNATION: Mixed-Use Employment

ZONING DISTRICT: Retail Commercial

KEY ISSUES: Will the Special Use Permits meet the required findings and will the proposed residential use be compatible with the surrounding neighborhood and in keeping with the standards of CCMC? Is the Tentative Map consistent with the required findings? Does the proposal meet the Tentative Map requirements and other applicable requirements?

SURROUNDING ZONING AND LAND USE INFORMATION

NORTH: Retail Commercial / Bank
SOUTH: Single Family 1 Acre / Single Family Residence
WEST: Retail Commercial and General Commercial / Retention Pond
EAST: Single Family 1 Acre / Vacant

ENVIRONMENTAL INFORMATION:
FLOOD ZONE: Zone X (Area of minimal flooding)
SLOPE/DRAINAGE: Generally flat
SEISMIC ZONE: Zone II (moderate)
EARTHQUAKE POTENTIAL/FAULT: Moderate Severity/Within 200 feet

SITE DEVELOPMENT INFORMATION:
SUBJECT SITE AREA: 2.75 acres
EXISTING LAND USE: Vacant

PREVIOUS REVIEWS:

CSM-19-153: Conceptual Subdivision Map to subdivide 2.75 acres into 34 lots for attached single family residential development.

DISCUSSION:

The subject property is 2.75 acres in size and zoned Retail Commercial. The property is surrounded by both commercial and residential uses. Per Carson City Municipal Code (CCMC) 18.04.120.3, a residential use is a conditional use in the Retail Commercial zoning district and therefore requires a Special Use Permit, subject to the supplemental standards outlined in Division 1.18 of the Development Standards (Residential Development Standards in Non-Residential Districts). In addition to the Special Use Permit for residential development in a non-residential district, the applicant is seeking approval of a Tentative Subdivision Map to subdivide the 2.75 acre parcel into 34 lots for attached single family residential development.

There is no maximum density within non-residential zoning districts subject to meeting the height, setback, parking, and open space requirements. The proposed lots will range in size from 1,746 square feet to 2,160 square feet with the average lot being 1,845 square feet in size. Included within the lot boundaries is the building footprint, roof overhangs, rear yards, front yards, and driveways. The buildings will include clusters of 2 to five units. Units will be two-story (27 feet in height) and will range in size from 1,397 to 1,460 square feet and include both two and three-bedroom floor plans. Each unit will have a single car garage, private porch, and balcony. Each lot will have a minimum of a 250 square foot private rear yard. Proposed setbacks are as follows:

Front - 10 feet to the house and 20 feet to the garage
Side - 0 feet (interior units) and 1.5 feet (exterior units)
Rear - 10 feet minimum
Periphery Boundary- 10 feet along the northern and western boundaries; and 30 feet along the southern and eastern boundaries.

Primary vehicular access to the project site is proposed from Clearview Drive and Silver Sage Drive. A second connection to Clearview Drive is proposed for emergency access and will be gated. This secondary access will not be available for use by residents and will be reserved for emergency services only. Interior roads will be 22 feet wide and be signed for “no parking.” Off-street parking will be provided throughout the development.

Parking standards are per Division 2 of the Development Standards. Division 2 allows the Director to consider an alternative standard to the parking standards identified. The applicant proposes a reduction in the parking standard from 85 spaces (2.5 spaces per unit) to 68 spaces (2 spaces per unit). Thirty-four guest parking spaces are provided throughout the development and each unit is provided with a single car garage. Additionally, while not counted towards the total parking count, each unit will have a 20 foot driveway which can serve as additional parking

for residents or their guests. The parking reduction is approved by the Director and supported by data from the Institute of Transportation Engineers (ITE) included in the application.

The Planning Commission is authorized to approve a Special Use Permit upon making the seven required findings of fact. The Planning Commission conducts a public hearing and advises the Board if the proposed tentative map is consistent with the provisions of the Municipal Code and NRS 278.320.

PUBLIC COMMENTS: Public notices were mailed on February 7, 2020 to 52 property owners within 600 feet of the subject site pursuant to the provisions of NRS and CCMC for the Tentative Subdivision Map application and Special Use Permit application. As of the completion of this staff report, no public comments 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 February 26, 2020 depending upon their submittal date to the Planning Division.

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

Engineering Division:

The Engineering Division has no preference or objection to the tentative map request.

CONDITIONS OF APPROVAL:

The Engineering Division has reviewed the application within our areas of purview relative to adopted standards and practices and to the provisions of CCMC 17.07.005. The Engineering Division offers the following condition of approval:

- All construction and improvements must meet the requirements of Carson City Standard Details, including, but not limited to:
    - Gas and electric utilities must be shown on construction drawings. A typical detail must be provided with the construction drawings showing separation requirements are being met per Nevada Division of Environmental Protection and City Details, C-1.2.5 and C-1.2.4.
    - The water main in Clearview Drive must be extended along the frontage to connect into Silver Sage Drive. It is suspected that an existing valve was buried near the dead end of the water main west of the project. The valve must be exposed and a new riser installed. If no valve can be found a new one must be installed. The new patch over the water main will need to extend to the newly installed curb and gutter.
    - An ADA access ramp will need to be installed at the corner of Silver Sage Dr. and Clearview Dr.
- The internal streets must be privately owned and maintained and must meet Carson City standards for street sections.
- Storm drain must be made to surface drain wherever practicable. Any storm drain utilities outside of the roadway must be privately owned and maintained.
- A blanket Public Utility and Access easement will need to be created over all internal streets; this will need to be shown on both the construction drawings and final map.
- A sampling tap will need to be included in a common area of the project near one of the entrances.

FINDINGS:

The following Tentative Map Findings by the Engineering Division are based on approval of the above conditions of approval:

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 existing infrastructure has been found sufficient for the sanitary sewer needs of the subdivision. The water main along Clearview Drive will need to be extended to Silver Sage. The City has the capacity to meet the water and sewer demand.

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

The City has sufficient system capacity and water rights to meet the required water allocation for the subdivision.

3. *The availability and accessibility of utilities.*

Sanitary sewer is available and accessible. Water will need to be extended along Clearview Drive to Silver Sage.

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

The road network necessary for the subdivision is available and accessible.

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.*

Development engineering has no comment on this finding.

6. *Conformity with the zoning ordinance and land use element of the city's master plan.*

Development engineering has no comment on this finding.

7. *General conformity with the city's master plan for streets and highways.*

The development is in conformance with the city’s master plan for streets and highways.

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

The existing infrastructure is sufficient to meet the additional demand imposed by the subdivision.

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

Based the submitted engineering reports, Development Engineering has no comments on this finding.

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

Development engineering has no comment on this finding.

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 subdivision has sufficient secondary access, and sufficient fire water flows.

12. *Recreation and trail easements*.

Development engineering has no comment on this finding.

These comments are based on the tentative map plans and reports submitted. All applicable code requirements will apply whether mentioned in this letter or not.

Fire Department

SUB-2020-0001

1. Project must comply with the currently adopted edition of the International Fire Code and northern Nevada fire code amendments as adopted by Carson City

2. The fire hydrant locations do not comply with IFC Appendix C, Table C102.1 "maximum distance" column. Please revise locations to provide proper coverage on Galway Court south of Dublin Street.

3. The road width is 20' wide. No on street parking is allowed. Provide "No Parking-Fire Lane" signs every 50' on both sides of the street.

LU-2020-0001:

The project must comply with the currently adopted edition of the International Fire Code and northern Nevada Fire Code amendments as adopted by Carson City.

School District

For every 100 new homes, we expect 30 new students. With most of the schools now at capacity and limited capital funding for new facilities, we are concerned as we cannot rezone our way out of the problem. We are doing our utmost to prepare for growth within our means.

Parks

1. The development will be subject to the collection of Residential Construction Tax (RCT), compliant with the Nevada Revised Statutes and Carson City Municipal Code (CCMC 15.60).

2. The applicant will be required to incorporate "best management practices" into their construction documents and specifications to reduce the spread of noxious weeds. The

Parks, Recreation & Open Space Department is willing to assist the applicant with this aspect of their project.

3. Carson City is a Bee Friendly USA City. As a result, the applicant shall use approximately 50% pollinator friendly plant material for any required landscaping on the project site. The Parks, Recreation & Open Space Department has provided the applicant with a recommended tree and shrub species list. Also, any remaining landscape plant material selection needs to be consistent with the City's approved tree species list or other tree species, as approved by the City.

4. The applicant will be required to maintain all common landscape and open space areas on the project site in perpetuity, including any landscaping in the road right-of-way.

SPECIAL USE PERMIT FINDINGS: Staff recommends approval of the Special Use Permit based on the findings below and in the information contained in the attached reports and documents, pursuant to CCMC 18.02.080.5 (Findings), subject to the recommended conditions of approval, and further substantiated by the applicant's written justification. In making findings for approval, the Planning Commission must consider:

1. Will be consistent with the objectives of the Master Plan elements;

The requested development is consistent with the concept of a Compact and Efficient Pattern of Growth (Guiding Principle 1). Carson City is committed to a compact pattern that makes efficient use of land area and water resources available for urban growth, and that fosters the provisions of infrastructure and services in a cost effective manner. The subject property can be served by water and sewer.

Guiding Principle 7 discusses compact, mixed use activity centers, stating "Carson City will encourage the creation of compact, mixed-use activity centers in easily accessible and highly visible locations of the community. The activity centers will promote the efficient use of available commercial lands and concentrate retail services in pedestrian and transit-oriented development nodes that may be easily accessed from and serve surrounding neighborhoods. Activity centers will vary in size and composition depending upon their location, context, and level of priority. Staff finds that the proposed development is consistent with the concepts of compact development, placing people near economic centers to encourage mixed use activity centers.

2. Will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood; and is compatible with and preserves the character and integrity of adjacent development and neighborhoods or includes improvements or modifications either on-site or within the public right-of-way to mitigate development related to adverse impacts such as noise, vibrations, fumes, odors, dust, glare or physical activity;

The subject property is adjacent to existing single family residential development to the south (across Clearview Drive), vacant parcels to the east and west, and a bank to the north. The proposed use will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood. The project includes single family attached units which can act as a transition between the existing commercial to the north and the residential to the south. There will be a 10 foot setback along the western and northern boundaries and a larger 30 foot setback along the southern and eastern boundaries. The 30 foot setbacks are generally comprised of common area that will be landscaped in accordance with Division 3 of the Development Standards. Staff finds the project as proposed and conditioned will not be detrimental to the surrounding properties or general neighborhood.

3. Will have little or no detrimental effect on vehicular or pedestrian traffic;

As proposed and conditioned, the project will have little or no detrimental effect on vehicular or pedestrian traffic. The applicant has provided a traffic memo outlining the estimated trips, based on the ITE Trip Generation Manual. The proposed project will generate 200 daily trips with an AM peak of 15 trips and a PM peak of 19 trips. This is below the threshold for a full traffic analysis. The project will include improvements such as sidewalks along Clearview Drive and Silver Sage Drive and a "Share the Road" sign on Clearview Drive. These sidewalks will complete the sidewalk along the west side of Silver Sage Drive (between Koontz Lane and Clearview Drive), and add to the sidewalk system along Clearview Drive.

4. Will not overburden existing public services and facilities, including schools, police and fire protection, water, sanitary sewer, public roads, storm drainage and other public improvements;

The project is located adjacent to existing single family and commercial developments which are served by the existing public services including schools, sheriff, transportation facilities, and parks. The School District remains concerned about capacity and has advised that for every 100 new homes it expects about 30 new students. With most of the schools now at capacity, and limited capital funding for new facilities, it is concerned as it cannot "rezone" its way out of the problem. The school district has advised that it is doing its utmost to prepare for growth, within its means. The proposed development will not overburden police protection. Development Engineering has reviewed the development for impacts to water, sewer, storm drainage, and roadway systems. The existing infrastructure has been found to be sufficient to supply water and sanitary sewer and the City has capacity to meet the demand. The Fire Department has also reviewed the development. As proposed, sufficient access is provided. The project must comply with the currently adopted edition of the International Fire Code and the Northern Nevada Fire Code Amendments as adopted by Carson City. The Fire Department will review the site improvement plans as well as the final map to ensure compliance with these regulations.

5. Meets the definition and specific standards set forth elsewhere in this Title for such particular use and meets the purpose statement of that district;

The project meets the definition and specific standards set forth in Title 18. The subject property is zoned Retail Commercial. Single family dwellings are a conditional use in this zoning district. Development Standards 1.18 provides standards for residential development in non-residential zoning districts, as well as supplemental findings. Compliance with the provisions of 1.18- Residential Development Standards in non-residential districts is outlined below:

The following standards are intended to establish minimum standards and Special Use Permit review criteria for residential development within the Neighborhood Business (NB), Retail Commercial (RC), General Commercial (GC), Residential Office (RO) and General Office (GO) zoning districts.

> *Permitted uses. Residential uses are only allowed as permitted by Chapter 18.04, Use Districts, as a primary or conditional use in the applicable zoning districts.*
>
> The subject property is located in the Retail Commercial zoning district and therefore residential uses are allowed subject to first obtaining approval of a Special Use Permit.
>
> *Maximum permitted density. There is no maximum residential density within non-*

residential zoning districts subject to meeting the height, setback, parking and open space requirements of this chapter.

The density for the project is 12.36 units per acre. The proposed development will comply with the height, setback, parking, and open space requirements.

Maximum building height shall be the maximum height established by the zoning district in which the project is located.

The Retail Commercial zoning allows for a maximum height of 45 feet. The applicant proposes two-story single family attached units with a maximum height of 27 feet.

Setbacks. Minimum setbacks shall be those established by the zoning district in which the project is located, subject to the following:

a. In the NB, RC, GC and GO zoning districts, a minimum setback of twenty (20) feet is required adjacent to a residential zoning district, with an additional ten (10) feet for each story above one (1) story if adjacent to a single-family zoning district.

Proposed setbacks are consistent with the Retail Commercial zoning district and Division 1.18. The setbacks are as follows:

Front - 10 feet to the house and 20 feet to the garage
Side - 0 feet (interior units) and 1.5 feet (exterior units)
Rear - 10 feet minimum

Periphery Boundary Setback: 10 feet from the northern and western project boundaries and 30 feet from the southern and eastern project boundaries.

b. A minimum setback of ten (10) feet is required from the right-of-way of an arterial street as identified in the adopted Transportation Master Plan, excluding the Downtown Mixed-Use area.

The project fronts Clearview Drive and Silver Sage Drive. Clearview Drive is classified as a minor arterial roadway and Silver Sage Drive is classified as a Minor Collector. The setbacks along the eastern and southern project boundaries are a minimum of 30 feet; therefore, the setback requirement is met.

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

Parking standards are per Division 2 of the Development Standards. Division 2 allows the Director to consider an alternative standard to the parking standards identified. The applicant proposes a reduction in the parking standard from 85 spaces (2.5 spaces per unit) to 68 spaces (2 spaces per unit). Thirty-four guest parking spaces are provided throughout the development and each unit is provided with a single car garage. Additionally, while not counted towards the total parking count, each unit will have a 20 foot driveway which can serve as additional parking for residents or their guests. As proposed, sufficient parking will be provided consistent with Division 2 of the Development Standards. The parking reduction is approved by the Director and supported by data from the Institute of Transportation Engineers (ITE) as outlined in the application.

Open Space.

a. *For Multi-Family Residential development, 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.*

This requirement does not apply. The proposed use is for a 34 lot attached single family residential development.

b. *For Multi-Family Residential development, 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.*

This requirement does not apply. The proposed use is for a 34 lot attached single family residential development.

c. *For Single-Family Residential development or Two-Family Residential development, a minimum of 250 square feet of open space must be provided for each unit either as private open space or common open space.*

As detailed in the application, each lot will have a minimum of 250 square feet of private open space in the rear yard. Additionally, there is another 33,977 square feet of common open space outside of the lot boundaries. The common open space areas will be landscaped and maintained by a home owners association or similar entity.

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

The front and street side yard setback areas are not included in the open space calculations. The private open space areas are provided in the rear yards of each unit.

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

The applicant has provided a conceptual landscape plan with the application. A detailed landscape plan that demonstrates compliance with Development Standards Division 3 is required to be submitted with construction plans. Staff has included this as a condition of approval.

Special Use Permit review standards. Where a residential use is a conditional use within a given zoning district, the Planning Commission shall make two (2) of the following findings in the affirmative in the review of the Special Use Permit in addition to the required findings of Section 18.02.080 of the Carson City Municipal Code.

a. *The development is not situated on a primary commercial arterial street frontage.*

This finding is met. Clearview Drive is considered a Minor Arterial and Silver Sage Drive is considered a Minor Collector. The properties to the south and east are residential; therefore, the site is not situated on a primary commercial arterial street frontage.

b. The development is integrated into a mixed-use development that includes commercial development.

The project site is located in a Mixed Use Employment master plan designation. It is part of a larger 13 acre area designated as Mixed-Use Employment. The other uses within this 13 acre area are commercial in nature, consisting of banks, vacant commercial property, and parking lots. Although the subject property is intended to develop as solely residential its proximity to commercial and residential uses alike create a mix of uses in the area.

6. Will not be detrimental to the public health, safety, convenience and welfare; and

Staff finds that the proposed single family residential development will not be detrimental to the public health, safety, convenience, and welfare. The use is an allowed use, consistent with the Master Plan, and will meet all City standards.

7. Will not result in material damage or prejudice to other property in the vicinity, as a result of proposed mitigation measures.

As conditioned, staff finds the single family residential development will not result in material damage or prejudice to other property in the vicinity. The project can act as a transition between the existing commercial to the north and the residential to the south.

TENTATIVE MAP FINDINGS: Staff recommends approval of the Tentative Subdivision Map based on the findings below and 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. A copy of the proposed tentative map was submitted to the Nevada Division of Water Resources and the Nevada Division of Environmental Protection. The Public Works Department has advised of adequate capacity to meet water and sewer demand. The utility design will need to meet all applicable development standards related to water and sewer design.

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. The City has sufficient system capacity and water rights to meet the required water allocation for the subdivision.

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 adjacent to existing single family and commercial developments which are served by the existing public services including schools, sheriff, transportation facilities, and parks. The School District remains concerned about capacity and has advised that for every 100 new homes it expects about 30 new students. With most of the schools now at capacity, and limited capital funding for new facilities, it is concerned as it cannot "rezone" its way out of the problem. The school district has advised that it is doing its utmost to prepare for growth, within its means. The proposed development will not overburden police protection. Development Engineering has reviewed the development for impacts to water, sewer, storm drainage, and roadway systems. The existing infrastructure has been found to be sufficient to supply water and sanitary sewer and the City has capacity to meet the demand. The Fire Department has also reviewed the development. As proposed, sufficient access is provided. As noted in the Fire Department comments, the project must comply with the currently adopted edition of the International Fire Code and the Northern Nevada Fire Code Amendments as adopted by Carson City.

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 project is not adjacent to public lands.

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

The Master Plan land use designation is Mixed Use Employment. This designation is intended to provide concentrated areas of employment, combined with a mix of complementary residential and commercial uses. The proposed residential development will complement the existing commercial uses already located in the area. The requested development is consistent with the concept of a Compact and Efficient Pattern of Growth (Guiding Principle 1). Carson City is committed to a compact pattern that makes efficient use of the limited land area and water resources it has available for urban growth, and that fosters the provision of infrastructure and services in a cost effective manner.

Guiding Principal 7 discusses compact, mixed use activity centers, stating "Carson City will encourage the creation of compact, mixed-use activity centers in easily accessible and highly visible locations of the community. The activity centers will promote the efficient use of available commercial lands and concentrate retail services in pedestrian and transit-oriented development nodes that may be easily accessed from and serve surrounding neighborhoods. Activity centers will vary in size and composition depending upon their location, context and level of priority."

Given the existing surrounding neighborhood context, staff finds this proposal to be consistent with the master plan.

The zoning designation is Retail Commercial. Residential uses are permitted in this zoning district subject to first obtaining approval of a Special Use Permit for residential uses in a commercial zoning district. The applicant has concurrently applied for a Special Use Permit (LU-2020-0001) and the Tentative Subdivision Map is reliant upon approval of the SUP. Staff finds the proposed subdivision is consistent with the Master Plan land use designation, and as conditioned is consistent with the zoning ordinance.

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

The proposed subdivision is in conformance with the City's master plan for streets and highways.

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

As proposed and conditioned, the project will have little or no detrimental effect on vehicular or pedestrian traffic. The applicant has provided a traffic memo outlining the estimated trips, based on the ITE Trip Generation Manual. The proposed project will generate 200 daily trips with an AM peak of 15 trips and a PM peak of 19 trips. This is below the threshold for a full traffic analysis. The project will include improvements such as sidewalks along Clearview Drive and Silver Sage Drive and a "Share the Road" sign on Clearview Drive. These sidewalks will complete the sidewalk along the west side of Silver Sage Drive (between Koontz Lane and Clearview Drive), and add to the sidewalk system along Clearview Drive.

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

The site is relatively flat and earthquake potential is moderate. The property is not located in a FEMA flood zone that requires special flood damage prevention considerations.

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

The proposed tentative map has been routed to the Nevada Department of Environmental Protection (NDEP) and the Nevada Division of Water Resources. Public Works has indicated sufficient water and sewer capacity to meet the demands of this project.

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 Public Works Department has reviewed the project in conjunction with the Fire Department. There is sufficient secondary access and sufficient fire flows to serve the project. The subdivision proposes one connection to Clearview Drive and one connection to Silver Sage Drive with an additional gated emergency access on Clearview Drive.

12. Recreation and trail easements.

The project is not required to provide recreation and trail easements. The project will include improvements such as sidewalks along Clearview Drive and Silver Sage Drive. These sidewalks will complete the sidewalk along the west side of Silver Sage Drive (between Koontz Lane and Clearview Drive), and add to the sidewalk system along Clearview Drive.

Attachments

Applications:

LU-2020-0001
SUB-2020-0001

Silver View Townhomes

Tentative Map & SUP

February 2020

Prepared For:

State Street Development, LLC.

Prepared By:

Manhard CONSULTING
241 Ridge Street, Suite 400
Reno, NV 89501

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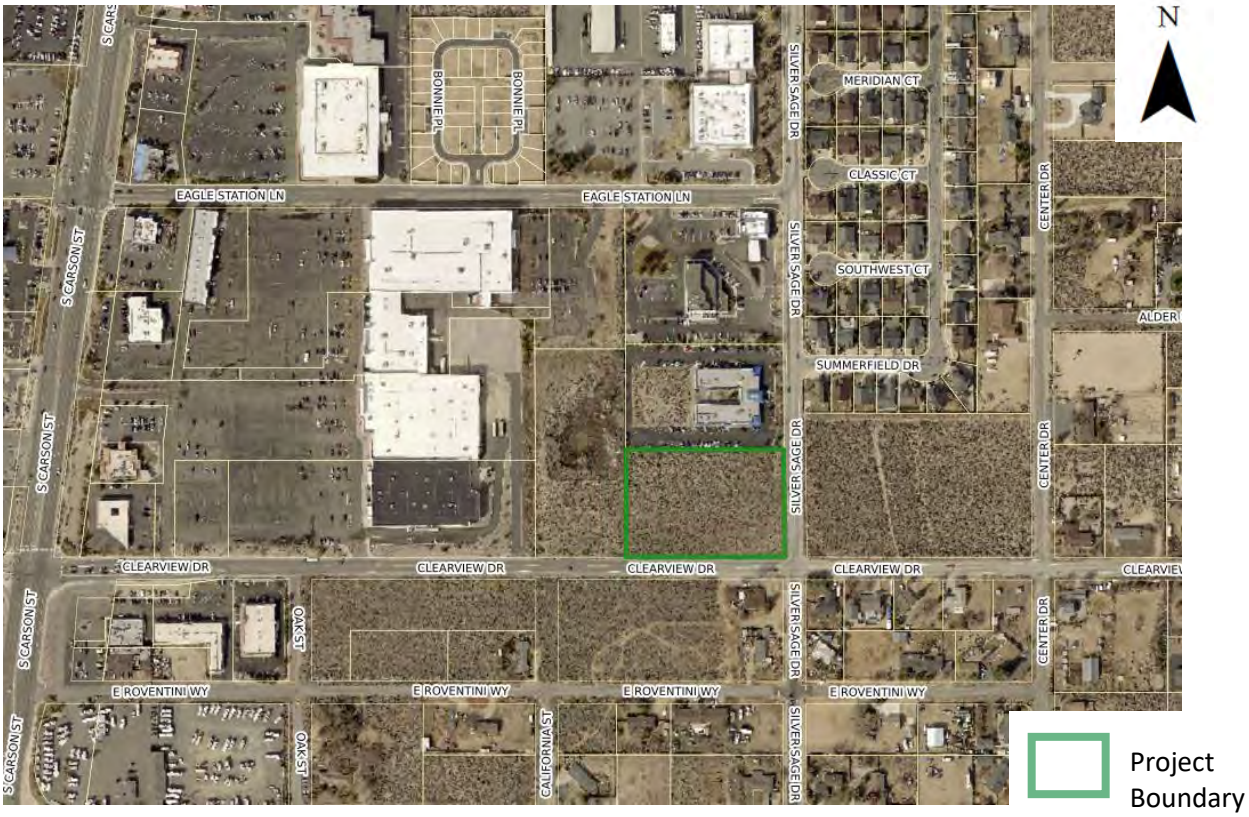
PROJECT LOCATION

The project site is located on the northwest corner of Clearview Drive and Silver Sage Drive on APN 009-125-12, approximately 0.3 miles east of S. Carson Street. The 2.75-acre site is currently undeveloped. Less than 0.15 miles west of the site, Clearview Drive provides access to multiple retail shopping and restaurant options via a public street system.

Figure 1: Project Location



EXISTING CONDITIONS

Per the Master Plan, the site is Mixed-Use Employment. The zoning for the site is Retail Commercial (RC). The surrounding Master Plan designations, zoning, and current land uses are as depicted in Figure 2.

