



File No. EA2020-113

CITY OF RICHLAND
Determination of Non-Significance

Description of Proposal: The existing gravel area being used as parking for Badger Mountain Park will be graded and paved with asphalt. Sidewalk, lighting and a stormwater system will be constructed associated with the parking lot. All stormwater will be contained and infiltrated on site through a series of swales. A total of 274 parking stalls are proposed.

Proponent: Knutzen Engineering on behalf of the City of Richland
Attn: Nathan Machiela
5401 Ridgeline Drive, Suite 160
Kennewick, WA 99338

Location of Proposal: The project site is located at the Badger Mountain Park, 341 Englewood Drive, Richland, WA 99352 upon Assessor's Parcel No. 126982000001000, located within Section 26, Township 9 North, Range 28 East, W.M., Benton County, Washington.

Lead Agency: City of Richland

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

() There is no comment for the DNS.

(X) This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for fourteen days from the date of issuance.

() This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

Responsible Official: Mike Stevens

Position/Title: Planning Manager

Address: 625 Swift Blvd., MS #35, Richland, WA 99352

Date: May 5, 2020

Signature _____

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [\[HELP\]](#)

1. Name of proposed project, if applicable:

Badger Mountain Parking Lot

2. Name of applicant:

Nathan Machiela (Knutzen Engineering)

3. Address and phone number of applicant and contact person:

Nathan Machiela; 5401 Ridgeline Dr Suite 160, Kennewick, WA 99338; 509-222-0959

4. Date checklist prepared:

04/14/2020

5. Agency requesting checklist:

City of Richland

6. Proposed timing or schedule (including phasing, if applicable):

Permits are expected to be obtained in the next 3 months, allowing for construction by 07/01/2020. The project will be broken up into 3 phases. Each phase will include grading and paving of the parking lot and sidewalks and associated utilities, to the point of being completely functional, advancing as far as the City of Richland's budget permits. Phase 1 is expected to finish by 10/01/20. Phases 2 and 3 will be permitted and completed in the years 2021 and 2022 respectively.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

None currently.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None currently.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None known of.

10. List any government approvals or permits that will be needed for your proposal, if known.

DEQ Erosivity Waiver Approval; Construction and Grading Permits through the City of Richland.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The existing gravel area being used as parking for Badger Mountain Park will be graded and paved with asphalt. Sidewalk, lighting and a stormwater system will be constructed associated with the parking lot. All stormwater will be contained and infiltrate on site through a series of swales on site. A total of 274 parking stalls are proposed. The parcel owned by the City of Richland encompassing the park is 77 acres. The project will affect approximately 2.75 acres.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The site is in the center of the Badger Mountain Park located at 350 Keene Rd, Richland, WA 99352. The Benton County Parcel # is 126982000001000. The parcel's legal description is THE EAST 1/2 OF THE NORTHWEST QUARTER, LESS RAILWAY RIGHT OF WAY OF SECTION 26 TOWNSHIP 9 NORTH, RANGE 28: R/W CON'T 2/23/82 SUBJ TO ESMTS & RESTRICT OR REC'D 9/20/79 9/27/76 & 12/6/72.

B. Environmental Elements [\[HELP\]](#)

1. Earth [\[help\]](#)

a. General description of the site:

(circle one): **Flat**, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

The steepest slope on site is approximately 30% where the land remains undeveloped and rolls slightly. The overall site slopes downwards to the South varying between a 5% – 10% slope.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Hezel loamy fine sand and Quincy loamy sand. The greater portion of the site has a layer of gravel on the surface.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None known of.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

The site will be graded flat and sloped appropriately for parking and to route stormwater runoff to onsite swales and catch basins. Undeveloped land will be grubbed to remove existing vegetation. There will be approximately 1663 CY of cut and 3202 CY of fill for a net cut/fill of 1539 CY of fill. Fill will come from a source approved by the City of Richland.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Erosion could occur on this site but will be minimized through implementation of BMP's during construction, including silt fencing, construction entrance, ground cover, waddles, site watering for dust control, catch basin inserts and protection. All stormwater runoff will be contained and managed on site.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 83% of the site affected by the development will be covered with impervious surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Standard erosion control methods will be used, such as catch basin protection (witches hats), silt fencing, and stabilized construction entrances. Dust during construction will be controlled by a water truck as necessary

2. Air [\[help\]](#)

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, minor amounts of dust and exhaust from equipment activity may occur. The completed project will not affect air quality.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known of.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Dust control measures will be implemented in accordance with recommendations by the Department of Ecology and the Benton County Clean Air Authority. Measures include but are not limited to watering, lowering speed, limit of construction vehicles, and reducing the amount of dust-generating activities on windy days.

3. Water [\[help\]](#)

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The site is approximately 0.7 miles from the Yakima River which flows into the Columbia River. The site is also approximately 1,000' from a small unnamed wetlands area. There are no other surface water bodies in the immediate vicinity.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

No fill or dredge will be placed or removed from surface water or wetlands.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water: [\[help\]](#)

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

No waste materials will be discharged into the ground.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The new impervious are on site will generate stormwater runoff. The stormwater system consists of surface infiltration through a series of swales.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Waste materials could not enter ground waters as it will be discharged on the surface.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Runoff generated from pervious surfaces will either infiltrate into underlying soils or flow to onsite collection systems. Stormwater generated from impervious surfaces will be collected and treated in the site swales.

4. Plants [\[help\]](#)

a. Check the types of vegetation found on the site:

deciduous tree: alder, maple, aspen, other

evergreen tree: fir, cedar, pine, other

shrubs

grass

pasture

crop or grain

Orchards, vineyards or other permanent crops.

wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

water plants: water lily, eelgrass, milfoil, other

other types of vegetation

- b. What kind and amount of vegetation will be removed or altered?
Existing grasses, weeds and sagebrush will be removed during grading.
- c. List threatened and endangered species known to be on or near the site.
None known per the Washington Department of Fish and Wildlife.
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
None currently.
- e. List all noxious weeds and invasive species known to be on or near the site.
None known.

5. Animals [\[help\]](#)

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other:
 mammals: deer, bear, elk, beaver, other:
 fish: bass, salmon, trout, herring, shellfish, other _____

- b. List any threatened and endangered species known to be on or near the site.
None known per the Washington Department of Fish and Wildlife.
- c. Is the site part of a migration route? If so, explain.
Yes, the Columbian Basin is part of a migration route for a number of fowl.
- d. Proposed measures to preserve or enhance wildlife, if any:
None currently.
- e. List any invasive animal species known to be on or near the site.
None known.

6. Energy and Natural Resources [\[help\]](#)

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
Electrical will be used for parking lot lighting.
- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
No.
- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
None currently.

7. Environmental Health [\[help\]](#)

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

- 1) Describe any known or possible contamination at the site from present or past uses.
None known.
- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.
None known.
- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.
None known.
- 4) Describe special emergency services that might be required.
The site will use typical emergency services provided through the City of Richland.
- 5) Proposed measures to reduce or control environmental health hazards, if any:
None currently.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

The noise level in the area is not perceived to have any adverse effect on the project. Noise is mainly generated by vehicle traffic on nearby streets and the nearby highway.

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term: Construction noises.

Long term: Automobile noise from traffic associated with the site. The site is already being used as a parking lot, so this is an existing noise.

- 3) Proposed measures to reduce or control noise impacts, if any:

Noise impacts from construction activities and ongoing operations are expected to be minimal without significant effects on the surrounding area. All operations will be in a manner with City of Connell code and Washington state Maximum Environmental Noise Levels (Chapter 173-60040 WAC)

8. Land and Shoreline Use [\[help\]](#)

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.
Currently the site is being used as a gravel parking lot for Badger Mountain Park. Nearby land uses include the park, commercial businesses and single-family housing. The proposal will not affect current land uses.
- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?
No.
- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
No.
- c. Describe any structures on the site.
There are baseball facilities adjacent to where the grading will take place as well as a Bonneville Power Station.
- d. Will any structures be demolished? If so, what?
No.
- e. What is the current zoning classification of the site?
PFF – Parks & Public Facilities
- f. What is the current comprehensive plan designation of the site?
Developed Open Space
- g. If applicable, what is the current shoreline master program designation of the site?
N/A.
- h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
Part of the parcel is marked as a “Geological Hazards” critical area by the City of Richland. It is assumed that this is for steep slopes. This is not expected to affect the project as the land that will be affected by the construction is not located within the critical area boundary.
- i. Approximately how many people would reside or work in the completed project?
No people would work or reside in the completed project.
- j. Approximately how many people would the completed project displace?
None.
- k. Proposed measures to avoid or reduce displacement impacts, if any:
None needed.

- L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
The project will be permitted through the local jurisdictions in accordance with all applicable zoning ordinances.
- m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:
N/A.

9. Housing [\[help\]](#)

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
None.
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
None.
- c. Proposed measures to reduce or control housing impacts, if any:
N/A.

10. Aesthetics [\[help\]](#)

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
No structures are proposed.
- b. What views in the immediate vicinity would be altered or obstructed?
None.
- c. Proposed measures to reduce or control aesthetic impacts, if any:
None

11. Light and Glare [\[help\]](#)

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
Parking lot lighting would be proposed for late evening and nighttime.
- b. Could light or glare from the finished project be a safety hazard or interfere with views?
No.
- c. What existing off-site sources of light or glare may affect your proposal?
None.
- d. Proposed measures to reduce or control light and glare impacts, if any:
All lighting will be shielded downward.

12. Recreation [\[help\]](#)

- a. What designated and informal recreational opportunities are in the immediate vicinity?
The site is in the middle of Badger Mountain Community Park which features a dog park, sports fields and a splash pad. Badger Mountain Elementary School is located approximately 0.25 miles from the site which features open space as well as a playground and sports equipment. There are no other known recreational opportunities in the immediate vicinity.
- b. Would the proposed project displace any existing recreational uses? If so, describe.
No.
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None currently.

13. Historic and cultural preservation [\[help\]](#)

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.
No.
- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.
No.
- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.
Internet search for project site. Washington State Department of Archeology and Historic Preservation, National Register of Historic Places in Franklin County.
- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
Upon any discovery of potential or known archaeological resources at the subject properties prior to or during future on-site construction, the developer, contractor, and/or any other parties involved in construction shall immediately cease all on-site construction, shall act to protect the potential or known historical and cultural resources area from outside intrusion, and shall notify, within a maximum period of twenty-four hours from the time of discovery, City of Richland officials of said discovery.

14. Transportation [\[help\]](#)

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
The site can be accessed off Englewood Dr. and Keen Rd.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?
Yes, there is Ben Franklin Transit stop located on Keene Rd that services the site. Bus stop ID: RC289.
- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?
The project would have 274 parking spaces. No spaces would be eliminated.
- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
No.
- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No.
- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?
The project would not generate any additional vehicular trips. No additional features to the existing park are proposed at this time.
- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No.
- h. Proposed measures to reduce or control transportation impacts, if any:
None needed.

15. **Public Services** [\[help\]](#)


- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.
No.
- b. Proposed measures to reduce or control direct impacts on public services, if any.
None needed.

16. **Utilities** [\[help\]](#)

- a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____
- c. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
Electricity - Bonneville Power Administration

Signature [\[HELP\]](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:  _____

Name of signee Nathan Machiela

Position and Agency/Organization Project Engineer

Date Submitted: 04/16/2020

ESA LISTED SALMONIDS CHECKLIST

The Listed Salmonids Checklist is provided in order that the City can identify a project's potential impacts (if any) on salmonids that have been listed as "threatened" or "endangered" under the Federal Endangered Species Act (ESA). A salmonid is any fish species that spends part of its life cycle in the ocean and returns to fresh water. Potential project impacts that may result in a "taking" of listed salmonids must be avoided, or mitigated to insignificant levels. Generally, under ESA, a "taking" is broadly defined as any action that causes the death of, or harm to, the listed species. Such actions include those that affect the environment in ways that interfere with or reduce the level of reproduction of the species.

If ESA listed species are present or ever were present in the watershed where your project will be located, your project has the potential for affecting them, and you need to comply with the ESA. The questions in this section will help determine if the ESA listing will impact your project. The Fish Program Manager at the appropriate Department of Fish and Wildlife (DFW) regional office can provide additional information. Please contact the Dept. of Fish and Wildlife at 1701 S. 24th, Yakima WA 98902-5720, Phone No. 509-575-2740.

1. Are ESA listed salmonids currently present in the watershed in which your project will be?

Yes No

Please Describe.

2. Has there ever been an ESA listed salmonid stock present in this watershed?

Yes No

Please Describe.

NOTE: Kennewick is located in the upper Mid-Columbia watershed. Salmonids are present in the watershed - questions no. 1 and no. 2 already answered "yes". Questions A-1 and A-2 are also answered.

PROJECT SPECIFIC: The questions in this section are specific to the project and vicinity.

A1. Name of watershed: Upper Mid-Columbia

A2. Name of nearest waterbody: Yakima River/Columbia River

A3. What is the distance from this project to the nearest body of water?

Often a buffer between the project and a stream can reduce the chance of a negative impact to fish.

A4. What is the current land use between the project and the potentially affected water body (parking lots, farmland, etc.)

A5. What percentage of the project will be impervious surface (including pavement & roof area)?

FISH MIGRATION: The following questions will help determine if this project could interfere with migration of adult and juvenile fish. Both increases and decreases in water flows can affect fish migration.

B1. Does the project require the withdrawal of

a. Surface water? Yes _____ No _____
Amount
Name of surface water body

b. Ground water? Yes _____ No _____
Amount
From Where
Depth of well

B2. Will any water be rerouted? Yes _____ No _____
If yes, will this require a channel change?

B3. Will there be retention ponds? Yes _____ No _____
If yes, will this be an infiltration pond or a surface discharge to either a municipal storm water system or a surface water body?

If to a surface water discharge, please give the name of the waterbody.

B4. Will this project require the building of new roads? (Increased road mileage may affect the timing of water reaching a stream and may, thus, impact fish habitat.)

B5. Are culverts proposed as part of this project? Yes _____ No _____

B6. Are stormwater drywells proposed as part of this project? Yes _____ No _____

B7. Will topography changes affect the duration/direction of runoff flows? Yes _____ No _____

If yes describe the changes.

B8. Will the project involve any reduction of a floodway or floodplain by filling or other partial blockage of flows? Yes _____ No _____

If yes, how will the loss of flood storage be mitigated by your project?

WATER QUALITY: The following questions will help determine if this project could adversely impact water quality. Degraded water quality can affect listed species. Water quality can be made worse by runoff from impervious surfaces, altering water temperature, discharging contaminants, etc.

C1. Will your project either reduce or increase shade along or over a waterbody?
Yes _____ No _____ (Removal of shading vegetation or the building of structures such as docks or floats often result in a change in shade.)

C2. Will the project increase nutrient loading or have the potential to increase nutrient loading or contaminants (fertilizers, other waste discharges, or runoff) to the waterbody?
Yes _____ No _____

C3. Will turbidity (dissolved or partially dissolved sediment load) be increased because of construction of the project or during operation of the project? (In-water or near water work will often increase turbidity.)
Yes _____ No _____

C4. Will your project require long term maintenance, i.e., bridge cleaning, highway salting, chemical sprays for vegetation management, clearing of parking lots?
Yes _____ No _____

Please Describe.

Vegetation: The following questions are designed to determine if the project will affect riparian vegetation, which can impact listed species.

D1. Will the project involve the removal of any vegetation from the stream banks?

YES ____ NO ____

If yes, please describe the existing conditions and the amount and type of vegetation to be removed.

D2. If any vegetation is removed, do you plan to re-plant? YES ____ NO ____

If yes, what types of plants will you use?

E. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand the City is relying on them to make its decision.



