Work Session Meeting Agenda
2 Park Drive South, Great Falls, MT
Gibson Room, Civic Center
May 19, 2020
5:30 PM

UPDATES CONCERNING PROCESS OF MEETINGS

Due to the COVID-19 health concerns, the format of the City Commission work session will be held in a virtual video-conferencing environment. In order to honor the Right of Participation and the Right to Know (Article II, Sections 8 and 9 of the Montana Constitution), the City of Great Falls and City Commission are making every effort to meet the requirements of open meeting laws:

- City Commission members and City staff will attend the meeting via a remote location, using a virtual meeting method.
- The agenda packet material is available on the City's website: **https://greatfallsmt.net/meetings.** The Public may view and listen to the meeting on government access channel City-190, cable channel 190; or online at **https://greatfallsmt.net/livestream.**
- Public comment will be taken during the meeting as indicated on the agenda with an **asterisk**. Public participation is welcome in the following ways:
    - Attend in person. Refrain from attending in person if you are not feeling well. The City will require social distancing at the meeting, and may limit the number of persons in the Gibson Room according to applicable health guidelines.
    - Provide public comments via email. Comments may be sent via email before 5:00 PM on Tuesday, May 19, 2020, to: **commission@greatfallsmt.net**. Include the agenda item or agenda item number in the subject line, and include the name and address of the commenter. Written communication received by that time will be shared with the City Commission and appropriate City staff for consideration during the agenda item and will be so noted in the official record of the meeting.
    - Call-in. The public may call in during the public comment period at 406-761-4786. All callers will be in a queued system and are asked to remain on hold and be patient. Calls will be taken in the order in which they are received. Callers will be restricted to customary time limits. We ask for your patience in the event there are technical difficulties.

CALL TO ORDER

PUBLIC COMMENT

(Public comment on any matter and that is within the jurisdiction of the City Commission. Please keep your remarks to a maximum of five (5) minutes. Speak into the microphone, and state your name and address for the record.)

* Members of the public participating telephonically, please follow along with the City Commission meeting at https://greatfallsmt.net/livestream or on cable channel 190. The Mayor will announce Public Comment. At that time call 406-761-4786. You will be placed in a queue until the City Clerk or Mayor calls on you to speak, at which time your line will be unmuted and you will be able to address the City Commission for up to five minutes, first giving your name and address for the record. You will be able to hear the meeting through the phone, so you should continue to follow along online or on your television. When it is your turn to speak, please mute your online or television audio to avoid time-delayed background noise/feedback through the phone, and do not use speakerphone when commenting.

WORK SESSION ITEMS

1. Geo-Technical & Foundation Policies - Craig Raymond.

2. Aquatic and Community Center - Steve Herrig.

DISCUSSION POTENTIAL UPCOMING WORK SESSION TOPICS

ADJOURNMENT

City Commission Work Sessions are televised on cable channel 190 and streamed live at https://greatfallsmt.net. Work Session meetings are re-aired on cable channel 190 the following Thursday morning at 10 a.m. and the following Tuesday evening at 5:30 p.m.

UPCOMING MEETING SCHEDULE

Work Session - Tuesday June 2, 2020 5:30 p.m.

Commission Meeting - Tuesday June 2, 2020 7:00 p.m.

Geo-Technical & Foundation Policies

City Commission Work Session May 19, 2020

1

Soils

01 BACKGROUND

02 CURRENT POLICY & PROCEDURES

03 OPTIONS TO CONSIDER

2

3

Background

- Many areas within Great Falls contain what's known as "Fatty Clay Soils" or "Expansive Clay Soils"
- High Plasticity soils have microscopic mineral grains that are especially attractive to water
- Clay soils will expand when absorbing water (like a sponge) and shrink when dry
- Type and depth of soils is known to be inconsistent and can be highly variable from one test boring to another