Figure 2: Surrounding Property Designations

Direction	Master Plan	Zoning	Current Land Use
North	Mixed Use Employment	Retail Commercial (RC)	Greater Nevada Credit Union
South	Mixed Use Residential	Single Family 1-Acre minimum (SF1A)	Vacant and Single Family Residential
East	Medium Density Residential	Single Family 1-Acre minimum (SF1A)	Vacant
West	Mixed Use Employment	Retail Commercial (RC)	Vacant

Figure 3: Existing Master Plan Designation: Mixed Use Employment (MUE)

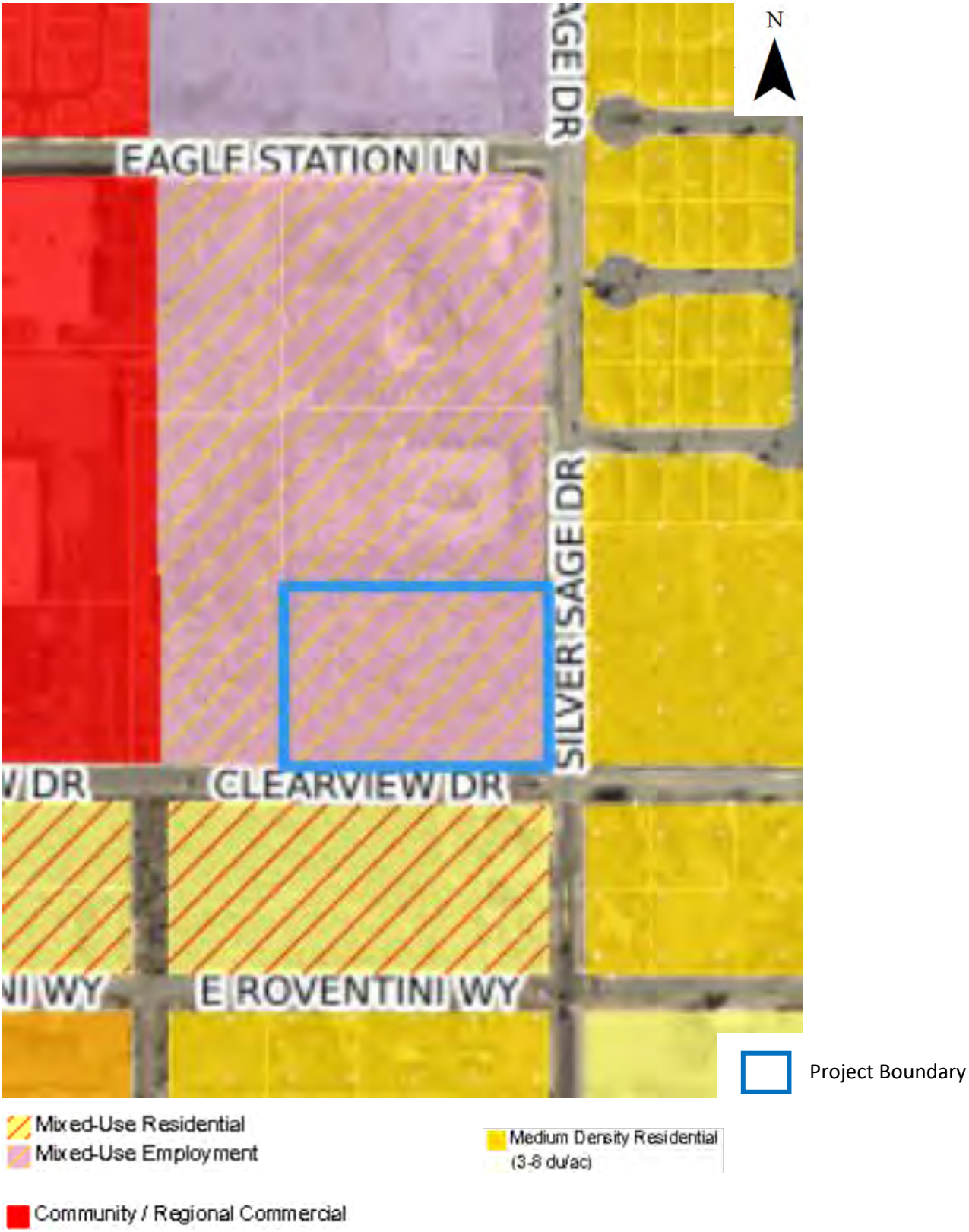
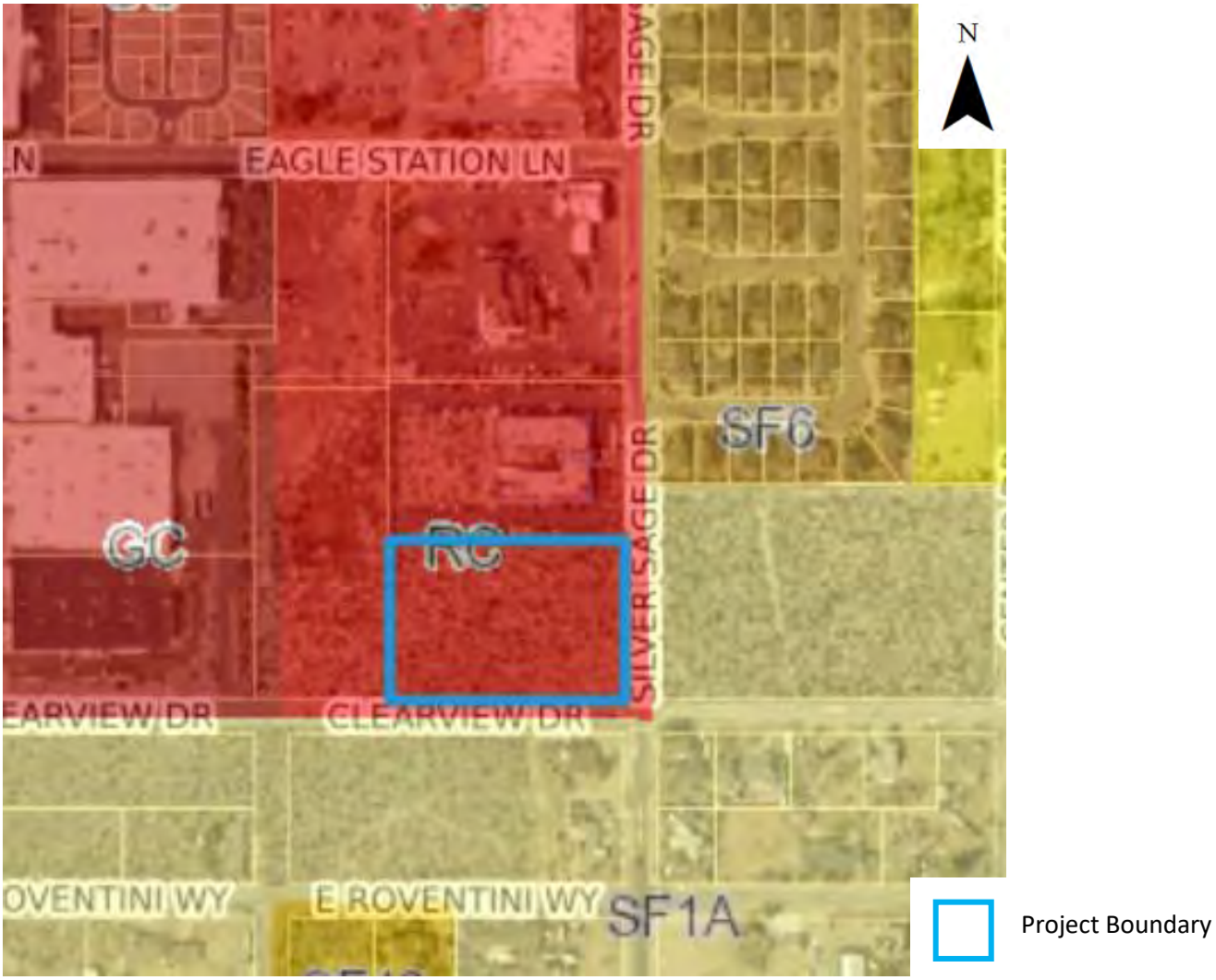


Figure 4: Existing Zoning Designation: Retail Commercial (RC)



APPLICATION REQUEST

This application package includes requests for:

1) A **Tentative Map** to create 34 single family residential lots on a 2.75 acre parcel; and
2) A **Special Use Permit** to allow for a residential use within a non-residential zoning district.

PROJECT DESCRIPTION AND JUSTIFICATION

State Street Development LLC. Proposes a Tentative Map (TM) to create 34 single family residential lots on a 2.75-acre site, a density of 12.36 units per acre (34 units/2.75 acres). The lots range in size from 1,746 square feet (sf) to 2,160 sf, with an average size of 1845 square feet. The design includes single family attached residential units in building clusters of between two and five units. The units are proposed to be two- and three-bedrooms, ranging in size from 1,397 to 1,460 square feet. Each unit will include an individual garage, private porch, and balcony. The units are proposed to be two stories with a building height of +/- twenty-seven (27) feet. The individual lot boundaries will include the building footprints and roof overhangs, rear yards, front yards, and 20' driveways.

Carson City Municipal Code (CCMC) 18.04.130.03 allows for single dwellings in the RC zoning district with a Special Use Permit. Additionally, Carson City Development Standards (CCDS) 1.18 outlines the supplemental standards for residential development in a non-residential district. Both Code sections are addressed in further detail later in this document.

Project Benefit

The 2.75-acre site is located within a larger 13-acre area of MUE land use (see Figure 3). The only existing development within that area is commercial. The proposed development will provide a complimentary residential component to the area within walking distance of retail shopping, restaurants, and public transit bus stops. Additionally, the proposed housing type will be appealing to both first time homeowners and downsizers by providing an urban design with small private yards and limited maintenance responsibility.

Open Space

Open Space for the proposed development is mandated by CCDS 1.18(6)(c), which reads (emphasis added):

> "For **Single-Family Residential development** or Two-Family Residential development, a minimum of **250 square feet** of open space must be provided for each unit **either** as private open space **or** common open space".

In accordance with this provision, each lot has a minimum 250 sq. ft. rear yard within the proposed lot boundaries, comprised of 0.23 acres total. Further, the design exceeds the open space requirement by including 0.78 acres (33,977 sf) of Common Open Space outside the lot boundaries (28% of the site, excluding the ROW areas). The Common Open Space will be maintained by a homeowner's association, or similar entity. See Figure 5 for details of the provided Open Space.

Setbacks

The proposed lot configurations meet the setbacks for RC zoning within the interior and the perimeter of the development. The perimeter boundaries along Silver Sage Drive and Clearview Drive are 30', accommodating CCDS 1.18.4, which requires 20' setbacks adjacent to residential districts (SF1A) plus an additional 10' for each story above one. The interior setbacks meet or exceed those required in RC zoning.

Figure 5: Development Standards (for residential development in non-residential zoning districts)

	Residential Standards	Proposed
Permitted Uses	Residential uses are allowed as permitted by the RC use district as a conditional use	Single Family dwelling - Section 18.04.130(3)
Maximum Permitted Density	No maximum residential density	12.36 units/acre (34 units/2.75 acres)
Maximum Height	45'	+/- 27'
Setbacks *subject to Division 1.18 (res. development standards in non-res. districts)	Front- 0' Side- 0' Street Side- *0' Rear- 0' * Min. 20' perimeter setback required adjacent to residential zoning plus 10' for 2 stories	Front- 10' to face of home, 20' to garage Side- 0' (interior units), 1.5' (exterior) Street Side- *30' on perimeter Rear- 10' min * 30' setback on south and west perimeter adjacent to residential zoning (SF1A)
Open Space	250 sf per unit (common or private open space) equating to 8,500 sf (34 x 250)	Open Space provided: 43,995 sf

Access

Vehicular access is proposed from Clearview Drive and Silver Sage Drive. The interior streets are proposed with a Right of Way width of 30'. The sections will require approval by the Carson City Fire Department. The interior streets will be posted for no on-street parking. Off-street parking will be provided with each lot and in common area facilities. A second street connecting to Clearview Drive is proposed for emergency access and will include a gate. The second access will not be available for use by residents and will be reserved for emergency services only.

The proposed development plan includes 5' wide sidewalks along one side of the internal roadways for pedestrian access throughout the site. The design would connect to proposed 5' wide sidewalks along the Clearview Drive and Silver Sage Drive frontages on the eastern and southern borders of the site. These perimeter sidewalks would complete the existing public Right of Ways, which already include paved travel lanes, curbs, and gutters.

Traffic

Per the ITE Trip Generation tables (6th edition) the proposed 34 units will not generate over 80 peak hour trips or 500 ADT (Average Daily Trips): therefore, the design does not necessitate submittal of a traffic impact study (per Title 18 Appendix: Division 12.13 – Traffic and impact study requirements).

Figure 6: ITE Average Trip Generation

Land Use	Dwelling Units	ADT	AM Peak Hour (weekday)	PM Peak Hour (weekday)
Residential Townhouses	34	200 (34 units x 5.86 ADT: weekdays)	15 (34 units x 0.44 trips: 7AM -9AM)	19 (34 units x 0.54 trips: 4PM-6PM)

Water/Sewer

The site will be provided water and sewer services from the City. Water will be connected in a loop system to existing infrastructure at Silver Sage Drive and Clearview Drive. Sewer connections will be made at two locations to existing infrastructure on Clearview Drive, connecting to 8" mains.

Drainage

A retention basin is proposed at the south east corner of the site to manage stormwater generated by the development. Percolation tests and other engineering studies are included with this submittal. Maintenance of the basin will be the responsibility of a condominium association, or similar entity.

Floodplain

The project area is designated as Flood Zone X, which indicates a minimal flood hazard.

Phasing

The phasing plan, and any future modification, will meet the requirements of NRS 278.360 regarding presentation of final maps. At this time, recordation of one final map for the site is proposed.

Dust Control

Any necessary dust control will be provided in accordance with Carson City regulations and requirements.

Architecture

Conceptual renderings for the proposal are provided as Figure 7. The proposed architecture is meant to serve as a representation of the intended building materials and general color palette proposed for the project.

Figure 7: Proposed Architecture

Parking

Due to the project's location and product type, the applicant is requesting approval of a modification to the required number of parking stalls per CCMC. The site is part of a larger area with Mixed Use Employment (MUE) designation per the Master Plan, with commercial uses and residential uses bordering the site. Also, the location is along JAC (Jump Around Carson) bus routes with two stops on Route 3, South Carson Area (per the JAC website), in the vicinity (located SW of the Clearview Drive/Silver Sage Drive intersection; and at Clearview Drive and Oak Street to the west).

The site's proximity to shopping and public transit, coupled with the MUE land use, encourages occupancy by residents with less reliance on vehicles. Per CCMC (Division 2 of Appendix 18) the proposal would typically require two parking stalls per unit plus one additional stall for every two units (2.5 stalls/unit). In accordance with CCMC, total parking is tallied by counting the total stalls provided by garage spaces and guest parking stalls. The common area of the proposed subdivision includes 34 guest parking stalls (one per unit) and each unit includes a garage. Additionally, 20' (minimum length) driveways are available on every residential lot, providing residents with more area for parking. Figure 8: Parking Calculations, summarizes the design and tally of parking areas.

Figure 8: Parking Calculations

CCMC Parking Requirement	# of Residential Units	Required Parking per CCMC	Provided Parking (guest stalls and garages)	*Total Parking Areas
2 per unit plus 1 guest stall for every 2 units	34	85 (34 x 2.5)	68 (34 garage stalls + 34 guest stalls)	102 (3 per unit)
* The available parking areas include 34 garages, 34 guest parking stalls, and 20' min. driveways for each lot (34).				

To support the requested modification and in accordance with CCMC Division 2.2 of Appendix 18, which reads: "If an accredited source (e.g. Institute of Transportation Engineers (ITE) provides an acceptable alternative to a parking standard in this division, the director may consider an alternative", Figure 9 is proposed for the Director's review. The table summarizes the Institute of Transportation Engineers parking demand statistics for *Land Use 230: Residential Townhouse.*

Figure 9: ITE Average Peak Parking Demand (Parking Generation 4th Edition)

Statistic	Peak Period Demand
Peak Period	11:00 pm - 6:00 am
Number of Studies	12
Average Size of Study Sites	151 dwelling units
Average Peak Period Parking Demand	1.38 vehicles per dwelling unit
Range	1.04 – 1.96 vehicles per dwelling unit
85th Percentile	1.52 vehicles per dwelling unit
33rd Percentile	1.28 vehicles per dwelling unit

Based on the above ITE parking demand summary, the project's 2 parking stalls per unit (68 stalls/34 units) is almost half a stall above the 85th percentile of expected vehicles per dwelling (1.52) and meets the demand for all of the studies included (high end of range is 1.96 vehicles/unit).

MASTER PLAN POLICY CHECKLIST/FINDINGS

The purpose of the Master Plan Policy Checklist is to provide a list of answers that address whether a development proposal is in conformance with the goals and objectives of the 2006 Carson City Master Plan that are related to this Tentative Map application. The Checklist is included with this letter. In addition, the following are included:

-**Tentative Map Findings**; and

-**Special Use Permit Findings**; and

- **CCDS 18.1.18 - Residential Development in Non-Residential Districts** comments.

The project complies with the Master Plan and accomplishes the following objectives.

Chapter 3: A Balanced Land Use Pattern

1. Goal 1.1c-Water Conservation: The proposed project is expected to encourage water conservation efforts through low-water landscaping, low-flow fixtures, and/or other water saving devices.
2. Goal 1.1e-Sustainable Construction Techniques: The proposed project is expected to utilize sustainable building materials and construction techniques.
3. Goal 1.5d–Coordination of Services: The site is located to be adequately served by city services including fire and sheriff services.
4. Goal 3.3d-Floodplain and Hazard Area Development: The proposed development is not within the

100-year floodplain or other hazardous areas.

5. Mixed Use Employment Policy 1.4-Location: The site is located on existing arterial and collector streets.

Chapter 4: Equitable Distribution of Recreational Opportunities

The proposed project does not include public recreational facilities.

Chapter 5: Economic Vitality

1. Goal 5.1j-Housing Mix: The proposed development will provide a housing type that will be appealing to first time homebuyers, young professionals, and downsizers, consistent with the City's goals to encourage a mix of housing for the labor force and the non-labor force.

Chapter 6: Livable Neighborhoods and Activity Centers

1. Goal 6.1a-Durable Materials: The proposed project is expected to utilize durable, long-lasting building materials.
2. Goal 6.1c-Variety and Visual Interest: The proposed development will incorporate defined entrances and pedestrian connections, landscaping, and other features consistent with the City's Development Standards.
3. Goal 6.2a-Neighborhood Compatibility: The proposed development will provide appropriate height, density, and setback transitions to ensure combability with surrounding development.
4. Goal 9.4b-"Spot" Rezoning: The proposed project will not require "spot" rezoning of the site and aims to provide a complimentary residential component to an area of Mixed Use Employment land use that currently only includes commercial development.

Chapter 7: A Connected City

1. Goal 11.2b-Transit Supportive Development: The site is located with frontage on a Minor Arterial (Clearview Drive) and a Minor Collector (Silver Sage Drive) with two bus transit stops (JAC) within walking distance.

Chapter 8: Specific Plan Areas

The proposed project is not within a Specific Plan Area.

TENTATIVE MAP FINDINGS

In accordance with Carson City Municipal Code Section 17.07.005, this project has been designed to consider the following:

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.**

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

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

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

3. **The availability and accessibility of utilities.**

   Public utilities are currently available to serve the proposed project.

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

   Police services are currently provided by the Carson City Sheriff's Office. Fire protection will be provided by the Carson City Fire Department. The project meets the requirements of the Fire Department. The Regional Transportation Commission is responsible for transportation in and around the project area. Carson City Parks Department provides recreational and parks services, although this project is not expected to impact recreational services. Educational services are provided by Carson City School District.

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 project site is not adjacent to public lands.

6. **Conformity with the zoning ordinance and land use element of the city's master plan.**

   The proposed project is in conformance with the Master Plan designation of Mixed Use Employment (MUE) and the current zoning designation of Retail Commercial. The parcel is part of an approximately 13-acre MUE area. Over half of that area is currently developed for commercial uses. The proposed residential development will compliment the existing development by including the only residential use within this 13-acre area of Mixed Use Employment land use. RC zoning allows for residential development with a Special Use Permit (a request for which is part of this submittal package).

7. General conformity with the city's master plan for streets and highways.

Policy 1.4 - Location within the Mixed Use Employment (MUE) section of the Master Plan begins:

> "MUE uses should have direct access to existing or planned arterial and collector streets and should not rely on local or residential streets for primary access."

The proposed project includes access to a Minor Arterial (Clearview Drive) and a Minor Collector (Silver Sage Drive), in conformance with the City's Master Plan for streets and highways.

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

The project includes frontages and proposed accesses from a Minor Arterial and a Minor Collector. The proposal will not generate enough Average Daily Trips (ADT) to trigger a need for new streets or intersection improvements (See Figure 6 for details).

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

Site topography is relatively flat and stabilized by sage brush. The parcel is designated by FEMA as Zone X, Area of Minimal Flood Hazard. The site will be designed to accommodate peak flow events and proposes a stormwater retention/detention basin on the south east corner of the development. A Preliminary Geotechnical Investigation is included with this submittal package.

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

All recommendations and comments provided during the review of this project will be incorporated where 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 availability and accessibility of fire protection to the proposed condominium units will be in compliance with Carson City Fire Department recommendations.

12. Recreation and trail easements.

Recreation and trail easements are not applicable to this subdivision.

SPECIAL USE PERMIT - FINDINGS

In accordance with Carson City Municipal Code Section 18.02.080, this project has been designed to consider the following:

Findings from a preponderance of evidence must indicate that the proposed use:

1. Will be consistent with the objectives of the Master Plan elements.

The inclusion of residential use for 2.75 acres of an approximately 13-acre portion of Mixed Use Employment land is consistent with the Master Plan intention for mixed-use areas. Currently, there is no residential use with the 13-acre portion. The Master Plan Policy Checklist is included in this application package with additional information.

2. Will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties of the general neighborhood; and is compatible with and preserves the character and integrity of adjacent development and neighborhoods or includes improvements or modifications either on-site or within the public right-of-way to mitigate development related to adverse impacts such as noise, vibrations, fumes, odors, dust, glare, or physical activity.

The surrounding neighborhood is comprised of vacant land, single family residential, and commercial uses, including paved parking areas. The project proposes attached single family residential development, an ideal transition between commercial use to the north and single family residential use to the south (east and west are vacant). Landscaping and open space will be in accordance with Carson City requirements, providing appropriate buffering of the development. Landscape/open space areas are shown on the Site Plan. Dust control during construction will be managed in accordance with Carson City requirements and the intended residential use should have no significant impact on surrounding development regarding noise, fumes, odors, or glare.

3. Will have little or no detrimental effect on vehicular or pedestrian traffic.

Figure 6 includes the calculated vehicular trip generation in Average Daily Trips (ADT) as well as peak AM and PM hours per the ITE Trip Generation manual. The figures (200 ADT, 15 AM peak trips, 19 PM peak trips) represent a modest impact on traffic in the area and do not trigger a traffic impact study per Carson City Code.

4. Will not overburden existing public services and facilities, including schools, police and fire protection, water, sanitary sewer, public roads, storm drainage, and other public improvements.

The site is located along a Minor Arterial and a Minor Collector within the RC zoning district and is served by public services including schools, police and fire protection, water, and sanitary sewer. The addition of 34 residential units within a commercial zoning district will not overburden public services or facilities.

5. Meets the definition and specific standards set forth elsewhere in this Title for such particular use and meets the purpose statement of that district.

Single family dwellings are permitted in the Residential Commercial zoning district subject to approval of a Special Use Permit (CCMC Section 18.04.130(3)). The proposed project meets the specific standards set forth in CCMC Section 18.04.130 and Title 18 Appendix 1.18, residential development standards in non-residential districts.

6. Will not be detrimental to the public health, safety, convenience and welfare.

Providing new single family dwellings with modern construction methods will not be detrimental to the public health, safety, and welfare because the area is intended for mixed uses (which currently only includes commercial development).

7. Will not result in material damage or prejudice to other property in the vicinity, as a result of proposed mitigation measures.

The use will meet the intended use of the area by providing a residential use complimentary to the existing commercial uses in the area. Additionally, the development will be consistent, and exceed, City standards related to open space, including proposed landscaping along the perimeter of the site. No foreseeable damage or prejudice to other properties is envisioned.

RESIDENTIAL DEVELOPMENT STANDARDS IN NON-RESIDENTIAL DISTRICTS- CCMC 18.1.18

The following standards are intended to establish minimum standards and Special Use Permit review criteria for residential development within the Neighborhood Business (NB), Retail Commercial (RC), General Commercial (GC), Residential Office (RO) and General Office (GO) zoning districts.

1. Permitted uses. Residential uses are only allowed as permitted by Chapter 18.04, Use Districts, as a primary or conditional use in the applicable zoning districts.

Residential uses, as proposed, are allowed as a conditional use within the Retail Commercial (RC) zoning district

2. Maximum permitted density. There is no maximum residential density within non-residential zoning districts subject to meeting the height, setback, parking and open space requirements of this chapter.

The proposed density of 12.36 units per acre (2.75 acres/34 units) is compatible with the surrounding land uses and the design generally conforms to development standards with one modification request relating to the allowance of credit for tandem parking.

3. Maximum building height shall be the maximum height established by the zoning district in which the project is located.

The proposed residential structures are twenty seven (27) feet in height, well below the allowed forty five (45) feet maximum in the RC zoning district.

4. **Setbacks. Minimum setbacks shall be those established by the zoning district in which the project is located, subject to the following:**

   a. **In the NB, RC, GC and GO zoning districts, a minimum setback of twenty (20) feet is required adjacent to a residential zoning district, with an additional ten (10) feet for each story above one (1) story if adjacent to a single-family zoning district.**
   b. **A minimum setback of ten (10) feet is required from the right-of-way of an arterial street as identified in the adopted Transportation Master Plan, excluding the Downtown Mixed-Use area.**

   The proposed setback for the south and west periphery of the site, adjacent to SF1A zoning, is 30' in order to accommodate the proposed two story structures. The interior setbacks are in accordance with RC zoning requirements.

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

   Due to the project's location and product type, the applicant is requesting approval of a modified parking schedule. The design does not include on-street parking, so CCMC requires one stall per two units for guest parking in addition to the base requirement of two stalls per unit. As demonstrated in Figure 8: Parking Calculations, the design provides two spaces per unit and 20' driveways on each residential lot, which would provide additional area for residents who require additional parking facilities.

   In order to approve the requested modification, CCMC Division 2.2 of Appendix 18, reads: "If an accredited source (e.g. Institute of Transportation Engineers (ITE) provides an acceptable alternative to a parking standard in this division, the director may consider an alternative". The project's location is unique: it's part of a 13-acre mixed use Master Plan designated area (MUE), but currently, only commercial development is constructed. The location is along JAC (Jump Around Carson) bus routes with two stops on Route 3, *South Carson Area* (per the JAC website), in the vicinity (located SW of the Clearview Drive/Silver Sage Drive intersection; and at Clearview Drive and Oak Street to the west). The proposed residential development type is geared toward "millennials", first time home buyers, and existing homeowners looking to downsize. These targeted buyers typically own less vehicles and market studies show that specifically, these demographics are most attracted to "walkable communities" or those located in close proximity to services. Considering the number of proposed parking stalls, combined with the target buyer for this community, the proximity to existing commercial development, and the availability of public transit, we believe an alternative parking requirement is warranted.

