THE VILLAGE BELOW GRADE GARAGES

DAN LUSTER

BELOW GRADE GARAGES

- Proposal to build below grade garages
- Per the approved master plan agreement, the developer may petition the City Council for the ability to build below grade garages for the residential units
- Staff has concerns about below grade parking because of the initial geotechnical report on the property that was submitted to the City
  - In the report, two of the test pits encountered ground water at a relatively shallow depth
  - If the water table were to rise and floods the garages, then parking becomes a major issue

PLAN TO ADDRESS ISSUES

- The developer would hire CMT Engineering, the firm that created the first reports, to study the issue further.
- Midway would hire (paid for by the developer) Loughlin Water Associates, LLC to review the multiple reports produced by CMT Engineering that were submitted by the developer and would include their findings and recommendations.
- A French drain system and pumps would be installed around buildings with subgrade garages to pump the water to a Midway Irrigation Company Ditch that crosses the property.

REASONS WHY DEVELOPER WOULD LIKE BELOW GRADE PARKING

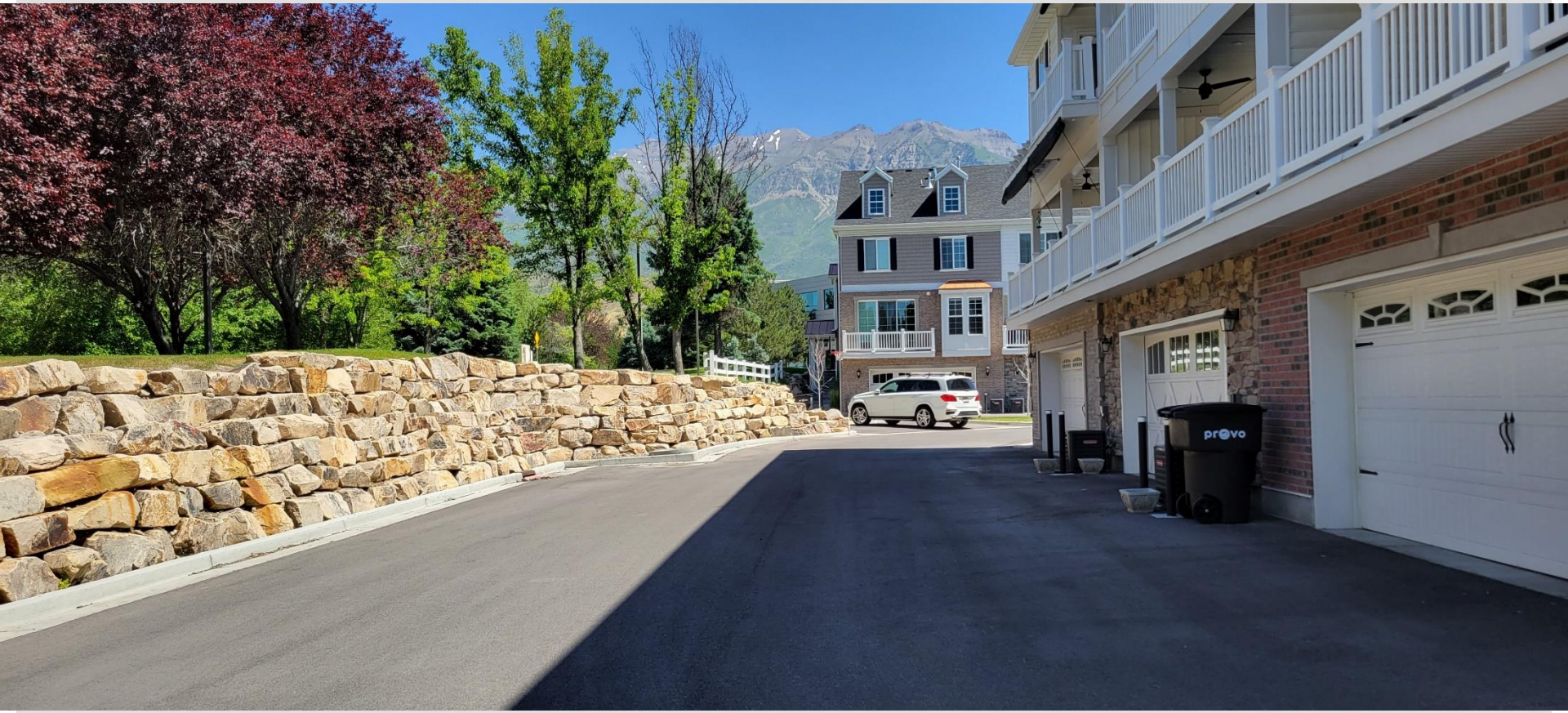
- The residences will have more living area on the ground floor which will make them more livable and more marketable.
- The buildings will be better designed which will greatly impact the streetscape and the overall character of the neighborhood.
- The value of the units will be greater.