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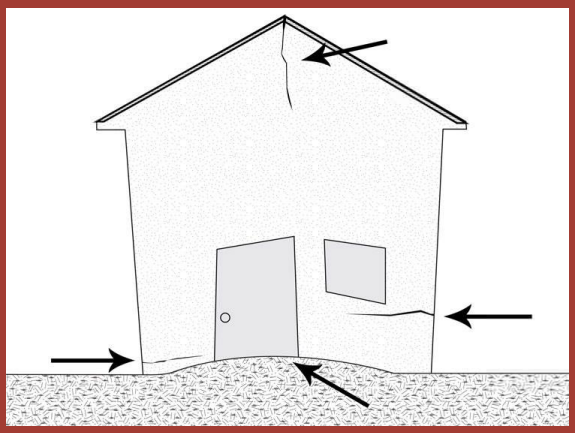
Background

- Unmitigated expansive or compressible soils can have damaging effects on any structure, such as:
  - Swelling and/or uneven floors
  - Inoperable doors and windows
  - Cracked foundation walls and slabs
  - Cracked sheetrock
- Repairs can cost tens of thousands and in some cases hundreds of thousands of dollars
- The City, several contactors and engineers have been named in numerous lawsuits over the years as a result of damaged structures



4

Current Policy & Procedures

- In 2008, as a result of lawsuits, City Staff drafted and published policy which required geo-technical testing, reports and recommendations for foundation/building design to limit differential movement to 1" maximum:
  - New Residential
  - New Commercial
  - Some additions and extensive repairs/replacement
- Typical commercial projects include on-site 3rd party inspection, monitoring and reports at specific milestones during construction
- On-site 3rd party inspection and monitoring not currently required on residential projects

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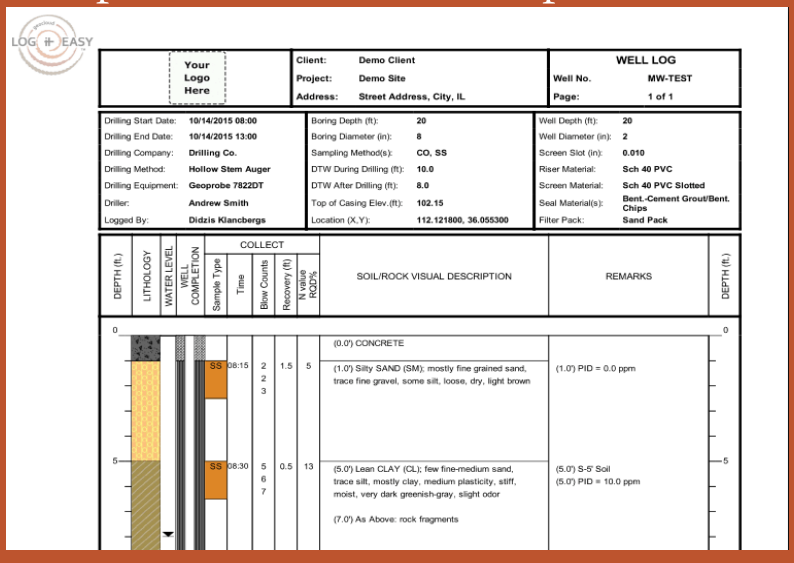
Sample Geo-Technical Report Format



Your Logo Here	Client: Demo Client	WELL LOG
	Project: Demo Site	Well No. MW-TEST
	Address: Street Address, City, IL	Page: 1 of 1

Drilling Start Date:	10/14/2015 08:00	Boring Depth (ft):	20	Well Depth (ft):	20
Drilling End Date:	10/14/2015 13:00	Boring Diameter (in):	8	Well Diameter (in):	2
Drilling Company:	Drilling Co.	Sampling Method(s):	CO, SS	Screen Slot (in):	0.010
Drilling Method:	Hollow Stem Auger	DTW During Drilling (ft):	10.0	Riser Material:	Sch 40 PVC
Drilling Equipment:	Geoprobe 7822DT	DTW After Drilling (ft):	8.0	Screen Material:	Sch 40 PVC Slotted
Driller:	Andrew Smith	Top of Casing Elev.(ft):	102.15	Seal Material(s):	Bent.-Cement Grout/Bent. Chips
Logged By:	Didzis Klancbergs	Location (X,Y):	112.121800, 36.055300	Filter Pack:	Sand Pack