6. **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.**
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.**
c. **Front and street side yard setback areas may not be included toward meeting the open space requirements.**

Please reference *Figure 5: Development Standards (for residential development in non-residential zoning districts)* for demonstration of meeting and exceeding compliance with these standards. Each residential lot includes a minimum 250 sf of private open space in addition to the common open space provided within the development.

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

The proposed landscaping plan was designed in accordance with CCMC.

8. **Special Use Permit review standards. Where a residential use is a conditional use within a given zoning district, the Planning Commission shall make two (2) of the following findings in the affirmative in the review of the Special Use Permit in addition to the required findings of Section 18.02.080 of the Carson City Municipal Code.**

a. **The development is not situated on a primary commercial arterial street frontage.**
b. **The development is integrated into a mixed-use development that includes commercial development**
c. **The applicant has provided evidence that the site is not a viable location for commercial uses.**
d. **The site is designated Mixed-Use Commercial, Mixed-Use Residential or Mixed-Use Employment on the Master Plan Land Use Map and the project meets all applicable mixed-use criteria and standards**

The proposed project complies with findings **a, b**, and **d** above.

a. The site is located at the intersection of a Minor Collector and a Minor Arterial with residential zoning bordering the site on the east and south, not primary commercial arterial street frontage.

b. The site is part of a 13-acre area of Mixed Use Employment per the Master Plan. There is not currently a residential component of development for the area. The proposal will complement existing commercial development and offer a mix of land uses in the area.

d. The site is designated as Mixed Use Employment (MUE) in the Master Plan. The surrounding development within the same land use encompasses approximately 13 acres, with over half of that area developed with existing commercial uses. The proposal would introduce a mix of development, with all residential design requirements met except for the requested modification to parking calculations.

Resource Concepts Inc

October 21, 2019

RPJ NV LLC.
Attn: Mark B. Turner
3075 College Dr.
Carson City, NV 89703

Subject: ***Preliminary Geotechnical Investigation***
Clearview Subdivision
Carson City, Nevada

Dear Mr. Turner:

In accordance with your request, we are submitting our Geotechnical Investigation for the Clearview Subdivision project located in Carson City, Nevada. Our work is intended for the sole and exclusive use of RPJ NV, LLC, their agents, or designated representatives. In our opinion, there are no significant geotechnical constraints, which would preclude the proposed construction of the project, provided the recommendations of this report are incorporated by design into the final plans and specifications.

The most significant geotechnical consideration that may affect construction of the project is the presence of a thin low plasticity clayey sand layer on the property that may create perched water conditions during wet periods.

We appreciate the opportunity to work with you on this project. Should you have questions concerning the contents of this report, or if we may be of further service, please contact the undersigned at your convenience.

Sincerely,
RESOURCE CONCEPTS, INC.

STATE OF NEVADA PROFESSIONAL ENGINEER
GARY C. LUCE
Exp 12-31-19
CIVIL
No. 12001

10-21-2019

Gary Luce, P.E.
Senior Geotechnical Engineer

Jim Koch, CEM
Project Geologist

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PRELIMINARY GEOTECHNICAL INVESTIGATION

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the Clearview Subdivision project (the "Site") located in Carson City, Nevada as shown in Figure 1, the Vicinity Map. The Site is comprised of a single parcel of land identified by the Carson City Assessor by APN 009-125-12. The 2.75-acre site is located on the northwest corner of East Clearview Drive and Silver Sage Drive. It is our understanding that the proposed development will consist of nine multifamily buildings with thirty-four single-family housing units (with zero lot line setbacks), local streets, parking areas, and associated landscaping.

The primary focus of the investigation was to evaluate the general subsurface geologic and soil conditions for the area of the Site. Based on the site characterization, laboratory testing, and engineering analysis, recommendations are provided for grading, foundation design, pavement sections, and related geotechnical concerns are provided. This report is considered preliminary until such time as site grading, and structural plans are available for review. At the time of this report Carson City Building Division has adopted the 2018 IBC and 2018 IRC.

2.0 SCOPE OF SERVICES

The scope of service performed to prepare this report included discussion of the project with the client and reviewing the following documents:

- *Manhard Consulting, Ltd., Conceptual Plan, Clearview Subdivision.*
- *Katzer, T. (1980), Carson City Quadrangle, General Groundwater Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
- *Mauer, Douglas K. (1992), Genoa Quadrangle Groundwater Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
- *Natural Resources Conservation Service Website, Soil Survey of Carson City Area, Nevada, (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).*
- *Pease, Robert C. (1979), Genoa Quadrangle Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
- *Pease, Robert C. (1980), Genoa Quadrangle Geologic Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
- *Trexler, D.T. (1977), Carson City Folio Geologic Map, Nevada Bureau of Mines and Geology, Carson City 7.5' Minute Quadrangle, Nevada, Scale 1:24,000.*
- *Trexler, D.T. and Bell, J.W., (1979), Carson City Quadrangle, Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
- *Review of published geologic maps, in-house documents, and other literature pertaining to the project area to aid in evaluating geologic conditions and hazards that may be present.*

In addition, we performed the following field analysis, laboratory analyses, and document preparation tasks:

- Excavated nine test pits to examine the prevailing soil conditions.
- Conducted two percolation tests in the area of the proposed retention basin.

- Recovered representative samples utilizing bulk methods.
- Laboratory tests on representative soil samples recovered from the test pits to determine their engineering characteristics.
- Conducted analyses and computations for soil bearing strength, settlement, and pavement sections.
- Prepared this report presenting our preliminary findings, conclusions, and recommendations regarding the geotechnical aspects of constructing the proposed project.

The recommendations presented herein are based on the scope of services described above and our experience with similar soil and geologic conditions in the area of the Site.

3.0 SITE AND PROJECT DESCRIPTION

The Site is bounded to the east and south by Silver Sage Drive, on the north by commercial development and by open land on the west.

Topography in the area of the project site is generally flat lying to gently sloping to the southeast. Elevations in the area of the proposed project site range from approximately 4,751 feet to 4,744 feet.

The Clearview Subdivision project, as currently proposed, includes approximately 2.75 acres of land. Vegetation on the Site consists of sagebrush, native grasses, weeds, and other low shrubs. The project conceptual layout and exploration locations on the Site are shown in Figure 2, the Site Plan.

The proposed development will consist of nine buildings with thirty-four residential units, local streets, parking areas, and associated landscaping.

The scope of construction anticipated to be performed for this project consists of (but may not be limited to) the following:

- Clearing of vegetation and grubbing of the surface on the Site.
- Mass grading of the Site.
- Conventional spread footing construction.
- Residential building construction.
- Constructing flexible pavement for the local streets and parking lot areas.
- Installation of curbing, gutters and sidewalks.
- Installation of site utilities.
- Installation of drainage and landscaping elements on the Site.

4.0 FIELD EXPLORATION

Our field investigation was performed on October 2 and October 3, 2019. At that time nine test pits were excavated on the Site. The test pits were performed utilizing a backhoe with an eighteen-inch bucket. Representative bulk samples were taken from the test pit locations. RCI test pit locations are shown in Figure 2 and the test pit logs are presented in Appendix A.

5.0 LABORATORY TESTING

Laboratory tests were performed in accordance with the American Society for Testing and Materials (ASTM), or by other locally accepted test methods. The types of tests performed are listed below:

- Gradation Analysis ASTM C117, D422.
- Moisture Content\Density ASTM D2216\D2937\D1188.
- Atterberg Limits ASTM D4318.
- R-value ASTM D2844.

Test results and descriptions of tests performed are provided in Appendix B.

6.0 REGIONAL GEOLOGY

The Site is located at the western edge of the Basin and Range geomorphic province. The Basin and Range are characterized by north-south trending mountain ranges separated by broad valleys. The valleys are down-dropped relative to the mountains along boundary normal faults. Faulting that resulted in the development of the Basin and Range topography occurred during the late Tertiary period (last seventeen million years). The faulting activity continues to the present day as evidenced by seismic activity which includes large earthquakes in the region from time to time. The Sierra Nevada geomorphic province begins a few miles west of the Site. The mountains in this area are locally referred to as the Carson Range. The Carson Range consists of granitic rocks that intruded older Mesozoic (sixty to two hundred twenty-five million years ago,) to Paleozoic (two hundred twenty-five million to six hundred million years ago,) sedimentary and volcanic rocks. The Pine Nut Mountains are located a few miles east of the Site and include rocks similar to the Carson Range but also younger Tertiary sedimentary and volcanic rocks.

The dominant fault system in western Nevada and Eastern California is the Sierra Nevada Frontal Fault System (SNFFS) that extends from Owens Valley to near Honey Lake. The Genoa Fault is the name given to the local portion of the SNFFS. The Genoa Fault is dominantly a single fault trace along the southern portion of the Carson Range within the Carson Valley. In the Carson City area (Eagle Valley), the Genoa Fault splits into a series of parallel faults that form a distributed fault system referred to as the Carson City and Kings Canyon fault zones. Distributed fault systems are characterized as having several parallel faults that tend to rupture simultaneously each moving a relatively small amount rather than all the displacement occurring on a single fault trace. The Carson City fault zone and Kings Canyon fault zone cross through Eagle Valley approximately one-half mile west of the Site. Many other subsidiary faults are found within Eagle Valley as well as the Carson Valley to the south and Washoe Valley to the north. A single Quaternary fault of undetermined age of last movement is mapped approximately two hundred feet west of the Site.

The geology of the project area is referenced from the Carson City Geologic Map (Trexler, 1977). Carson City lies within a large fault-bounded valley referred to as Eagle Valley. The valley area is typical of the western edge of the Great Basin geomorphic province. The geologic map indicates the project site area is predominantly underlain by Quaternary alluvial plain deposits. The alluvial plain deposits are on the order of two thousand feet deep in the Eagle Valley basin based on geophysical data.

The local geology in the area of the project is presented as Figure 3, the Geologic Map.

7.0 SOIL AND GROUNDWATER CONDITIONS

7.1 Subsurface Conditions

Natural Resources Conservation Service mapping of the Site shows a single soil unit to be present. The NRCS data pertains only to the top five feet of soil present. The soil unit (and map number) is Sand Surpass Sandy Loam (6721). This soil unit is classified as dominantly silty to clayey sand (SM-SC). The soil map unit found on the Site is illustrated on the Soils Map, Figure 5 for reference.

The surface soil conditions to a depth of five feet observed in our borings were generally consistent with the descriptions found on the Natural Resources Conservation Service (NRCS). On-site soils as observed in our borings are generally alluvial silty sand (SM) overlying clayey sand (SC) with well-graded sand and traces of gravel to the total depth explored.

7.2 Groundwater

Groundwater depths within the project area have been mapped on the Carson City Quadrangle by Maurer, 1992. Mapping and well data show that the groundwater surface in the area of the Site is present at approximately forty feet below the existing surface. Groundwater or evidence of high groundwater was not encountered in any of our test pits. The clayey sand layer does suggest the potential for perched groundwater to develop after significant precipitation or if over watered during construction. Variations in rainfall, snowmelt, temperature, and other factors can cause fluctuations in the level of groundwater. Groundwater flow in the project site area is generally to the southeast towards the Carson River.

8.0 GEOLOGIC HAZARDS

8.1 Active Faulting

Carson City is located near active faults which are capable of producing significant ground motions due to seismic events. Figure 4, the Fault Map for the site vicinity shows the distribution of active faults in the area taken from the U.S. Geological Survey (USGS), 2008 Quaternary fault and fold database for the United States; http//earthquake.usgs.gov/regional/q. Faults considered active for the type of development planned are located near the Site. Based on the USGS data and the Genoa Earthquake Hazards Map (Nevada Bureau of Mines and Geology, 1979) no faults have been mapped across the Site nor was any evidence of faulting observed in the field. The nearest active faults are located approximately five hundred feet west of the Site. Therefore, the risk of fault ground rupture at the Site is considered low.

Strong seismic shaking is considered likely during the life of the project. Ground shaking intensities for design considerations should be governed by seismic events occurring along the base of the Carson Range on the Kings Canyon fault zone. Faulting along the Carson Range has been evaluated by the Nevada Bureau of Mines and Geology to be capable of producing earthquake Richter Magnitudes on the order of 7.0 with peak ground accelerations as high as 2.0 g. These values are equivalent to Modified Mercalli Intensities of X or greater.

The seismic risk due to shaking at the Site is not considered significantly greater than that of the surrounding developments and the Carson City area in general. We recommend that the seismic design of the structures be performed in accordance with the latest version of the International Building Code (IBC). Site-specific IBC geotechnical seismic design parameters are presented in Section 9.6 of this report.

8.2 Liquefaction

Strong vibratory motions such as those generated by earthquakes may cause liquefaction of granular soils. Soils that are highly susceptible to liquefaction are loose, granular and saturated. Liquefaction of soils may cause surface distress, loss of bearing capacity, and settlement of structures. Liquefaction is generally accepted to be restricted to within fifty feet of the surface due to confining pressures.

Lateral spreading is a ground-failure phenomenon that can also occur in association with liquefaction, whereby lateral displacements occur at the ground surface. Conditions required for lateral spreading include gently sloping terrain, and, where a "free-face" (such as a creek bank) is nearby. Based on our review of the site topography, density of site soils, depth to groundwater and lack of liquefiable layers, the potential for liquefaction and lateral spreading is considered very low.

8.3 Landslides and Slope Stability

We do not consider the potential for land sliding to be a hazard to the Site due to the gently sloping topography and provided that the grading recommendations provided are strictly adhered to.

8.4 Expansive Soil

No expansive soils were identified on the Site within construction depths during our field exploration. Due to the low amount of clay fines, laboratory testing for plasticity indices indicated that the clayey sands are only slightly plastic.

8.5 Flooding

A review of the FIRM map 3200010207F effective on June 20, 2019 indicates that the Site is not located in areas within the 1.0 percent annual chance of flooding. The flood map of site is presented as Figure 6.

8.6 Radon

Radon gas is found in soil and air everywhere in varying amounts due to natural processes. According to the US Environmental Protection Agency (EPA), high radon levels have been reported in every state. Radon is generated when uranium breaks down into radium which in turn decays into radon gas. Radon gas is known to be of more concern in areas of igneous rocks and derived soils. Radon gas is odorless and transparent and not detectable except by specialized monitoring equipment. The EPA has determined based on testing that the Carson City area has a high potential to exceed the mitigation threshold level of four picocuries per liter of air (pCi/L). Mitigation strategies are discussed in Section 9.5.7.

The EPA has produced an informational guide for builders and homeowners which can be viewed on the UNR website: https://www.unce.unr.edu/programs/sites/radon/files/pdf/CitizensGuideNV.pdf .

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 General Conditions- Soil Handling and Excavation Characteristics

Our conclusions are based on our investigation conducted in October of 2019, review of previous geotechnical reports for areas near the Site and our local experience.

9.1.1 Based on the results of our investigation, the Site is geotechnically well suited for the proposed commercial uses, provided the recommendations presented herein are implemented in the design and construction of the project.

9.1.2 Our field investigation indicates that native soils to what are considered typical construction depths on the Site are characterized by stratified layers of silty, clayey and well graded sands.

9.1.3 Potential seismic hazards at the Site will likely be associated with possible moderate to strong ground shaking from an event along the regional active faults. No faults are known on the Site and therefore the risk of fault rupture is considered low. Structures should be designed in accordance with 2012/15 IBC seismic requirements.

9.1.4 Soil Conservation Service data, laboratory analysis, and our local experience indicate that soils are not aggressive for either Type II or Type IP concrete. However, soils are aggressive (corrosive) for uncoated steel. The project structural engineer should consider the use of coatings or other cathodic protection where uncoated steel may be in contact with native soils.

9.1.5 A preconstruction conference should be held at the Site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance. Soil handling, grading requirements, scheduling, and testing requirements can be discussed at that time.

9.1.6 Site preparation should begin with the removal of brush, organic matter and debris if any. Prior to the commencement of grading, all domestic debris, if any, and refuse should be removed from the Site and disposed of as appropriate.

9.1.7 It is estimated that soil grubbing will range from four to six inches in depth. The depth of removal should be such that material exposed in the cut areas or soils to be used as fill is relatively free of organic matter. Soil and organic material generated during stripping is not suitable for use in structural areas but may be placed in landscaped or other non-structural areas if deemed suitable for the specific application.

9.1.8 All references to relative compaction and optimum moisture content in this report are based on the ASTM D1557-12 Test Procedure.

9.1.9 Earthwork operations should be observed, and compacted fill tested by our representative.

9.1.10 In our opinion, grading and excavations may be accomplished with light to moderate effort with conventional heavy-duty grading/excavation equipment. Excavations in native soils are not anticipated to generate significant quantities of oversized material (greater than six inches in dimension) that will require special handling or exporting from the Site.

9.1.11 Excavated native granular soils (including clayey sands), free of organic matter or debris, generated from cut operations, after clearing and grubbing is complete, are anticipated to be suitable for use as engineered fill.

9.1.12 Where structural fill material is required, it should meet the Standard Specifications for Public Works (304.03). Structural fill is defined herein as all fill within three feet laterally outside of building perimeter foundations. In addition, all fill placed beneath pavement sections should also be considered structural. Import structural fill material where required should be certified within the past year for public works usage or sampled and approved by RCI prior to its transportation to the Site.

9.1.13 During or immediately following wet weather, the near-surface soil may deflect or pump under heavy equipment loads. Yielding soil conditions can typically be stabilized using one of the methods listed below. However, soil conditions and mitigation methods should be reviewed and approved by RCI when encountered.

- **Option 1.** Deeply scarify (ten to twelve inches) allow to air dry to near optimum moisture content and re-compact.

- **Option 2**. Remove unstable (wet) soils to a firm base and allow the wet subgrade soil to dry to near optimum moisture content and re-compact. Replace the removed soils with drier soil meeting the structural fill specifications.

Other stabilization alternatives such as the use of geosynthetic fabrics or grids, rock stabilization layers, and soil chemical treatments may be appropriate depending on the situation. Consultation with us is crucial for expedient and appropriate mitigation.

9.2 Grading – Building Pads

The following discussion and recommendations are intended for mass grading of structural areas and finish grading for foundation, driveway areas, and flatwork. Due to the lack of a grading plan at the time of this report, these recommendations are subject to review prior to plan submittal to Carson City.

9.2.1 Building pad areas, or in soil areas to receive fill, should be scarified to a depth of eight to ten inches and granular soils compacted to at least 90% relative compaction near optimum moisture content.

9.2.2 Structural fill should then be compacted in horizontal layers and brought to final subgrade elevations. Structural fill should be placed in level eight-inch loose lifts. Each lift should be moisture conditioned at or near optimum moisture content and then compacted to a minimum of 90% relative compaction.

9.2.3 The cut portion of cut-fill transition building pads or pavements should be undercut at least one foot vertically for five feet laterally into the cut face from the point of transition and replaced with properly compacted structural fill.

9.2.4 Where cut and fill soil slopes are required, they should be constructed at a maximum gradient of 2:1 (horizontal to vertical).

9.3 Grading – Underground Utilities

9.3.1 Temporary excavations, such as utility trench sidewalls excavated within undisturbed native soils or structural fill should remain near-vertical to depths of at least three feet. Some minor sloughing should be expected within some of the cleaner surficial sand lenses or during periods of high precipitation. Native granular soils within ten feet of the existing surface should be considered Soil Type C by OSHA Standards. If the contractor is uncertain about the soil designation the engineer should be contacted or the more conservative approach utilized by treating the excavation in question as Soil Type C. It is the contractor's responsibility to provide sufficient and safe excavation support per OSHA Standards as well as protecting nearby utilities, structures, and other improvements, which may be damaged by earth movements.

9.3.2 Should any large precipitation events be forecast, it is imperative that open excavations be protected from flooding. Tarping, daylighting to drain or temporary backfilling should be considered by the contractor to prevent flooding damage and erosion in general.

9.3.3 Bedding and pipe zone backfill should extend from the bottom of the trench excavation to a minimum of twelve inches above the crown of the pipe. Pipe bedding material should consist of Class A backfill material as defined by the Standard Specifications for Public Works (Orange Book). Bedding and pipe zone material should be hand compacted in six-inch maximum lifts.

9.3.4 Trench backfill above the pipe zone should meet Orange Book Class E backfill requirements at a minimum and be compacted to a minimum of 90% relative density in structural areas and a minimum of 85% in landscape areas.

9.3.5 Underground utility trenches within structural areas (building pads and streets) should be backfilled with properly compacted material. Granular material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than six inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding eight inches. The lifts should be compacted to a minimum of 90% relative compaction at or near optimum moisture content.

9.4 Grading – Pavement and Flatwork Areas

9.4.1 Pavement and flatwork subgrade areas underlain by native soil materials should be scarified to a depth of eight to ten inches and moisture conditioned at or near optimum moisture content. The upper six inches of pavement subgrade soils should be compacted to a minimum of 90% relative compaction at or near optimum moisture content.

9.4.2 The subgrade soils for pavements should be finished to a compacted smooth unyielding surface. We recommend proof-rolling the subgrade with a loaded water truck (or similar equipment) to verify the stability of the subgrade prior to placing aggregate base.

9.4.3 Aggregate base used to support pedestrian and vehicular pavements should be compacted to a minimum of 95% relative compaction

9.5 Preliminary Foundation Design Criteria

The following foundation information is intended to provide preliminary structural design criteria. When final grading plans are completed, they should be reviewed by the geotechnical engineer and recommendations amended if necessary.

9.5.1 Conventional foundations should consist of continuous perimeter strip footings and isolated interior spread footings. Minimum strip footing width should not be less than twelve inches; isolated spread footings should be at least sixteen inches square.

9.5.2 Perimeter footings should extend at least twenty-four inches below lowest adjacent exterior grade bearing on compacted native soils or structural fill. Interior footings should extend at least eight inches below lowest adjacent grade. These embedment recommendations are crucial for frost protection, to develop bearing capacity, to inhibit surface water intrusion into crawl spaces and to provide lateral force resistance. Final surface grading should provide for positive drainage away from the structure per the 2018 IBC or 2018 IRC as appropriate. Footing and foundation backfill should be compacted to at least 90% below paving, concrete slabs or flatwork.

9.5.3 Adjacent utilities should not be constructed in the zone of influence parallel to footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom of the footing. Utility penetrations into the building envelope should be made perpendicular to the building stem wall if possible.

9.5.4 Shallow foundations proportioned as recommended above may be designed based on an allowable bearing capacity of 2,000 psf. Bearing capacity may be increased by one-third for transient events such as wind and earthquake loading.

9.5.5 A lateral passive pressure of 320 psf is recommended for resistance of foundation elements to sliding. A coefficient of friction of 0.35 for foundation elements in contact with native soils is appropriate for native sandy soils. A coefficient of friction of 0.40 is appropriate for concrete underlain by a minimum of six inches of aggregate base.

9.5.6 It is estimated that total and differential settlement of footings under the recommended allowable bearing capacity to be less than one inch and three-quarter inch respectively.

9.5.7 EPA recommends that homes that have radon levels of four picocuries per liter of air (pCi/L) be mitigated. Mitigations can consist of passive, active or combined passive and active mitigations. Typical mitigations consist of a gravel layer (typically four to six inches) placed below a vapor retarder either under slabs or in crawls spaces. Should a gravel layer be considered for raised floor construction, building pad subgrade elevations will need to be adjusted to accommodate the minimum crawl space clearance considering the depth of gravel. Installation of a vent pipe to the roof is recommended at the time of initial construction in the event that high levels are subsequently determined. If radon levels are found to be elevated post-construction, a fan can be added at that time. Passive venting (no fan) or mechanical venting has a very high success rate in mitigating radon.

9.5.8 The mitigation methods have the potential to provide added value by decreasing moisture and other adverse soil gases such as methane and volatile organic compounds should they be encountered beneath structures. The reduction of moisture in crawl spaces discourages molds and mildew which has also been found to be a significant problem in portions of Carson City.

9.6 Seismic Design Criteria

The Site is located near faults capable of generating strong seismic shaking during the life of the project. The project area should be considered Site Class D or "Stiff Soil" as defined by the 2012 IBC. The following table summarizes site seismic design criteria obtained from the 2012/15 IBC/ASCE 7-19 through the California Office of Statewide Health Planning and Development (OSHPD) website https://seismicmaps.org/.

TABLE 9.6
IBC SEISMIC DESIGN PARAMETERS

Parameter	Factors	IBC Reference
Site Class	D	Table 20.3-1 (2010 ASCE-7)
Spectral Acceleration	S_s = 2.278 S_1= 0.798	Figure 1613.3.1(1) Figure 1613.3.1(2)
Seismic Coefficient, F_a	F_a = 1.0	Table 1613.3.3(1)
Seismic Coefficient, F_v	F_v = 1.5	Table 1613.3.3(2)
Adjusted Spectral Response S_{MS}, S_{MI}	S_{MS} = 2.278 S_{MI} = 1.197	Equation 16-37 Equation 16-38
Design Spectral Acceleration S_{DS}, S_{D1}	S_{DS} = 1.519 S_{D1} = 0.798	Equation 16-39 Equation 16-40

9.7 Retaining Walls

At the time of this report, retaining walls are not shown on conceptual site plans. Final plans for retaining structures, if any, should be submitted to RCI for review to ensure that the following generalized recommendations are appropriate to the specific wall being designed.

9.7.1 Allowable bearing capacities for retaining wall foundations may be assumed as indicated in Section 9.5 above. Earth pressures are dependent on the backfill and should be considered on a case by case basis. However, for preliminary planning of retaining walls less than eight feet tall and assuming structural fill backfill at least three feet behind the wall the values in Table 9.7.1 are recommended.

TABLE 9.7.1
PRELIMINARY EARTH PRESSURE VALUES FOR RETAINING WALLS

Passive Pressure	At Rest Pressure	Active Pressure
350 psf/f	55 psf/f	35 sf/f

9.7.2 Crack control spacing should be determined by the project structural engineer based on slab thickness and intended usage.