REASONS WHY DEVELOPER WOULD LIKE BELOW GRADE PARKING

- The buildings will be better designed which will greatly impact the streetscape and the overall character of the neighborhood.
- There will be more garage area for parking and storage which will help make it possible that surface street parking will be minimal.

RIVERWOODS, PROVO

RIVERWOODS



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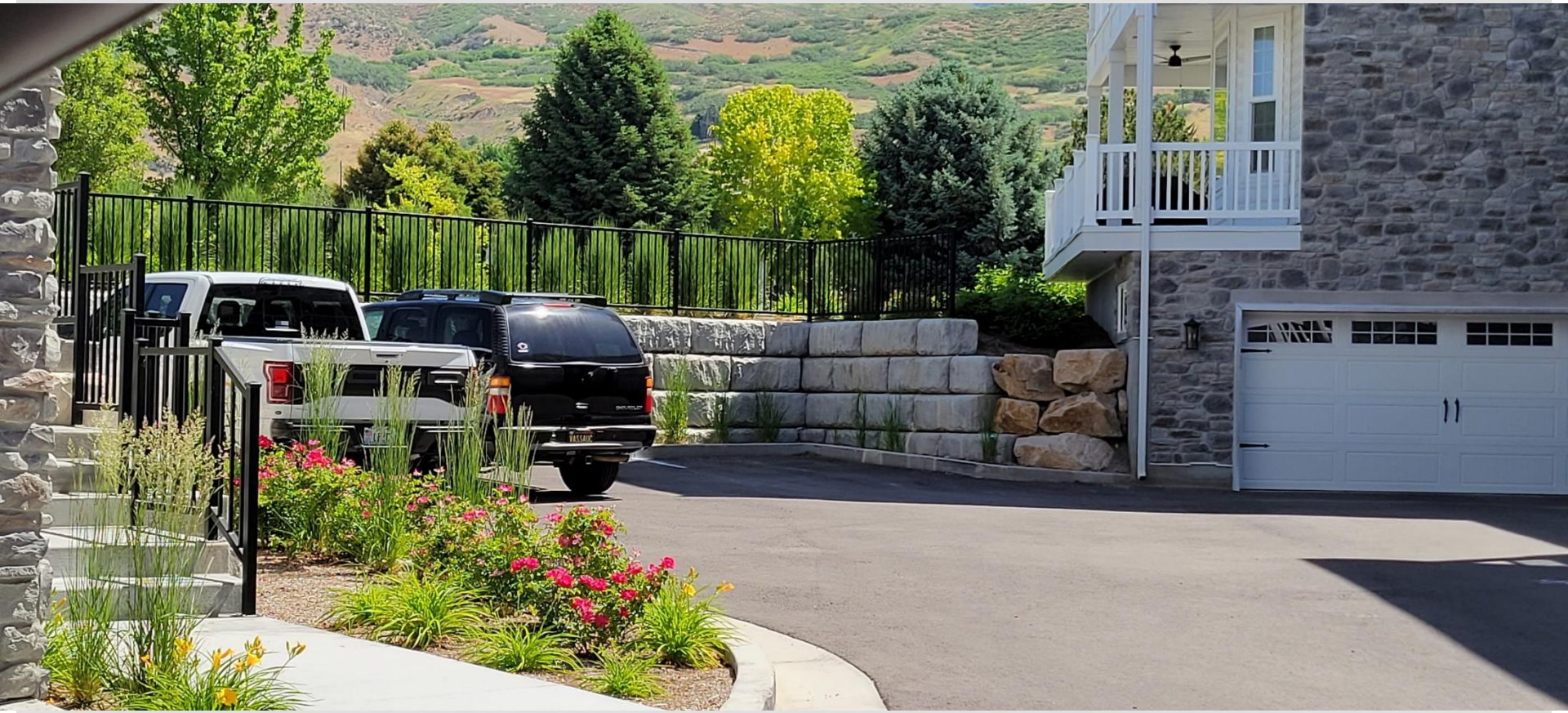