Signature _____

Date _____

GENERAL NOTES

- GENERAL NOTES**
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), THE CURRENT EDITION OF WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION M41-10, THE CITY STANDARDS AND SPECIFICATIONS, EASTERN WASHINGTON STORMWATER MANUAL, AND LOCAL RULES AND STANDARDS OF GOVERNING AGENCIES HAVING JURISDICTION.
 - PRIOR TO DIGGING VERIFY LOCATION AND DEPTH OF UTILITIES AND ANY OTHER UNDERGROUND INTERFERENCE. CALL TWO BUSINESS DAYS BEFORE YOU DIG AT 811.
 - STATEMENT OF ERRORS, AMBIGUITIES AND OMISSIONS: ANY ERRORS, AMBIGUITIES, AND OMISSION IN DRAWINGS AND/OR SPECIFICATIONS SHALL BE REPORTED TO KNUTZEN ENGINEERING FOR CORRECTION BEFORE ANY PART OF THE WORK IS STARTED. UNLESS EXPRESSLY STIPULATED NO ADDITIONAL ALLOWANCE WILL BE MADE IN THE CONTRACTOR AND/OR MANUFACTURER'S FAVOR BY VIRTUE OF ERRORS, AMBIGUITIES, AND/OR OMISSIONS WHICH SHOULD HAVE BEEN DISCOVERED DURING THE PREPARATION OF BID ESTIMATE AND DIRECTED TO THE ATTENTION OF KNUTZEN ENGINEERING IN A TIMELY MANNER. KNUTZEN ENGINEERING ACCEPTS NO RESPONSIBILITY FOR WORK DONE BY THE CONTRACTOR OR SUBCONTRACTORS CONTRARY TO THE PLANS OR SPECIFICATIONS. SUBSTITUTION OR CHANGES WILL NOT BE ACCEPTED UNLESS APPROVED IN WRITING. THE SUBCONTRACTOR SHALL REVIEW ALL SECTIONS OF SPECIFICATIONS AND ALL SHEETS OF THE PLANS FOR ANY INFORMATION OR DETAILS PERTAINING TO THEIR SPECIFIC TRADE.
 - CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF SITE CONDITIONS, INSTALLATION STANDARDS AND CONSTRUCTION CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO SHOP FABRICATION AND/OR FIELD ERECTION. DISCREPANCIES BETWEEN SITE CONDITIONS AND THE CONSTRUCTION DRAWINGS SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER. WORK DONE WITHOUT THE ENGINEER'S APPROVAL IS THE RESPONSIBILITY OF THE CONTRACTOR. LOCATIONS OF EXISTING UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE ONLY. CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT OCCUR TO EXISTING UTILITIES.
 - CONTRACTOR IS TO PROVIDE A METHOD OF CONSTRUCTION OF OFF-SITE WORK THAT WILL ALLOW MINIMAL DISTURBANCE TO TRAFFIC FLOWS ON PUBLIC AND PRIVATE WAYS.
 - ALL SPECIAL INSPECTION AND TESTING SHALL BE PERFORMED BY AN INDEPENDENT INSPECTION AND TESTING AGENCY HIRED BY THE OWNER. CONTRACTOR TO COORDINATE WITH INSPECTION AND TESTING AGENCY FOR REQUIRED CONSTRUCTION INSPECTIONS AND MATERIAL TESTING.
 - CONTRACTOR SHALL PROTECT EXISTING PROPERTY CORNERS. IF CORNERS ARE DISTURBED THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING A PROFESSIONAL LAND SURVEYOR TO RE-ESTABLISH THE PROPERTY CORNER(S).
 - THE CONTRACTOR SHALL REFERENCE RECOMMENDATIONS OF THE GEO-TECHNICAL ENGINEERS SOILS REPORT.
 - CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED CURBING OR SIDEWALK WITH IN THE RIGHT OF WAY PER CITY SPECIFICATIONS.
 - ALL ACCESSIBLE ACCESS PATHS, RAMPS, PARKING, AND SIGNAGE SHALL BE TO CURRENT ACCESSIBLE CODES.
 - CONTRACTOR TO CONTRACT WITH A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF WASHINGTON TO PROVIDE CONSTRUCTION STAKING SERVICES. IN ACCORDANCE WITH CITY REQUIREMENTS, CONTRACTED SURVEYOR SHALL PROVIDE SURVEYED ASBUITS AS WELL AS LEGAL DESCRIPTIONS REQUIRED TO RECORD NEW EASEMENTS OR VARYED OLD EASEMENTS (WHERE APPLICABLE) UPON COMPLETION OF PROJECT, 4 WEEKS PRIOR TO GOAL FOR OBTAINING CERTIFICATE OF OCCUPANCY.
 - COSTS FOR GENERAL CONSTRUCTION ITEMS WHICH ARE NOT SHOWN ON THESE DRAWINGS, BUT ARE NECESSARY AND NORMAL FOR COMPLETION OF THIS PROJECT, SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE CONTRACTORS BID FOR THIS PROJECT.

EARTHWORK

- ALL STRUCTURAL FILL OR BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557. ALL STRUCTURAL FILL AND BACKFILL SHALL BE PLACED IN MAXIMUM 8" LIFTS. MOISTURE CONDITIONED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT.
- REMOVE ALL DEBRIS FROM THE AREA TO BE BACKFILLED PRIOR TO BACKFILLING.
- SATISFACTORY NATIVE SOILS SHALL BE FREE OF ROCK OR GRAVELS LARGER THAN 3" IN ANY DIMENSION, DEBRIS, WASTE OR FROZEN MATERIAL, NATIVE VEGETATION, OR OTHER DELETERIOUS MATTER.
- PLACE LOAD BEARING BACKFILL IN LAYERS NOT MORE THAN 8" THICK, LOOSE MEASUREMENT. SPREAD AND COMPACT EACH LAYER UNIFORMLY TO THE REQUIRED DENSITY.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE IN KIND ANY UTILITIES AND OR IRRIGATION PIPING DISTURBED AND OR DAMAGED DURING THE WORK.
- ALL AREAS TO RECEIVE STRUCTURAL IMPROVEMENTS, PARKING IMPROVEMENTS, AND ROADWAY IMPROVEMENTS SHALL BE STRIPPED OF ALL VEGETATION, ORGANIC MATERIAL, DEMOLITION DEBRIS, THE SOIL SHALL BE SCARIFIED TO A DEPTH OF 12 INCHES AND COMPACTED TO 92% MDD IN ACCORDANCE WITH ASTM D1557.
- ALL EXPOSED CUT SLOPES SHALL BE STABILIZED WITH HYDROMULCH TO PREVENT EROSION.
- STORM PONDS/SWALES SIDEWALLS SHALL BE COMPACTED TO 85% MDD PER ASTM D1557. THE POND BOTTOM SHALL BE SCARIFIED TO A DEPTH OF 18 INCHES WITH A RIPPER UPON COMPLETION OF THE PONDS/SWALES PUSH OUT.

SITE UTILITIES

- A PRE-CONSTRUCTION CONFERENCE SHALL BE SCHEDULED WITH THE CONTRACTOR, ENGINEER, ARCHITECT, CITY PERSONNEL, AND ANY AFFECTED UTILITIES PRIOR TO START OF UTILITY WORK.
- MAINTAIN A MINIMUM OF 5' HORIZONTAL SEPARATION OF WATER LINE FROM BURIED POWER LINES. MAINTAIN 1' HORIZONTAL SEPARATION OF GAS LINES FROM BURIED POWER LINES.
- INFILTRATION RATE OF 2.4 IN/HR USED IN DESIGN OF INFILTRATION SYSTEMS.
- ALL BEDDING AND BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557. REMOVE ALL DEBRIS FROM THE AREA TO BE BACKFILLED PRIOR TO BACKFILLING. PLACE BACKFILL IN LAYERS NOT MORE THAN 12 INCHES THICK, LOOSE MEASUREMENT. SPREAD AND COMPACT EACH LAYER UNIFORMLY TO THE REQUIRED DENSITY.

ASPHALT PAVEMENT

- PRIOR TO BEGINNING WORK, CONTACT THE OWNER/CITY OR COUNTY OFFICIAL TO COORDINATE TRAFFIC FLOW, WORK SCHEDULES AND UTILITY INTERFACES.
- PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS M41-10, SECTION 8-22. CONTRACTOR SHALL USE WSDOT APPROVED MATERIALS, PREPARE THE SURFACES, APPLY THE PAINT, AND BE WITHIN THE TOLERANCES AS SPECIFIED IN THE WSDOT STANDARD SPECIFICATIONS.
- ASPHALT PLACEMENT SHALL BE IN ACCORDANCE WITH 2010 WSDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION M41-10, SECTION 5-04.
- ASPHALT MATERIAL SHALL CONFORM TO 2010 WSDOT STANDARD SPECIFICATION M41-10, SECTION 9-02.1(4). AGGREGATE SHALL CONFORM TO 2010 WSDOT STANDARD SPECIFICATION M41-10 SECTIONS 9-03.8(1), (2), (3)A AND (3)B.
- ALL ASPHALT AND BASE THICKNESSES NOTED ARE COMPACTED THICKNESS.
- ONE DAY PRIOR TO PLACEMENT OF BITUMINOUS MATERIAL ON THE BASE, THE SURFACE SHALL BE STERILIZED WITH A SOIL HERBICIDE APPLIED AT MANUFACTURER'S RECOMMENDED RATE.
- ALL ROADWAY IMPROVEMENTS WITHIN THE PUBLIC RIGHT OF WAY SHALL BE DONE IN ACCORDANCE WITH CITY STANDARDS, SPECIFICATIONS AND AMENDMENTS.

CONCRETE

- CONCRETE FOR WALKS, CURBS AND GUTTERS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
- REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED. FABRICATE REINFORCEMENT PER ACI 318, CLASS "B" SPLICES UNLESS NOTED OTHERWISE.
- WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185.
- TOOL ALL EXPOSED EDGES WITH A 3/8" RADIUS UNLESS OTHERWISE INDICATED.
- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH ACI 301 AND ACI 305 OR 306 FOR HOT AND COLD WEATHER CONCRETING.
- TOLERANCES FOR CONCRETE CONSTRUCTION SHALL BE BASED ON A 10'-0" STRAIGHT EDGE. GRADE SHALL NOT DEVIATE MORE THAN 1/8" AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4".
- PROVIDE SEALED EXPANSION JOINTS BETWEEN BUILDING FOUNDATION WALL AND ALL ADJACENT SIDEWALK.

SPECIAL INSPECTION

- PER IBC 1705.6, PRIOR TO PLACEMENT OF PREPARED FILL, THE SPECIAL INSPECTOR SHALL DETERMINE THAT THE SITE HAS BEEN PREPARED IN ACCORDANCE WITH THE APPROVED SOILS REPORT.
- PER IBC 1705.6, WHERE FILL EXCEEDS 12" IN DEPTH, THE SPECIAL INSPECTOR SHALL HAVE CONTINUOUS INSPECTION OF FILL PLACEMENT AND COMPACTON.
- TESTING AGENCY WILL TEST COMPACTION OF SOILS IN PLACE ACCORDING TO ASTM D 1557, ASTM D 2167, ASTM D 2937, ASTM D 6938, AS APPLICABLE. TESTS WILL BE PERFORMED AT THE FOLLOWING LOCATIONS AND FREQUENCIES:
 - FOUNDATION, PAVING, AND ADJACENT: AT SUBGRADE AND AT EACH COMPACTED FILL AND BACKFILL LAYER, AT LEAST 1 TEST FOR EVERY 5,000 SQ. FT. OR LESS OF PAVED AREA OR BUILDING SLAB, BUT IN NO CASE FEWER THAN 1 TEST PER DAY.
 - TRENCH BACKFILL: AT EACH COMPACTED INITIAL AND FINAL BACKFILL LAYER, AT LEAST 1 TEST FOR EACH 150 FEET OR LESS OF TRENCH LENGTH, BUT NO LESS THAN 1 TEST PER DAY.
- COMPACTION TESTING IS REQUIRED AT THE ABOVE SCHEDULE UNLESS GREATER TESTING IS RECOMMENDED BY STRUCTURAL DRAWINGS. LESS TESTING WOULD BE ACCEPTABLE IF APPROVED IN WRITING BY GEOTECHNICAL ENGINEER, SPECIAL INSPECTOR, FOUNDATION ENGINEER, AND KNUTZEN ENGINEERING.

EROSION CONTROL

- PROVIDE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES TO PREVENT SOIL EROSION AND DISCHARGE OF SOIL-BEARING WATER RUNOFF OR AIRBORNE DUST TO ADJACENT PROPERTIES, WALKWAYS, AND DESIGNATED STORMWATER SWALES ACCORDING TO REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
- ESTABLISH CONSTRUCTION ACCESS.
 - CONSTRUCTION VEHICLE ACCESS AND EXIT SHALL BE LIMITED TO ONLY NECESSARY LOCATIONS. ACCESS POINTS PUBLIC ROADS, MINIMUM 100 FEET LONG.
 - WHEEL WASH OR TIRE BATHS SHOULD BE LOCATED ON-SITE, IF NEEDED TO PREVENT EXCESSIVE TRACKING OF SEDIMENT ON ROADS.
 - PUBLIC ROADS SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR PICKUP SWEEPING AND SHALL BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA. STREET WASHING WILL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.
 - STREET WASH WASTEWATER SHALL BE CONTROLLED BY PUMPING BACK ON-SITE, OR OTHERWISE BE PREVENTED FROM DISCHARGING INTO SYSTEMS TRIBUTARY TO STATE SURFACE WATERS.
 - A SEPARATION GEOTEXTILE SHALL BE PLACED UNDER THE SPALLS TO PREVENT FINE SEDIMENT FROM PUMPING UP INTO THE ROCK PAD. THE GEOTEXTILE SHALL MEET THE FOLLOWING STANDARDS:
 - GRAB TENSILE STRENGTH (ASTM D4632) 200 PSI/MINUTE.
 - GRAB TENSILE ELONGATION (ASTM D4632) 30% MAXIMUM.
 - MULLEN BURST STRENGTH (ASTM D3786-80A) 400 PSI/MINUTE.
 - AOS (ASTM D4751) 20 TO 45 (US STANDARD SIEVE SIZE).
 - WHENEVER POSSIBLE, THE ENTRANCE SHALL BE CONSTRUCTED ON A FIRM, COMPACTED SUBGRADE. THIS CAN SUBSTANTIALLY INCREASE THE EFFECTIVENESS OF THE PAD AND REDUCE THE NEED FOR MAINTENANCE.

- QUARRY SPALLS SHALL BE ADDED IF THE PAD IS NO LONGER IN ACCORDANCE WITH THE SPECIFICATIONS.
- IF THE ENTRANCE IS NOT PREVENTING SEDIMENT FROM BEING TRACKED ONTO PAVEMENT THEN ALTERNATIVE MEASURES TO KEEP THE STREETS FREE OF SEDIMENT SHALL BE USED. THIS MAY INCLUDE STREET SWEEPING, AN INCREASE IN THE DIMENSIONS OF THE ENTRANCE, OR THE INSTALLATION OF A WHEEL WASH.
- ANY QUARRY SPALLS THAT ARE LOOSEENED FROM THE PAD, WHICH END UP ON THE ROADWAY, SHALL BE REMOVED IMMEDIATELY.
- UNTIL PROJECT COMPLETION AND SITE STABILIZATION, ALL CONSTRUCTION ACCESSES INTENDED AS PERMANENT ACCESS FOR MAINTENANCE SHALL BE PERMANENTLY STABILIZED.
- CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY SILT FENCING TO PREVENT ANY WATER RUNOFF FROM ANY DISTURBED AREAS. AT A MINIMUM, SILT FENCE WILL BE ALONG THE DOWN SLOPE PROPERTY LINES. THE SILT FENCES SHALL BE CONSTRUCTED IN THE AREAS OF CLEARING, GRADING, OR DRAINAGE PRIOR TO STARTING THOSE ACTIVITIES. THE SILT FENCE SHALL PREVENT SOIL CARRIED BY RUNOFF WATER FROM GOING BENEATH, THROUGH, OR OVER THE TOP OF THE SILT FENCE, BUT SHALL ALLOW THE WATER TO PASS THROUGH THE FENCE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING AND MAINTAINING A DUST CONTROL PLAN. DUST CONTROL SHALL BE IN ACCORDANCE WITH ALL LOCAL ORDINANCES. ALL DUST CONTROL MEASURES SHALL BE DONE WITH A PERSON OPERATED WATERING DEVICE (E.G. WATER TRUCK, WATER WAGON, ETC.) NO UNATTENDED WATERING ALLOWED. NO IRRIGATION LINES OR OTHER IRRIGATION/SPRINKLER TYPE WATERING DEVICES ALLOWED.
- CONTRACTOR SHALL PROTECT EXISTING STORMWATER INLETS BY WRAPPING GRATE IN GEOTEXTILE FABRIC.
- INSPECT, REPAIR, AND MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION UNTIL PERMANENT VEGETATION HAS BEEN ESTABLISHED.
- REMOVE EROSION AND SEDIMENTATION CONTROLS ONCE THEY ARE NO LONGER NEEDED AND RESTORE AND STABILIZE AREAS DISTURBED DURING REMOVAL.

