

SITE-SPECIFIC INVESTIGATION REPORT
VISTA DRIVE AND GRAND AVENUE PROPERTY
LARAMIE, WYOMING

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SUBMITTED BY: Trihydro Corporation

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1.0 INTRODUCTION

The City of Laramie (City) owns the corner property located at the western corner of Grand Avenue and Vista Drive in Laramie, Wyoming. The property is located in the western half of the northwest quarter of Section 1, Township 15 North, Range 73 West. The property lies within the boundaries of the Casper Aquifer Protection Overlay Zone (APO Zone) described in the *Casper Aquifer Protection Plan (CAPP)*, which was approved by the City of Laramie on June 3, 2008. This site-specific investigation (SSI) report addresses the planned development in accordance with the requirements of Section 15.08.040.A of the Laramie Unified Development Code (UDC). The City does not currently have plans to develop the property, though additional landscaping may be possible in the future.

This investigation report was prepared by a professional geologist (required by Section 15.08.040.A.8.a) on behalf of the City. The report identifies potential groundwater impacts from the proposed development (required by Section 15.08.040.A.8.b) and describes existing conditions, proposed activities, and applicable stormwater management techniques (required by Section 15.08.040.A.8.c).

2.0 SITE-SPECIFIC INVESTIGATION DATA

Information required in the site-specific investigation is presented in the Laramie UDC, Section 15.08.040.A. The results from the site-specific investigation are presented below by the code citation, followed by the applicable investigation data or response.

1. A literature search to determine the presence of mapped faults, folds, fractures, and other evidence of conduit flow on the subject property: In conducting the literature search for this site-specific investigation, references reviewed/consulted include the following:

- Geologic maps of the area (Ver Ploeg 2009)
- City of Laramie GIS maps

During the literature search, one fault and one unnamed intermittent drainage were identified to be in the vicinity of the property – the Quarry fault, and an unnamed drainage. The fault is an east-west trending normal fault, with the southern side being the downthrown side of the fault. The unnamed drainage is located north of the site, across Grand Avenue. The location of the fault and drainage, as mapped by Ver Ploeg (2009) in relation to the subject property, are shown on Figure 1. Both features are located more than 100 feet from the subject property.

2. A Site narrative that includes historical information on previous land use, contaminant releases, abandoned wells, underground storage tanks, and septic systems as well as any other information relevant to the site: The subject property is currently owned by the City and zoned B2 – General Business. The property is currently undeveloped except for landscaping and several utilities. An above-ground power line crosses through the property from north to south. Also, a stormwater drainage is located along the northern boundary of the property. Photographs of the subject property are presented in Appendix A.

Based on a review of the Wyoming Department of Environmental Quality, Solid and Hazardous Waste Online database, a record of previous contaminant releases at the subject property was not identified.

3. A site plan showing the proposed use and zoning of the property including existing and proposed ground contours accurate to a two-foot interval as referenced to the USGS contour map for the area or other specified elevation standard as required by the City, and for a distance of at least five hundred feet beyond any proposed development activity, existing and proposed structures, parking areas, driveways, landscaping areas, setbacks, surface and subsurface drainage facilities, potential contaminant storage locations and methods of storage, above ground storage tanks, best management practices, utilities, roads, storm water management, and a vicinity map. Where necessary, specific construction details shall be provided to assure adequacy to accept design standards: A preliminary site plan for development is not presented as there are no plans to develop this property at this time.

4. Identification of potential contaminants and amounts stored, generated, or handled on the subject property:
Development of the site is not expected to involve more than landscaping and beautification work. Landscaping of the area may introduce contaminants in the form of fertilizers, herbicides, and pesticides. Per Section 15.08.040.A.6 (Prohibited Activities) of the Laramie UDC, developments requiring the application of certain types and quantities of pesticides, herbicides, and fertilizers are prohibited activities in the APO Zone. Herbicides and pesticides applied to landscaping must become non-hazardous within 48 hours of application. Additionally, fertilizer must be applied in quantities less than or equal to the agronomic uptake rate of the vegetation fertilized.

5. A field inspection shall be conducted to verify the presence or absence of vulnerable features as defined in Section 15.08.040.A. A summary of the field inspection shall include a written report, maps identifying vulnerable features, and the distance and direction of the nearest well and vulnerable feature. Where subsurface wastewater disposal is proposed, the investigator shall conduct deep pit soil analysis to a depth at least five feet below the proposed bottom of the leaching system to establish that there are no obstructions such as bedrock, water table or other forms of refusal that could interfere with the proper functioning of the wastewater disposal system: A field inspection of the subject property was conducted on April 29, 2015, for the purpose of identifying site features, identifying current land use, and gathering information to be included in this SSI report. Photographs of the site are presented in Appendix A. As reported above, a stormwater drainage channel is located along the northern boundary of the property. Water is conveyed via the drainage channel to the northwest along the south side of Grand Avenue.

The nearest well to the subject property is the Vista and Grand Monitoring Well (Triangle Well, Wyoming State Engineer's Office (WSEO) Permit Number U.W. P203337W). This well was drilled as part of Phase II of the Laramie Monitor Well Project (Hinckley 2015). The location of the well on the subject property is shown on Figure 1.

There is no subsurface wastewater disposal proposed for the property. Therefore, deep pit soil analysis was not conducted for this SSI.