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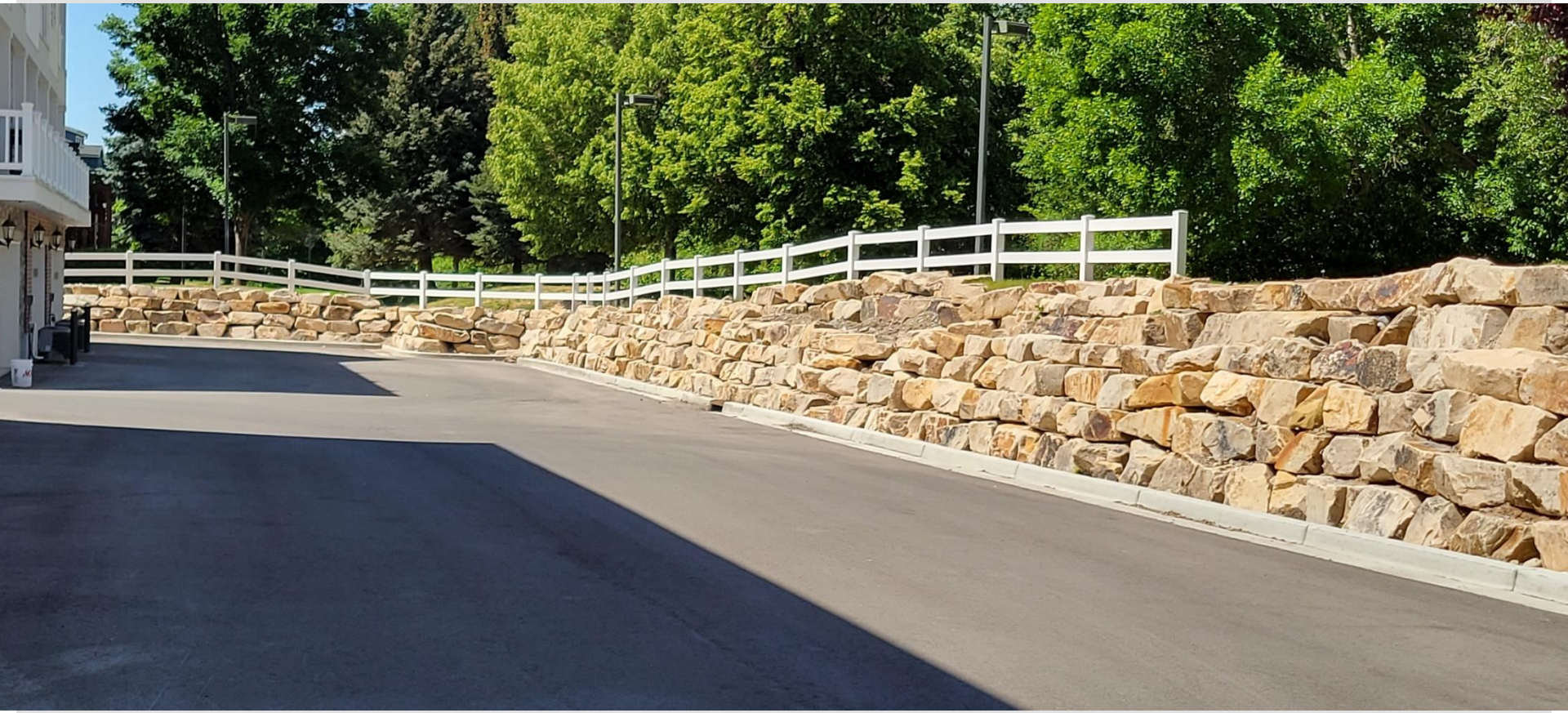