STORMWATER SYSTEM OPERATION AND MAINTENANCE

- CATCH BASINS
 - REMOVE SEDIMENT, TRASH AND DEBRIS WHEN GRATE BECOMES CLOGGED MORE THAN 10%.
 - REMOVE SEDIMENT, TRASH AND DEBRIS IN SUMP THAT EXCEEDS 60% OF SUMP DEPTH AS MEASURED FROM BOTTOM OF BASIN TO INVERT OF LOWEST PIPE. BUT IN NO CASE SHALL THE CLEARANCE FROM TOP OF DEBRIS TO INVERT OF LOWEST PIPE BE LESS THAN 6". NO VEGETATION SHALL BE ALLOWED TO GROW IN SUMP. AT A MINIMUM, REMOVE SEDIMENT, TRASH AND DEBRIS IN SUMP ANNUALLY.
 - STRUCTURAL DAMAGE TO FRAME, GRATE, TOP SLAB, OR SUMP, SHALL BE REPAIRED OR REPLACED. STRUCTURAL DAMAGE INCLUDES CRACKS GREATER THAN 1/4" OR HOLES GREATER THAN 2" IN TOP SLAB, FRAME NOT SITTING FLUSH ON TOP SLAB (MORE THAN 3/4" SEPARATION) OR NOT SECURELY ATTACHED, CRACKS GREATER THAN 1/4" IN SUMP WALLS, SOIL ENTERING SUMP, CRACKS AT GROUT FILLET AROUND PIPES IN EXCESS OF 1/2" SETTLEMENT OF ENTIRE BASIN SUCH THAT IT CREATES A SAFETY, FUNCTION OR DESIGN PROBLEM.
 - REPLACE ANY MISSING GRATE OR REPAIR IF GRATE IS DIFFICULT TO REMOVE. REPLACE GRATE IF OPENINGS GREATER THAN 7/8" OR GRATE HAS MISSING OR BROKEN BARS.
- INFILTRATION BASINS
 - REMOVE TRASH AND DEBRIS AT LEAST 2 TIMES PER YEAR AND WHEN ACCUMULATION EXCEEDS 1 CUBIC FOOT PER 1000 SQUARE FOOT OF POND.
 - REMOVE SEDIMENT ACCUMULATIONS IN POND IN EXCESS OF 2" AND AT LEAST ONCE PER YEAR.
 - IF EROSION OR SETTLEMENT OF POND SIDE SLOPES OCCURS, REPAIR TO MATCH ORIGINAL DESIGN CONDITIONS. IF POND SIDE SLOPES CONTINUE TO SETTLE, CONSULT A REGISTERED ENGINEER SINCE THIS COULD INDICATE A SEVERE UNDERLYING PROBLEM.
 - TREES ARE NOT ALLOWED IN POND AREAS INCLUDING POND SIDE SLOPES. IF POOR VEGETATION COVER OCCURS OVER GREATER THAN 10% OF POND AREA, REPLACE VEGETATION AND DETERMINE WHY. CUT VEGETATION SUCH THAT IT DOES NOT EXCEED 10"
 - IF RODENT HOLES OCCUR OR IF ANY EVIDENCE OF WATER PIPING OCCURS, REMOVE RODENTS AND COMPLETELY FILL VOIDS WITH BENTONITE CLAY, LEAN MIX CONCRETE, OR CONSOLIDATED DENSITY FILL.
 - IF WATER REMAINS MORE THAN 72 HOURS AFTER CESSATION OF RAINFALL, A PERCOLATION TEST MUST BE DONE AND A REGISTERED ENGINEER CONSULTED.

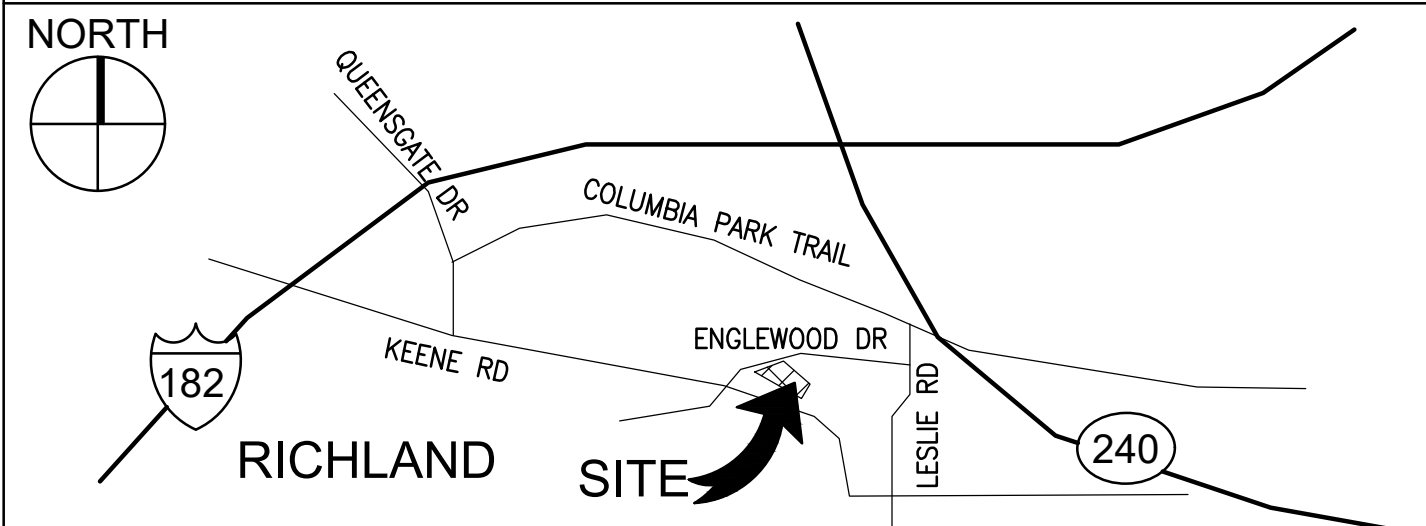
STORMWATER PREVENTION POLLUTION PLAN

- CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING AND IMPLEMENTING A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH STORMWATER MANAGEMENT MANUAL FOR EASTERN WASHINGTON (SWMMEW).
- WHENEVER INSPECTION AND OR MONITORING REVEALS THAT THE BMP'S IDENTIFIED IN THE CONSTRUCTION SWPPP ARE INADEQUATE, DUE TO THE ACTUAL DISCHARGE OF OUR POTENTIAL TO DISCHARGE A SIGNIFICANT AMOUNT OF ANY POLLUTANT, THE SWPPP SHALL BE MODIFIED, AS APPROPRIATE AND IN A TIMELY MANNER.

REFERENCE SOURCES

- WASHINGTON STATE DEPARTMENT OF HEALTH CAN BE FOUND AT: <https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/CrossConnectionControlBackflowPrevention>.
- EASTERN WASHINGTON STORMWATER MANUAL CAN BE FOUND AT: (<https://fortress.wa.gov/ecy/publications/documents/1810044.pdf>).
- CONTECH MAINTENANCE GUIDE CAN BE FOUND AT: (<https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/CDS-Maintenance-Guide.pdf?ver=2018-05-31-143259-453>).
- WSDOT STANDARD PLANS CAN BE FOUND AT: (<https://www.wsdot.wa.gov/Design/Standards/default.htm#StandardPlans>).
- FOR MUTCD STANDARD MANUAL CAN BE FOUND AT: (<https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1r2edition.pdf>).
- THE CITY OF RICHLAND STANDARD SPECIFICATIONS AND DRAWINGS CAN BE FOUND AT: (<https://www.ci.richland.wa.us/departments/public-works/engineering-and-private-development/standards--details>).
- THE CITY OF RICHLAND MUNICIPAL CODE CAN BE FOUND AT: (<https://www.codepublishing.com/WA/Richland/>).

VICINITY MAP



LEGEND AND ABBREVIATIONS

NEW	EXISTING	ACCESSIBLE PARKING MARKER
AVR	EAVR	AIR VAC RELIEF
AD	EAD	AREA DRAIN
BOU	EBOU	GUY WIRE
BO	EBO	BLOW OFF ASSEMBLY
CB	E/CB	BOLLARD
CO	E/CO	CAP
DS	E/DS	CATCH BASIN ROUND/SQUARE
EM	E/EM	CATCH BASIN SOLID
EM	E/EM	CLEAN OUT
EM	E/EM	CONTINUOUS DEFLECTIVE SEPARATION UNIT
EM	E/EM	DOWN SPOUT
EM	E/EM	DRY WELL
EM	E/EM	ELECTRICAL METER
EM	E/EM	ELECTRICAL VAULT
EM	E/EM	GAS METER
EM	E/EM	FIRE DEPARTMENT CONNECTION
EM	E/EM	FIRE HYDRANT
EM	E/EM	FLAG POLE
EM	E/EM	IRRIGATION VALVE
EM	E/EM	LIGHT POLE
EM	E/EM	MANHOLE
EM	E/EM	PAVEMENT ARROWS
EM	E/EM	POST INDICATOR VALVE
EM	E/EM	POWER POLE
EM	E/EM	REDUCER
EM	E/EM	SHRUB
EM	E/EM	SLOPE DIRECTION/PIPE SLOPE
EM	E/EM	STORM BUBBLER
EM	E/EM	STREET SIGN
EM	E/EM	STREET LIGHT
EM	E/EM	TELEPHONE PEDESTAL
EM	E/EM	THRUST BLOCK
EM	E/EM	TRANSFORMER
EM	E/EM	TREE
EM	E/EM	UTILITY BOX
EM	E/EM	VAN PAVEMENT MARKING
EM	E/EM	WATER VALVE
EM	E/EM	WATER/IRRIGATION METER
EM	E/EM	WORK MONUMENT POINT
EM	E/EM	YARD HYDRANT
EM	E/EM	EXISTING ASPHALT
EM	E/EM	EXISTING CONCRETE
EM	E/EM	EXISTING GRAVEL
EM	E/EM	EXISTING LAWN
EM	E/EM	EXISTING LANDSCAPE
EM	E/EM	EXISTING UNDEVELOPED
EM	E/EM	REMOVE LANDSCAPE
EM	E/EM	REMOVE ASPHALT
EM	E/EM	REMOVE CONCRETE
EM	E/EM	REMOVE GRAVEL
EM	E/EM	REMOVE LAWN
EM	E/EM	REMOVE UNDEVELOPED
EM	E/EM	REMOVE ASPHALT
EM	E/EM	REMOVE POLYETHYLENE
EM	E/EM	REMOVE PRESSURE SEWER
EM	E/EM	REMOVE RIGHT-OF-WAY
EM	E/EM	REMOVE RADIUS
EM	E/EM	REMOVE RAIN WATER LEADER
EM	E/EM	REMOVE SANITARY SEWER
EM	E/EM	REMOVE PIPE SLEEVE
EM	E/EM	REMOVE SPOT ELEVATION
EM	E/EM	REMOVE STORM DRAIN
EM	E/EM	REMOVE TELEPHONE
EM	E/EM	REMOVE TV TELEVISION
EM	E/EM	REMOVE TOP OF ASPHALT ELEVATION
EM	E/EM	REMOVE TOP OF CONCRETE ELEVATION
EM	E/EM	REMOVE TOP OF GRAVEL ELEVATION
EM	E/EM	REMOVE TOP OF WALL ELEVATION
EM	E/EM	REMOVE TYPICAL
EM	E/EM	REMOVE WATER
EM	E/EM	REMOVE SAWCUT LINE
EM	E/EM	REMOVE NEW EASEMENT LINE
EM	E/EM	REMOVE PROPERTY LINE
EM	E/EM	REMOVE EXISTING CONTOUR
EM	E/EM	REMOVE NEW CONTOUR
EM	E/EM	REMOVE EXISTING FENCE
EM	E/EM	REMOVE NEW FENCE
EM	E/EM	REMOVE REMOVE FENCE
EM	E/EM	REMOVE REMOVE SURFACE FEATURE
EM	E/EM	REMOVE REMOVE UNDERGROUND UTILITY
EM	E/EM	REMOVE ABANDONED UNDERGROUND UTILITY
EM	E/EM	REMOVE EXISTING UNDERGROUND UTILITY
EM	E/EM	REMOVE NEW UNDERGROUND UTILITY
EM	E/EM	REMOVE RAIL ROAD TRACKS

Building Code Review Approved by Ty Jennings, CBO MCP
 City of Richland Building Codes Review
 05/04/2020
REVIEWED
GLENWOOD CT, 1100_200955_GRD_Rev1

**** PRECONSTRUCTION MTG REQUIRED ****
 Before commencing any grading, a preconstruction meeting with the grading contractor, engineering representative, testing agency, and a CoR Building Inspector is required. See permit card for details.

GER Grading Requirements
 Grading shall be completed in accordance with GN Northern, Inc.'s Geotechnical Investigation Report dated April 30, 2020. (GNN Proj. No. 220-1234)
 Provide observation and testing reports as required by CoR Building Inspector for grading.

DRAWING INDEX

- C001 GENERAL NOTES AND LEGEND
- C003 SURVEY
- C005 EROSION CONTROL AND DEMOLITION PLAN
- C100 OVERALL SITE PLAN
- C101 PARTIAL SITE PLAN
- C102 PARTIAL SITE PLAN
- C111 PARTIAL GRADING PLAN
- C112 PARTIAL GRADING PLAN
- C121 PARTIAL UTILITY PLAN
- C122 PARTIAL UTILITY PLAN
- C501 SECTIONS AND DETAILS

Table 1705.6 REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

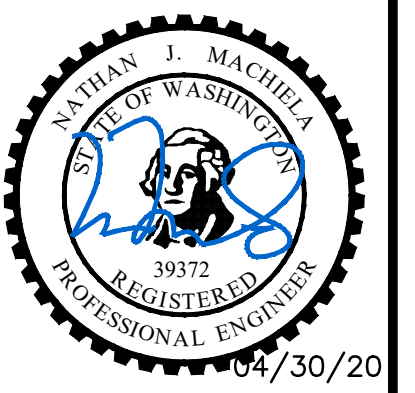
Type	Duration
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	C
2. Verify excavations are extended to proper depth and have reached proper material.	C
3. Perform classification and testing of compacted fill materials.	C
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	C
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	P

Continuous (C); Periodic (P)

I:\2019\19156-COR-Badger Mountain Park Parking Lot\DWG\19156C001.dwg - May 01 2020 - 10:05am - nma

KNUTZEN ENGINEERING
 5401 RIDGELINE DR.
 SUITE 160
 KENNEWICK, WA 99338
 1-509-222-0959
www.knutzenengineering.com

NO.	REVISIONS	DATE	DESIGN	CHKD	APPD



GENERAL NOTES AND LEGEND
 CITY OF RICHLAND
 BADGER MOUNTAIN PARK - NORTH PARKING LOT
 RICHLAND, WA 99352

APPROVAL

DESIGN	SJT	03/17/20
CHECKED	NJM	03/17/20
APPROVED	NUM	03/17/20

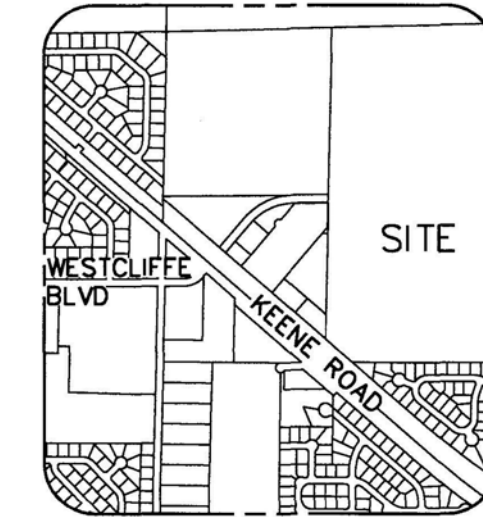
SCALE: AS NOTED
 CADFILE: 19156C001
 JOB No. 19156
 DWG. No. **C001**