6. A map showing the area and types of exposed bedrock, marshes, perennial drainages, intermittent drainages, ephemeral drainages, creeks, and other bodies of water on the subject property: Figure 1 shows the location of exposed bedrock surrounding the property. The extreme southern corner of the property is covered by Quaternary terrace deposits with the majority of the site being covered by alluvium and colluvium deposits. Satanka Shale is exposed to the north of the property. Based on lithology data obtained during the drilling of the Triangle Well, the thickness of the Satanka Shale underlying the property is approximately 23 feet with 6 feet of alluvium over top the Satanka Shale.

The nearest mapped intermittent drainage is located approximately 200 feet north of the property. This drainage receives stormwater from a large drainage basin and has the possibility of conveying large volumes of runoff near the property.

7. Where the 100-year flood plain mapping is unavailable, the professional geologist and/or engineer will calculate the 100-year floodplain for the drainage. The flood plain mapping will be provided on a site map with a scale not to exceed 1 inch equals 200 feet: Based on data from the Federal Emergency Management Agency (FEMA) Flood Plain mapping, effective October 16, 1996, the subject property is located outside of the 100-year flood plain. The FEMA mapping also indicates that the property is located outside the 500-year flood plain as well. The portion of the 1996 flood plain map showing the property is included as Appendix B.
8. An evaluation of the water supply and sewage system that includes the potential effects or risks of the system to the Casper Aquifer and its recharge area and the adequacy and safety of the systems. Items such as floor drains and plumbing schematics and the locations of potential contaminants, waste storage, and liquid transfer area locations shall be provided: Development (landscaping) on this property will likely not require sanitary sewer and water utilities, and, therefore, will not necessitate individual septic systems or water supply wells.
9. A map(s) depicting the potentiometric surface of the Casper Aquifer at the subject property using data from historical water level measurements and published potentiometric surface maps. No new wells shall be drilled for the purpose of determining the potentiometric surface: The potentiometric surface map of the Casper Aquifer is shown on Figure 1. The potentiometric surface was generated based upon the water-level data gathered from the Laramie Water Management Study, Level II (Toboga 2006). The potentiometric surface indicates that groundwater at the subject property flows generally from southeast to northwest toward the City Springs and Turner Wellfield. As reported in Hinckley (2015), the depth to groundwater in the Triangle Well on May 20, 2015 was 53.54 feet below the top of the casing.
10. A surface water risk assessment and mitigation plan for any impacts caused by storm water runoff, retention and/or detention basins on the City water supply and the Casper Aquifer: Based on the limited space for business development at the site, the changes in infiltration of groundwater and stormwater runoff are expected to be negligible. Stormwater generated from the site could be conveyed to the curbs and gutters located in Vista Drive or directly to the drainage channel along the northern edge of the property.
11. A maintenance plan and agreement for any retention and/or detention basins and associated improvements will be required. Such plan and agreements shall be recorded in the Albany County Clerk's Office: Retention, detention or other new stormwater management facilities are not proposed to be constructed in association with this property.
12. A groundwater risk assessment and mitigation plan to respond to any evidence of contamination or vulnerability which is the result of the development. Such plan shall not limit the liability of any person for impacts to the

Casper Aquifer: Possible development at the subject property is limited to additional landscaping. This type of development presents a low risk of contamination to the Casper Aquifer. During Phase II of the Monitor Well Project, the Triangle Well, located on the property, was drilled with steel surface casing and an open hole completion. If left as is, the well could be considered a risk as a possible conduit for contaminant infiltration to the aquifer. The Hinckley (2015) report recommends completing the well with casing and a grout seal from the ground surface to the top of the target interval (100 – 125 ft). Casing and sealing the well should prevent contaminant migration along the casing. Despite the shallow thickness of the Satanka Shale underlying the property, the risk of contamination to groundwater at the property is low. Therefore, a mitigation plan is not needed.

13. Demonstration of compliance with all applicable City Standards: During the design of the property, professional design services will be provided by architects and engineers registered in Wyoming. The design and construction plans will follow City of Laramie standard details. Plans and designs are subject to the City review process prior to approval.

3.0 SITE-SPECIFIC INVESTIGATION CONCLUSIONS

Development of the property on the western corner of Vista Drive and Grand Avenue and is not expected to occur at this time. Possible future development of the property (landscaping) may have prohibited uses as provided in Section 6 (17.82.060 - Prohibited Activity) of the UDC. However, with proper application of materials related to landscaping, the site likely poses a low risk to the Casper Aquifer. No vulnerable features were identified within 100 feet of the property. Based on these findings, the risk of contamination to the Casper Aquifer from development at the property is low.



4.0 REFERENCES

CAPP 2008, Casper Aquifer Protection Plan. City of Laramie, Wyoming.

City of Laramie/Albany County. Environmental Advisory Committee. 2006. Laramie Regional Drinking Water Protection Plan. An Aquifer Protection Plan for the City of Laramie, WY.

Federal Emergency Management Agency. 1996. Flood Insurance Rate Map – City of Laramie, Wyoming. Wyoming: Community Panel Number 560002 0005 D.

Hinckley Consulting and Wyoming Groundwater, LLC. 2015. Phase II – Laramie Monitor Well Project Report: Laramie, WY.

Toboga, Karl G. 2006. Laramie Water Management Study, Level II. Wyoming: Wyoming Water Development Commission Report.

Ver Ploeg, Alan J. 2009a. Geologic map of the Laramie quadrangle, Albany County, Wyoming: Wyoming State Geological Survey Map Series 50 (MS-50). Map scale 1:24,000. 1 sheet.

Weston Engineering. 2012. Wyoming State Bank addition site specific geologic and hydrogeologic investigation report: Laramie, WY.

FIGURES

APPENDIX A

FIELD INSPECTION PHOTOGRAPHS

APPENDIX B

LARAMIE FLOOD MAP