RIVERWOODS

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RIVERWOODS

SUBMITTED REPORTS

- Geotechnical Report 2017a
- Geotechnical Report 2017b
- Geotechnical Report 2021a
- Geotechnical Report 2021b (Summary of the December 2017 report and the March 2021 Village report)
- Geotechnical Report and Letter 2022a
- Geotechnical Letter 2022b

LOUGHLIN WATER ASSOCIATES, LLC RECOMMENDATION

- The Village does not appear to have shallow groundwater. However, that does not mean that conditions could not change in the future. Shallow groundwater elevations west of The Village are higher in elevation (around 5,600 feet) than the site excavations (down to 5,555 feet), and irrigation return from the north and the west have the potential to impact soil moisture in the future. Additionally, return from forced irrigation and seepage from a proposed central surface water feature have the potential to impact subgrade structures. We assume that the current irrigation will be maintained but contained in a pipe during and following the construction of The Village. The design criteria of 30 gpm recommended by CMT (2022b) for subdrains is based on aquifer testing of a nearby well and may not be applicable to flow into horizontal drains in areas of transient water occurrence.

LOUGHLIN WATER ASSOCIATES, LLC RECOMMENDATION

It is not feasible to develop perimeter foundation subdrain system based on a transient (short term) occurrence of water in the slotted pipes. Therefore, we recommend that The Village:

- Engage a qualified geotechnical engineer or hydrogeologist to observe foundation and storm drain and sewer line excavations to the proposed invert elevations for the presence and quantity of shallow groundwater during the first phase of development.

- Include the installation of perimeter foundation subdrains with cleanouts to the lowest slab grade elevations below subgrade floors and garages. Final sizing of the subdrains can be based on the observations made during the initial excavation phase, but the initial design should be a minimum diameter of 4 inches.

POSSIBLE FINDINGS

- CMT Engineering concluded that the development does not appear to have shallow groundwater.
- Loughlin Water Associates, LLC concluded that the development does not appear to have shallow groundwater.
- If subgrade parking is allowed, the buildings will be better designed which will greatly impact the streetscape and the overall character of the neighborhood.
- If subgrade parking is allowed, there will be more garage area for parking and storage which will help make it possible that surface street parking will be minimal.

PROPOSED CONDITIONS

1. A qualified geotechnical engineer or hydrogeologist observes foundation and storm drain and sewer line excavations to the proposed invert elevations for the presence and quantity of shallow groundwater during the first phase of development.
2. Include the installation of perimeter foundation subdrains with cleanouts to the lowest slab grade elevations below subgrade floors and garages. Final sizing of the subdrains can be based on the observations made during the initial excavation phase, but the initial design should be a minimum diameter of four inches.
3. The retaining areas for the subgrade parking use landscaping rocks and fencing, very similar to the examples attached to this report, that are found at the Riverwoods in Provo.