9.7.3 Positive drainage is essential behind any earth retaining structure to prevent the backfill from becoming saturated. Saturated backfill can result in significant (a factor of two or more) increases in the lateral wall pressures above the previously recommended values. Positive drainage for retaining walls should consist of a vertical layer of permeable material positioned between the retaining wall and the soil backfill. The permeable material may be composed of a composite drainage fabric, or a natural permeable material, such as coarse sand or pea gravel at least six inches in thickness, with a synthetic, geotextile filter fabric between it and the soil backfill.

9.8 Slabs-On-Grade

9.8.1 Conventional concrete slab-on-grade floors are suitable for the building pads prepared as recommended in Section 9.5. A minimum 10-mil-thick vapor retarder meeting ASTM E1745-97 Class C requirements may be placed below the slab where interior moisture is considered undesirable. The vapor retarder may be covered by an optional two-inch layer of medium sand as a cushion. To reduce the potential for punctures, a higher quality vapor retarder (fifteen mil, Class A or B) may be used. The vapor retarder, if used, should extend to the edges of the slab, and should be sealed at all seams and penetrations. Slabs should be underlain by a minimum of four inches of compacted (95% minimum relative density) aggregate base. Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading.

9.8.2 If a significant amount of time has passed since building pad grading and the soil surface of the building pad has become dry, then it should be re-moistened prior to placing the moisture retarding system. The building pad should be moistened by soaking or sprinkling such that the upper twelve inches of soil is near optimum moisture, as determined by our representative at least forty-eight hours before concrete placement.

9.8.3 Some floor coverings, such as tile or linoleum, are sensitive to moisture that can be transmitted from and through the slab. Slab floors should be moist cured for a minimum of seven days prior to placing any floor coverings. Floor coverings should be installed in accordance with the manufacturer's recommendations including any moisture transmissivity testing requirements.

9.8.4 Crack control spacing should be determined by the project structural engineer based on slab thickness and intended usage.

9.8.5 All exterior concrete should be air entrained from 4.5% to 7.0% air content. The water cement ratio for all exterior concrete should be 0.45 or less. The use of mid-range plasticizer is recommended to facilitate the finishing process while maintaining the desired water cement ratio.

9.8.6 Exterior concrete should be placed and finished in accordance with American Concrete Institute (ACI) recommendations for concrete placed in areas subject to freeze-thaw environments.

9.8.7 Recommendations presented herein are intended to reduce the potential for cracking of slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of concrete, the use of crack control joints and proper concrete placing and curing. Adherence to ACI and Portland Concrete Association (PCA) recommendations including those for low humidity and wind, if applicable, should be incorporated into project construction practices.

9.8.8 Should post-tensioned slabs be considered, a representative of RCI should be contacted for additional recommendations.

9.9 Pavements

9.9.1 Pavement sections are provided for interior streets, on-site parking and driveway use only. Pavement sections are based on Carson City Design Standards and Asphalt Institute recommendations for parking areas subject to automobile and truck traffic (IS 182).

9.9.2 It is recommended that the use of AC 64-28NV (polymerized asphalt oil) be considered as we have found that it substantially reduces cracking due to thermal stresses prevalent in the freeze thaw environment of this area. The savings in long term maintenance of the pavement including crack sealing is in our opinion worth the extra expense. However, this asphalt oil recommendation should be considered optional in that it is relative to frequency of maintenance only and does not affect structural calculations.

9.9.3 The following preliminary Asphalt Concrete (AC) pavement sections are recommended for design to establish subgrade elevations for local streets, parking, and driveways.

TABLE 9.9.3
PRELIMINARY AC PAVEMENT SECTIONS

Facility	AC Thickness (inches)	AB Thickness (inches)
Local Streets	3.0	8.0
Driveways and Parking Areas	3.0	6.0
Dumpster Areas	4.0	6.0

The pavement sections are based on the following assumptions:

- All pavements have a twenty-year design life.
- The subgrade soil has an R-Value of forty-five or higher. Design calculations were conservatively based on an R-value of forty-five.

- The ADT for all local streets was assumed to be five hundred which is substantially more than ITE estimates would indicate (one hundred ten or less for all streets)
- The Type 2, Class B Aggregate Base (AB) has a minimum R-Value of seventy and meets the requirements of the Standard Specifications for Public Works as adopted by Douglas County.
- The AB is compacted to 95% or higher relative compaction at or near optimum moisture content.
- Soil subgrade has been prepared as previously recommended.
- Asphalt concrete should conform to Section 320 of Orange Book for design, production, preparation for placement, and placement of HMA.

9.9.4 If Portland Concrete Cement (PCC) driveways or trash enclosures are required, they should be constructed as shown in Table 9.9.4 below.

TABLE 9.9.4
MINIMUM PCC PAVEMENT SECTIONS

Alternate	PCC Thickness (inches)	AB Thickness (inches)
Automobile Parking Areas and Driveways	5.0	6.0
Areas Subject to Semi Truck Traffic or Dumpster Areas	5.0	8.0

- The minimum compressive strength (twenty-eight day) should be at least 3,000 psi and meet the requirements stated in Section 9.9 as appropriate for exterior concrete. Traffic on the slab should be avoided until at least 80% of the design strength has been verified by testing.
- Reinforcement of the PCC driveways should be specified by the project structural (or civil) engineer.
- Construction (or crack control) joints should also be as recommended by the project structural (or civil) engineer.

9.10 Site Drainage

9.10.1 Adequate drainage is crucial to reduce the potential for differential soil movement, erosion and subsurface seepage. The Site should be graded and maintained such that surface drainage is directed away from structures and the top of slopes into swales or other controlled drainage devices.

9.10.2 Soil slopes constructed steeper than recommended in Section 9.2 (2H:1V) or where subject to concentrated flows in excess of four feet per second should be stabilized with riprap, slope netting or other mechanical methods as designed by the project civil engineer.

9.10.3 Temporary erosion control during construction should be as required in the approved storm water pollution prevention plan (SWPPP).

9.10.4 Landscape irrigation should be kept at least three feet away from all building foundations. We recommended that drip irrigation be installed near foundations wherever feasible.

9.10.5 Under no circumstances should water be allowed to pond adjacent to footings.

10.0 CLOSURE

10.1 Grading Plan Review

RCI should review the grading plans and details prior to final design submittal to determine whether additional analysis and/or recommendations are required.

10.2 Limitations and Uniformity of Conditions

The preliminary recommendations of this report pertain only to the Site investigated and are based upon the assumption that soil and groundwater conditions do not deviate from those disclosed in the investigation. Our professional services were performed and prepared in accordance with generally accepted geotechnical engineering principles and practices used in Carson City at this time.

No guarantee or warranty as to the continuity of soil conditions on the Site is implied or intended. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, RCI should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by RCI.

This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

11.0 REFERENCES

1. *Manhard Consulting Ltd., Preliminary Site Plan.*
2. *Katzer, T. (1980), Carson City Quadrangle, General Groundwater Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
3. *Mauer, Douglas K. (1992), Genoa Quadrangle Groundwater Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
4. *Pease, Robert C. (1979), Genoa Quadrangle Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
5. *Pease, Robert C. (1980), Genoa Quadrangle Geologic Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
6. *Trexler, D.T. (1977), Carson City Folio Geologic Map, Nevada Bureau of Mines and Geology, Carson City 7.5' Minute Quadrangle, Nevada, Scale 1:24,000.*
7. *Trexler, D.T. and Bell, J.W., (1979), Carson City Quadrangle, Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1:24,000.*
8. *FEMA Flood Map Service Center accessed March 4, 2017: http://map1.msc.fema.gov.*
9. *Natural Resources Conservation Service Website, accessed March 4, 2017: (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).*
10. *Standard Specifications for Public Works Construction, Regional Transportation Commission of Washoe County, Washoe County, City of Sparks, City of Reno, Carson City, City of Yerington, 2012.*
11. *U.S. Geological Survey Earthquake Hazards Program, U. S. Seismic Design Map web site: http://earthquake.usgs.gov/designmaps/us/application.php?.*
12. *U.S. Geological Survey, Quaternary fault and fold database for the United States, accessed March 1, 2017, from USGS web site: http://earthquake.usgs.gov/regional/qfaults/.*
13. *Review of published geologic maps, in-house documents, and other literature pertaining to the project area to aid in evaluating geologic conditions and hazards that may be present.*

FIGURES

Not to Scale

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FIGURE 1 VICINITY MAP

RPJ, NV LLC
CLEARVIEW SUBDIVISION
CARSON CITY, NV

PROJECT NO. 19-301.1

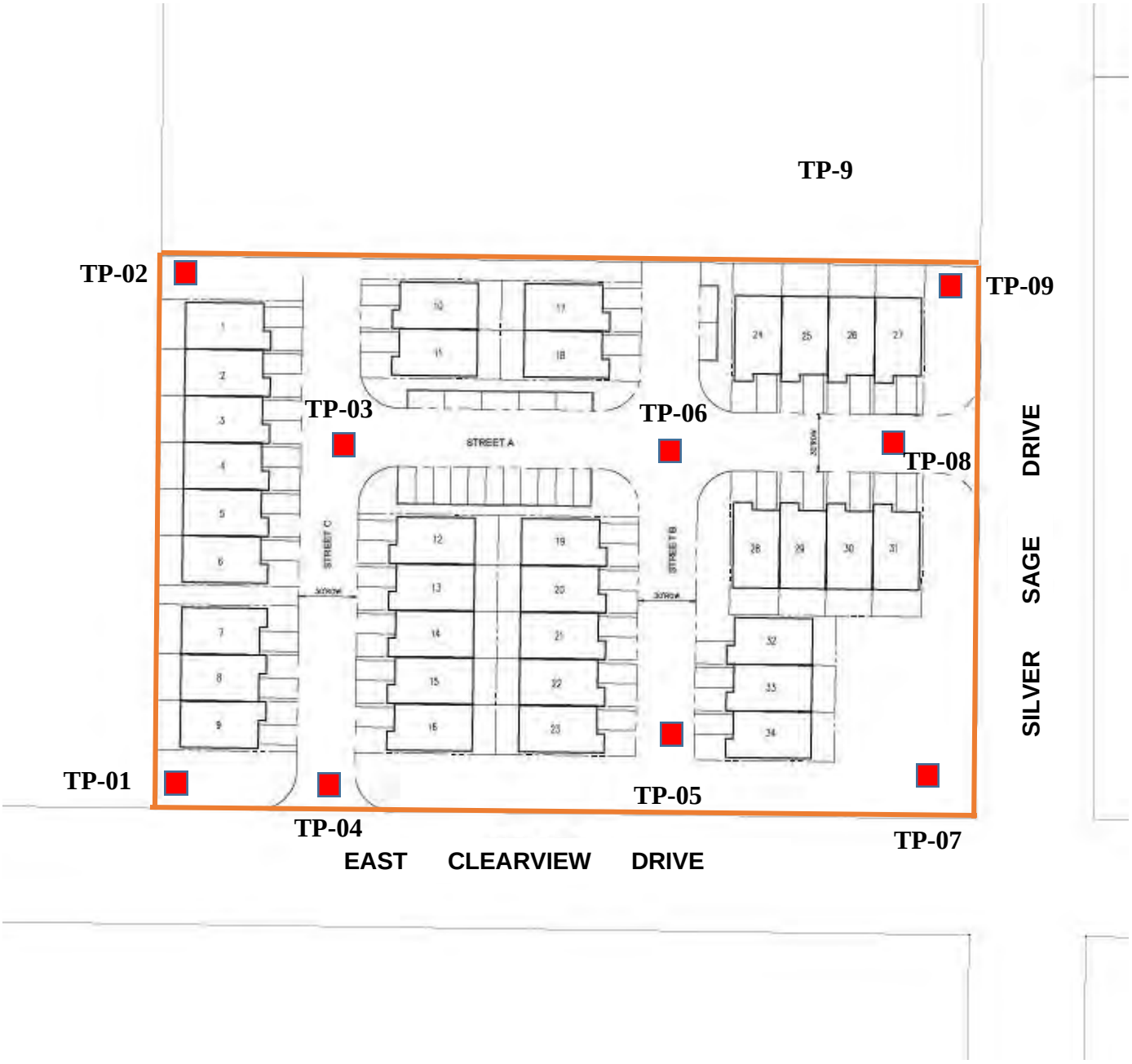

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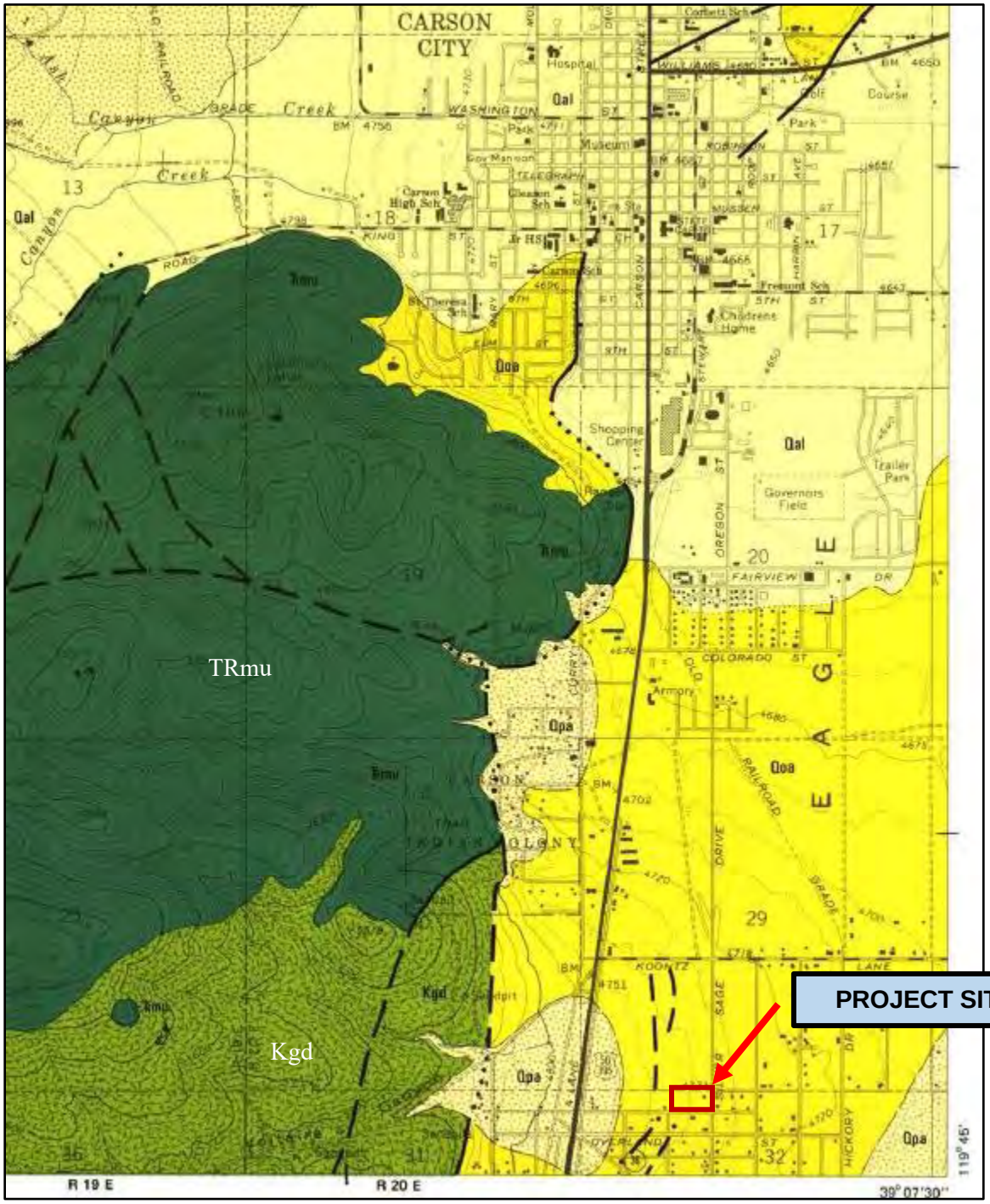
FIGURE 2 SITE PLAN

RPJ, NV LLC
CLEARVIEW SUBDIVISION
CARSON CITY, NV

PROJECT NO. 19-205.2



Not to Scale

Robert C. Pease, 1980

Qpa- Older Qaternary Alluvial-Plain Deposits of Clear Creek
Qoa- Old Quaternary Alluvium
Qal- Quaternary Alluvial Plain Deposits of Eagle Valley
Kgd- Cretaceous Hornblende Biotite Granite
TRmu- Triassic Mafic Metamorphosed Intrusive and Extrusive Rocks

FAULT
INFERRED FAULT LOCATION

Map Reference: *Nevada Bureau of Mines and Geology, 1980*
U.S. Geological Survey, Genoa 7 ½ ' quadrangle

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FIGURE 3 GEOLOGIC MAP

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Quaternary Fault (Inactive)
Active Holocene Fault
Fault of Indeterminate Age

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FIGURE 4 FAULT MAP

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CARSON CITY, NV

PROJECT NO. 19-301.1

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6719	Surpass gravelly sandy loam, 0 to 2 percent slopes	8.3	100.0%
Totals for Area of Interest		8.3	100.0%

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FIGURE 5 SOILS MAP

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PROJECT NO. 19-301.1

National Flood Hazard Layer FIRMette

Map Reference: FEMA website, http://www.fema.gov/flood-insurance-rate-map-firm

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FIGURE 6 FLOOD ZONE MAP

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CARSON CITY, NV

PROJECT NO. 19-301.1

APPENDIX A

FIELD INVESTIGATION

Our field exploration was performed on October 2 and October 3, 2019 and consisted of the excavation of nine exploration test pits. Test pits were completed using a Cat 420E backhoe. The soil conditions encountered in the test pits were visually examined, classified, and logged in general accordance with the Unified Soil Classification System. Upon completion of sampling and logging, the test pits were backfilled with native soil. Locations of the exploration test pits are presented on the Site Plan, Figure 2.

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TEST PIT NUMBER TP-01

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Moist, Dark Brown
		Fines = 19%			0.9
			SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
					1.6
2.5		Fines = 13%	SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
					4.0
5.0			SW		(SW) WELL GRADED SAND-Medium Dense, Moist, Dark Yellowish Brown
7.5					9.8
					Bottom of test pit at 9.8 feet.

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TEST PIT NUMBER TP-02

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0		SM		(SM) SILTY SAND- Loose, Moist, Dark Brown
1.0		SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
2.1		SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
2.5		SW		(SW) WELL GRADED SAND-Medium Dense, Moist, Dark Yellowish Brown with fine gravel
3.4				
5.0				
7.5				
10.0				
10.2				Bottom of test pit at 10.2 feet.

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TEST PIT NUMBER TP-03

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Moist, Dark Brown
		Fines = 15%	SM		0.8 (SM) SILTY SAND- Dense, Dry, Dark Brown
2.5		Fines = 14%	SC		2.0 (SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
					3.6 Bottom of test pit at 3.6 feet.

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TEST PIT NUMBER TP-04

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Dry, Very Dark Brown
		Fines = 16%			0.9
			SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
					1.4
			SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
2.5		Fines = 16%			
					3.6
			SM		(SM) SILTY SAND- Dense, Dryt, Dark Yellowish Brown
					4.3

Bottom of test pit at 4.3 feet.

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TEST PIT NUMBER TP-05

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0		SM		(SM) SILTY SAND- Loose, Dry, Very Dark Brown
				0.9
		SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
				1.4
2.5		SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
				3.6

Bottom of test pit at 3.6 feet.

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TEST PIT NUMBER TP-06

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0		SM		(SM) SILTY SAND- Loose, Dry, Very Dark Brown
0.6		SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
1.6		SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
2.5				
3.9				Bottom of test pit at 3.9 feet.

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TEST PIT NUMBER TP-07

CLIENT RPJ NV LLC. **PROJECT NAME** Clearview Subdivision

PROJECT NUMBER 19-301.1 **PROJECT LOCATION** Carson City, Nevada

DATE STARTED 10/3/19 **COMPLETED** 10/3/19 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Sierra View **GROUND WATER LEVELS:**

EXCAVATION METHOD Cat 420 E **AT TIME OF EXCAVATION** ---

LOGGED BY JH **CHECKED BY** GL **AT END OF EXCAVATION** ---

NOTES _____ **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Moist, Dark Brown
0.4					
		Fines = 17%	SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
2.5					
2.8		Fines = 7%	SM		(SM) SILTY SAND- Very Dense to Dense, Dry to Moist, Dark Yellowish Brown
5.0					
7.5					
10.0					
10.0					Bottom of test pit at 10.0 feet.

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TEST PIT NUMBER TP-08

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Moist, Very Dark Brown
0.5			SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
1.1			SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
2.5		Fines = 19%			
3.0					Bottom of test pit at 3.0 feet.

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TEST PIT NUMBER TP-09

CLIENT RPJ NV LLC.
PROJECT NAME Clearview Subdivision
PROJECT NUMBER 19-301.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 10/2/19 **COMPLETED** 10/2/19
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Sierra View
GROUND WATER LEVELS:
EXCAVATION METHOD Cat 420 E
AT TIME OF EXCAVATION ---
LOGGED BY JH **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		(SM) SILTY SAND- Loose, Moist, Very Dark Brown
0.6					
		Fines = 16%	SM		(SM) SILTY SAND- Dense, Dry, Dark Brown
1.5					
2.5			SC		(SC) CLAYEY SAND- Dense, Dry, Dark Yellowish Brown
4.1					
5.0			SW		(SW) WELL GRADED SAND-Medium Dense, Moist, Dark Yellowish Brown
7.5					
9.5					Bottom of test pit at 9.5 feet.

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures.

The remaining soil samples are stored in our laboratory for future reference and analysis if needed. Unless notified to the contrary, all samples will be disposed of thirty days from the date of this report.

RESISTANCE 'R'-VALUE & EXPANSION of SOILS

ASTM D2844 / AASHTO T190

Job RCI - SAO No. 2892119

Soil Description Tp - 4 @ 2.0' -3.0' Date 7-Oct By BL

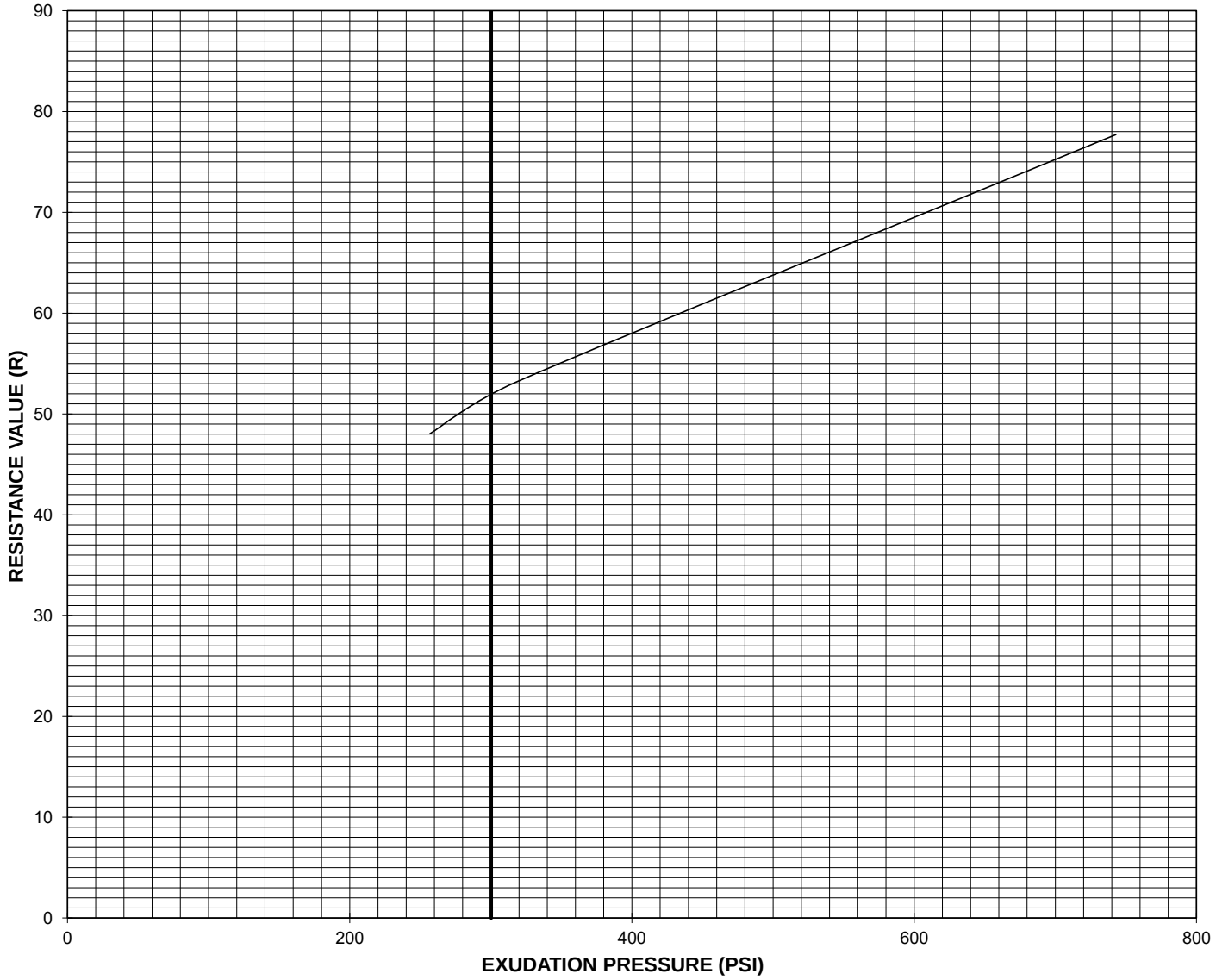
Source Clearview Subdivision 19 - 301.1 Lab #: 5145

BATCH	Maximum Particle Size	- 3/4"	- 3/4"	- 3/4"	- 3/4"	- 3/4"
	Initial Point Weight	1400	1400	1400		
	Adjusted Weight + Water	1110	1115	115		
	Water Added (ml)	63	77	84		
MOISTURE	Cup No.	--	--	--		
	Cup + Wet Soil	300	345.7	289.9		
	Cup + Dry Soil	278.9	318.5	265.7		
	Moisture Loss	21.1	27.2	24.2		
	Cup					
	Dry Soil	278.9	318.5	265.7		
	Moisture Content	7.6	8.5	9.1		
	Compaction Pressure	350	300	200		
DENSITY	Mold Number	D	L	F		
	Mold + Wet Soil	3049.3	3133.8	3085.4		
	Mold (plus baskets_____)	1916.4	2031.4	1908.7		
	Wet Soil	1132.9	1102.4	1176.7		
	Sample Height	2.49	2.39	2.48		
	Wet Density	137.9	139.8	143.8		
	Dry Density	128.2	128.8	131.8		
EXUDATION	5 Lights or 3 w/Free Water	5	5	5		
	Testing Machine Gage Reading	9331	3996	3224		
	Exudation Pressure (psi)	743	318	257		
	Free Moisture (Y/N)	N	N	N		
	Time					
EXPANSION	Final Dial	0	0	0		
	Initial Dial	0	0	0		
	Factor	4.33	4.33	4.33		
	Expansion Pressure (psf)	0	0	0		
	Percolation (Y/N)	N	N	N		
STABILITY	Lateral Press @ 1000 lbs.	14	24	30		
	Lateral Press @ 2000 lbs.	22	50	58		
	Displacement Turns	4.48	4.63	4.72		
	"R" Value @ 300psi	77.8	54.3	48.2		
	Corrected "R" Value	77.7	53.2	48.0		