DEPTH (ft.)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Time	COLLECT: Blow Counts	COLLECT: Recovery (ft)	COLLECT: Torque RQD%	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft.)
0									(0.0') CONCRETE		0
				SS	08:15	2 2 3	1.5	5	(1.0') Silty SAND (SM); mostly fine grained sand, trace fine gravel, some silt, loose, dry, light brown	(1.0') PID = 0.0 ppm	
5				SS	08:30	5 6 7	0.5	13	(5.0') Lean CLAY (CL); few fine-medium sand, trace silt, mostly clay, medium plasticity, stiff, moist, very dark greenish-gray, slight odor	(5.0') S-5' Soil (5.0') PID = 10.0 ppm	5
									(7.0') As Above: rock fragments		

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Current Policy & Procedures

- Lawsuits have continued, resulting in risk to:
  - Engineers
  - Contractors
  - Developers
  - Realtors
- Local engineers have largely stopped performing geo-technical evaluations and reports for residential projects unless under specific contracted terms
- Out of town firms may provide these services, but results in:
  - Additional cost
  - Extensive delays

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Policy Options to Consider

<u>Building Code/Site Investigation Emphasis Option:</u>

- Requires Geologic Hazards Plan & Report to:
  - Identify geologic conditions on the property and any potential hazards to or from adjacent properties
  - Determine acceptable level of risk
  - Identify mitigation measures if any are necessary
- Requires special inspection progress and final reports:
  - Important follow through and verification that those measures that were identified as necessary to mitigate poor geologic conditions are actually implemented
- Approximate cost increase of $1,500 to $7,500 per single family dwelling depending on structure built and site conditions

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Policy Options to Consider

Market Driven Risk Determination Option:

- Provide substantive notification of risks:
  - Official Code of the City of Great Falls
  - Permit Documents
  - Certificates of Occupancy
  - Recorded at County Clerk & Recorder's Office
- Place burden on permit applicant and subsequent owners to educate themselves and determine appetite for risk
- No requirement for geo-technical analysis to obtain permits
- Streamlines permit process

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Discussion

City Commission Work Session May 19, 2020

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CHAPTER 4

FOUNDATIONS

R401.4 Soil tests. Where quantifiable data created by accepted soil science methodologies indicate *expansive soils, compressible soils*, shifting soils or other questionable soil characteristics are likely to be present, the *building official* shall determine whether to require a soil test to determine the soil's characteristics at a particular location. This test shall be done by an *approved agency* using an *approved* method.

R401.4.1 Geotechnical evaluation. In lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1 shall be assumed.

TABLE R401.4.1
PRESUMPTIVE LOAD-BEARING VALUES OF FOUNDATION MATERIALS[a]

CLASS OF MATERIAL	LOAD-BEARING PRESSURE (pounds per square foot)
Crystalline bedrock	12,000
Sedimentary and foliated rock	4,000
Sandy gravel and/or gravel (GW and GP)	3,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000
Clay, sandy, silty clay, clayey silt, silt and sandy siltclay (CL, ML, MH and CH)	1,500[b]

For SI: 1 pound per square foot = 0.0479 kPa.

a. Where soil tests are required by Section R401.4, the allowable bearing capacities of the soil shall be part of the recommendations.

b. Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

R403.1.8 Foundations on expansive soils. Foundation and floor slabs for buildings located on *expansive soils* shall be designed in accordance with Section 1808.6 of the *International Building Code.*

Exception: Slab-on-ground and other foundation systems that have performed adequately in soil conditions similar to those encountered at the building site are permitted subject to the approval of the *building official.*

R403.1.8.1 Expansive soils classifications. Soils meeting all of the following provisions shall be considered to be expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity Index (PI) of 15 or greater, determined in accordance with ASTM D4318.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 μm), determined in accordance with ASTM D422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D422.
4. Expansion Index greater than 20, determined in accordance with ASTM D4829.