What's Wrong w/ a Townhome

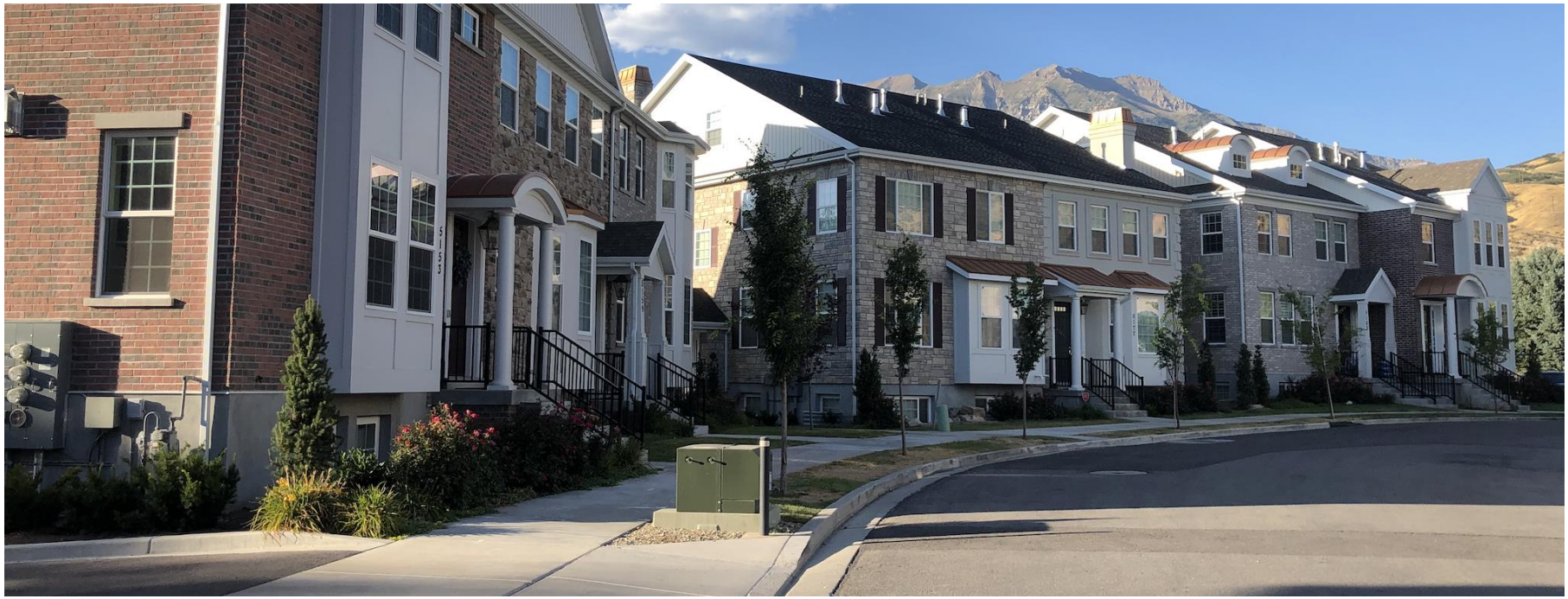
Three Key Townhome Issues

1)No Parking/Storage

2)Flat/Cheap Design

3)Treehouse

1. Parking: Below-Grade = No Cars on Street



1. Parking: Grade-Level = Cars in the Street/Sidewalk

2. Flat/Cheap Design: Grade-Level = Got to Maximize on two levels

2. Flat/Cheap Design: Grade-Level = Low Roof Pitch High Roof Eves

Treehouse: THE STAIRS

- Walk as little as possible
- Order groceries delivered
- Don’t invite grandma

Improving the Townhome: Parking is Everything

Problem	Solution	Benefit
• Living in a treehouse	Below Grade Parking	• Ground-level living
• Cars in the street		• 3-4 car garage
• No storage		• 3-4 car garage
• Flat/Boxy design		• 35-feet for design
• Cheap materials		• Luxury product/economics

Parking Below Grade: Visual Impact

Lower Parking Enables:

- “Cottage Design” (1.5 stories)
- Steep Roof Pitches
- “Walkability”—ground-level living

Parking Below Grade: Visual Impact

Standard Parking Forces:

- Urban design (**2.5-3** stories)
- Flat roof pitches/Flat facades
- More cars on the street

