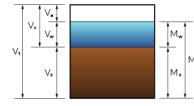


Lorenzen Soil Mechanics, Inc.

2720 Palmer Street Unit C
Missoula, MT 59808
Phone (406) 830-0633



tlorenzen76@charter.net

November 26, 2023

Mr. Dave Aube
Cushing Terrell
306 Railroad Street Suite 104
Missoula, MT 59802

RE: Hillview Subdivision Responses to Hillview Subdivision & Annexation – 1st Sufficiency Review

Dear Dave;

This letter report serves as responses to comments made by the City of Missoula in their October 5th, 2023 1st Sufficiency Review. Their comments and Lorenzen Soil Mechanics' (LSM) responses follow:

1. The road section in the report is for residential streets. Provide additional sections for collector street, or use standard found in MCPWSS.

LSM recommends the connector street typical sections be:

Asphalt Plant Mix	3 inches
3/4-inch Minus Crushed Base Course	4 inches
3-inch Minus Crushed Subbase Course	12 inches
Scarified and Wetted Subgrade	6 inches

This section will provide a structural number of 3.23. Given the other input values being the same as for the initial pavement design analysis for the local streets, this typical section will support a loading of 5,000,000 ESALs.

Prepare the typical section by:

1. Scarifying the granular subgrade to at least 6 inches and wetting.
2. Compacting the scarified and wetted subgrade to a standard relative compaction (ASTM D698) of at least 98 percent.
3. Providing a 3-inch minus crushed subbase course meeting the gradation in the following table:

3-inch Minus Crushed Subbase

Sieve Size	Percent Passing
3"	100
1"	80 - 100
1/2"	60 - 75
No. 4	35 - 55
No. 40	5 - 30
No. 200	0 - 8

4. Placing the 3-inch minus crushed subbase in 8-inch (maximum) loose lifts and compacting each lift to a standard relative compaction of at least 98 percent.
5. Providing a 3/4-inch base course meeting the gradation in the following table:

3/4" Crushed Base Course

Sieve Size	Percent Passing
3/4"	90 - 100
3/8"	70 - 90
No. 4	40 - 70
No. 10	25 - 55
No. 200	2 - 8

6. Placing the 3/4-inch minus crushed base and compacting it to a standard relative compaction of at least 98 percent.
7. Providing a performance graded PG 58-28 binder for the asphalt concrete and the plant mix surfacing aggregate meeting the Montana Public Works' gradation presented in the following table:

Plant Mix Surfacing

Sieve Size	% Passing Job Mix Target Bands	Job Mix Tolerances
3/4"	100	---
1/2"	83 - 93	+/- 7
3/8"	73 - 87	+/- 7
No. 4	47 - 63	+/- 6
No. 10	32 - 43	+/- 6
No. 40	15 - 25	+/- 5
No. 200	5 - 7	+/- 2

8. Placing the asphalt concrete plant mix surfacing in a two 2-inch thick lifts and compacting each lift to an average relative compaction (ASTM D2041) of at least 93 percent, and no individual sample being less than 92 percent.

2. Report recommends foundations on subgrade. Provided recommendations for those areas that will be fill.

In general, the native subgrades across the site are of A-1 or A-2 AASHTO classifications. It stands to reason that the fill soils will be spoils that are also A-1 or A-2. LSM recommends the top 2 feet of fill soils meet the classifications for A-1 or A-2 soils. The recommended typical sections will be constructed over the top 2 feet of A-1 or A-2 soils.

3. Provide a final grade section across Lots 66 and 36 and across Rimel Road. Show building area given the slope set-backs of building code.

Final grading across Lots 66 and 36 may, or may not, include retaining walls. This may be the case for each of the residential lots. The City's residential code states the setbacks of buildings adjacent to descending slopes are to be the smaller of either 40 feet or one-third the height of the descending slope. For an ascending slope, the setback is the smaller of either 15 feet or one-half the height of the ascending slope. A geotechnical review of the site may modify the setback requirements. At this time, LSM recommends showing the setbacks based on the City's residential code. If

necessary, LSM can review the site at the time of its development to assess if modifications can be made.

The Missoula Public Works Manual allows a maximum vertical grade of 6 percent for Collector streets. The maximum grade along the Local A roadway at Rimel Road is 5.6 percent. From a geotechnical viewpoint for the soils in this area, LSM believes the materials are stable. They are mapped as being Eocene through Miocene epochs Gravel and Clay and tend to be stable in cut sections.

This concludes LSM's responses to the City's three comments. If you have any questions regarding this letter report, please contact me at 406-830-0633.

Sincerely,
Lorenzen Soil Mechanics, Inc.

A handwritten signature of Todd A. Lorenzen in black ink.

Todd A. Lorenzen

PROFESSIONAL ENGINEER
LICENSED
PEL-PE-LIC-10067

November 26, 2023

Todd Lorenzen, P.E.
Geotechnical Engineer