SECTION 1808
FOUNDATIONS

1808.1 General. Foundations shall be designed and constructed in accordance with Sections 1808.2 through 1808.9. Shallow foundations shall satisfy the requirements of Section 1809. Deep foundations shall satisfy the requirements of Section 1810.

1808.2 Design for capacity and settlement. Foundations shall be so designed that the allowable bearing capacity of the soil is not exceeded, and that differential settlement is minimized. Foundations in areas with expansive soils shall be designed in accordance with the provisions of Section 1808.6.

1808.6 Design for expansive soils. Foundations for buildings and structures founded on expansive soils shall be designed in accordance with Section 1808.6.1 or 1808.6.2.

Exception: Foundation design need not comply with Section 1808.6.1 or 1808.6.2 where one of the following conditions is satisfied:

1. The soil is removed in accordance with Section 1808.6.3.
2. The *building official* approves stabilization of the soil in accordance with Section 1808.6.4.

1808.6.1 Foundations. Foundations placed on or within the active zone of expansive soils shall be designed to resist differential volume changes and to prevent structural damage to the supported structure. Deflection and racking of the supported structure shall be limited to that which will not interfere with the usability and serviceability of the structure.

Foundations placed below where volume change occurs or below expansive soil shall comply with the following provisions:

1. Foundations extending into or penetrating expansive soils shall be designed to prevent uplift of the supported structure.
2. Foundations penetrating expansive soils shall be designed to resist forces exerted on the foundation due to soil volume changes or shall be isolated from the expansive soil.

1808.6.3 Removal of expansive soil. Where expansive soil is removed in lieu of designing foundations in accordance with Section 1808.6.1 or 1808.6.2, the soil shall be removed to a depth sufficient to ensure a constant moisture content in the remaining soil. Fill material shall not contain expansive soils and shall comply with Section 1804.5 or 1804.6.

Exception: Expansive soil need not be removed to the depth of constant moisture, provided that the confining pressure in the expansive soil created by the fill and supported structure exceeds the swell pressure.

1808.6.4 Stabilization. Where the active zone of expansive soils is stabilized in lieu of designing foundations in accordance with Section 1808.6.1 or 1808.6.2, the soil shall be stabilized by chemical, dewatering, presaturation or equivalent techniques.

Geologic Hazards.

A. Purpose and Intent.

1. Property within the City of Great Falls has areas that are susceptible to one or more geologic hazards occurring either on or affected by property which is proposed to be developed. A list of common geologic hazards found in Great Falls includes but is not limited to:

    a. Expansive or unstable soils and/or rock;
    b. Unstable or potentially unstable slopes;
    c. Landslide or laterally unstable areas or potential landslide areas;
    d. Flood inundation, debris flows, and debris fans;
    e. Unstable fill;
    f. Erosion and deposition areas, or highly erodible soils;
    g. Rock fall;
    h. Subsidence;
    i. Shallow water tables;
    j. Groundwater springs or seeps;
    k. Flood-prone areas;
    l. Collapsible soils;
    m. Faults;
    n. Upturned or steeply dipping bedrock;
    o. Radon;
    p. Problems caused by features or conditions on adjacent properties; and
    q. Other general geologic or site problems.

2. Geologic hazards can be interrelated, and evaluation of geologic hazards requires comprehensive review and analysis. Development within the City of Great Falls should consider geologic hazards and consult maps or other information to conduct initial review of site hazards prior to site development.

3. Recognition of these hazards must be acknowledged by those intending to develop property within the City of Great Falls, in order to allow those developing property to minimize losses due to geologic conditions in the City, and to:

a. Protect human life, safety, and property;
b. Minimize damage to private property;
c. Minimize damage to public facilities, infrastructure, and utilities;
d. Provide flexible approaches to evaluating geologic hazards risk;
e. Reduce the amount of effort and expenditures associated with response, cleanup, and repair following a geologic hazard event;
f. Educate the public about the potential risks associated with geologic hazards in Great Falls;
g. Require applicants who desire to develop property in the City to evaluate, mitigate as necessary, and be responsible for geologic hazards related to the property to be developed.