Parking Below Grade: Visual Impact

Parking Below Grade: Visual Impact

Parking Below Grade: Consultant(s) Reports

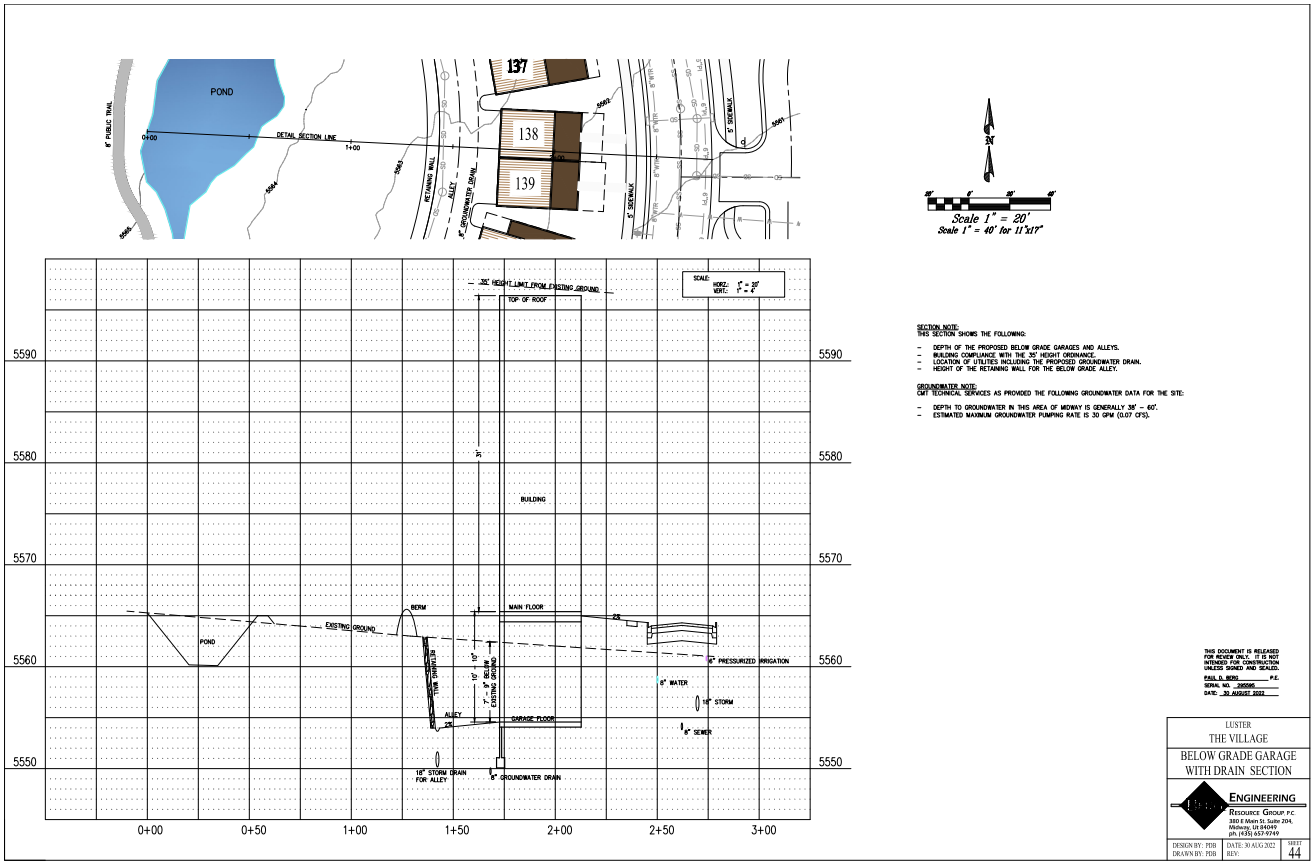
Loughlin Report 8/15/22

Therefore, we recommend that The Village:

- Engage a qualified geotechnical engineer or hydrogeologist to **observe foundation and storm drain and sewer line excavations** to the proposed invert elevations for the presence and quantity of shallow groundwater during the first phase of development.

- Include the **installation of perimeter foundation subdrains** with cleanouts to the lowest slab grade elevations below subgrade floors and garages. Final sizing of the subdrains can be based on the observations made during the initial excavation phase, but the initial design should be **a minimum diameter of 4 inches**.

Parking Below Grade: Engineering Design



SECTION NOTE:
THIS SECTION SHOWS THE FOLLOWING:

- DEPTH OF THE PROPOSED BELOW GRADE GARAGES AND ALLEYS.
- BUILDING COMPLIANCE WITH THE 35' HEIGHT ORDINANCE.
- LOCATION OF UTILITIES INCLUDING THE PROPOSED GROUNDWATER DRAIN.
- HEIGHT OF THE RETAINING WALL FOR THE BELOW GRADE ALLEY.