GRAPH READING

EXPANSION PRESS. (PSF)	0
R-VALUE	52

R-Value and Expansion Pressure of Compacted Soils AASHTO T190 / ASTM D2844



Lab Log #	Sample Source	Material	Expansion Pressure (psf) @ 300 (psi)	R-Value @ 300 (psi)
5145	Clearview Subdivision 19 - 301.1	Tp - 4 @ 2.0' -3.0'	0	52

POINT #	WATER CONTENT (%)	DRY DENSITY (PCF)	EXUDATION PRESS. (PSI)	EXPANSION PRESS. (PSF)	RESISTANCE VALUE (R)
1	7.6	128.2	743	0	78
2	8.5	128.8	318	0	53
3	9.1	131.8	257	0	48
4					
5					

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RCI - SAO
Tp - 4 @ 2.0' -3.0'

TESTED BY	JOB NUMBER	APPROVED	DATE	REVISED	DATE
BL	2892119.000		10/7/2019		

RESISTANCE 'R'-VALUE & EXPANSION of SOILS

ASTM D2844 / AASHTO T190

Job RCI - SAO No. 2892119

Soil Description TP - 8 @ 2.0' - 3.0' Date 7-Oct By BL

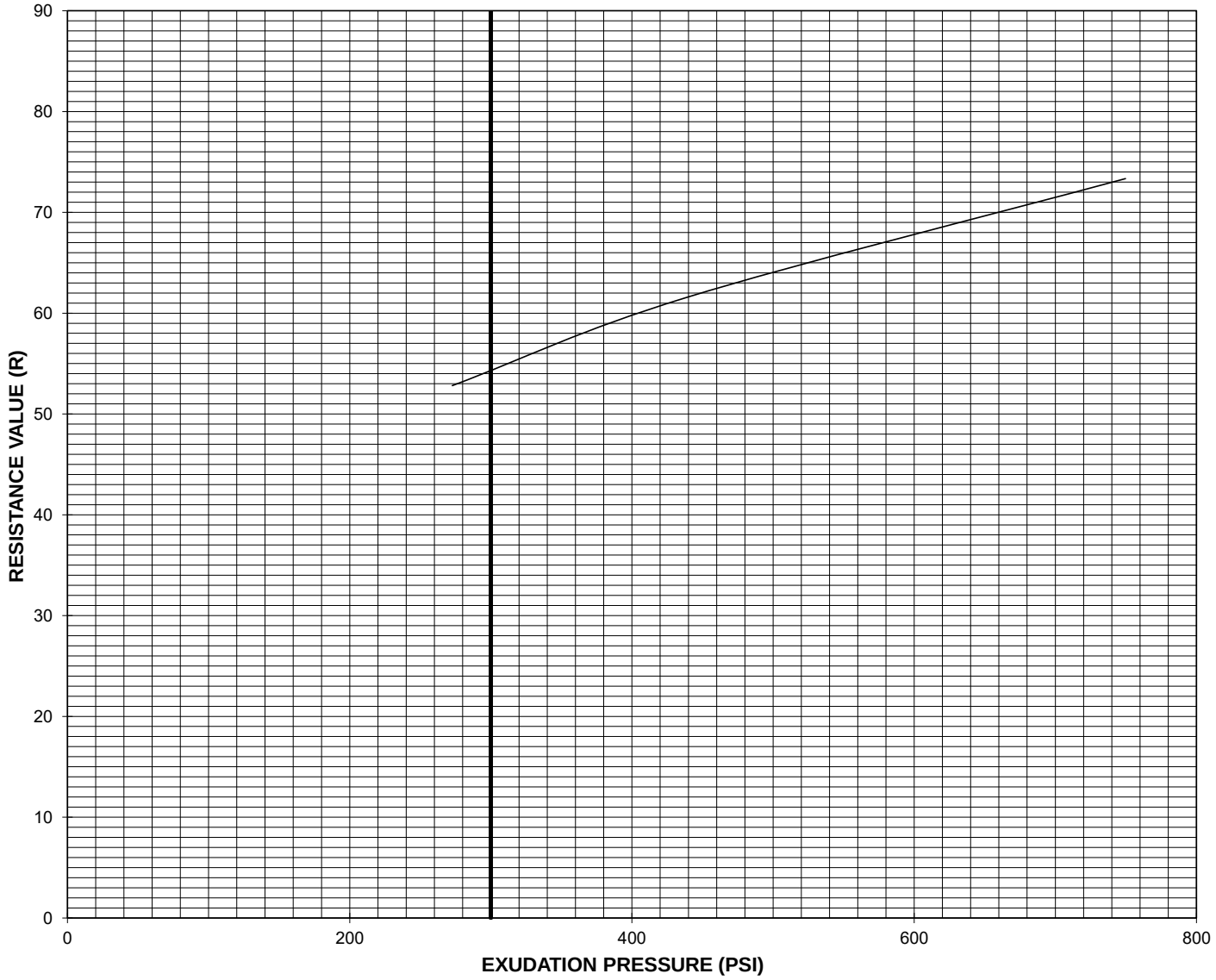
Source Clearview Subdivision 19 - 301.1 Lab #: 5145

BATCH	Maximum Particle Size	- 3/4"	- 3/4"	- 3/4"	- 3/4"	- 3/4"
	Initial Point Weight	1400	1400	1400		
	Adjusted Weight + Water	1125	1130	1125		
	Water Added (ml)	56	70	84		
MOISTURE	Cup No.	--	--	--		
	Cup + Wet Soil	320.4	324.4	315.2		
	Cup + Dry Soil	294.6	294.7	282.9		
	Moisture Loss	25.8	29.7	32.3		
	Cup					
	Dry Soil	294.6	294.7	282.9		
	Moisture Content	8.8	10.1	11.4		
	Compaction Pressure	350	300	250		
DENSITY	Mold Number	A	B	Z		
	Mold + Wet Soil	2889.3	3029.9	3124.6		
	Mold (plus baskets_____)	1770.7	1907.8	1955.7		
	Wet Soil	1118.6	1122.1	1168.9		
	Sample Height	2.44	2.4	2.48		
	Wet Density	138.9	141.7	142.8		
	Dry Density	127.7	128.7	128.2		
EXUDATION	5 Lights or 3 w/Free Water	5	5	5		
	Testing Machine Gage Reading	9416	5520	3425		
	Exudation Pressure (psi)	750	439	273		
	Free Moisture (Y/N)	N	N	N		
	Time					
EXPANSION	Final Dial	0	0	0		
	Initial Dial	0	0	0		
	Factor	4.33	4.33	4.33		
	Expansion Pressure (psf)	0	0	0		
	Percolation (Y/N)	N	N	N		
STABILITY	Lateral Press @ 1000 lbs.	18	22	25		
	Lateral Press @ 2000 lbs.	28	40	49		
	Displacement Turns	4.18	4.49	5.02		
	"R" Value @ 300psi	73.8	62.6	53.0		
	Corrected "R" Value	73.3	61.6	52.8		

GRAPH READING

EXPANSION PRESS. (PSF)	0
R-VALUE	54

R-Value and Expansion Pressure of Compacted Soils AASHTO T190 / ASTM D2844



Lab Log #	Sample Source	Material	Expansion Pressure (psf) @ 300 (psi)	R-Value @ 300 (psi)
5145	Clearview Subdivision 19 - 301.1	TP - 8 @ 2.0' - 3.0'	0	54

POINT #	WATER CONTENT (%)	DRY DENSITY (PCF)	EXUDATION PRESS. (PSI)	EXPANSION PRESS. (PSF)	RESISTANCE VALUE (R)
1	8.8	127.7	750	0	73
2	10.1	128.7	439	0	62
3	11.4	128.2	273	0	53
4					
5					

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Phone: 775-823-4068 Fax: 775-823-4066

RCI - SAO
TP - 8 @ 2.0' - 3.0'

TESTED BY	JOB NUMBER	APPROVED	DATE	REVISED	DATE
BL	2892119.000		10/7/2019		

GRAIN SIZE DISTRIBUTION

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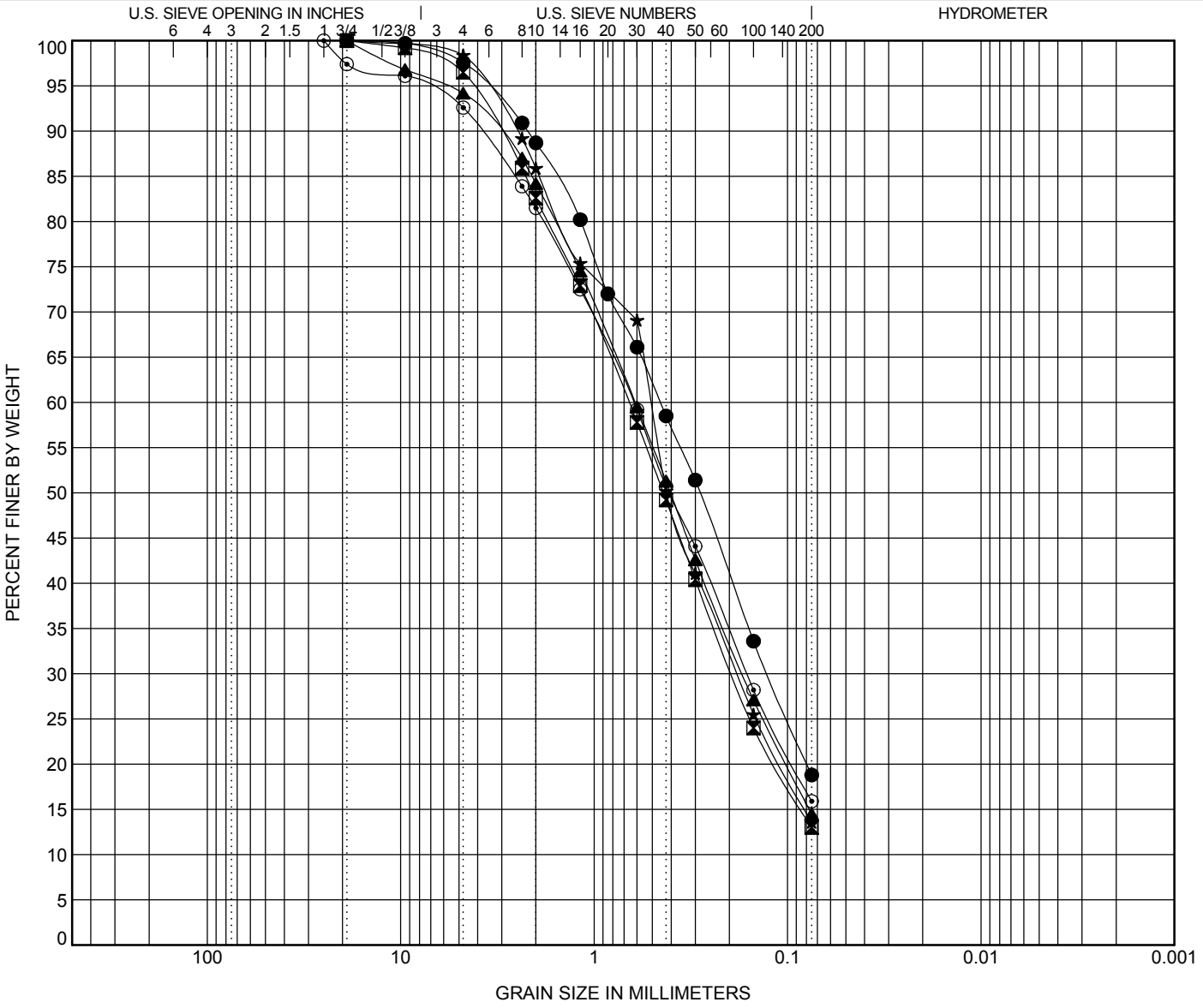
PROJECT NUMBER 19-301.1 **PROJECT LOCATION** Carson City, Nevada



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**TP-01**	**1.0**	**Silty Sand**					
⊠	**TP-01**	**2.5**	**Clayey Sand**					
▲	**TP-03**	**1.0**	**Silty Sand**					
★	**TP-03**	**2.5**	**Clayey Sand**					
⊙	**TP-04**	**1.0**	**Silty Sand**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**TP-01**	**1.0**	**19**	**0.455**	**0.127**		**2.4**	**78.8**	**18.8**	
⊠	**TP-01**	**2.5**	**19**	**0.662**	**0.193**		**3.5**	**83.5**	**13.0**	
▲	**TP-03**	**1.0**	**19**	**0.614**	**0.171**		**5.8**	**79.7**	**14.5**	
★	**TP-03**	**2.5**	**19**	**0.508**	**0.183**		**1.6**	**84.8**	**13.6**	
⊙	**TP-04**	**1.0**	**25**	**0.625**	**0.162**		**7.4**	**76.7**	**15.9**	

GRAIN SIZE DISTRIBUTION

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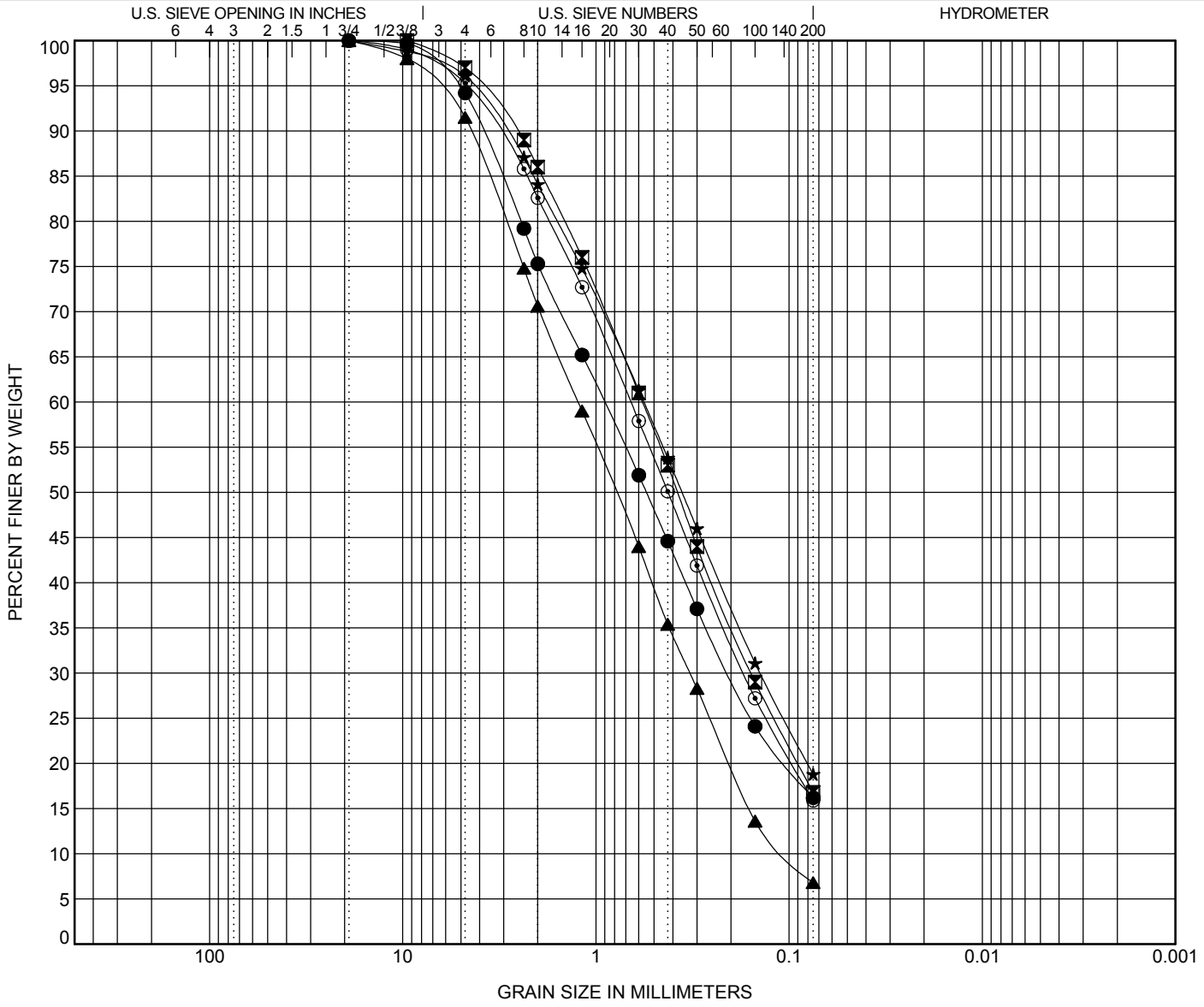
775-883-1600

CLIENT RPJ NV LLC. **PROJECT NAME** Clearview Subdivision

PROJECT NUMBER 19-301.1 **PROJECT LOCATION** Carson City, Nevada



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	TP-04	2.5	Clayey Sand					
⊠	TP-07	1.0	Clayey Sand					
▲	TP-07	3.0	Well Graded Sand				0.83	11.88
★	TP-08	2.5	Clayey Sand					
⊙	TP-09	1.0	Silty Sand					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-04	2.5	19	0.906	0.205		5.8	78.0	16.2	
⊠	TP-07	1.0	9.5	0.575	0.157		3.0	80.2	16.8	
▲	TP-07	3.0	19	1.235	0.326	0.104	8.5	84.7	6.8	
★	TP-08	2.5	19	0.565	0.141		3.9	77.3	18.8	
⊙	TP-09	1.0	19	0.66	0.171		4.7	79.4	15.9	

Manhard CONSULTING LTD

PRELIMINARY WATER MAIN ANALYSIS REPORT

FOR

SILVER VIEW TOWNHOMES

CARSON CITY, NEVADA

Prepared for:

State Street Development
508 North Curry Street
Carson City, NV 89703

Prepared by:

Manhard Consulting Ltd.
241 Ridge Street, Suite 400
Reno, NV 89501

Project: LILCCNV02

Date: 1/13/20

Table of Contents

Appendices
Appendix A

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List of Tables

1 INTRODUCTION

1.1 Purpose of Analysis

This report represents a preliminary analysis of the proposed water main system for the Silver View Townhomes. 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 Silver View Townhomes development is approximately 2.75 acres in size and is located in the southern portion of Carson City at the intersection of Silver Sage and Clearview. It is west of Silver Sage Drive and south of Clearview Drive. This site is situated within the Southwest ¼ of Section 29 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 parcel 009-125-12.

1.3 Project Description

The Silver View Townhomes development is a proposed subdivision which consists of 34 single-family residential townhome units on a 2.75 acre parcel. The project site is currently zoned within the RC zoning district.

1.4 Methodologies

The Silver View Townhomes 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 Silver View Townhomes 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 Silver Sage Drive to the east of the project site and the other occurs on Clearview Drive. In addition, the main in Clearview Drive will be extended and connected to the mains at the intersection with Silver Sage Drive. From the main in Clearview Drive, a proposed 8" water main will connect to an existing Public system and routed through the subject property and eventually connecting to the other existing 8" water main in Silver Sage Drive. The Silver View Townhomes 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: Silver View Townhomes Pressure Summary

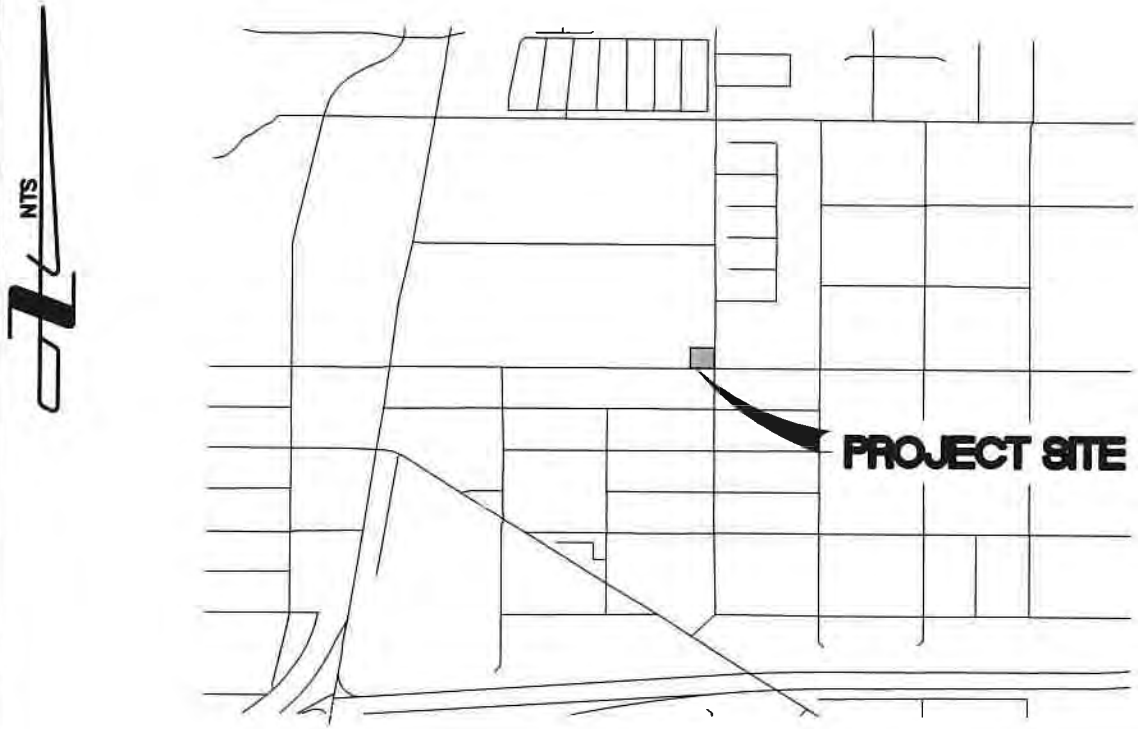
Condition	High Pressure (psi)	Low Pressure (psi)
Max Day	49	46
Peak Hour	49	46
Fire Flow (farthest hydrant)	49	44

The pressures above are based on a static pressure of approximately 45 psi at the connection with Clearview. A hydrant test will be required to determine the actual pressures provided to the site.

The maximum day demand low pressure of 46 psi is above the NAC minimum of 40 psi. The peak hour demand low pressure is below the minimum of 46 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 Silver View Townhomes 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 Silver View Townhomes Development is in compliance and meets the minimum pressures per NAC 445A.6711 during maximum day, peak hour, and fire flow conditions.



VICINITY MAP

N.T.S.

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SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.: DMK
DRAWN BY: DMK
DATE: 01-14-20
SCALE: NTS

EXHIBIT 1
LILCCNV01

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

1 inch = 50 ft.