B. Applicability and Exemptions.

1. Applicability of Geologic Hazards Plan and Report. Unless exempt under this chapter, the geologic hazards standards in this section shall apply to any of the following activities or scenarios:

a. Any building permit or property improvement permit for construction of a new building with a building footprint of two hundred (200) square feet or larger and that is located on a permanent foundation;
b. Any application or development activity requiring a grading permit;
c. Any of the following development application types:

i. Major Development Plans, defined as:
(1) Commercial development including mineral extraction, waste development, any development with a disturbed area of 1 acre or more;

ii. Major or Minor Subdivisions as defined in Chapter 8 of Title 17; and/or

d. Any application for development or redevelopment on any property with slopes exceeding seventeen (17) percent within the limits of disturbance.

2. The Planning and Community Development Director, may, at the Director's discretion, have any geologic hazard evaluation reviewed by an independent qualified professional geologist or a qualified professional geotechnical engineer. This separate review shall supplement the Initial Site Evaluation, any Geologic Hazards Plan and Report, and the City's review, and will be considered by the City in making

a final determination on the associated land developmental proposal. The cost of having an independent review and analysis of geological hazard evaluation reports shall be borne by the developer.

3. Exemptions from Geologic Hazards Plan and Report.
   a. The following types of development activities are exempt from Geologic Hazards Evaluation in this section:

      i. Fences;

      ii. Residential garages and carports;

      iii. Lighting;

      iv. Booms;

      v. Poles;

      vi. Monument and Free Standing Pole Signs unless specifically recommended by the design engineer;

      vii. Decorations;

      viii. Machinery or equipment;

      ix. Decorative or perimeter walls that do not serve to retain soil, unless supporting a load or other weight surcharge;

      x. Any replat of a previous subdivision in which no new structures or new building lots are being created and no new development is proposed; and/or

      xi. Sites with existing studies or reports that are 10 years or older shall be subject to the procedure herein to determine whether the existing study or report is sufficient for the proposed development application, or if changes in conditions warrant a new evaluation.

   b. An exemption from these standards does not exempt the applicant from lability and responsibility to evaluate and mitigate known geologic hazards on a site.

C. Geologic Hazards Plan and Report.

1. The purpose of the Geologic Hazards Plan and Report is to:

   a. Identify the geologic hazards affecting the development site;
   b. Assess proposed development that could pose a more significant geologic hazard impact;
   c. Analyze potential geologic hazard impacts the proposed development could have on surrounding properties or public facilities;

d. Identify appropriate mitigation measures that shall be employed to reduce or avoid the identified hazards to acceptable levels so that development may proceed;
e. Require on-site monitoring and assessment by a qualified professional geologist or a qualified professional geotechnical engineer during the project;
f. Recommend areas that are not suitable for the proposed development or that pose unacceptable risks for development; and
g. Include the requirements or reporting pursuant to the International Building Code and International Residential Code, as applicable.

2. Geologic Hazards Analysis. A Geologic Hazards Plan and Report, when required, shall be prepared by a qualified professional geologist, qualified professional geotechnical engineer, or a qualified professional structural engineer. The Geologic Hazards Plan and Report shall address the topics listed in this subsection, where applicable. The level of detail and emphasis may vary due to specific geologic conditions or hazard risks of the site or the scale and type of proposed development activity.

   a. General Project Description and Certification.

      i. A project description shall be included that presents the overall proposed project details including the size and location of the project and the existing and proposed land uses.
      ii. The qualified professional geologist or qualified professional geotechnical engineer preparing or certifying the Plan and Report shall apply their professional seal and sign the Plan and Report.