GROUNDWATER NOTE:
CMT TECHNICAL SERVICES AS PROVIDED THE FOLLOWING GROUNDWATER DATA FOR THE SITE:

- DEPTH TO GROUNDWATER IN THIS AREA OF MIDWAY IS GENERALLY 38' – 60'.
- ESTIMATED MAXIMUM GROUNDWATER PUMPING RATE IS 30 GPM (0.07 CFS).

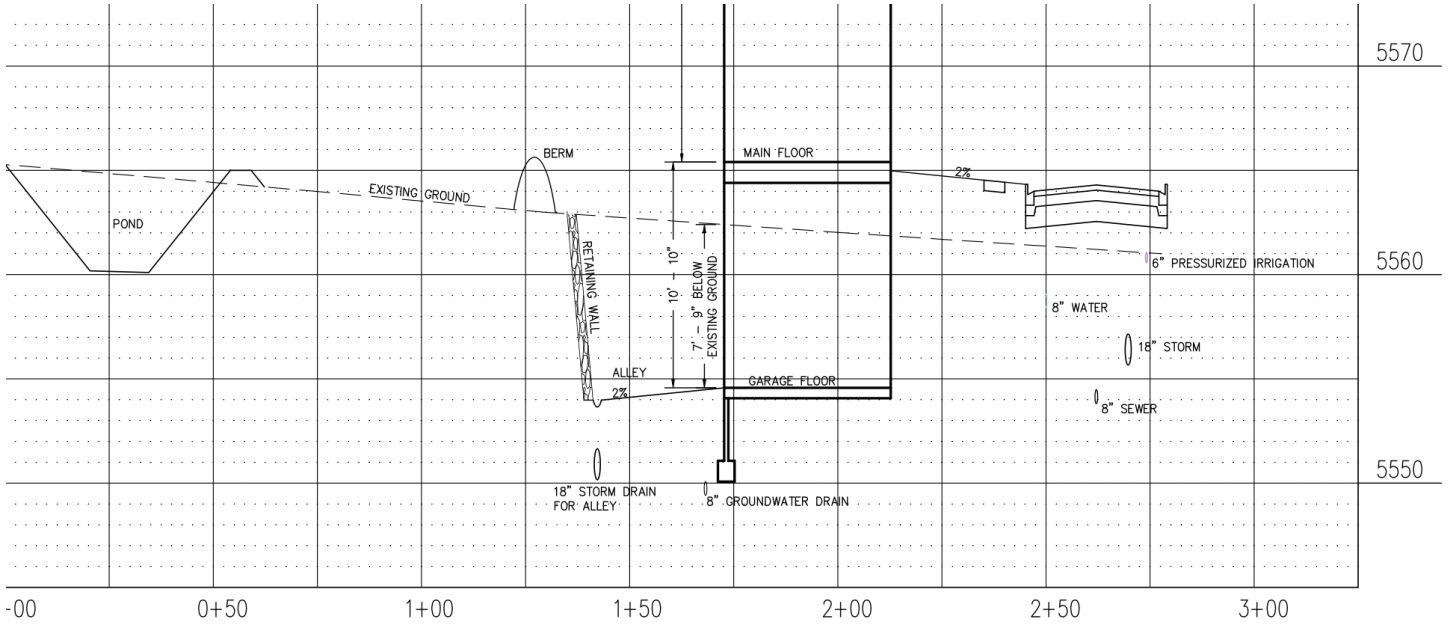
THIS DOCUMENT IS RELEASED FOR REVIEW ONLY. IT IS NOT FOR CONSTRUCTION OR BIDDING UNLESS SIGNED AND SEALED.
PAUL D. BERG, P.E.
SIGNAL NO. 395595
DATE: 30 AUGUST 2022

LUSTER
THE VILLAGE
BELOW GRADE GARAGE WITH DRAIN SECTION

ENGINEERING
RESOURCE GROUP P.C.
360 E Main St. Suite 204,
Midway, UT 84049
ph. (435) 657-9749

DESIGN BY: PDB
DRAWN BY: PDB
DATE: 30 AUG 2022
REV:
SHEET 44

Parking Below Grade: Engineering Design



Parking Below Grade: Practical Solution

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