APN - 002-125-16

PROPOSED WATER MAIN

EXISTING WATER MAIN

APN - 002-124-03

APN - 002-125-21

PROPOSED WATER MAIN

APN - 002-125-12

SILVER SAGE DRIVE

CLEARVIEW DRIVE

EXISTING WATER MAIN

PROPOSED WATER MAIN

APN - 002-141-01

EXISTING WATER MAIN

DATE	REVISIONS	DRAWN BY	CHECK BY

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SILVER VIEW TOWNHOMES

CARSON CITY

PROPOSED WATER IMPROVEMENTS - FIGURE 2

DRAWN BY:	DATE:	SCALE:	CODE:
DMK	01-13-2020	1"=40'	LIL.CCNV02

APPENDIX A

WATER DEMAND CALCULATIONS FOR SILVER VIEW TOWNHOMES

Number of units = 34
Average per lot demand = 1.0 gpm/lot
Maximum day demand factor = 2.0
Peak hour global demand multiplier = 1.5

Average demand = 34*1.0 = 34.0 gpm
Maximum day demand = 34*2.0 = 68.0 gpm
Peak hour demand = 68*1.5 = 102.0 gpm

Scenario Summary Report
Scenario: ADD
Silver View Townhomes

Scenario Summary

ID	1
Label	ADD
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	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

Scenario Summary Report
Scenario: ADD
Silver View Townhomes

Scenario Summary

ID	1
Label	ADD
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	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: Pipe Table

Silver View Townhomes

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)
32	P-1	175	R-1	J-1	8.0	Ductile Iron	130.0	34
34	P-2	62	J-1	J-2	8.0	Ductile Iron	130.0	34
36	P-3	136	J-2	J-3	8.0	Ductile Iron	130.0	0
39	P-5	233	J-4	R-1	8.0	Ductile Iron	130.0	-34
41	P-4(1)	65	J-3	J-5	8.0	Ductile Iron	130.0	0
42	P-4(2)	50	J-5	J-4	8.0	Ductile Iron	130.0	-34
46	P-7	76	J-6	J-7	8.0	Ductile Iron	130.0	0
49	P-9	49	J-8	J-7	8.0	Ductile Iron	130.0	0
51	P-10	49	J-7	J-9	8.0	Ductile Iron	130.0	0
53	P-11	57	J-10	J-6	8.0	Ductile Iron	130.0	0
56	P-6(1)	13	J-2	J-11	8.0	Ductile Iron	130.0	0
57	P-6(2)	53	J-11	J-6	8.0	Ductile Iron	130.0	0
58	P-12	11	H-1	J-11	6.0	Ductile Iron	130.0	0
62	P-8(1)	50	J-7	J-13	8.0	Ductile Iron	130.0	0
63	P-8(2)	12	J-13	J-5	8.0	Ductile Iron	130.0	0
64	P-13	13	H-2	J-13	6.0	Ductile Iron	130.0	0

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.22	0.000	True	20
0.22	0.000	True	20
0.00	0.000	True	358
0.22	0.000	True	20
0.00	0.000	True	203
0.22	0.000	True	20
0.00	0.000	True	168
0.00	0.000	True	80
0.00	0.000	True	167
0.00	0.000	True	80
0.00	0.000	True	42
0.00	0.000	True	160
0.00	0.000	True	29

FlexTable: Pipe Table

Silver View Townhomes

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.00	0.000	True	145
0.00	0.000	True	43
0.00	0.000	True	29

FlexTable: Junction Table

Silver View Townhomes

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	4,745.00	<None>	<Collection: 0 items>	0	4,850.40	46
33	J-2	4,743.00	<None>	<Collection: 1 items>	34	4,850.40	46
35	J-3	4,738.00	<None>	<Collection: 0 items>	0	4,850.40	49
37	J-4	4,737.00	<None>	<Collection: 0 items>	0	4,850.40	49
40	J-5	4,737.50	<None>	<Collection: 1 items>	34	4,850.40	49
43	J-6	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
45	J-7	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
48	J-8	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
50	J-9	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
52	J-10	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
55	J-11	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
61	J-13	4,737.50	<None>	<Collection: 0 items>	0	4,850.40	49

Scenario Summary Report
Scenario: PHD
Silver View Townhomes

Scenario Summary

ID	66
Label	PHD
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	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: Pipe Table

Silver View Townhomes

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
32	P-1	175	R-1	J-1	8.0	Ductile Iron	130.0	34	0.22	0.000	True	20
34	P-2	62	J-1	J-2	8.0	Ductile Iron	130.0	34	0.22	0.000	True	20
36	P-3	136	J-2	J-3	8.0	Ductile Iron	130.0	0	0.00	0.000	True	358
39	P-5	233	J-4	R-1	8.0	Ductile Iron	130.0	-34	0.22	0.000	True	20
41	P-4(1)	65	J-3	J-5	8.0	Ductile Iron	130.0	0	0.00	0.000	True	203
42	P-4(2)	50	J-5	J-4	8.0	Ductile Iron	130.0	-34	0.22	0.000	True	20
46	P-7	76	J-6	J-7	8.0	Ductile Iron	130.0	0	0.00	0.000	True	168
49	P-9	49	J-8	J-7	8.0	Ductile Iron	130.0	0	0.00	0.000	True	80
51	P-10	49	J-7	J-9	8.0	Ductile Iron	130.0	0	0.00	0.000	True	167
53	P-11	57	J-10	J-6	8.0	Ductile Iron	130.0	0	0.00	0.000	True	80
56	P-6(1)	13	J-2	J-11	8.0	Ductile Iron	130.0	0	0.00	0.000	True	42
57	P-6(2)	53	J-11	J-6	8.0	Ductile Iron	130.0	0	0.00	0.000	True	160
58	P-12	11	H-1	J-11	6.0	Ductile Iron	130.0	0	0.00	0.000	True	29
62	P-8(1)	50	J-7	J-13	8.0	Ductile Iron	130.0	0				
63	P-8(2)	12	J-13	J-5	8.0	Ductile Iron	130.0	0				
64	P-13	13	H-2	J-13	6.0	Ductile Iron	130.0	0				

FlexTable: Pipe Table

Silver View Townhomes

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.00	0.000	True	145
0.00	0.000	True	43
0.00	0.000	True	29

FlexTable: Junction Table

Silver View Townhomes

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	4,745.00	<None>	<Collection: 0 items>	0	4,850.40	46
33	J-2	4,743.00	<None>	<Collection: 1 items>	34	4,850.40	46
35	J-3	4,738.00	<None>	<Collection: 0 items>	0	4,850.40	49
37	J-4	4,737.00	<None>	<Collection: 0 items>	0	4,850.40	49
40	J-5	4,737.50	<None>	<Collection: 1 items>	34	4,850.40	49
43	J-6	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
45	J-7	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
48	J-8	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
50	J-9	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
52	J-10	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
55	J-11	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
61	J-13	4,737.50	<None>	<Collection: 0 items>	0	4,850.40	49

Scenario Summary Report
Scenario: MDD
Silver View Townhomes

Scenario Summary

ID	67
Label	MDD
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	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: Pipe Table

Silver View Townhomes

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
32	P-1	175	R-1	J-1	8.0	Ductile Iron	130.0	51	0.33	0.000	True	20
34	P-2	62	J-1	J-2	8.0	Ductile Iron	130.0	51	0.33	0.000	True	20
36	P-3	136	J-2	J-3	8.0	Ductile Iron	130.0	0	0.00	0.000	True	358
39	P-5	233	J-4	R-1	8.0	Ductile Iron	130.0	-51	0.33	0.000	True	20
41	P-4(1)	65	J-3	J-5	8.0	Ductile Iron	130.0	0	0.00	0.000	True	203
42	P-4(2)	50	J-5	J-4	8.0	Ductile Iron	130.0	-51	0.33	0.000	True	20
46	P-7	76	J-6	J-7	8.0	Ductile Iron	130.0	0	0.00	0.000	True	168
49	P-9	49	J-8	J-7	8.0	Ductile Iron	130.0	0	0.00	0.000	True	80
51	P-10	49	J-7	J-9	8.0	Ductile Iron	130.0	0	0.00	0.000	True	167
53	P-11	57	J-10	J-6	8.0	Ductile Iron	130.0	0	0.00	0.000	True	80
56	P-6(1)	13	J-2	J-11	8.0	Ductile Iron	130.0	0	0.00	0.000	True	42
57	P-6(2)	53	J-11	J-6	8.0	Ductile Iron	130.0	0	0.00	0.000	True	160
58	P-12	11	H-1	J-11	6.0	Ductile Iron	130.0	0	0.00	0.000	True	29
62	P-8(1)	50	J-7	J-13	8.0	Ductile Iron	130.0	0				
63	P-8(2)	12	J-13	J-5	8.0	Ductile Iron	130.0	0				
64	P-13	13	H-2	J-13	6.0	Ductile Iron	130.0	0				

FlexTable: Pipe Table

Silver View Townhomes

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.00	0.000	True	145
0.00	0.000	True	43
0.00	0.000	True	29

FlexTable: Junction Table

Silver View Townhomes

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	4,745.00	<None>	<Collection: 0 items>	0	4,850.40	46
33	J-2	4,743.00	<None>	<Collection: 1 items>	51	4,850.40	46
35	J-3	4,738.00	<None>	<Collection: 0 items>	0	4,850.40	49
37	J-4	4,737.00	<None>	<Collection: 0 items>	0	4,850.40	49
40	J-5	4,737.50	<None>	<Collection: 1 items>	51	4,850.40	49
43	J-6	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
45	J-7	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
48	J-8	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
50	J-9	4,740.00	<None>	<Collection: 0 items>	0	4,850.40	48
52	J-10	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
55	J-11	4,743.00	<None>	<Collection: 0 items>	0	4,850.40	46
61	J-13	4,737.50	<None>	<Collection: 0 items>	0	4,850.40	49

Scenario Summary Report
Scenario: MDD+FF
Silver View Townhomes

Scenario Summary

ID	69
Label	MDD+FF
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	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: Pipe Table

Silver View Townhomes

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)
32	P-1	175	R-1	J-1	8.0	Ductile Iron	130.0	1,004
34	P-2	62	J-1	J-2	8.0	Ductile Iron	130.0	1,004
36	P-3	136	J-2	J-3	8.0	Ductile Iron	130.0	-186
39	P-5	233	J-4	R-1	8.0	Ductile Iron	130.0	-598
41	P-4(1)	65	J-3	J-5	8.0	Ductile Iron	130.0	-186
42	P-4(2)	50	J-5	J-4	8.0	Ductile Iron	130.0	-598
46	P-7	76	J-6	J-7	8.0	Ductile Iron	130.0	-361
49	P-9	49	J-8	J-7	8.0	Ductile Iron	130.0	0
51	P-10	49	J-7	J-9	8.0	Ductile Iron	130.0	0
53	P-11	57	J-10	J-6	8.0	Ductile Iron	130.0	0
56	P-6(1)	13	J-2	J-11	8.0	Ductile Iron	130.0	1,139
57	P-6(2)	53	J-11	J-6	8.0	Ductile Iron	130.0	-361
58	P-12	11	H-1	J-11	6.0	Ductile Iron	130.0	-1,500
62	P-8(1)	50	J-7	J-13	8.0	Ductile Iron	130.0	-361
63	P-8(2)	12	J-13	J-5	8.0	Ductile Iron	130.0	-361
64	P-13	13	H-2	J-13	6.0	Ductile Iron	130.0	0

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
6.41	0.018	True	20
6.41	0.018	True	20
1.19	0.001	True	358
3.82	0.007	True	20
1.19	0.001	True	203
3.82	0.007	True	20
2.31	0.003	True	168
0.00	0.000	True	80
0.00	0.000	True	167
0.00	0.000	True	80
7.27	0.023	True	42
2.31	0.003	True	160
17.02	0.157	True	29

FlexTable: Pipe Table

Silver View Townhomes

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
2.31	0.003	True	145
2.31	0.003	True	43
0.00	0.000	True	29

FlexTable: Junction Table

Silver View Townhomes

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	4,745.00	<None>	<Collection: 0 items>	0	4,850.03	45
33	J-2	4,743.00	<None>	<Collection: 1 items>	51	4,849.66	46
35	J-3	4,738.00	<None>	<Collection: 0 items>	0	4,849.95	48
37	J-4	4,737.00	<None>	<Collection: 0 items>	0	4,850.26	49
40	J-5	4,737.50	<None>	<Collection: 1 items>	51	4,850.12	49
43	J-6	4,743.00	<None>	<Collection: 0 items>	0	4,849.13	46
45	J-7	4,740.00	<None>	<Collection: 0 items>	0	4,849.60	47
48	J-8	4,740.00	<None>	<Collection: 0 items>	0	4,849.60	47
50	J-9	4,740.00	<None>	<Collection: 0 items>	0	4,849.60	47
52	J-10	4,743.00	<None>	<Collection: 0 items>	0	4,849.13	46
55	J-11	4,743.00	<None>	<Collection: 0 items>	0	4,848.69	46
61	J-13	4,737.50	<None>	<Collection: 0 items>	0	4,850.00	49

FlexTable: Hydrant Table

Silver View Townhomes

ID	Label	Hydrant Status	Include Hydrant Lateral Loss?	Emitter Coefficient (gpm/psi^n)	Length (Hydrant Lateral) (ft)	Elevation (ft)	Zone	Demand Collection
54	H-1	Closed	False	0.000	20	4,743.00	<None>	<Collection: 1 items>
60	H-2	Closed	False	0.000	20	4,737.50	<None>	<Collection: 0 items>

Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1,500	4,844.13	44
0	4,850.00	49

Manhard CONSULTING LTD

PRELIMINARY DRAINAGE STUDY REPORT

FOR

SILVER VIEW TOWNHOMES

CARSON CITY, NEVADA

Prepared for:

State Street Development
508 North Curry Street
Carson City, NV 89703

Prepared by:

Manhard Consulting Ltd.
241 Ridge Street, Suite 400
Reno, NV 89501

Project: LILCCNV02

Date: 1/13/20

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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 Silver View Townhomes 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 Silver View Townhomes development is approximately 2.75 acres in size and is located in the southern portion of Carson City at the intersection of Silver Sage and Clearview. It is west of Silver Sage Drive and south of Clearview Drive. This site is situated within the Southwest ¼ of Section 29 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 parcel 009-125-12.

1.3 Project Description

The Silver View Townhomes development is a proposed subdivision which consists of 34 single-family residential townhome units on a 2.75 acre parcel. The project site is currently zoned within the RC zoning district.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community-Panel Number 3200010094F, effective date December 22, 2016 the subject property is located in unshaded Zone X (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. The *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)

3 EXISTING HYDROLOGIC CONDITIONS

3.1 Existing On-Site Drainage

For the existing catchment a time of concentration (Tc) of 10 minutes 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 Figure 2 (Existing Hydrologic Conditions) for existing hydrology drainage map and the associated hydrologic sub-areas.

Table 1 – Existing Conditions Rational Method Model Summary for the Mills Landing, 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)
EX1	2.75	0.30/0.50	10.00	1.46/3.53	1.20	4.85
TOTAL	**2.75**	-----	-----	-----	**1.20**	**4.85**

The 5-year and 100-year peak flows from on-site catchment in the existing condition are 1.20 cfs and 4.85 cfs, respectively. The existing flow from area EX1 discharges to Silver Sage Drive, and the flow north along the curb and gutter in Silver Sage Drive.

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 Table 3. Both pipe sizes and catch basins have been sized to accommodate the proposed flows. Reference Figure 3 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 site will be contained in swales and the roadway and will travel to the storm drain inlets. From the inlets, the flow will be routed through the proposed storm drain system to the detention/retention basin(s).

Table 2 – Proposed Conditions Rational Method Model Summary for the Silver View Townhomes Project, 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)
P1	0.133	0.65/0.81	10.00	1.46/3.53	0.13	0.38
P2	0.323	0.65/0.81	10.00	1.46/3.53	0.31	0.92
P3	0.169	0.65/0.81	10.00	1.46/3.53	0.16	0.48
P4	0.173	0.65/0.81	10.00	1.46/3.53	0.16	0.49
P5	0.293	0.65/0.81	10.00	1.46/3.53	0.28	0.83
P6	0.203	0.65/0.81	10.00	1.46/3.53	0.19	0.58
P7	0.152	0.65/0.81	10.00	1.46/3.53	0.14	0.43
P8	1.160	0.65/0.81	10.00	1.46/3.53	1.10	3.32
P9	0.028	0.88/0.93	10.00	1.46/3.53	0.04	0.09
P10	0.028	0.88/0.93	10.00	1.46/3.53	0.04	0.09
P11	0.113	0.65/0.81	10.00	1.46/3.53	0.11	0.32
TOTAL	**2.775**	-----	-----	-----	**2.66**	**7.93**

5 HYDRAULIC ANALYSIS

5.1 Proposed Drainage Conditions

All onsite storm drainage pipes and/or drainage features shall be designed to intercept the 100-year storm flows and convey them to the proposed detention/retention facility. All proposed storm drainage facilities shall be privately owned and maintained.

Each of the proposed developed sub-basins are will collect the developed storm flows in the following manner;

Areas P1 through P3 – These areas are collected into a storm drainage system and conveyed to the retention pond in Area P8.

Areas P4 through P7 – These areas are collected into a storm drainage system and conveyed to the retention pond in Area P8.

Area P8 – Area P8 utilizes an overland flow and surface swale to convey flows to the on-site retention facility. The on-site retention facility collects all the flows from Areas P1 through P8 and does not allow them to exit the site. The retention pond has an infiltration rate of 1.48 inches permit at a 3' depth and 3.38 inches per minute at a 6' depth. These values are based on field percolation tests conducted by RCI.

Area P9, P10 and P11 – These minor areas allow a small portion of the site drainage to exit the site and be conveyed down the exiting curb and gutter of Clearview and Silver Sage Drives.

5.2 Retention/Detention

According to the existing and proposed hydrologic analysis, the existing 5-year and 100-year condition flows are 1.20 cfs and 4.85 cfs, respectively, and the proposed 5-year and 100-year condition flows are 2.66 cfs and 7.93 cfs. This is a 5-year increase of 1.46 cfs and a 100-year increase of 3.08 cfs. Given that there is not any existing public storm drain adjacent to the site, it is proposed that the majority of the 5 and 100- year runoff volumes be retained onsite and the small remainder flow be allowed to discharge to the public streets. The 5-year retention volume is 1,600 cubic feet and the 100-year retention volume is 4,800+/- cubic feet.

The pond volume shown in the tentative map has approximately 5,800 cf of storage with an additional 1 foot of freeboard. This volume alone is enough to retain the 100-year storm event.

The geotechnical reports indicate an infiltration rate for the area of the retention basin. The retention pond has an infiltration rate of 1.48 inches per minute (7.4'/hour) at a 3' depth and 3.38 inches per minute (16.9'/hour) at a 6' depth. These values are based on field percolation tests conducted by RCI. At these rates, the proposed pond with a bottom of 2256 sq-ft would have a minimum infiltration rate of 4.63 cfs

When you take the infiltration rate into consideration, the 5-year storm event is infiltrated faster than the flow is entering the pond, and the 100-year event is being infiltrated while it is entering the pond and the required storage volume is reduced to approximately 2,000 cubic feet. This volume will take approximately an additional 7 minutes to infiltrate and empty the pond after the storm event is over.

5.3 Street Capacities

In the 5-year storm event, the streets have a capacity of 0.41 cfs, and in the 100-year storm event, the streets have a capacity of 11.89 cfs. None of the proposed drainage areas convey more than the street capacities to the proposed street sections. Area P8 does not convey more than the capacity, because most of area P8 is in the open space and not directed to the curb and gutter.

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.

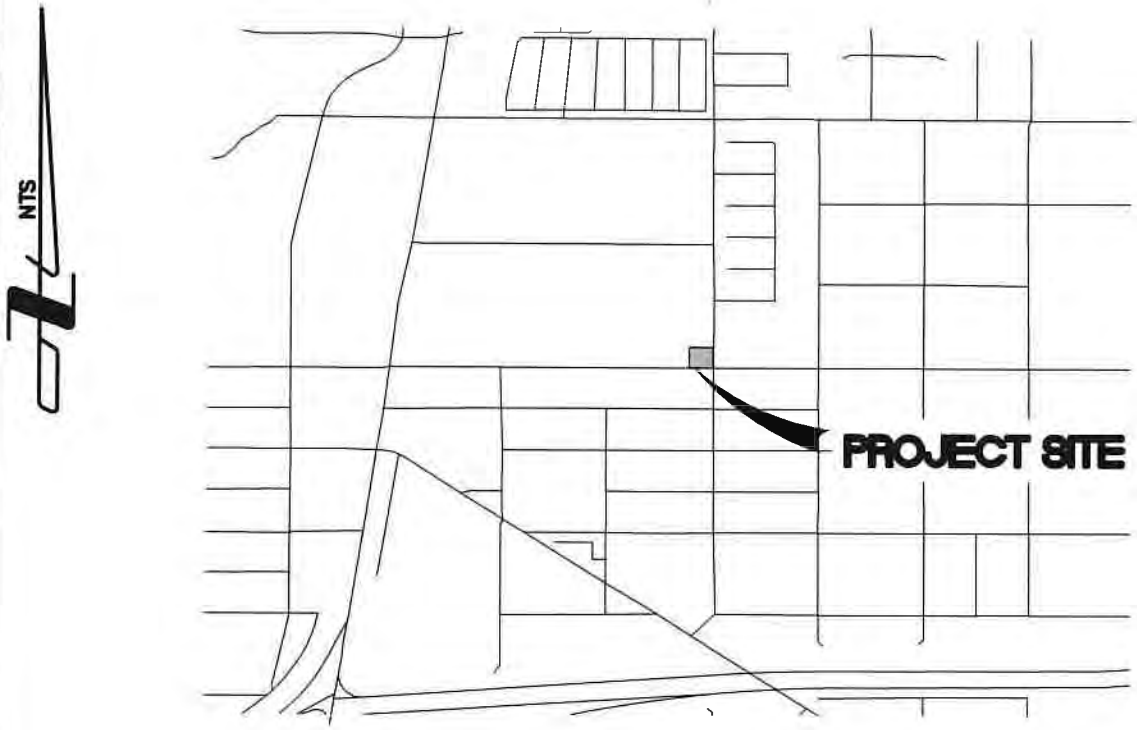
6.2 Impacts to Adjacent Properties

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 decrease downstream storm flow runoff rates, volumes, velocities, depths, and will not influence floodplain boundaries.

With the utilization of the on-site retention pond, the volume of water being released from the site in the 5-year storm is reduced from 1.20 cfs to 0.19 cfs and in the 100-year storm from 4.85 cfs to 0.5 cfs. This will have a positive impact to downstream properties by providing extra capacity in the storm water conveyance systems. Additionally, it provides for groundwater recharge in the valley.

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.



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

SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.: DMK
DRAWN BY: DMK
DATE: 01-14-20
SCALE: NTS

EXHIBIT 1
LILCCNV01

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

1 inch = 50 ft.

APN - 002-125-16

APN - 002-125-12

AREA EX-1
A=2.75 AC
i(5)=1.46 in/hr
i(100)=3.53 in/hr
C(5)=0.30
C(100)=0.50
Q(5)=1.20 cfs
Q(100)=4.85 cfs

APN - 002-125-21

APN - 002-124-03

SILVER SAGE DRIVE

CLEARVIEW DRIVE

APN - 002-141-01

DATE	REVISIONS	DRAWN BY	CHECK BY

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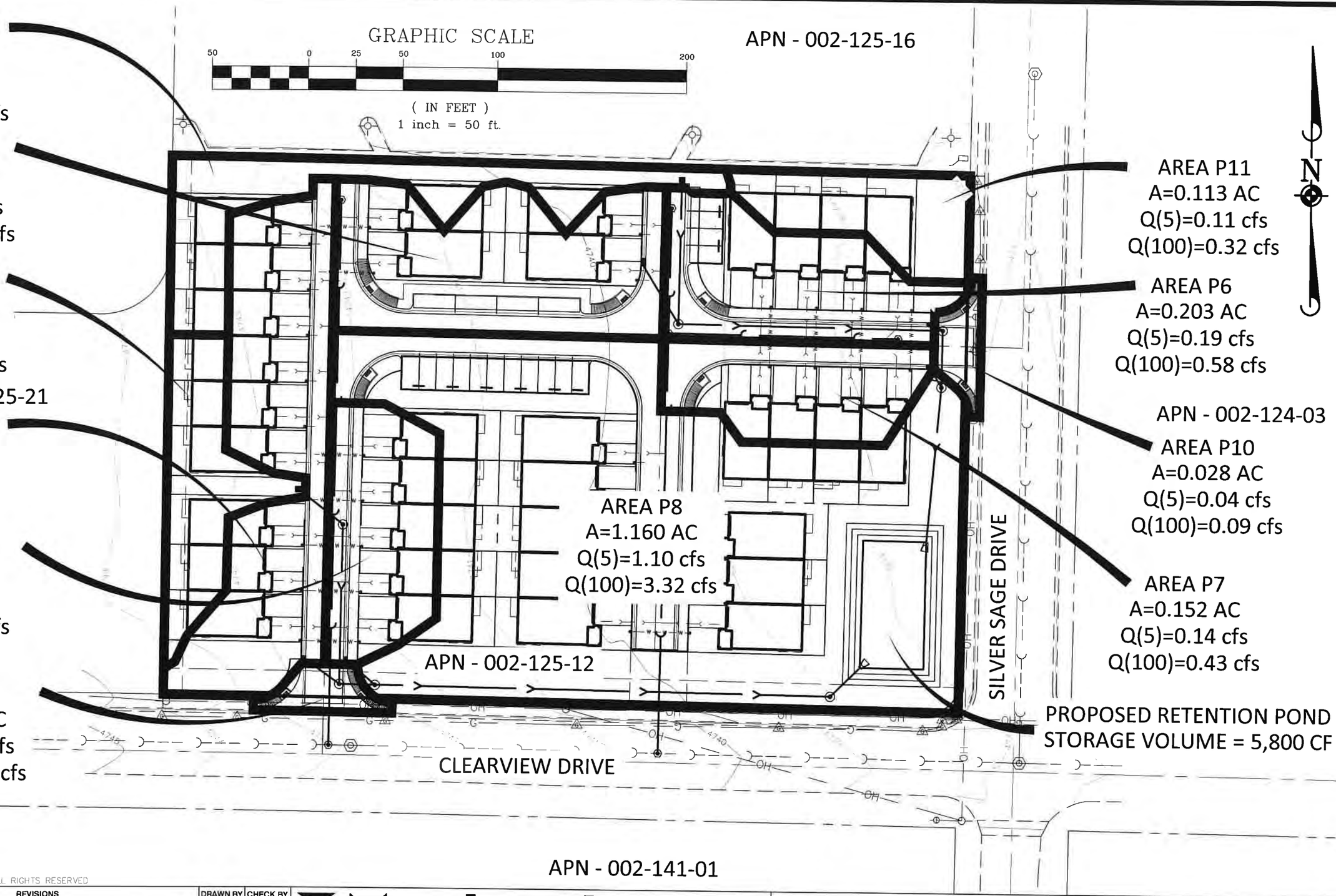
SILVER VIEW TOWNHOMES

CARSON CITY

EXISTING H YDROLOGY CONDITIONS- FIGURE 2

DRAWN BY:	DATE:	SCALE:	CODE:
DMK	01–13–2020	1”=40’	LIL.CCNV02



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SILVER VIEW TOWNHOMES

CARSON CITY

PROPOSED HYDROLOGY CONDITIONS - FIGURE 3

DRAWN BY:	DATE:	SCALE:	CODE:
DMK	01–13–2020	1”=40’	LIL.CCNV02

APPENDIX A
SUPPORTING DATA

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/13/2020 at 5:56:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOAA Atlas 14, Volume 1, Version 5
Location name: Carson City, Nevada, USA*
Latitude: 39.1288°, Longitude: -119.7639°
Elevation: 4740.49 ft**
* source: ESRI Maps
** source: USGS