1100 Glenwood Ct

20-00955

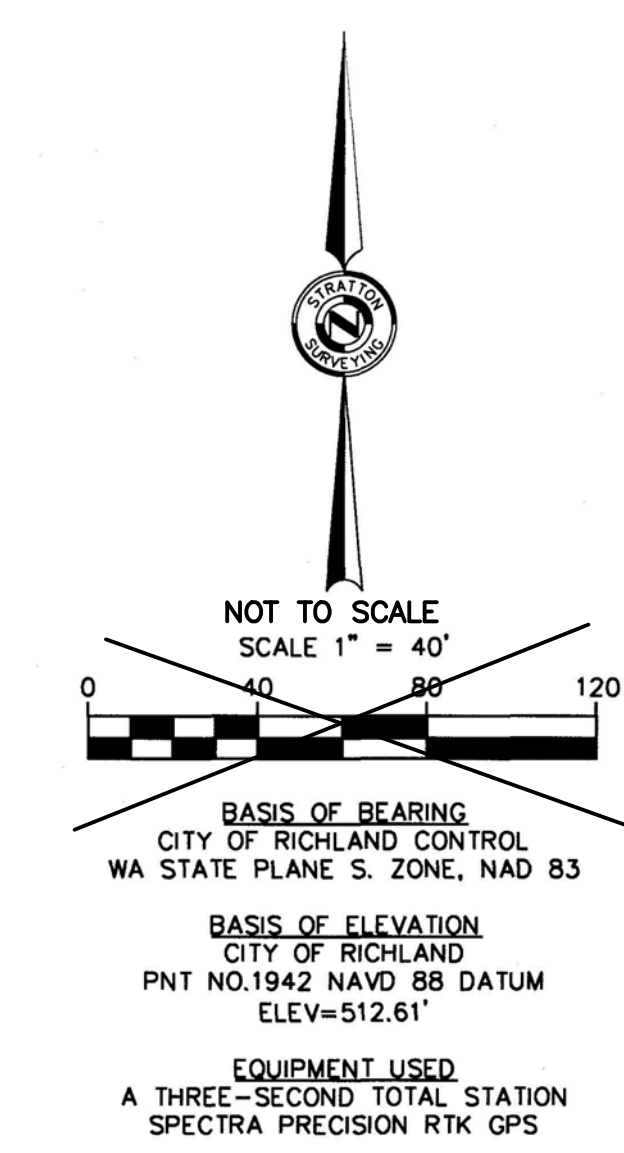
TOPOGRAPHIC DESIGN SURVEY

EAST 1/2 OF THE N.W. 1/4 OF SEC. 26, T.09N., R.28E., W.M.,
CITY OF RICHLAND,
BENTON COUNTY, WASHINGTON



VICINITY SKETCH
NOT TO SCALE

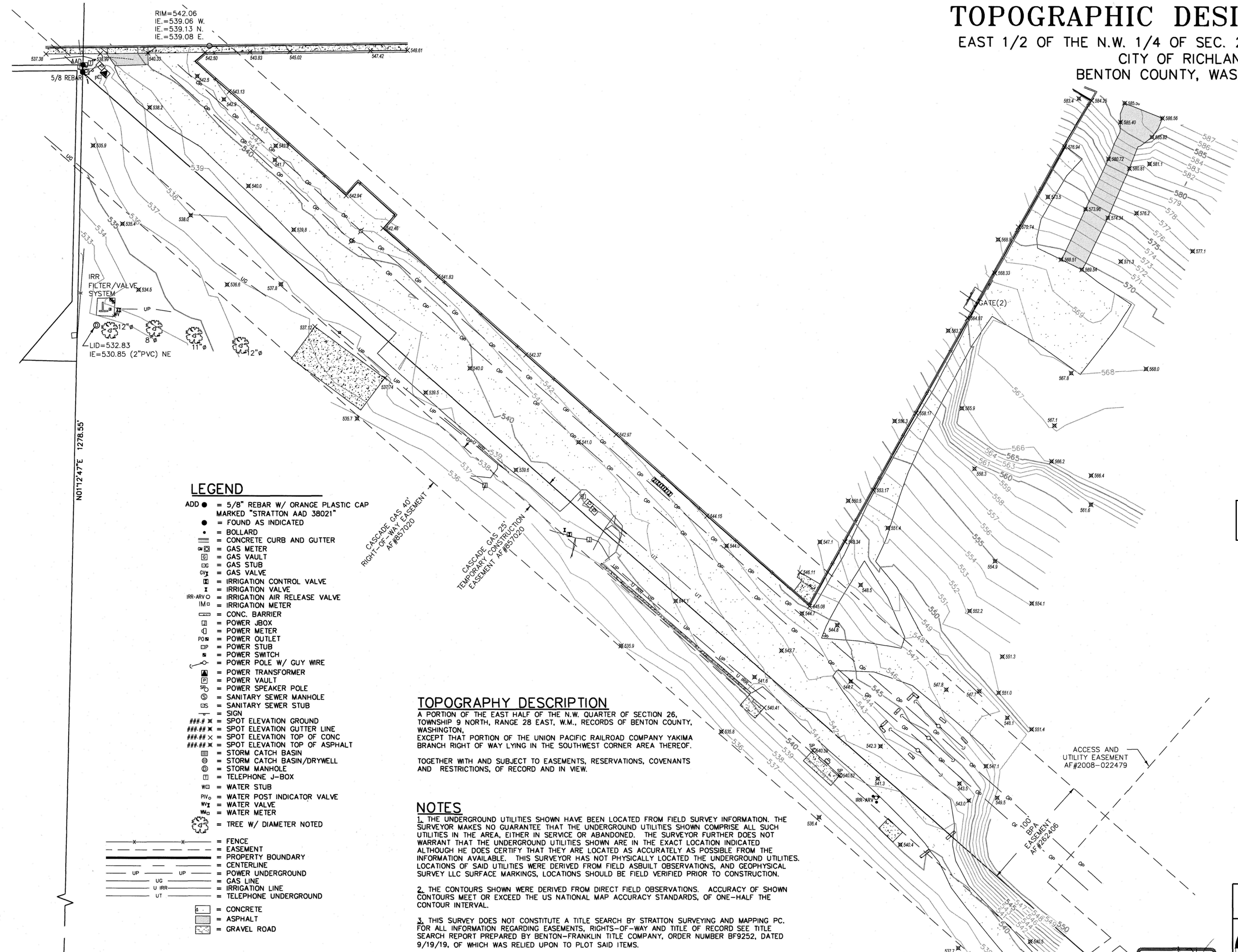
SITE SURVEY PROVIDED
FOR INFORMATION ONLY



TOPOGRAPHIC SURVEY FOR	
KNUTZEN ENGINEERING	
STRATTON SURVEYING & MAPPING, PC	
313 NORTH MORAIN STREET KENNEWICK, WA 99336 (509) 735-7364 FAX: (509) 735-6560 stratton@strattonsurvey.com	
5634TP1.DWG	© 2019
DATE: 11/05/2019	SHT. 1 OF 1
DRAWN BY: DEB	JOB # 5634

APPROVAL	
DESIGN	SJT 03/17/20
CHECKED	NJM 03/17/20
APPROVED	NUM 03/17/20
SCALE: AS NOTED	
CADFILE: 19156C001	
JOB No.	REV.
19156	1

DWG. No.
C003



- LEGEND**
- ADD ● = 5/8" REBAR W/ ORANGE PLASTIC CAP MARKED "STRATTON AAD 38021"
 - = FOUND AS INDICATED
 - = BOLLARD
 - = CONCRETE CURB AND GUTTER
 - ⊕ = GAS METER
 - ⊞ = GAS VAULT
 - ⊞ = GAS STUB
 - ⊞ = GAS VALVE
 - ⊞ = IRRIGATION CONTROL VALVE
 - ⊞ = IRRIGATION VALVE
 - ⊞ = IRRIGATION AIR RELEASE VALVE
 - ⊞ = IRRIGATION METER
 - ⊞ = CONC. BARRIER
 - ⊞ = POWER JBOX
 - ⊞ = POWER METER
 - ⊞ = POWER OUTLET
 - ⊞ = POWER STUB
 - ⊞ = POWER SWITCH
 - ⊞ = POWER POLE W/ GUY WIRE
 - ⊞ = POWER TRANSFORMER
 - ⊞ = POWER VAULT
 - ⊞ = POWER SPEAKER POLE
 - ⊞ = SANITARY SEWER MANHOLE
 - ⊞ = SANITARY SEWER STUB
 - ⊞ = SIGN
 - ### = SPOT ELEVATION GROUND
 - ### = SPOT ELEVATION GUTTER LINE
 - ### = SPOT ELEVATION TOP OF CONC
 - ### = SPOT ELEVATION TOP OF ASPHALT
 - ⊞ = STORM CATCH BASIN
 - ⊞ = STORM CATCH BASIN/DRYWELL
 - ⊞ = STORM MANHOLE
 - ⊞ = TELEPHONE J-BOX
 - ⊞ = WATER STUB
 - ⊞ = WATER POST INDICATOR VALVE
 - ⊞ = WATER VALVE
 - ⊞ = WATER METER
 - ⊞ = TREE W/ DIAMETER NOTED
 - = FENCE
 - = EASEMENT
 - = PROPERTY BOUNDARY
 - = CENTERLINE
 - = POWER UNDERGROUND
 - = GAS LINE
 - = IRRIGATION LINE
 - = TELEPHONE UNDERGROUND
 - ⊞ = CONCRETE
 - ⊞ = ASPHALT
 - ⊞ = GRAVEL ROAD

TOPOGRAPHY DESCRIPTION
A PORTION OF THE EAST HALF OF THE N.W. QUARTER OF SECTION 26, TOWNSHIP 9 NORTH, RANGE 28 EAST, W.M., RECORDS OF BENTON COUNTY, WASHINGTON, EXCEPT THAT PORTION OF THE UNION PACIFIC RAILROAD COMPANY YAKIMA BRANCH RIGHT OF WAY LYING IN THE SOUTHWEST CORNER AREA THEREOF, TOGETHER WITH AND SUBJECT TO EASEMENTS, RESERVATIONS, COVENANTS AND RESTRICTIONS, OF RECORD AND IN VIEW.

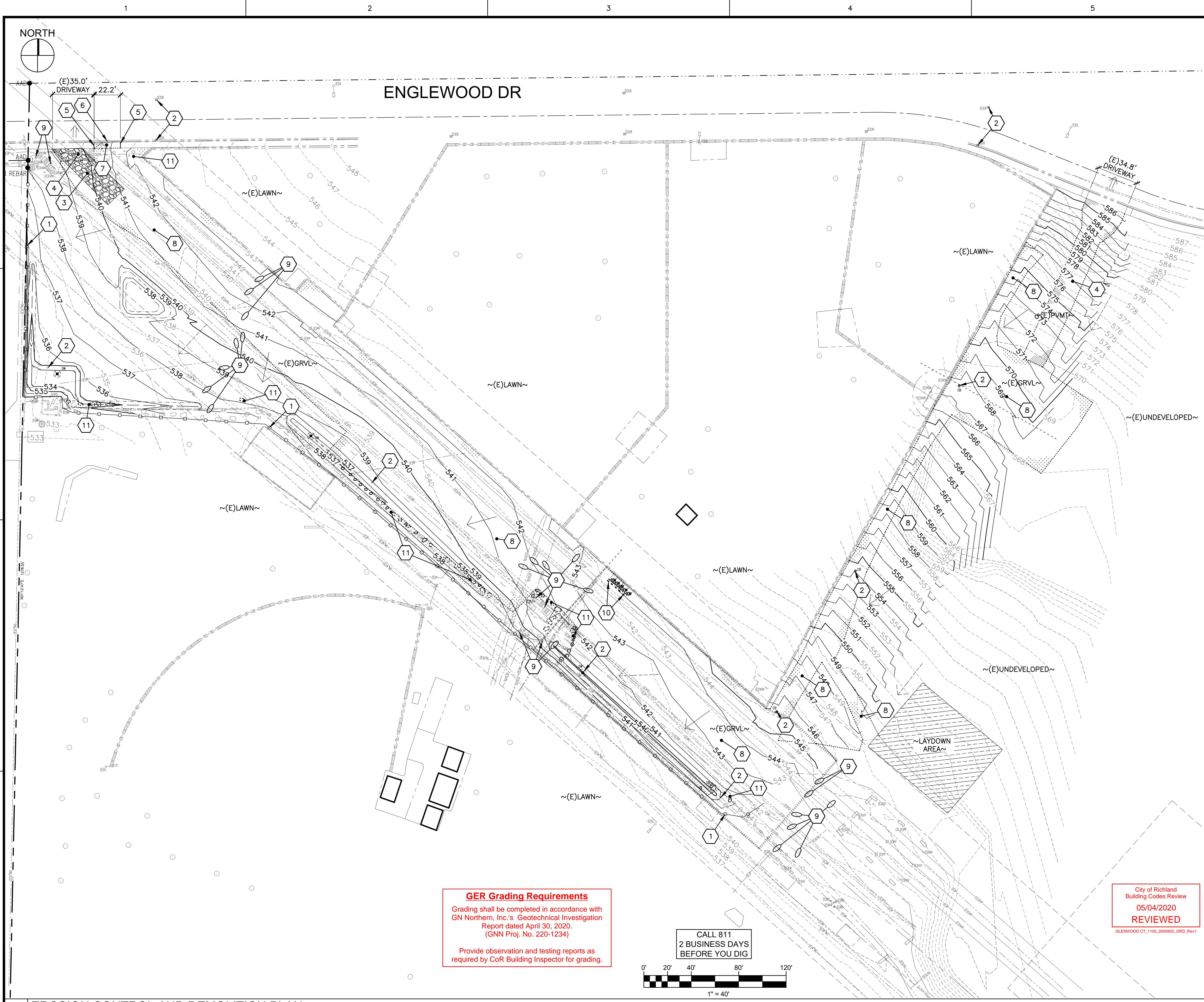
- NOTES**
- THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS POSSIBLE FROM THE INFORMATION AVAILABLE. THIS SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. LOCATIONS OF SAID UTILITIES WERE DERIVED FROM FIELD ASBUILT OBSERVATIONS, AND GEOPHYSICAL SURVEY LLC SURFACE MARKINGS. LOCATIONS SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
 - THE CONTOURS SHOWN WERE DERIVED FROM DIRECT FIELD OBSERVATIONS. ACCURACY OF SHOWN CONTOURS MEET OR EXCEED THE US NATIONAL MAP ACCURACY STANDARDS, OF ONE-HALF THE CONTOUR INTERVAL.
 - THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY STRATTON SURVEYING AND MAPPING PC. FOR ALL INFORMATION REGARDING EASEMENTS, RIGHTS-OF-WAY AND TITLE OF RECORD SEE TITLE SEARCH REPORT PREPARED BY BENTON-FRANKLIN TITLE COMPANY, ORDER NUMBER BF9252, DATED 9/19/19, OF WHICH WAS RELIED UPON TO PLOT SAID ITEMS.
 - THIS IS A TOPOGRAPHIC MAP. THIS IS NOT A BOUNDARY SURVEY AND IS ONLY INTENDED TO DEPICT THOSE TOPOGRAPHIC FEATURES OR IMPROVEMENTS SHOWN HEREON. THE PROPERTY LINES SHOWN ARE RECORD LINES AND ARE ONLY SHOWN FOR GRAPHICAL REFERENCE.
 - THE PURPOSE OF THIS TOPOGRAPHIC SURVEY IS FOR THE USE AND AID IN THE DESIGN OF A LOT DEVELOPMENT.
 - FIELD WORK COMPLETED 10/15/19

City of Richland
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A1 SURVEY
SCALE: NOT TO SCALE