   b. Conclusions and Recommendations. The Geologic Hazard Plan and Report shall address the following:

      i. Whether the intended use of the land is compatible with any identified or potential geologic hazards or constraints;

      ii. The development of mitigation procedures or design changes necessary to minimize or abate any hazardous condition, if such mitigation or design change is possible. Each hazardous condition requires a recommendation, which may be a recommendation that the conditions are too severe to warrant development;

      iii. The long-term stability and safety of the proposed project. Discuss the critical planning and construction aspects of the development, including the suitability of using irrigated landscaping, the stability of earth materials, the appropriateness of

the proposed grading plans, the need for selective location of project facilities, and the static and dynamic parameters for the design of structures; as applicable;

iv. Include the reporting requirements in the International Building Code and International Residential Code, as applicable.

v. Identify that qualified professional geologist, qualified professional geotechnical engineer, and/or qualified professional special inspector approved by the Building Official which will be on site, monitoring, and assessing development to ensure compliance with conclusions, recommendations and mitigation measures; and

vi. Clearly state the geologic basis for all conclusions.

D. Mitigation Measures. In cases where geologic hazards are identified, appropriate mitigation measures shall be required in conjunction with the approval of the project, if approval is recommended. Such mitigation measures may include, but not limited to:

1. Changes to the proposed land use configuration;
2. Changes to the location of proposed structures;
3. Modification of land use types;
4. Modification of lot boundaries or building envelopes;
5. Special foundation designs and/or over-excavation;
6. Mitigation of rock fall and/or debris flow;
7. Grading, drainage, and erosion controls;
8. Geotechnical engineering solutions; and
9. Limitations on irrigated landscapes.
10. Recommend areas that are not suitable for the proposed development or that pose unacceptable risks for development

E. Review Procedures.

1. The Geologic Hazard Plan and Report shall be reviewed by the Planning and Community Director and/or City Engineer or their designee as part of the review of the land development application. The City's review shall determine whether the findings, conclusions, and recommendations of the Geologic Hazard Plan and Report have been incorporated into the design of the Major or Minor Development Plan, Subdivision Plat, Drainage and Erosion Control Plan, Grading Plan, and public improvement construction drawings, or other required documents. If the city review determines that the submitted study is incomplete or fails to comply with the

standards and requirements set forth in this section, the Planning and Community Development Director may require new or supplemental information.

2. Recommendations of the Geologic Hazards Plan and Report shall be incorporated, as applicable, into the approval of the Major or Minor Development Plan, Subdivision Plat, Drainage and Erosion Control Plan, Grading Plan, public improvement construction drawings, and building construction plans.

3. The qualified professional geologist, qualified professional geotechnical engineer, or qualified professional structural engineer preparing or certifying the Plan and Report shall review any on-site monitoring reports of the development to ensure compliance with the mitigation measures set forth in the Geologic Hazard Plan and Report.

4. Before permanent foundation structures are placed in the development, the qualified professional engineer which prepared the Geologic Hazards Plan and Report must provide the Planning and Community Development Director with a letter of compliance with the Geologic Hazards Plan and Report and mitigation procedures.

5. Applicants who intend to develop property within the City of Great Falls assume liability and responsibility to evaluate for, and mitigate known, geologic hazards on their proposed development sites.

6. The assumption of liability in this Chapter shall be placed on development permit applications, permits, certificates of occupancy and other documents associated with the development, as determined by the Director of Planning and Community Development.

Geologic Hazards.

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   g. Rockfall;

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    a. Protect human life, safety, and property;

    b. Minimize damage to private property;

    c. Minimize damage to public facilities, infrastructure, and utilities;

    d. Provide flexible approaches to evaluating geologic hazards risk;

    e. Reduce the amount of effort and expenditures associated with response, cleanup, and repair following a geologic hazard event;

    f. Educate the public about the potential risks associated with geologic hazards in Great Falls;

    g. Require applicants who desire to develop property in the City to evaluate, mitigate as necessary, and be responsible for geologic hazards related to the property to be developed; and

    h. Require applicants to comply with requirements in the International Building Code and International Residential Code as applicable.

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Geo-Tech Process