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	1.16 (0.996-1.37)	1.44 (1.25-1.70)	1.93 (1.66-2.28)	2.38 (2.03-2.82)	3.13 (2.59-3.71)	3.83 (3.06-4.56)	4.64 (3.59-5.59)	5.63 (4.18-6.89)	7.19 (5.03-8.98)	8.59 (5.72-10.9)
10-min	0.882 (0.762-1.04)	1.10 (0.954-1.30)	1.46 (1.26-1.73)	1.81 (1.55-2.15)	2.39 (1.97-2.83)	2.91 (2.33-3.47)	3.53 (2.74-4.25)	4.28 (3.18-5.24)	5.47 (3.83-6.83)	6.54 (4.36-8.33)
15-min	0.728 (0.628-0.856)	0.908 (0.788-1.07)	1.21 (1.04-1.43)	1.50 (1.28-1.77)	1.97 (1.63-2.34)	2.40 (1.92-2.86)	2.92 (2.26-3.51)	3.54 (2.63-4.33)	4.52 (3.16-5.65)	5.40 (3.60-6.88)
30-min	0.490 (0.422-0.578)	0.610 (0.530-0.722)	0.816 (0.700-0.964)	1.01 (0.860-1.19)	1.33 (1.10-1.57)	1.62 (1.30-1.93)	1.97 (1.52-2.37)	2.38 (1.77-2.92)	3.04 (2.13-3.80)	3.64 (2.43-4.64)
60-min	0.303 (0.262-0.357)	0.378 (0.328-0.447)	0.504 (0.433-0.596)	0.624 (0.533-0.738)	0.821 (0.679-0.973)	1.00 (0.802-1.19)	1.22 (0.942-1.46)	1.47 (1.09-1.80)	1.88 (1.32-2.35)	2.25 (1.50-2.87)
2-hr	0.207 (0.185-0.237)	0.256 (0.229-0.294)	0.326 (0.289-0.372)	0.389 (0.341-0.444)	0.482 (0.412-0.553)	0.566 (0.472-0.655)	0.660 (0.536-0.773)	0.774 (0.606-0.918)	0.967 (0.726-1.19)	1.15 (0.832-1.45)
3-hr	0.166 (0.149-0.186)	0.206 (0.187-0.233)	0.259 (0.231-0.291)	0.301 (0.267-0.338)	0.362 (0.316-0.409)	0.413 (0.354-0.471)	0.471 (0.395-0.542)	0.544 (0.447-0.636)	0.662 (0.528-0.800)	0.778 (0.603-0.974)
6-hr	0.116 (0.105-0.130)	0.145 (0.131-0.162)	0.180 (0.161-0.201)	0.208 (0.185-0.231)	0.245 (0.215-0.274)	0.274 (0.237-0.309)	0.303 (0.259-0.346)	0.338 (0.282-0.390)	0.387 (0.315-0.454)	0.430 (0.342-0.514)
12-hr	0.078 (0.069-0.087)	0.098 (0.087-0.110)	0.123 (0.109-0.138)	0.142 (0.126-0.160)	0.169 (0.147-0.191)	0.189 (0.163-0.215)	0.210 (0.178-0.241)	0.231 (0.193-0.269)	0.260 (0.211-0.308)	0.282 (0.224-0.340)
24-hr	0.052 (0.047-0.057)	0.065 (0.059-0.071)	0.082 (0.074-0.090)	0.096 (0.087-0.105)	0.115 (0.103-0.127)	0.130 (0.116-0.143)	0.146 (0.129-0.161)	0.162 (0.143-0.180)	0.185 (0.160-0.207)	0.203 (0.173-0.229)
2-day	0.031 (0.028-0.035)	0.039 (0.035-0.044)	0.050 (0.045-0.056)	0.059 (0.052-0.066)	0.071 (0.063-0.080)	0.081 (0.071-0.091)	0.091 (0.080-0.103)	0.102 (0.088-0.117)	0.117 (0.100-0.135)	0.130 (0.109-0.151)
3-day	0.023 (0.020-0.026)	0.029 (0.026-0.033)	0.037 (0.033-0.042)	0.044 (0.039-0.049)	0.053 (0.047-0.060)	0.061 (0.053-0.069)	0.069 (0.060-0.078)	0.077 (0.066-0.088)	0.089 (0.075-0.103)	0.099 (0.082-0.115)
4-day	0.019 (0.017-0.021)	0.024 (0.021-0.027)	0.031 (0.027-0.035)	0.036 (0.032-0.041)	0.044 (0.039-0.050)	0.051 (0.044-0.058)	0.057 (0.049-0.066)	0.065 (0.055-0.074)	0.075 (0.063-0.087)	0.083 (0.069-0.097)
7-day	0.012 (0.011-0.014)	0.016 (0.014-0.018)	0.020 (0.018-0.023)	0.024 (0.021-0.027)	0.029 (0.026-0.033)	0.034 (0.029-0.038)	0.038 (0.033-0.043)	0.043 (0.037-0.049)	0.049 (0.041-0.057)	0.054 (0.045-0.063)
10-day	0.010 (0.009-0.011)	0.012 (0.011-0.014)	0.016 (0.014-0.018)	0.019 (0.017-0.021)	0.023 (0.020-0.026)	0.026 (0.023-0.029)	0.029 (0.025-0.033)	0.032 (0.028-0.037)	0.037 (0.031-0.042)	0.040 (0.034-0.047)
20-day	0.006 (0.005-0.007)	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.010-0.013)	0.014 (0.012-0.015)	0.015 (0.014-0.017)	0.017 (0.015-0.019)	0.019 (0.016-0.021)	0.021 (0.018-0.024)	0.023 (0.020-0.026)
30-day	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.007-0.008)	0.009 (0.008-0.010)	0.010 (0.009-0.012)	0.012 (0.010-0.013)	0.013 (0.011-0.014)	0.014 (0.012-0.016)	0.016 (0.014-0.018)	0.017 (0.015-0.020)
45-day	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.012 (0.010-0.014)	0.013 (0.011-0.015)
60-day	0.003 (0.003-0.003)	0.004 (0.004-0.004)	0.005 (0.005-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.010 (0.009-0.012)

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

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

Please refer to NOAA Atlas 14 document for more information

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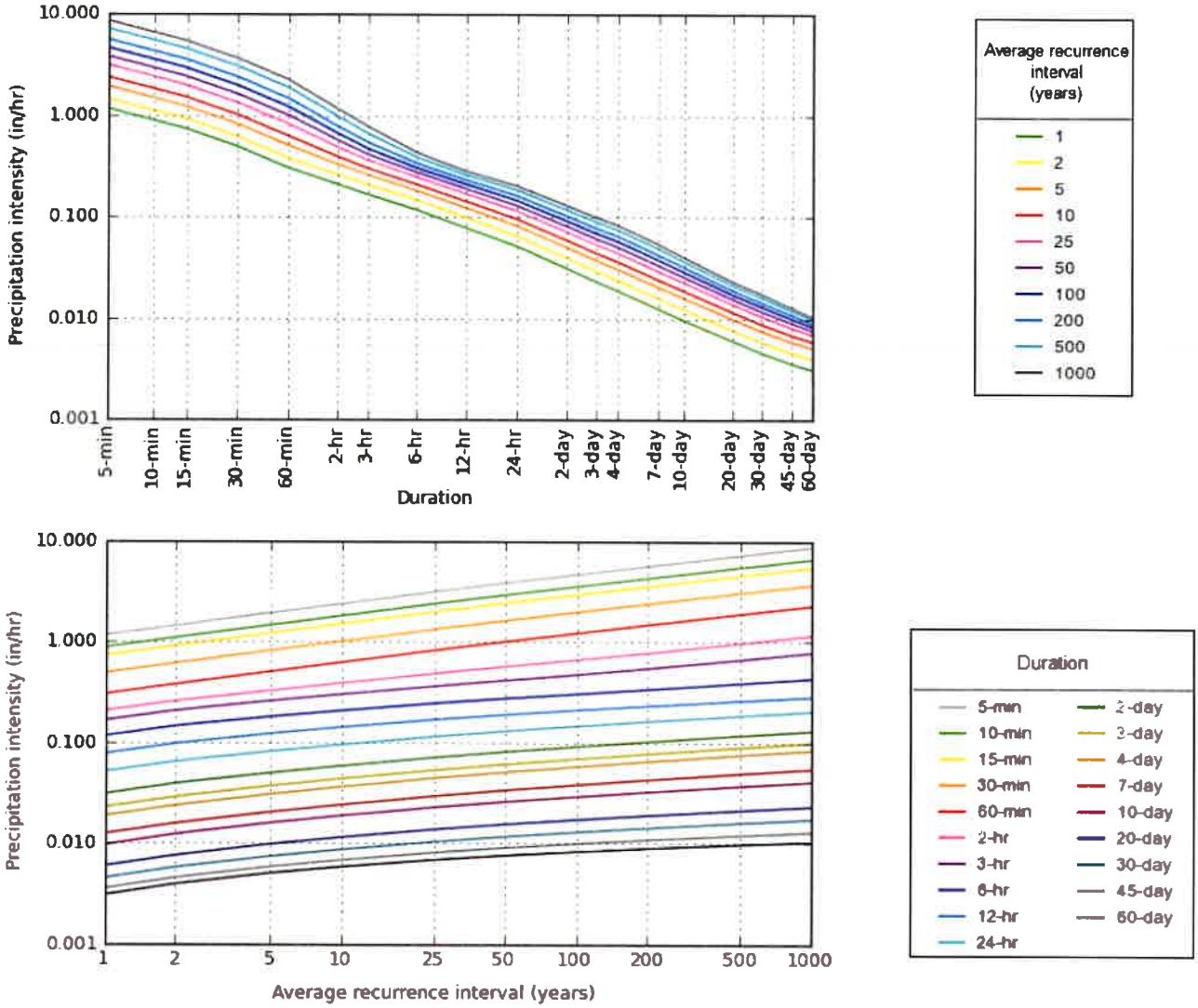
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.1288°, Longitude: -119.7639°



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Mon Jan 13 22:53:47 2020

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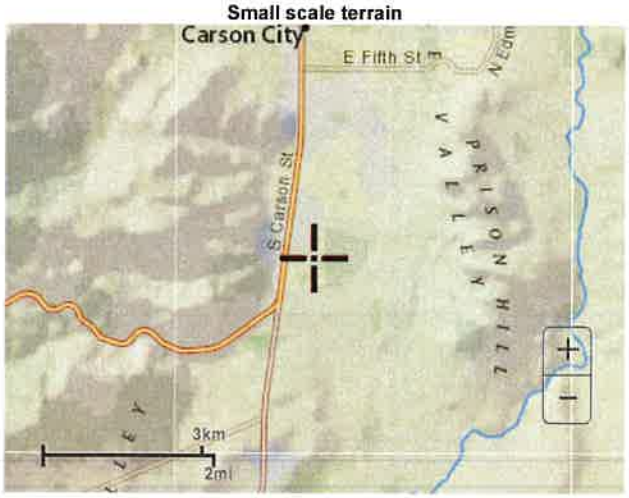
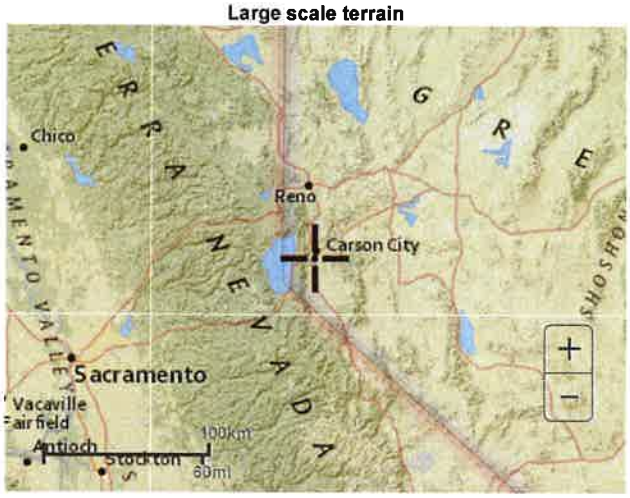
Maps & aerials

Small scale terrain

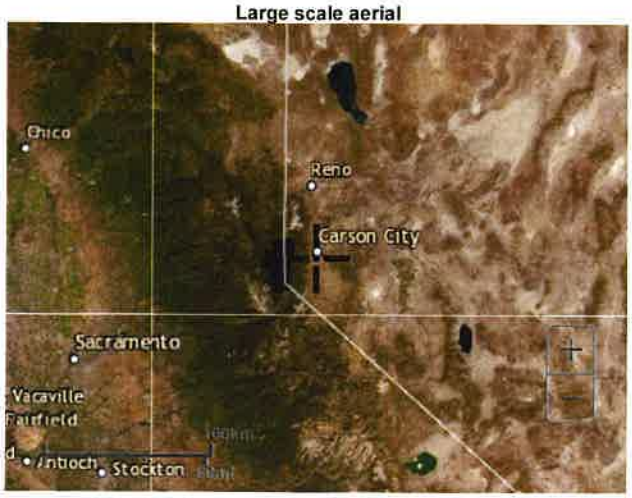


Large scale terrain



Large scale map

Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

RATIONAL FORMULA METHOD
RUNOFF COEFFICIENTS

Land Use or Surface Characteristics	Aver. % Impervious Area	Runoff Coefficients 5-Year (C_5)	Runoff Coefficients 100-Year (C_{100})
Business/Commercial:			
Downtown Areas	85	.82	.85
Neighborhood Areas	70	.65	.80
Residential:			
(Average Lot Size)			
⅛ Acre or Less (Multi-Unit)	65	.60	.78
¼ Acre	38	.50	.65
⅓ Acre	30	.45	.60
½ Acre	25	.40	.55
1 Acre	20	.35	.50
Industrial:	72	.68	.82
Open Space:			
(Lawns, Parks, Golf Courses)	5	.05	.30
Undeveloped Areas:			
Range	0	.20	.50
Forest	0	.05	.30
Streets/Roads:			
Paved	100	.88	.93
Gravel	20	.25	.50
Drives/Walks:	95	.87	.90
Roof:	90	.85	.87

Notes:

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

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

CROSS SECTION FOR SILVER VIEW TOWNHOMES - FULL STREET - 100 YEAR CAPACITY

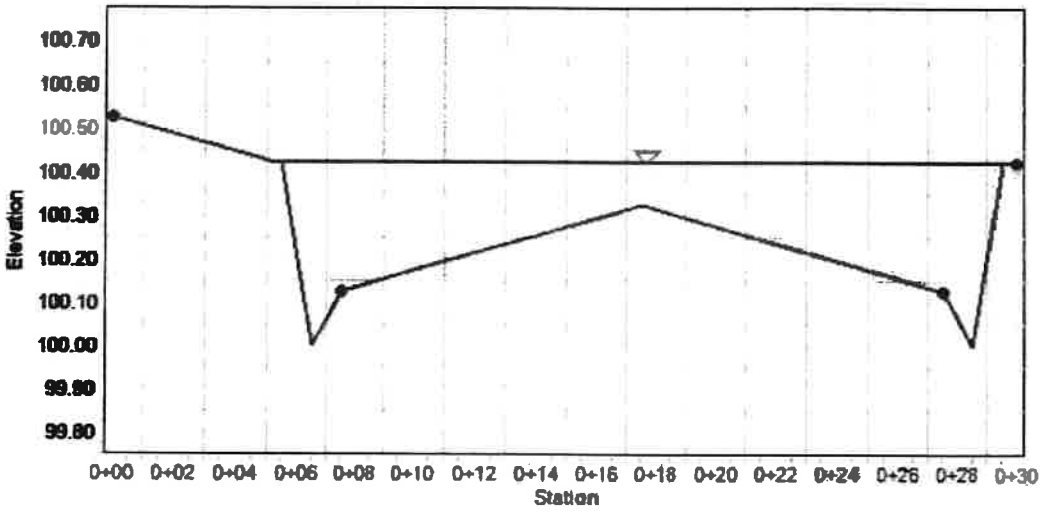
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.42	ft
Discharge	11.89	ft³/s

Cross Section Image



CROSS SECTION FOR SILVER VIEW TOWNHOMES - HALF STREET w/o SW - 5 YEAR CAPACITY

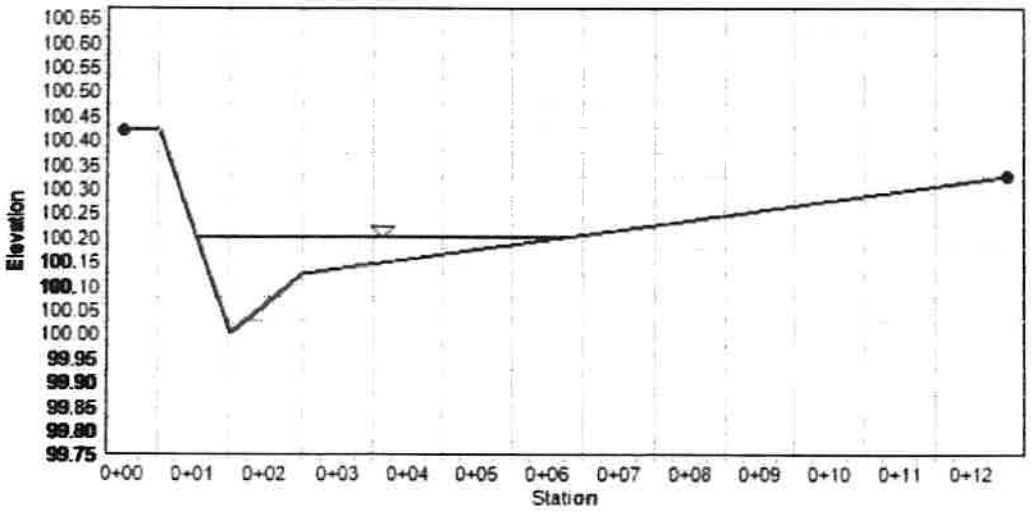
Project Description

Friction Method	**Manning Formula**
Solve For	**Discharge**

Input Data

Channel Slope	**0.00500**	**ft/ft**
Normal Depth	**0.20**	**ft**
Discharge	**0.41**	**ft³/s**

Cross Section Image



CROSS SECTION FOR SILVER VIEW TOWNHOMES - HALF STREET w/ SW - 5 YEAR CAPACITY

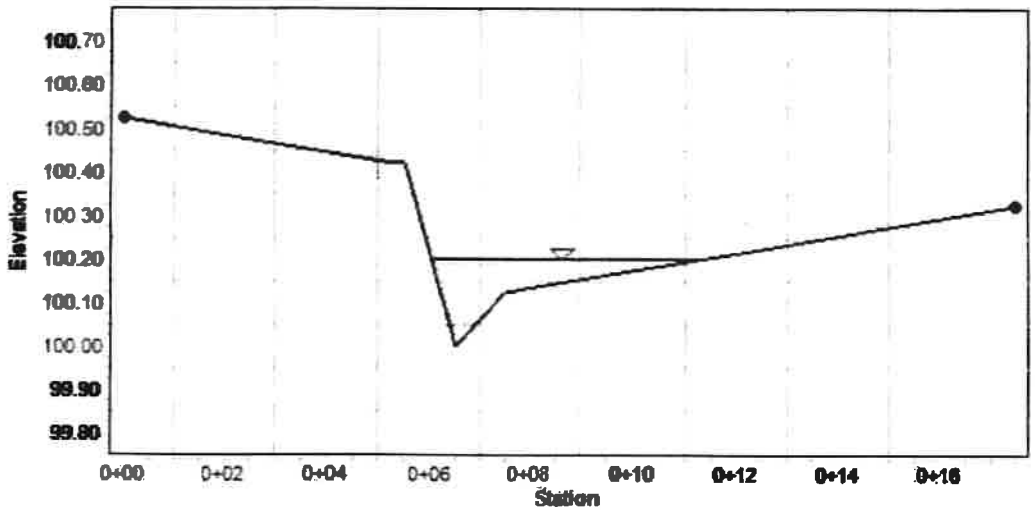
Project Description

Friction Method	**Manning Formula**
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.20	ft
Discharge	0.41	ft³/s

Cross Section Image



Manhard CONSULTING LTD

PRELIMINARY SEWER REPORT

FOR

SILVER VIEW TOWNHOMES

CARSON CITY, NEVADA

Prepared for:

State Street Development
508 North Curry Street
Carson City, Nevada 89703

Prepared by:

Manhard Consulting Ltd.
241 Ridge Street, Suite 400
Reno, Nevada 89501

1-15-20

Project: LILCCNV02

Date: 1/15/20

Table of Contents

Figures

Appendices

1 INTRODUCTION

1.1 Purpose of Analysis

This report represents a detailed analysis of the proposed sanitary sewer system for the Silver View Townhomes. 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 Silver View Townhomes development is approximately 2.75 acres in size and is located in the southern portion of Carson City and is east of South Carson Street, south of Eagle Station Lane, west of Silver Sage Drive, and north of Clearview Drive. Formally, this site is situated within the South West Quarter of Section 29, 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 009-125-12.

Figure 2, the *Proposed Sewer Display*, illustrates the location and orientation of the project and its proposed lots and roadway locations.

1.3 Project Description

The Silver View Townhomes Development is a proposed subdivision which consists of 34 single-family residential units. The project site is currently zoned within the RC zoning district.

2 PROPOSED ALIGNMENT AND QUANTITY OF SERVICE

2.1 Project Wastewater Collection System

Sewage flow from Silver View Townhomes will be conveyed via public 8" diameter PVC SDR-35 sewer mains that ultimately discharge into the existing 8" sanitary sewer main at two locations along Clearview Drive. The proposed sizes and locations of the sanitary sewers can be found on the *Proposed Sewer Display*, which is included in this report.

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 Silver View Townhomes 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)
34	2.5	150	3.80	48,450	0.07
			Total	**48,450**	**0.07**

2.3 Proposed Sewer Mains

Basic normal depth calculations for the proposed 8-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 20% at the slope mentioned above is within the requirements for Carson City. The velocity of an 8-inch sewer main is 1.36 fps for a pipe slope of 0.40%. 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%. The size and locations of the proposed sanitary sewers mentioned above can be found on the *Proposed Sewer Display*, 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 48,450 gpd (0.07 cfs) at a maximum depth of 20%, which will be able to adequately serve Silver View Townhomes.

The proposed sanitary sewerage system within this report for the Silver View Townhomes 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 SILVER VIEW TOWNHOMES

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 34 dwelling units; therefore the following equations are used:

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

Average flow = 34 * 2.5 * 150 = 12,750 gpd = 0.02 cfs

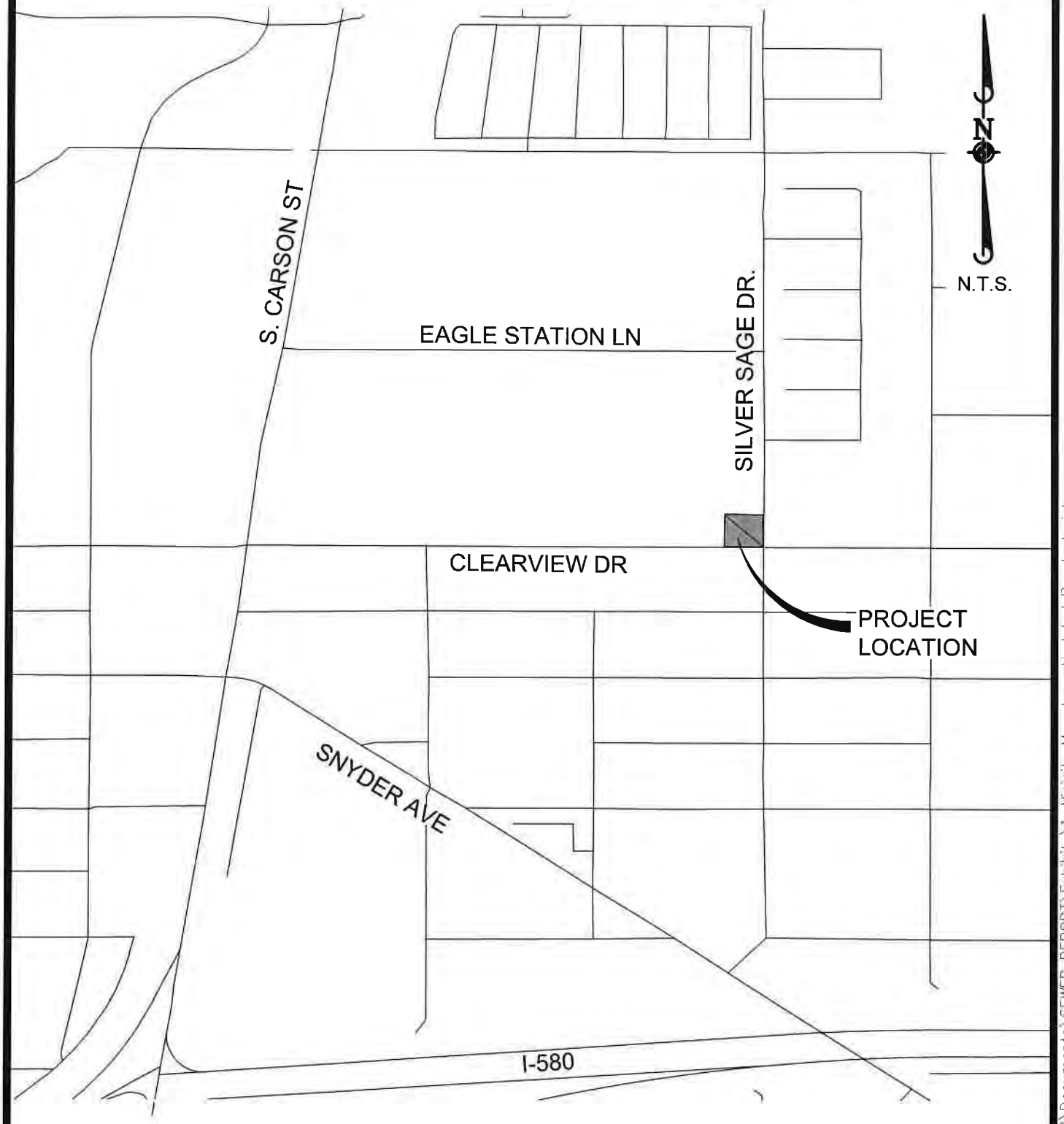
Peak flow = Average flow * peaking factor

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 = 12,750 * 3.8 = 48,450 gpd = 0.07 cfs

The design shall be for the peak flow; therefore the design flow is 0.07 cfs.



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SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.:	DMK
DRAWN BY:	TJS
DATE:	1/15/20
SCALE:	N.T.S.