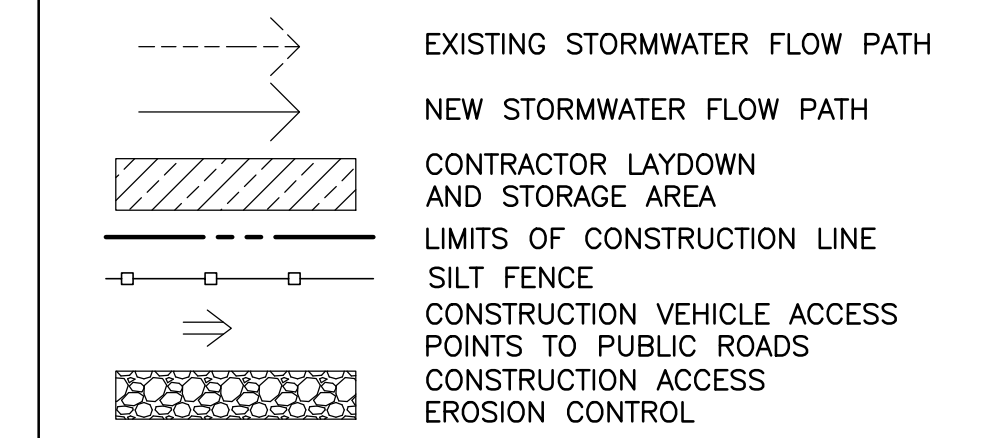
I:\2019\19156-COR Badger Mountain Park Parking Lot\DWG\19156C001.dwg - May 01 2020 - 10:05am - nma



KEY NOTES

- 1 SILT FENCING SHALL BE INSTALLED AT LOCATIONS SHOWN AND AS NEEDED AT ANY LOCATIONS OF SITE WHERE SURFACE RUNOFF MAY ERODE SOILS AWAY FROM SITE. CONTRACTOR SHALL INSTALL ADDITIONAL SILT FENCING AS NECESSARY. REFER TO DETAIL D1/C501, AND CITY STD DETAIL S16
- 2 EXISTING AND PROPOSED DRAINAGE STRUCTURE TO BE PROTECTED WITH FILTER FABRIC, SEE DETAIL D2/C501
- 3 CONSTRUCTION ACCESS, SEE GENERAL NOTES ON SHEET C001, AND CITY STD DETAIL S16
- 4 REMOVE ASPHALT AND DISPOSE OF PROPERLY, REMOVE GRAVEL BASE AND SALVAGE FOR REUSE
- 5 SAWCUT, CONCRETE SIDEWALK AS NECESSARY FOR NEW CONSTRUCTION AT NEAREST EXPANSION/CONTROL JOINT AS INDICATED, PROVIDE NEAT CUT EDGE
- 6 SAWCUT CONCRETE CURBING AS NECESSARY TO MATCH NEW DRIVE WING
- 7 REMOVE CONCRETE AND DISPOSE OF PROPERLY, REMOVE GRAVEL BASE AND SALVAGE FOR REUSE
- 8 REMOVE GRAVEL AND STOCK PILE FOR REUSE
- 9 PROTECT UTILITY IN PLACE
- 10 REMOVE AND RELOCATE CONTROLS VALVES, AND MODIFY IRRIGATION LINES AS NEEDED FOR NEW CONSTRUCTION
- 11 REMOVE OR MOVE LARGE ROCKS AS NEEDED FOR NEW CONSTRUCTION

LEGEND

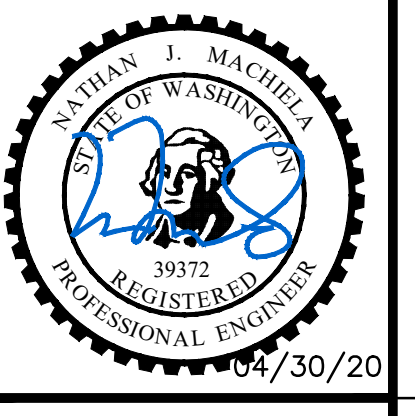


NOTES

1. SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
2. MOST SUITABLE LOCATION FOR CONSTRUCTION ENTRANCE TO BE DETERMINED BY GENERAL CONTRACTOR. CONSTRUCTION ENTRANCE SHOWN ON DRAWING IS A SUGGESTED LOCATION ONLY.
3. FINAL CONSTRUCTION LAY-DOWN AREA AND STOCKPILE AREA LOCATION AND SIZE TO BE DETERMINED BY THE GENERAL CONTRACTOR WITH APPROVAL OF OWNER.
4. CUT & FILL SLOPES SHOULD BE CONSTRUCTED WITH INCLINATION NO STEEPER THEN 2H:1V AND MUST BE PROTECTED FROM WIND AND EROSION.
5. PLACE TOPSOIL, COMPACT, AND PROVIDE TEMPORARY SOIL STABILIZATION. PERMANENT LANDSCAPING CAN BE INSTALLED ONCE LIKELIHOOD OF SEDIMENTATION DURING CONSTRUCTION IS REDUCED, UPSTREAM AREAS ARE FULLY STABILIZED, AND IRRIGATION SYSTEM IS OPERATIONAL.
6. EROSION, SEDIMENT, AND AIR QUALITY CONTROL SHALL COMPLY WITH THE COUNTY AND CITY AIR QUALITY CONTROL ORDINANCES, AND THE NOTES AND DETAILS ON THESE PLANS.
7. PROVIDE INLET PROTECTION ON ALL STORM DRAIN INLETS SURROUNDING SITE. INSPECT FABRIC REGULARLY AND REPLACE AS NECESSARY IF FOUND TO BE RIPPED OR TORN.
8. ANYTIME AN OPEN TRENCH AND DEMOLITION AREAS ARE PRESENT DURING NON WORK HOURS THE CONTRACTOR SHALL HAVE PORTABLE 6.0' CHAIN LINK CONSTRUCTION FENCE IN PLACE AROUND THE WORK AREA.
9. NOT ALL UNDERGROUND UTILITIES ON THESE DRAWINGS MAY BE SHOWN. FIELD LOCATE AND VERIFY ALL UNDERGROUND UTILITIES. COORDINATE ALL RELOCATION WORK WITH THE APPROPRIATE UTILITY COMPANY AND/OR OWNER PRIOR TO ANY EXCAVATION WORK.
10. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK.
11. ACP AND CONCRETE CUT LINES ARE BASED ON NEW SURFACE FEATURES TO BE INSTALLED. CUT LINES DO NOT ACCOUNT FOR GRADING, TRENCHING, GRADE TRANSITIONS, OR OVERLAY WORK. ADJUST ACTUAL CUT AS NECESSARY FOR RELATED NEW WORK.
12. REMOVE ALL EXISTING IRRIGATION SYSTEM COMPONENTS WITHIN NEW CONSTRUCTION AREAS THAT WILL INTERFERE WITH NEW WORK CUT, CAP, AND SEAL WATERTIGHT EXISTING PIPING TO REMAIN.
13. ALL UTILITY MAINS MUST REMAIN OPERATIONAL DURING CONSTRUCTION. COORDINATE WITH THE CITY TO SCHEDULE SERVICE OUTAGES AS NEEDED.
14. CONTRACTOR TO REMOVE ANY ABANDONED UTILITY LINES AS NEEDED FOR NEW CONSTRUCTION AND PROPOSED GRADES.

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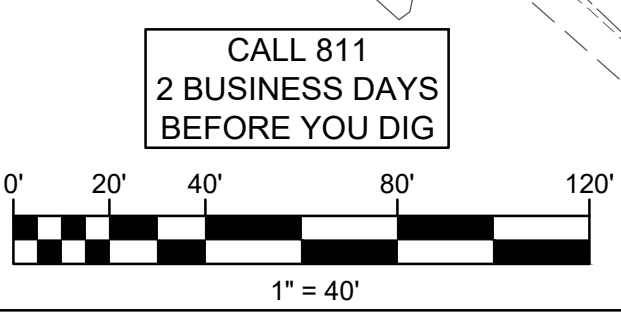
EROSION CONTROL AND DEMOLITION PLAN
 CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
 RICHLAND, WA 99352

APPROVAL	
DESIGN	SJT 03/17/20
CHECKED	NJM 03/17/20
APPROVED	NJM 03/17/20

SCALE: AS NOTED
 CADFILE: 19156C001
 JOB No. 19156
 REV. 0

DWG. No. **C005**

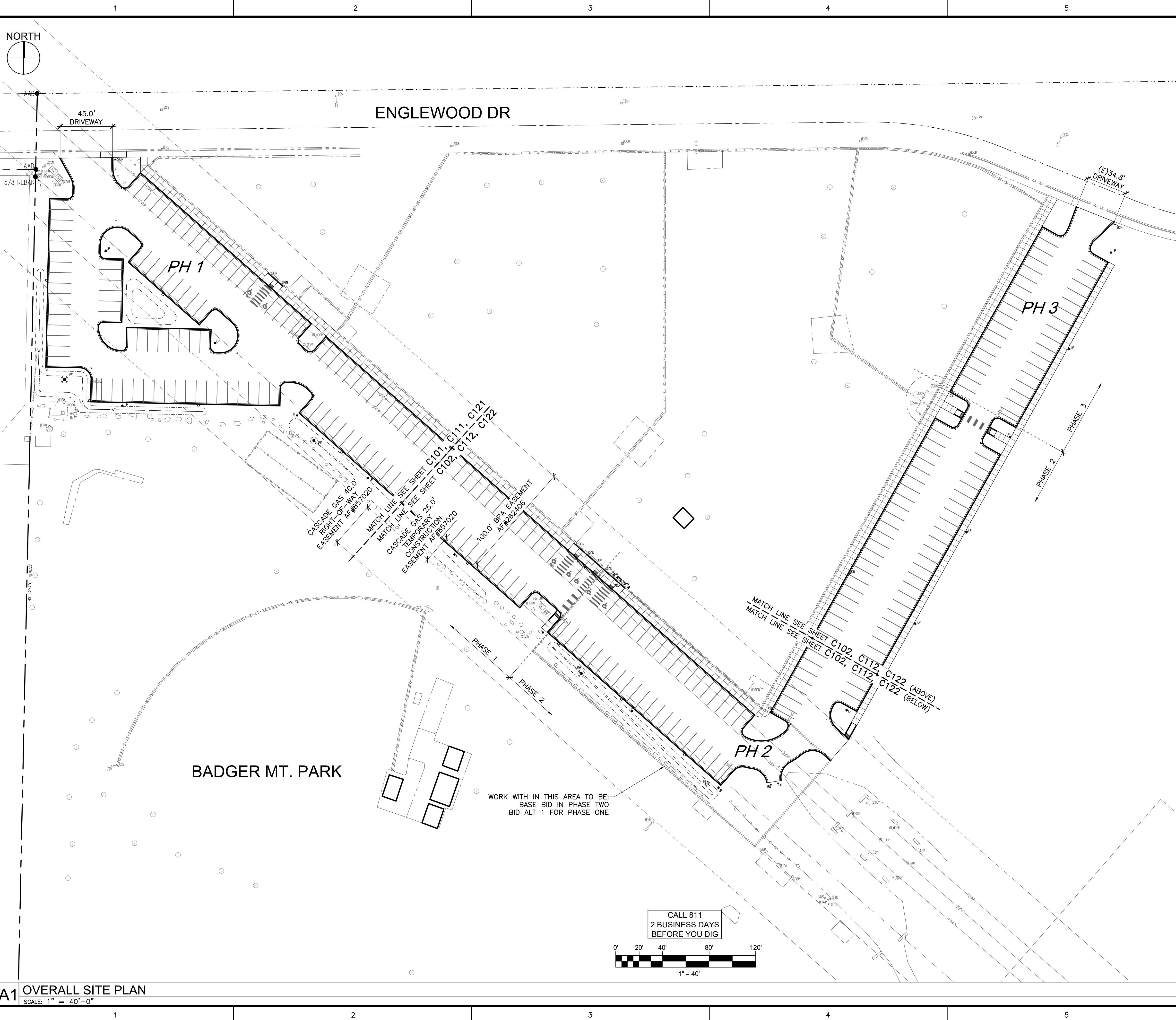
GER Grading Requirements
 Grading shall be completed in accordance with GN Northern, Inc.'s Geotechnical Investigation Report dated April 30, 2020. (GNN Proj. No. 220-1234)
 Provide observation and testing reports as required by CoR Building Inspector for grading.



City of Richland
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GLENWOOD CT, 1100_20000955_GRD_Rev1

12019156-COR-Badger Mountain Park Parking LotDWG19156C001.dwg - May 01 2020 - 10:04am - nma

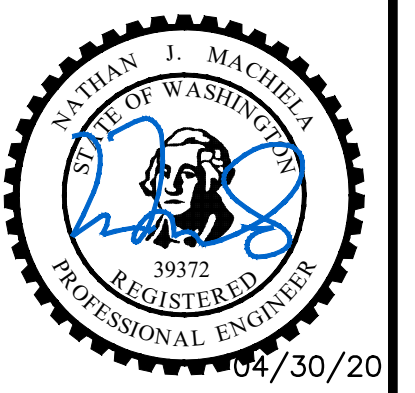
A1 EROSION CONTROL AND DEMOLITION PLAN
 SCALE: 1" = 40'-0"



- NOTES**
- SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
 - PARKING:
255 STANDARD STALLS, 5 ACCESSIBLE STALLS, 2 ACCESSIBLE VAN STALLS, 12 MOTORCYCLE STALLS, TOTAL 266 STALLS.
 - AREA:
101,042 SF IMPERVIOUS AREA, 39,828 SF PERVIOUS AREA (28%), 140,870 SF TOTAL WORK AREA.

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OVERALL SITE PLAN
 CITY OF RICHLAND
 BADGER MOUNTAIN PARK - NORTH PARKING LOT
 RICHLAND, WA 99352

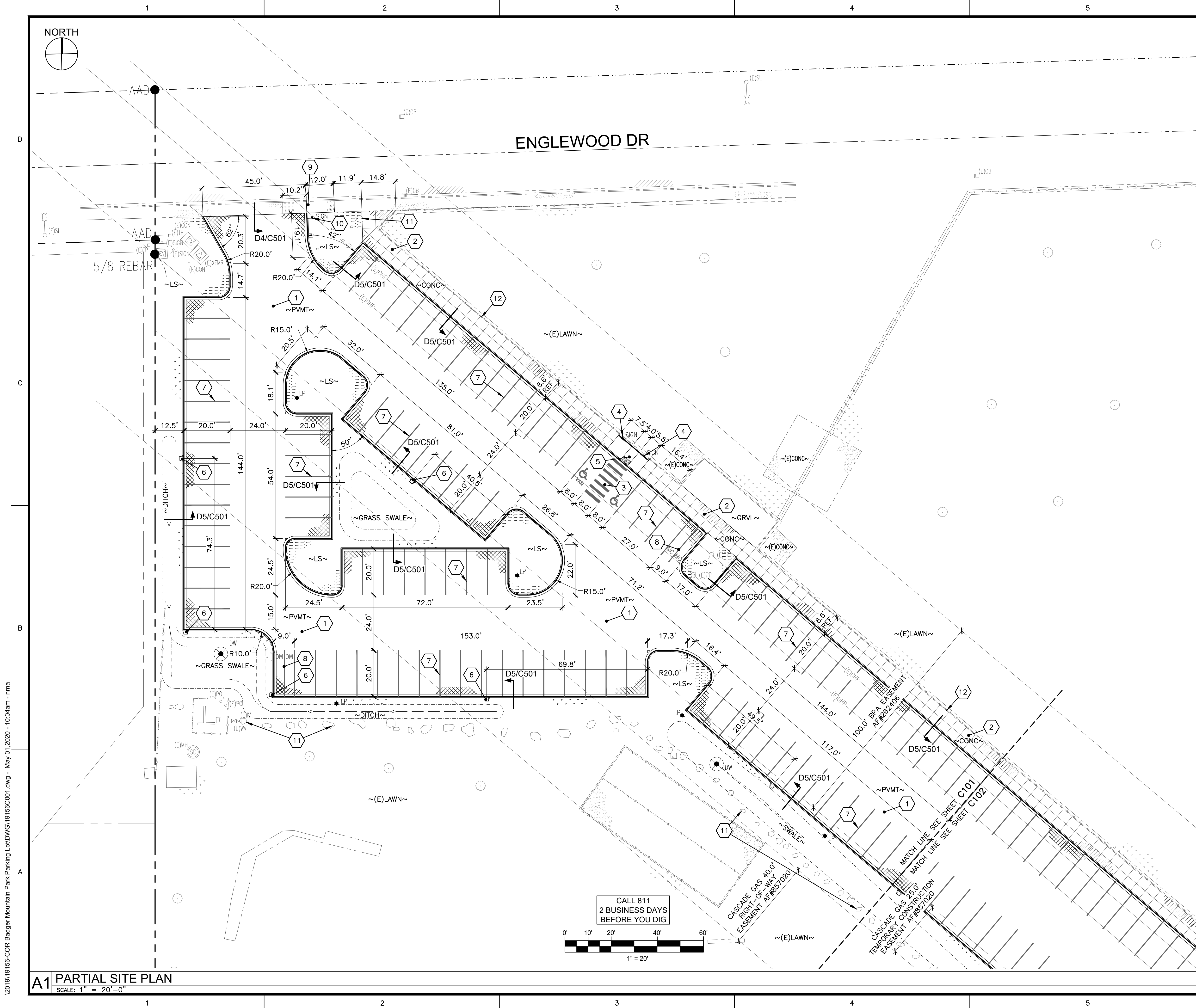
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DESIGN	SJT 03/17/20
CHECKED	NJM 03/17/20
APPROVED	NUM 03/17/20
SCALE: AS NOTED	
CADFILE: 19156C001	
JOB No.	REV.
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City of Richland
 Building Codes Review
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 GLENWOOD CT_1100_200965_GRD_Rvt1