SHEET 1 OF 2
LILCCNV02

APPENDIX A

FlowMaster Flow Data

Worksheet for 8" Sewer at 0.40%

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	8.00	in
Discharge	0.07	ft³/s

Results

Normal Depth	1.64	in
Flow Area	0.05	ft²
Wetted Perimeter	0.63	ft
Hydraulic Radius	0.98	in
Top Width	0.54	ft
Critical Depth	0.12	ft
Percent Full	20.4	%
Critical Slope	0.00670	ft/ft
Velocity	1.36	ft/s
Velocity Head	0.03	ft
Specific Energy	0.17	ft
Froude Number	0.78	
Maximum Discharge	0.82	ft³/s
Discharge Full	0.76	ft³/s
Slope Full	0.00003	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	20.45	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer at 0.40%

GVF Output Data

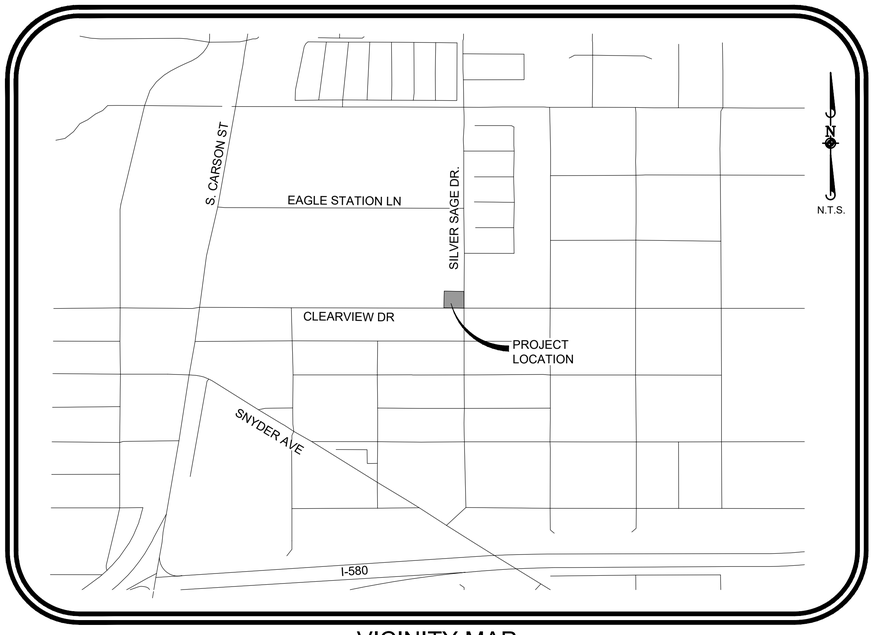
Upstream Velocity	Infinity	ft/s
Normal Depth	1.64	in
Critical Depth	0.12	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00670	ft/ft

TENTATIVE MAP
FOR
SILVER VIEW TOWNHOMES

Carson City, Nevada

ABBREVIATIONS

AGG.	AGGREGATE GRAVEL	INL	INLET
B.A.M.	BIT. AGG. MIXTURE	INV.	INVERT
B-B	BACK TO BACK	I.E.	INVERT ELEVATION
BC	BEGINNING OF CURB	IP	IRON PIPE
BFC	BACK FACE OF CURB	LP	LOW POINT
BIT.	BITUMINOUS CONCRETE	MAX.	MAXIMUM
BM	BENCHMARK	MB	MAILBOX
B.O.	BY OTHERS	MIN.	MINIMUM
B/P	BOTTOM OF PIPE	MJ	MECHANICALLY RESTRAINED JOINT
BVC	BEGINING OF VERTICAL CURVE	NWL	NORMAL WATER LEVEL
BW	BOTTOM OF WALL	PC	POINT OF CURVE
CB	CATCH BASIN	PCC	POINT OF COMPOUND CURVE
CL	CENTERLINE	PI	POINT OF INTERSECTION
CMP	CORRUGATED METAL PIPE	PL	PROPERTY LINE
CNTRL	CONTROL	PO	PUSH ON
CONC.	CONCRETE	PP	POWER POLE
CY	CUBIC YARD	PROP.	PROPOSED
D	DITCH	PT	POINT OF TANGENCY
DIA.	DIAMETER	PVC	POLYVINYL CHLORIDE PIPE
DIP	DUCTILE IRON PIPE	PVI	POINT OF VERTICAL INTERSECTION
DIWM	DUCTILE IRON WATER MAIN	P	PAVEMENT
DT	DRAIN TILE	R	RADIUS
EL	ELECTRIC	RCP	REINFORCED CONCRETE PIPE
EC	END OF CURVE	ROW	RIGHT-OF-WAY
E-E	EDGE TO EDGE	RR	RAILROAD
ELEV.	ELEVATION	SS	SANITARY SEWER
EP	EDGE OF PAVEMENT	SF	SQUARE FOOT
EVC	END OF VERTICAL CURVE	SHLD.	SHOULDER
EX.	EXISTING	SL	STREET LIGHT
F-F	FACE TO FACE	SSMH	SANITARY SEWER MANHOLE
FES	FLARED END SECTION	SD	STORM DRAIN
FF	FINISHED FLOOR	SDMH	STORM DRAIN MANHOLE
FL	FLOW LINE	STA.	STATION
FLG	FLANGE	SY	SQUARE YARDS
FM	FORCE MAIN	TBR	TO BE REMOVED
FG	FINISH GRADE	T	TELEPHONE
GAS	GAS	TC	TOP OF CURB
GW	GUY WIRE	T/P	TOP OF PIPE
HDWL	HEADWALL	TW	TOP OF WALL
HH	HANDHOLE	TRANS	TRANSFORMER
HP	HIGH POINT	VB	VALVE BOX
HWL	HIGH WATER LEVEL	VV	VALVE VAULT
HYD.	HYDRANT	WL	WATER LEVEL
		WM	WATER MAIN



VICINITY MAP

UTILITY PROVIDERS

CABLE TV: . . . . . CHARTER SPECTRUM
ELECTRIC: . . . . . NV ENERGY
GAS: . . . . . SOUTHWEST GAS
SEWER: . . . . . CARSON CITY PUBLIC WORKS
SOLID WASTE: . . . . . CAPITOL SANITATION
TELEPHONE: . . . . . A.T.&T.
WATER: . . . . . CARSON CITY PUBLIC WORKS

OWNER/DEVELOPER

STATE STREET DEVELOPMENT LLC
ATTN: MARK TURNER
508 N CURRY STREET
CARSON CITY, NV 89703
EMAIL: silveroakmark@me.com

CIVIL ENGINEER

MANHARD CONSULTING, L.T.D.
241 RIDGE ST., SUITE 400
RENO, NV 89521
CONTACT: DAVID KITCHEN
(775) 746-3500 PHONE
(775) 746-3520 FAX

LAND SURVEYOR

MANHARD CONSULTING, L.T.D.
241 RIDGE ST., SUITE 400
RENO, NV 89501
CONTACT: JERRY JUAREZ
(775) 746-3500 PHONE
(775) 746-3520 FAX

SOILS ENGINEER

RESOURCE CONCEPTS INC.
340 NORTH MINNESOTA STREET
CARSON CITY, NV 89703-4152
(775) 883-1600 PHONE
(775) 831-1656 FAX

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SHEET INDEX

PROJECT DATA

ASSESSOR'S PARCEL #: 009-125-12
TOTAL PROJECT AREA: . . . . . 2.75 ACRES
LOT AREA: . . . . . 1.43 ACRES - 52%
RIGHT-OF-WAY AREA: . . . . . 0.54 ACRES - 20%
PUBLIC COMMON AREA: . . . . . 0.78 ACRES - 28%
PRIVATE COMMON AREA (WITHIN LOT AREA): . . . . . 0.23 ACRES - 8%
TOTAL LOTS: 34
MIN. LOT SIZE: . . . . . 1,743 S.F.
MAX. LOT SIZE: . . . . . 1,936 S.F.
AVERAGE LOT SIZE: . . . . . 1,830 S.F.
EXISTING ZONING: . . . . . RC
EXISTING MASTER PLAN DESIGNATION: . . . . . MUE
PROPOSED DENSITY: . . . . . 12.36 UNITS/AC
FLOOD DESIGNATION: . . . . . ZONE X
MINIMUM REAR YARD AREA REQUIRED: . . . . . 250 S.F.
MINIMUM REAR YARD AREA PROVIDED: . . . . . 283 S.F.

BASIS OF BEARINGS

GRID NORTH, MODIFIED NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994 (NAD 83/94) DETERMINED USING REAL TIME KINEMATIC GPS (RTK GPS) OBSERVATIONS OF CARSON CITY CONTROL MONUMENTS CC036 AND CC069. COMBINED GRID TO GROUND FACTOR = 1.0002. ALL DISTANCES SHOWN HEREIN ARE GROUND VALUES.

BASIS OF ELEVATION

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), AS TAKEN FROM CARSON CITY CONTROL MONUMENT CC036, HAVING A PUBLISHED ELEVATION OF 4729.12 U.S. FEET. CC036 IS DESCRIBED AS A 2 INCH BRASS DISK STAMPED "CC036 2010" LOCATED ON THE WEST SIDE OF SILVER SAGE DRIVE, APPROXIMATELY 100 FEET NORTH OF THE INTERSECTION OF SILVER SAGE DRIVE AND HORIZON DRIVE.

LEGAL DESCRIPTION

A PARCEL OF LAND SITUATE WITHIN A PORTION OF THE SW QUARTER ($\frac{1}{4}$) OF SECTION TWENTY NINE (29) OF TOWNSHIP FIFTEEN (15) NORTH, RANGE TWENTY (20) EAST, MOUNT DIABLO MERIDIAN, COUNTY OF CARSON CITY, STATE OF NEVADA.

ENGINEER'S STATEMENT

I, DAVID M. KITCHEN, DO HEREBY CERTIFY THAT THIS MAP HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION AND WAS COMPLETED ON THIS 10TH DAY OF FEBRUARY, 2020.

PROFESSIONAL ENGINEER - STATE OF NEVADA
DAVID M. KITCHEN
Exp: 06-30-21
CIVIL
No. 14487
2/10/20

DAVID M. KITCHEN P.E.#14487

DATE | REVISIONS | DRAWN BY | CHECK BY

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SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
TITLE SHEET

PROJ. MGR.: DMK
PROJ. ASSOC.: TJS
DRAWN BY: TJS
DATE: 1/15/20
SCALE: AS SHOWN

SHEET 1 OF 5

LILCCNV02

PENDING AGENCY APPROVAL

HATCH LEGEND

AC PAVEMENT

PCC

SITE LEGEND

EXISTING

PROPOSED

STREET SIGN

STREET LIGHT

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

N

APN: 009-125-16
GREATER NEVADA CREDIT UNION
LAND USE: MUE
ZONING: RC

APN: 009-125-21
CARSON CITY PROPERTY LLC
LAND USE: MUE
ZONING: RC

APN: 009-124-03
JJ SUMMERS LLC
LAND USE: MDR
ZONING: SF1A

APN: 009-171-01
HAYDEN FRENCH TRUST 3/23/15
LAND USE: MUR
ZONING: SF1A

APN: 009-172-01
WHIPPLE BRENT R & SHERREAN

DUBLIN STREET

CLEARVIEW DRIVE
EXISTING/PUBLIC

LIMERICK COURT

GALWAY COURT

SILVER SAGE DRIVE
EXISTING/PUBLIC

COMMON AREA A [1875 SF]
COMMON AREA B [1416 SF]
COMMON AREA C [2387 SF]
COMMON AREA D [4946 SF]
COMMON AREA E [1989 SF]
COMMON AREA F [3726 SF]
COMMON AREA G [17639 SF]

POND

ADA

FENCE (TYP.)

5.0' PROPOSED P.U.E.

10.0' UNDERGROND P.U.E.

10.0' PROPOSED P.U.E.

30.0' PROPOSED P.U.E.

13.5' POWERLINE EASEMENT

EXISTING CURB AND GUTTER

PROPOSED SIDEWALK ADJACENT TO BACK OF EXISTING CURB.

"SHARE THE ROAD" SIGN.

EMERGENCY ACCESS GATE

RELOCATE EXISTING SPEED LIMIT SIGN.

ADDITIONAL RIGHT OF WAY FOR EXISTING PUBLIC STREETS

TYPICAL LOT

PROPERTY LINE (TYP.)

REAR OF HOME

FACE OF GARAGE

FACE OF HOME

0' SETBACK ON ATTACHED LOTS

RIGHT OF WAY (ROW)

30' ROW

STREET

30' R.O.W. LOCAL STREETS
NTS

R.O.W. 30.0' RIGHT OF WAY R.O.W.
12.5' 17.5'
DWY 11.0' 22.0' FFC TO FFC 11.0' S/W DWY
20'-4"± 1.17' 2% MIN. 3" MIN. AC SURFACE 2% MIN. 1.17' 5.0' 2% MIN. 20'-4"±
0.5% MIN. 14.0% MAX. 0.5% MIN. 14.0% MAX.
8" MIN. TYPE 2, CLASS B, AGGREGATE BASE WITH 95% COMPACTION (TYPICAL)
TYPE II CURB & GUTTER
P.C.C. SIDEWALK
W SS SD
7.0'-8.0' 3.0' 4.0'-5.0'

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NO.	REVISION	DRAWN BY	CHECK BY	DATE

SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
SITE PLAN

PENDING AGENCY APPROVAL

PROFESSIONAL ENGINEER - STATE OF NEVADA
DAVID M. KITCHEN
Exp: 06-30-21
CIVIL
No. 14487
2/10/20

PROJ. MGR.:	DMK
PROJ. ASSOC.:	TJS
DRAWN BY:	TJS
DATE:	1/15/20
SCALE:	1"=20'

SHEET 2 OF 5

LILCCNV02

February 10, 2020 - 12:29 Dwg Name: P:\Lilcnv02\dwg\Eng\Final Drawings\Plan Set\Tentative Map\3-Site Plan.dwg Updated By: tsuleski

HATCH LEGEND

AC PAVEMENT

PCC

EXISTING

UTILITY LEGEND

STORM SEWER
SANITARY SEWER MAIN
WATER MAIN
GAS
CABLE TELEVISION
OVERHEAD POWER LINE
SANITARY MANHOLE
STORM MANHOLE
TYPE 4-R CATCH BASIN
TYPE 3-R CATCH BASIN

PROPOSED

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

N

NOTE:
ALL STORM DRAIN FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED.

APN: 009-125-16
GREATER NEVADA CREDIT UNION

APN: 009-125-21
CARSON CITY PROPERTY LLC

APN: 009-124-03
JJ SUMMERS LLC

APN: 009-171-01
HAYDEN FRENCH TRUST 3/23/15

APN: 009-172-01
WHIPPLE BRENT R & SHERREAN

DUBLIN STREET

LIMERICK COURT

GALWAY COURT

SILVER SAGE DRIVE
EXISTING/PUBLIC

CLEARVIEW DRIVE
EXISTING/PUBLIC

POND

IRRIGATION METER AND BACKFLOW

SAMPLING STATION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

8"SS

12"SD

DRAWN BY | CHECK BY

REVISION

DATE

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SILVER VIEW TOWNHOMES

CARSON CITY, NEVADA

UTILITY PLAN

PROFESSIONAL ENGINEER STATE OF NEVADA
DAVID M. KITCHEN
Exp: 06-30-21
CIVIL
No. 14487
2/10/20

PROJ. MGR.:	DMK
PROJ. ASSOC.:	TJS
DRAWN BY:	TJS
DATE:	1/15/20
SCALE:	1"=20'

SHEET 3 OF 5

LILCCNV02

PENDING AGENCY APPROVAL

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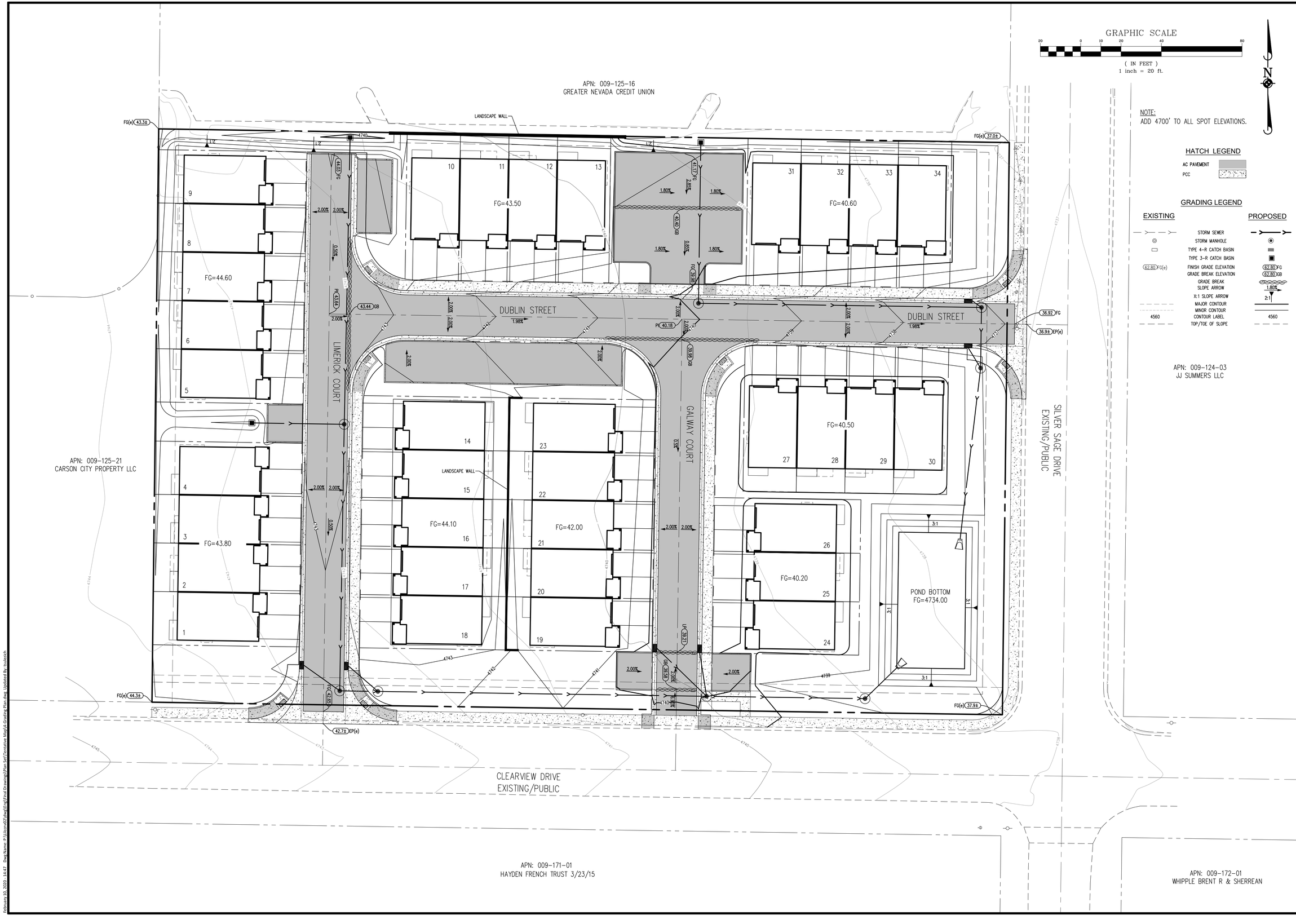

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DRAWN BY | CHECK BY
REVISION
DATE

SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
GRADING PLAN

PENDING AGENCY APPROVAL

PROFESSIONAL ENGINEER - STATE OF NEVADA
DAVID M. KITCHEN
Exp: 06-30-21
CIVIL
No. 14487
2/10/20

PROJ. MGR.:	DMK
PROJ. ASSOC.:	TJS
DRAWN BY:	TJS
DATE:	1/15/20
SCALE:	1"=20'

SHEET 4 OF 5

LILCCNV02

February 10, 2020 - 14:47 Dwg Name: P:\Lilcnv02\dwg\Eng\Final Drawings\Plan Set\Tentative Map\4 Grading Plan.dwg Updated By: tcuteich

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

N

APN: 009-125-16
GREATER NEVADA CREDIT UNION

APN: 009-125-21
CARSON CITY PROPERTY LLC

APN: 009-124-03
JJ SUMMERS LLC

APN: 009-171-01
HAYDEN FRENCH TRUST 3/23/15

APN: 009-172-01
WHIPPLE BRENT R & SHERREAN

DUBLIN STREET

DUBLIN STREET

LIMERICK COURT

GALWAY COURT

SILVER SAGE DRIVE
EXISTING/PUBLIC

CLEARVIEW DRIVE
EXISTING/PUBLIC

POND

INLET PROTECTION

INLET PROTECTION

INLET PROTECTION

INLET PROTECTION

INLET PROTECTION

CONSTRUCTION ENTRANCE

CONCRETE WASHOUT AREA

CONSTRUCTION ENTRANCE

INLET PROTECTION

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.

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, 50' 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

RIPRAP CLASS 150

DRAWN BY | CHECK BY
REVISION
DATE

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SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
EROSION CONTROL

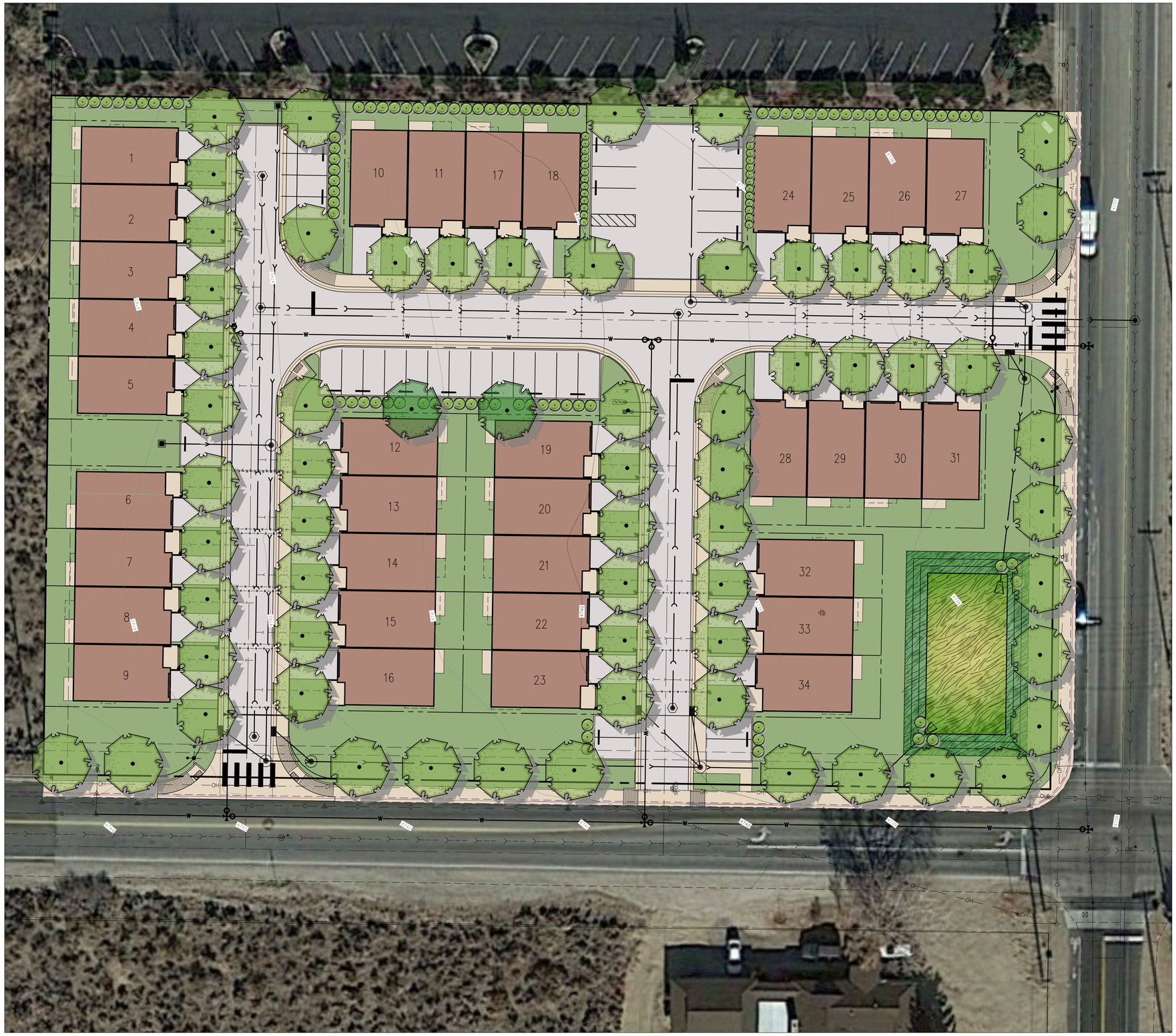
PROFESSIONAL ENGINEER - STATE OF NEVADA
DAVID M. KITCHEN
Exp: 06-30-21
CIVIL
No. 14481
2/10/20

PROJ. MGR.:	DMK
PROJ. ASSOC.:	TJS
DRAWN BY:	TJS
DATE:	1/15/20
SCALE:	1"=20'

SHEET
5 OF 5
LILCCNV02

PENDING AGENCY APPROVAL

February 10, 2020 - 10:15 Dwg Name: P:\Lilcon\02\dwg\Eng\Final Drawings\Plan Set\Tentative Map\5-Erosion Control Plan.dwg Updated By: tjsilezh



Carson City Required Landscaping

OPEN SPACE DATA

Per CCMC Section 18.1.18.6 (c)
Required: A minimum of 250 sq. ft. of open space must be provided for each unit, either as private open space or common open space.

POLLINATOR PLANT MATERIAL
Requirement: 50% of the plant material is to be specified as Pollinator friendly plant material

LANDSCAPE DATA

TOTAL SITE AREA: 2.75 acres

OPEN SPACE AREA

Open Space Required: 250 sq. ft. of Open Space per Unit
34 Units x 250 sq. ft. = 8,500 sq. ft.

Private Open Space Provided:
+/- 10,019 sq. ft. of Private Open Space Proposed

Common Open Space Provided:
+/- 33,977 sq. ft.

TOTAL OPEN SPACE PROVIDED: +/- 43,996 sq. ft.

LANDSCAPE DATA

Site Area =	119,790 sf
Building Lot Area =	62,726 sf
Impervious Surface Area =	79,625 sf

Landscape Area Required = 15,925 sf (20%)
(20% OF IMPERVIOUS SURFACE AREA)

Landscape Area Provided = 43,996 sf
- 10,019 sf Private Open Space
- 33,977 sf Common Open Space

TOTAL TREES REQUIRED = 40
(1 / 400 SF REQUIRED LANDSCAPE AREA)

TREES PROVIDED = 65 (INCLUDING PARKING & STREET)

PARKING AREA TREES REQUIRED= 3
(1 TREE PER 10 PARKING SPACES REQUIRED, 32 SPACES TOTAL)

PARKING AREA TREES PROVIDED = 2 (Additional Street Trees Provided)

STREET TREES REQUIRED = 58 (1748= 2,156 lf - 408 lf drives)
(1 TREE PER 30 LF FRONTAGE)

STREET TREES PROVIDED = 63

SHRUBS REQUIRED = 240 (40x6)
(6 SHRUBS PER TREE)

SHRUBS PROVIDED = 250 (4 shrubs per unit provided in building lot landscaping, 136 Shrubs Total)

Note: Building Lot Landscaping to be determined by contractor and must meet minimum number of shrubs as noted above.

CONCEPT PLANT SCHEDULE

STREET TREE -	63
PARKING LOT TREE -	2
SHRUB -	114

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

NORTH

DATE | REVISIONS | DRAWN BY | CHECK BY

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SILVER VIEW TOWNHOMES
CARSON CITY, NEVADA
PRELIMINARY LANDSCAPE PLAN

REGISTERED LANDSCAPE ARCHITECT
James Matthew Newton
993
Expires 06/30/19
STATE OF NEVADA

PROJ. MGR.:	KED
PROJ. ASSOC.:	MN
DRAWN BY:	JBD
DATE:	6-18-19
SCALE:	1"=60'

SHEET L1 OF L1
BHOCCNV01