DWG. No.
C100

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A1 OVERALL SITE PLAN
 SCALE: 1" = 40'-0"



KEY NOTES

- 1 STANDARD ASPHALT SECTION - 2-1/2" THICK ASPHALT OVER 6" TOP COURSE PER WSDOT 9-03.9(3)
- 2 STANDARD CONCRETE SECTION - 4" THICK CONCRETE SIDEWALK OVER 4" TOP COURSE PER WSDOT 9-03.9(3). TROWEL CONTROL JOINTS AT 5' O.C. AND INSTALL EXPANSION JOINTS AT 30' O.C.
- 3 PAINT WHITE 4" WIDE PARKING STRIPING, LETTERING, AND ACCESSIBLE PARKING SYMBOLS PER ADA REQUIREMENTS AS SHOWN ON PLAN. SEE DETAIL C2/C501
- 4 ACCESSIBLE PARKING SIGN, SEE DETAIL C1/C501
- 5 ACCESSIBLE RAMP, SEE DETAIL C3/C501
- 6 CONCRETE INLET, SEE DETAIL B2/C501
- 7 PAINT 4" WHITE PARKING STRIPE, TYP
- 8 PAINT 4" WIDE WHITE MOTORCYCLE STALLS
- 9 WIDEN DRIVEWAY, PER CITY STD DETAIL ST2A
- 10 "STOP" SIGN, PER MUTCD R2-1, PER CITY STD DETAIL ST23
- 11 RELOCATE EXISTING ROCKS OUT OF NEW SWALE/DITCH OR CONCRETE
- 12 THICKEN CONCRETE SIDEWALK EDGE AS NEEDED TO MEET UP WITH AND TO BE A MIN OF 4" DEEPER THAN EXISTING TOP OF MOW STRIP

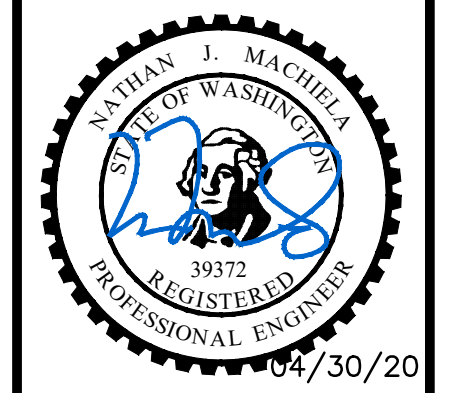
NOTES

1. SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
2. CURB RETURN RADII ARE 5.0' RADIUS UNLESS NOTED OTHERWISE.
3. DIMENSIONS ARE TO FACE OF CURB, UNLESS NOTED OTHERWISE. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK.
4. A SEALED EXPANSION JOINT MATERIAL SHALL BE USED AT JOINTS WHERE NEW CONCRETE ABUTS EXISTING CONCRETE (TYP).
5. WHERE NEW SIDEWALK, DRIVEWAY OR ACCESSIBLE RAMP TIES INTO (E)SIDEWALK, REMOVE AND REPLACE ADDITIONAL SIDEWALK PANEL FOR ADA TRANSITION IF REQUIRED.
6. REFER TO LANDSCAPE FOR FENCING, GATES AND/OR MOW STRIP.

City of Richland
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DATE	REVISIONS	NO.



PARTIAL SITE PLAN
CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
RICHLAND, WA 99352

APPROVAL		
DESIGN	SJT	03/17/20
CHECKED	NJM	03/17/20
APPROVED	NUM	03/17/20
SCALE: AS NOTED		
CADFILE: 19156C001		
JOB No.	REV.	
19156		

DWG. No.
C101

12019156-COR-Badger Mountain Park Parking LotDWG19156C001.dwg - May 01 2020 - 10:04am - nma

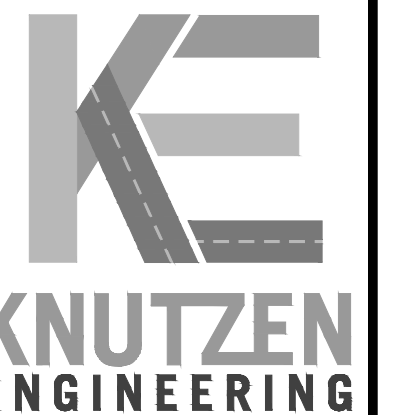
A1 PARTIAL SITE PLAN
SCALE: 1" = 20'-0"



ENGLEWOOD DR

KEY NOTES

- 1 MEET AND MATCH EXISTING ELEVATION
- 2 NEW CONCRETE SIDEWALK UP TO EXISTING MOW STRIP, MAXIMUM 3" ELEVATION DIFFERENCE
- 3 MAXIMUM 2:1 SLOPE IN LANDSCAPE AREAS
- 4 MAXIMUM 2% SLOPE IN ANY DIRECTION IN ACCESSIBLE PARKING OR MAIN WALK AREAS
- 5 45° CURB TRANSITION AT DRIVEWAY TIE IN
- 6 TRIANGLE SWALE-25.0'x28.0'x34.0'x1.0' DEEP, BOTTOM=537.50, TOP=538.50 4:1 SIDE SLOPES, 1,319 CF STORAGE
- 7 SWALE-37.0'x14.0'x1.0' DEEP BOTTOM=534.00, TOP=535.0 4:1 SIDE SLOPES, 764 CF STORAGE
- 8 IRREGULAR SWALE-224'x1.0'(VARIES)x1.5' DEEP BOTTOM=536.5, TOP=538.0 4:1 SIDE SLOPES, 1,246 CF STORAGE
- 9 DITCH- 84.5'x0.5' MIN. DEEP BOTTOM, ELEVATIONS VARIES, WITH 4:1 SIDE SLOPES
- 10 DITCH- 98.0'x0.5' MIN. DEEP BOTTOM, ELEVATIONS VARIES, WITH 4:1 SIDE SLOPES



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04/30/20

PARTIAL GRADING PLAN
CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
RICHLAND, WA 99352

GER Grading Requirements
Grading shall be completed in accordance with G/N Northern, Inc.'s Geotechnical Investigation Report dated April 30, 2020. (GNN Proj. No. 220-1234)
Provide observation and testing reports as required by CoR Building Inspector for grading.

NOTES

- 1. SEE DRAWING C001 FOR GENERAL NOTES AND LEGEND.
- 2. SPOT ELEVATIONS AND CONTOURS ARE TO THE TOP OF SIDEWALK, CURB, OR PAVEMENT FINISHED SURFACE UNLESS NOTED OTHERWISE.
- 3. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK. IMMEDIATELY NOTIFY ARCHITECT OF DISCREPANCIES BEFORE WORK COMMENCES.
- 4. SEE DRAWING C121 FOR CATCH BASIN LOCATION DIMENSIONS.
- 5. DO NOT EXCEED MAXIMUM SLOPE OF 4:1 IN ALL AREAS OF SITE.
- 6. DO NOT COMPACT SOILS IN SWALE AREAS BEYOND 85% OF MDD PER ASTM D1557.

City of Richland
Building Codes Review
05/04/2020
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GLENWOOD CT_1100_200965_GRD_Rvt1

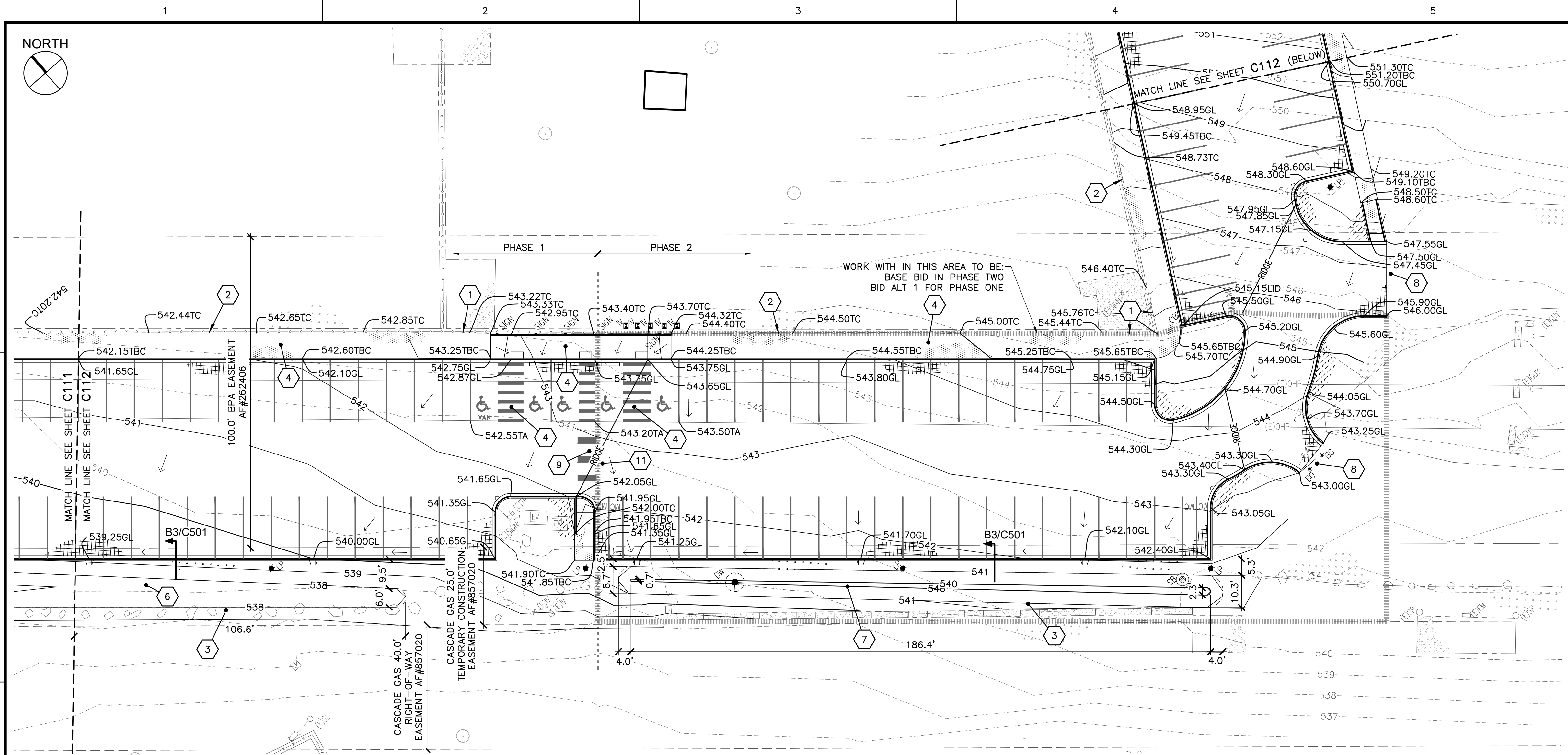
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CHECKED	NJM 03/17/20
APPROVED	NUM 03/17/20
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JOB No.	REV.
19156	1

DWG. No. **C111**

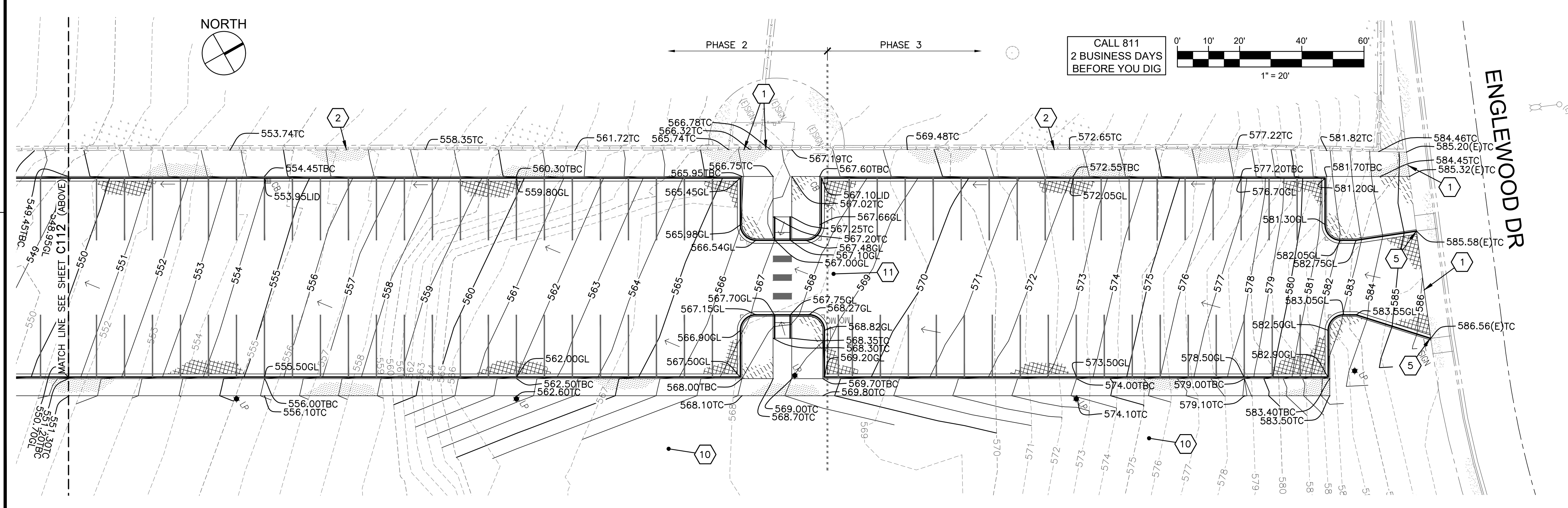


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A1 PARTIAL GRADING PLAN
SCALE: 1" = 20'-0"



B1 PARTIAL GRADING PLAN
SCALE: 1" = 20'-0"



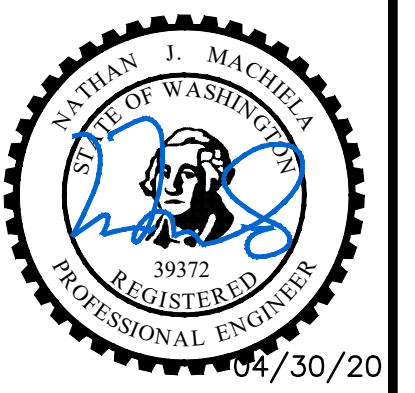
A1 PARTIAL GRADING PLAN
SCALE: 1" = 20'-0"

KEY NOTES

- 1 MEET AND MATCH EXISTING ELEVATION
- 2 NEW CONCRETE SIDEWALK UP TO EXISTING MOW STRIP, MAXIMUM 3" ELEVATION DIFFERENCE
- 3 MAXIMUM 2:1 SLOPE IN LANDSCAPE AREAS
- 4 MAXIMUM 2% SLOPE IN ANY DIRECTION IN ACCESSIBLE PARKING OR MAIN WALK AREAS
- 5 45' CURB TRANSITION AT DRIVEWAY TIE IN
- 6 IRREGULAR SWALE—SEE SHEET C111
- 7 IRREGULAR SWALE—186.4'x1.5'(VARIES)x1.0' DEEP BOTTOM=540.0, TOP=541.0 4:1 SIDE SLOPES, 942 CF STORAGE
- 8 ADJUST GRAVEL AT ASPHALT TO MEET AND MATCH ELEVATION
- 9 MAXIMUM 5% SLOPE IN DIRECTION OF TRAVEL WITH 2% CROSS SLOPE IN CROSS WALK
- 10 PLACE EXTRA MATERIAL IN UNDEVELOPED AREA, COMPACT TO 95% OF MDD PER ASTM D1557. MAXIMUM 5:1 SLOPE
- 11 ADJUST EXISTING TO TEMPORARILY MATCH UP TO NEW CONSTRUCTION AT PHASE LINE

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Provide observation and testing reports as required by CoR Building Inspector for grading.

NOTES

1. SEE DRAWING C001 FOR GENERAL NOTES AND LEGEND.
2. SPOT ELEVATIONS AND CONTOURS ARE TO THE TOP OF SIDEWALK, CURB, OR PAVEMENT FINISHED SURFACE UNLESS NOTED OTHERWISE.
3. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK. IMMEDIATELY NOTIFY ARCHITECT OF DISCREPANCIES BEFORE WORK COMMENCES.
4. SEE DRAWING C122 FOR CATCH BASIN LOCATION DIMENSIONS.
5. DO NOT EXCEED MAXIMUM SLOPE OF 4:1 IN ALL AREAS OF SITE.
6. DO NOT COMPACT SOILS IN SWALE AREAS BEYOND 85% OF MDD PER ASTM D1557.

City of Richland
Building Codes Review
05/04/2020
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GLENWOOD CT-1100_200965_GRD_Rev1

PARTIAL GRADING PLAN
CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
RICHLAND, WA 99352

APPROVAL	
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JOB No.	REV.
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DWG. No.	
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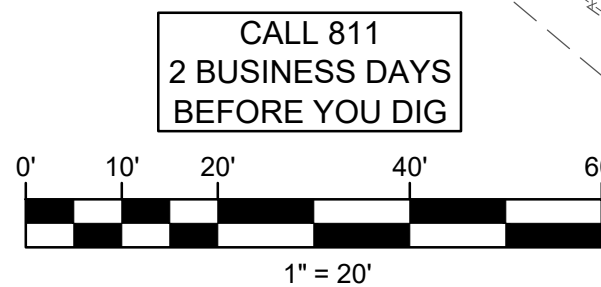


ENGLEWOOD DR

5/8 REBAR

RIM: 534.50
BOTTOM OF
ROCK 529.50

RIM: 537.00
BOTTOM OF
ROCK 532.00



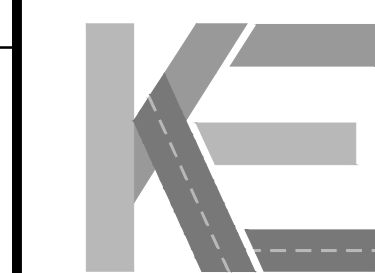
KEY NOTES

- 1 DRYWELL, SEE DETAIL A1/C501
- 2 4" IRRIGATION SLEEVE (SLV), TYPICAL. COORDINATE LOCATIONS WITH 'LANDSCAPE' PLANS
- 3 LIGHT POLE, BASE AND ASSOCIATED CONDUIT, REFER TO ELECTRICAL FOR DETAILS

NOTES

- 1. SEE DRAWING C001 FOR GENERAL NOTES AND LEGEND.
- 2. ALL UNDERGROUND UTILITIES ON THE SITE MAY NOT BE SHOWN. FIELD LOCATE AND VERIFY ALL UNDERGROUND UTILITIES, COORDINATE ALL RELOCATION WORK WITH THE APPROPRIATE UTILITY COMPANY AND/OR OWNER PRIOR TO ANY EXCAVATION WORK.
- 3. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK. IMMEDIATELY NOTIFY ARCHITECT OF DISCREPANCIES BEFORE WORK COMMENCES.
- 4. ALL SITE ELECTRICAL WORK MAY NOT BE SHOWN ON THE CIVIL SITE DRAWINGS, SITE ELECTRICAL IS SHOWN FOR REFERENCE PURPOSES ONLY. REFER TO ELECTRICAL PLANS IN THIS CONSTRUCTION PACKAGE FOR ELECTRICAL DEMOLITION, RELOCATION, AND NEW INSTALLATION.
- 5. REFER TO ELECTRICAL PLANS FOR TELEPHONE, FIBER OPTICS EQUIPMENT AND CONDUIT, FOR LOCATIONS, DETAILS AND SPECIFICATIONS. COORDINATE WITH UTILITY COMPANY FOR TIE IN LOCATION AND SPECIFICATIONS.

City of Richland
Building Codes Review
05/04/2020
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GLENWOOD CT_1100_200965_GRD_Rvt1



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PARTIAL UTILITY PLAN
CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
RICHLAND, WA 99352

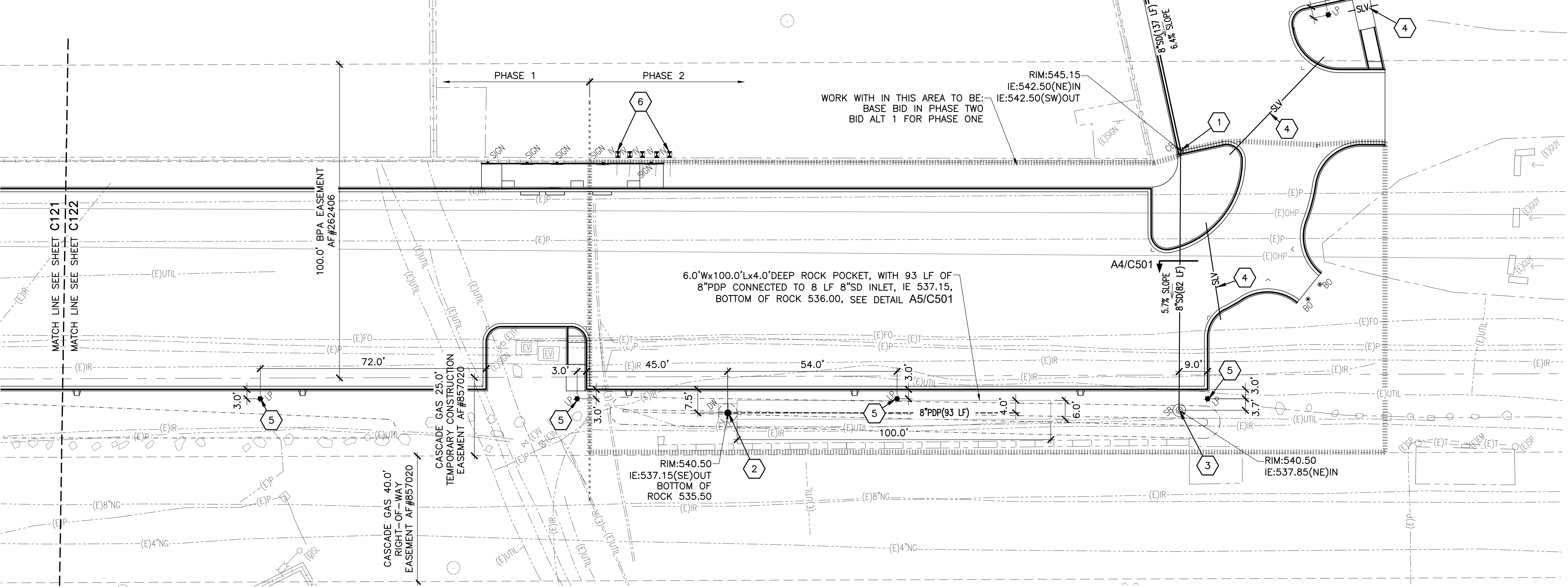
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APPROVED	NUM 03/17/20

SCALE: AS NOTED

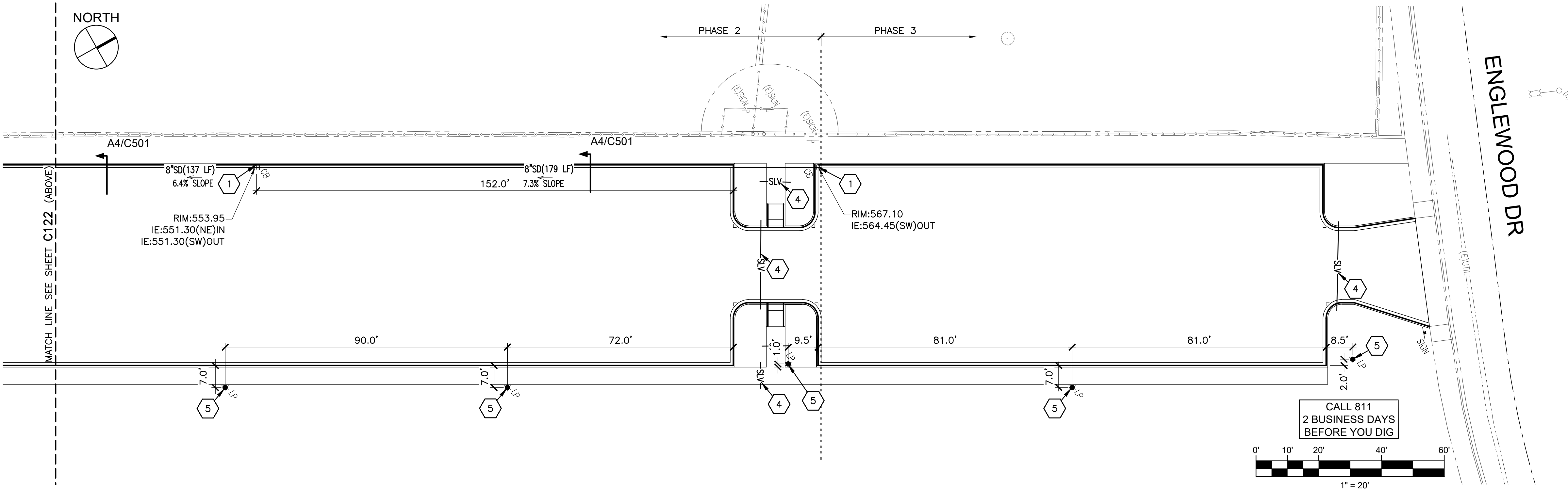
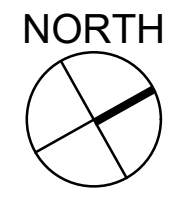
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19156C001	19156	0

DWG. No.

C121



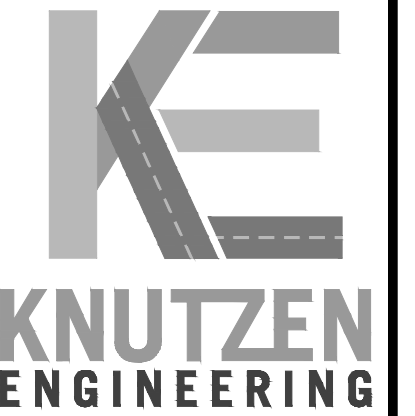
B1 PARTIAL UTILITY PLAN
SCALE: 1" = 20'-0"



A1 PARTIAL UTILITY PLAN
SCALE: 1" = 20'-0"

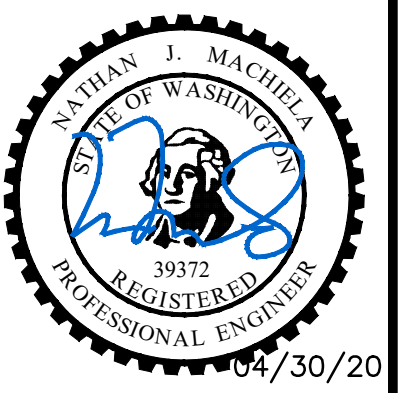
KEY NOTES

- 1 CATCH BASIN IN CURB, SEE DETAIL B4/C501
- 2 DRYWELL, SEE DETAIL A1/C501
- 3 STORM BUBBLER, SEE DETAIL B5/C501
- 4 4" IRRIGATION SLEEVE (SLV), TYPICAL COORDINATE LOCATIONS WITH LANDSCAPE PLANS
- 5 LIGHT POLE, BASE AND ASSOCIATED CONDUIT, REFER TO ELECTRICAL FOR DETAILS
- 6 RELOCATED IRRIGATION CONTROL VALVES TO OTHER SIDE OF FENCE AND OUT OF NEW SIDEWALK, COORDINATE WITH THE CITY OF RICHLAND PARKS DEPARTMENT



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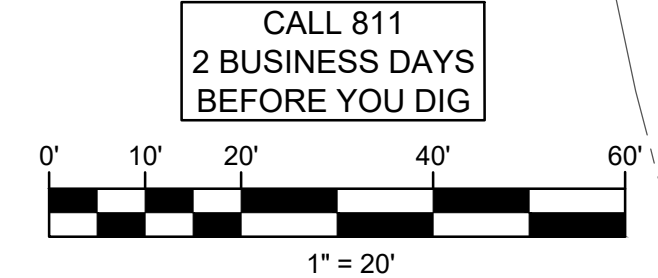
PARTIAL UTILITY PLAN
CITY OF RICHLAND
BADGER MOUNTAIN PARK - NORTH PARKING LOT
RICHLAND, WA 99352

APPROVAL	
DESIGN	SJT 03/17/20
CHECKED	NJM 03/17/20
APPROVED	NUM 03/17/20
SCALE: AS NOTED	
CADFILE: 19156C001	
JOB No.	REV.
19156	0

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C122

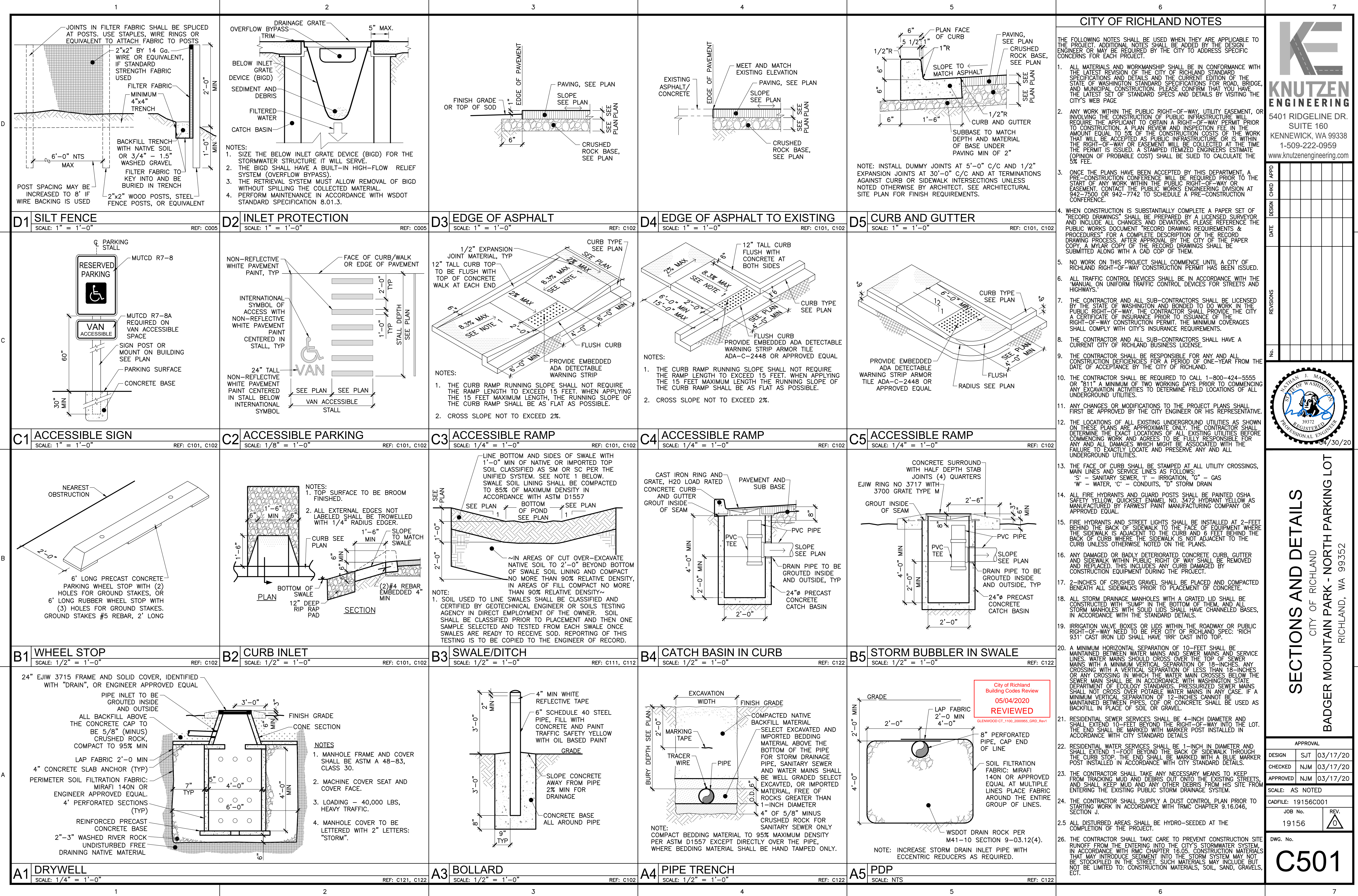
NOTES

- 1. SEE DRAWING C001 FOR GENERAL NOTES AND LEGEND.
- 2. ALL UNDERGROUND UTILITIES ON THE SITE MAY NOT BE SHOWN. FIELD LOCATE AND VERIFY ALL UNDERGROUND UTILITIES. COORDINATE ALL RELOCATION WORK WITH THE APPROPRIATE UTILITY COMPANY AND/OR OWNER PRIOR TO ANY EXCAVATION WORK.
- 3. FIELD VERIFY ALL MEASUREMENTS AND INVERTS PRIOR TO START OF WORK. IMMEDIATELY NOTIFY ARCHITECT OF DISCREPANCIES BEFORE WORK COMMENCES.
- 4. ALL SITE ELECTRICAL WORK MAY NOT BE SHOWN ON THE CIVIL SITE DRAWINGS. SITE ELECTRICAL IS SHOWN FOR REFERENCE PURPOSES ONLY. REFER TO ELECTRICAL PLANS IN THIS CONSTRUCTION PACKAGE FOR ELECTRICAL DEMOLITION, RELOCATION, AND NEW INSTALLATION.
- 5. REFER TO ELECTRICAL PLANS FOR TELEPHONE, FIBER OPTICS EQUIPMENT AND CONDUIT, FOR LOCATIONS, DETAILS AND SPECIFICATIONS. COORDINATE WITH UTILITY COMPANY FOR TIE IN LOCATION AND SPECIFICATIONS.



City of Richland
Building Codes Review
05/04/2020
REVIEWED
GLENWOOD CT_1100_200965_GRD_Rvt1

I:\2019\19156-COR Badger Mountain Park Parking Lot\DWG\19156C001.dwg - May 01 2020 - 09:50am - nma



CITY OF RICHLAND NOTES

- THE FOLLOWING NOTES SHALL BE USED WHEN THEY ARE APPLICABLE TO THE PROJECT. ADDITIONAL NOTES SHALL BE ADDED BY THE DESIGN ENGINEER OR MAY BE REQUIRED BY THE CITY TO ADDRESS SPECIFIC CONCERNS FOR EACH PROJECT.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF THE CITY OF RICHLAND STANDARD SPECIFICATIONS AND DETAILS AND THE CURRENT EDITION OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION. PLEASE CONFIRM THAT YOU HAVE THE LATEST SET OF STANDARD SPECS AND DETAILS BY VISITING THE CITY'S WEB PAGE.
 - ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY UTILITY EASEMENT, OR INVOLVING THE CONSTRUCTION OF PUBLIC INFRASTRUCTURE WILL REQUIRE THE APPLICANT TO OBTAIN A RIGHT-OF-WAY PERMIT PRIOR TO CONSTRUCTION. A PLAN REVIEW AND INSPECTION FEE IN THE AMOUNT EQUAL TO 5% OF THE CONSTRUCTION COSTS OF THE WORK THAT WILL BE ACCEPTED AS PUBLIC INFRASTRUCTURE OR IS WITHIN THE RIGHT-OF-WAY OR EASEMENT WILL BE COLLECTED AT THE TIME THE PERMIT IS ISSUED. A STAMPED ITEMIZED ENGINEERS ESTIMATE (OPINION OF PROBABLE COST) SHALL BE SUBMITTED TO CALCULATE THE 5% FEE.
 - ONCE THE PLANS HAVE BEEN ACCEPTED BY THIS DEPARTMENT, A PRE-CONSTRUCTION CONFERENCE WILL BE REQUIRED PRIOR TO THE START OF ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY OR EASEMENT. CONTACT THE PUBLIC WORKS ENGINEERING DIVISION AT 942-7500 OR 942-7742 TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE.
 - WHEN CONSTRUCTION IS SUBSTANTIALLY COMPLETE A PAPER SET OF RECORD DRAWINGS SHALL BE PREPARED BY A LICENSED SURVEYOR AND INCLUDE ALL CHANGES AND DEVIATIONS. PLEASE REFERENCE THE PUBLIC WORKS DOCUMENT "RECORD DRAWING REQUIREMENTS & PROCEDURES" FOR A COMPLETE DESCRIPTION OF THE RECORD DRAWING PROCESS. APPROVAL BY THE CITY OF THE PAPER COPY, A MYLAR COPY OF THE RECORD DRAWINGS SHALL BE SUBMITTED ALONG WITH A CAD COP OF THEM.
 - NO WORK ON THIS PROJECT SHALL COMMENCE UNTIL A CITY OF RICHLAND RIGHT-OF-WAY CONSTRUCTION PERMIT HAS BEEN ISSUED.
 - ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".
 - THE CONTRACTOR AND ALL SUB-CRONTACTORS SHALL BE LICENSED BY THE STATE OF WASHINGTON AND BONDED TO DO WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL PROVIDE THE CITY A CERTIFICATE OF INSURANCE PRIOR TO ISSUANCE OF THE RIGHT-OF-WAY CONSTRUCTION PERMIT. THE MINIMUM COVERAGES SHALL COMPLY WITH CITY'S INSURANCE REQUIREMENTS.
 - THE CONTRACTOR AND ALL SUB-CRONTACTORS SHALL HAVE A CURRENT CITY OF RICHLAND BUSINESS LICENSE.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CONSTRUCTION DEFICIENCIES FOR A PERIOD OF ONE-YEAR FROM THE DATE OF ACCEPTANCE BY THE CITY OF RICHLAND.
 - THE CONTRACTOR SHALL BE REQUIRED TO CALL 1-800-424-5555 OR "811" A MINIMUM OF TWO WORKING DAYS PRIOR TO COMMENCING ANY EXCAVATION ACTIVITIES TO DETERMINE FIELD LOCATIONS OF ALL UNDERGROUND UTILITIES.
 - ANY CHANGES OR MODIFICATIONS TO THE PROJECT PLANS SHALL FIRST BE APPROVED BY THE CITY ENGINEER OR HIS REPRESENTATIVE.
 - THE LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED WITH THE FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
 - THE FACE OF CURB SHALL BE STAMPED AT ALL UTILITY CROSSINGS, MAIN LINES AND SERVICE LINES AS FOLLOWS: "S" - SANITARY SEWER, "I" - IRRIGATION, "G" - GAS, "W" - WATER, "C" - CONDUITS, "D" STORM DRAIN
 - ALL FIRE HYDRANTS AND GUARD POSTS SHALL BE PAINTED OSHA SAFETY YELLOW, QUICKSET ENAMEL NO. 3472 HYDRANT YELLOW AS MANUFACTURED BY FARWEST PAINT MANUFACTURING COMPANY OR APPROVED EQUAL.
 - FIRE HYDRANTS AND STREET LIGHTS SHALL BE INSTALLED AT 2- FEET BEHIND THE BACK OF SIDEWALK TO THE FACE OF EQUIPMENT WHERE THE SIDEWALK IS ADJACENT TO THE CURB AND 6 FEET BEHIND THE BACK OF CURB WHERE THE SIDEWALK IS NOT ADJACENT TO THE CURB UNLESS OTHERWISE NOTED ON THE PLANS.
 - ANY DAMAGED OR BADLY DETERIORATED CONCRETE CURB, GUTTER AND SIDEWALK WITHIN PUBLIC RIGHT OF WAY SHALL BE REMOVED AND REPLACED. THIS INCLUDES ANY CURB DAMAGED BY CONSTRUCTION EQUIPMENT DURING THE PROJECT.
 - 2-INCHES OF CRUSHED GRAVEL SHALL BE PLACED AND COMPACTED BENEATH ALL SIDEWALKS PRIOR TO PLACEMENT OF CONCRETE.
 - ALL STORM DRAINAGE MANHOLES WITH A GRATED LID SHALL BE CONSTRUCTED WITH "SUMP" IN THE BOTTOM OF THEM, AND ALL STORM MANHOLES WITH LIDS SHALL HAVE CONCRETE CHANNLED BASES, IN ACCORDANCE WITH THE STANDARD DETAILS.
 - IRRIGATION VALVE BOXES OR LIDS WITHIN THE ROADWAY OR PUBLIC RIGHT-OF-WAY NEED TO BE PER CITY OF RICHLAND SPEC. "RICH 931" CAST IRON LID SHALL HAVE "IRR" CAST INTO TOP.
 - A MINIMUM HORIZONTAL SEPARATION OF 10- FEET SHALL BE MAINTAINED BETWEEN WATER MAINS AND SEWER MAINS AND SERVICE LINES. WATER MAINS SHOULD CROSS OVER THE TOP OF SEWER MAINS WITH A MINIMUM VERTICAL SEPARATION OF 18- INCHES. ANY CROSSING WITH A VERTICAL SEPARATION OF LESS THAN 18- INCHES OR ANY CROSSING IN WHICH THE WATER MAIN CROSSES BELOW THE SEWER MAIN SHALL BE IN ACCORDANCE WITH WASHINGTON STATE DEPARTMENT OF ECOLOGY STANDARDS. PRESSURIZED SEWER MAINS SHALL NOT CROSS OVER POTABLE WATER MAINS IN ANY CASE. IF A MINIMUM VERTICAL SEPARATION OF 12- INCHES CANNOT BE MAINTAINED BETWEEN PIPES, CIP OR CONCRETE SHALL BE USED AS BACKFILL IN PLACE OF SOIL OR GRAVEL.
 - RESIDENTIAL SEWER SERVICES SHALL BE 4- INCH DIAMETER AND SHALL EXTEND 10- FEET BEYOND THE RIGHT-OF-WAY INTO THE LOT. THE END SHALL BE MARKED WITH MARKER POST INSTALLED IN ACCORDANCE WITH CITY STANDARD DETAILS.
 - RESIDENTIAL WATER SERVICES SHALL BE 1- INCH IN DIAMETER AND SHALL EXTEND 1- FOOT BEYOND THE BACK OF SIDEWALK THROUGH THE CURB STOP. THE END SHALL BE MARKED WITH A BLUE MARKER POST INSTALLED IN ACCORDANCE WITH CITY STANDARD DETAILS.
 - THE CONTRACTOR SHALL TAKE ANY NECESSARY MEANS TO KEEP FROM TRACKING MUD AND DEBRIS OUT ONTO THE EXISTING STREETS, AND SHALL KEEP MUD AND ANY OTHER DEBRIS FROM HIS SITE FROM ENTERING THE EXISTING PUBLIC STORM DRAINAGE SYSTEM.
 - THE CONTRACTOR SHALL SUPPLY A DUST CONTROL PLAN PRIOR TO STARTING WORK IN ACCORDANCE WITH TRMC CHAPTER 9.16.046, SECTION J.
 - ALL DISTURBED AREAS SHALL BE HYDRO- SEEDED AT THE COMPLETION OF THE PROJECT.
 - THE CONTRACTOR SHALL TAKE CARE TO PREVENT CONSTRUCTION SITE RUNOFF FROM ENTERING INTO THE CITY'S STORMWATER SYSTEM, IN ACCORDANCE WITH RMC CHAPTER 16.05. CONSTRUCTION MATERIALS THAT MAY INTRODUCE SEDIMENT INTO THE STORM SYSTEM MAY NOT BE STOCKPILED IN OR ALONG THE STREET. SUCH MATERIALS SHALL NOT BE LIMITED TO: CONSTRUCTION MATERIALS, SOIL, SAND, GRAVELS, ECT.

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NO.	DATE	REVISIONS



SECTIONS AND DETAILS
 CITY OF RICHLAND
 BADGER MOUNTAIN PARK - NORTH PARKING LOT
 RICHLAND, WA 99352

APPROVAL	
DESIGN	SJT 03/17/20
CHECKED	NJM 03/17/20
APPROVED	NUM 03/17/20
SCALE: AS NOTED	
CADFILE: 19156C001	
JOB No.	REV.
19156	1
DWG. No.	
C501	

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Stormwater Management Design Report

Badger Mountain Community Park

350 Keene Rd
Richland, WA

Prepared For:

City of Richland
625 Swift Blvd
Richland, WA 99352

Prepared By:

Nathan Machiela, PE
Levi Gilbert, EIT
Project No. 19156



Preparation Date:

March 13, 2020

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APPENDIX B	– USDA NRCS WEB SOIL SURVEY RESULTS
APPENDIX C	– US ECOLOGY WELL LOG

1.0 PROJECT AND SITE INFORMATION

The Badger Mountain Community Park - Parking Improvements project site is located at 350 Keene Rd in Richland, WA south of Englewood Dr, as shown in Figure 1 and 2 below. The proposed improvements include the construction of approximately 104,500 square feet of walkways and parking areas. With the impervious areas there will also be several stormwater infiltration systems constructed. The 77.0-acre site zoned as public & park facilities and Natural Open Site. This site is bordered on the north, east, and south by residential properties and the west by commercial properties. The existing site topography generally slopes from north to south. Construction for the proposed improvements is expected to take place in spring 2020.

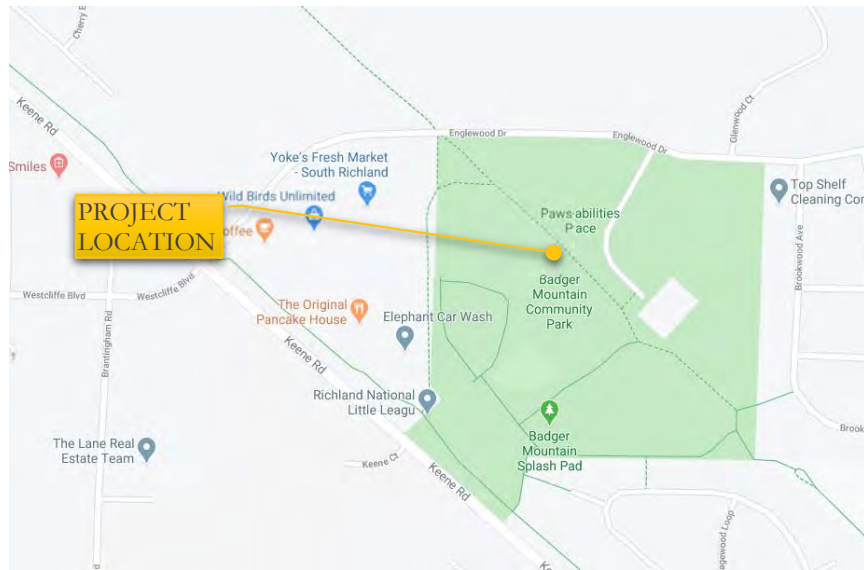


Figure 1. Vicinity Map.
(Google Maps Image)



Figure 2. Existing Site Conditions.
(Google Earth Image)

The NRCS Web Soil Survey classifies the site soil as a Haxel Loamy fine sand on the north and a Quincy loamy sand on the south. The soil located at the proposed site of the infiltration systems is a hydraulic group A soil with a saturated hydraulic conductivity of 42.0 $\mu\text{m}/\text{sec}$ which equates to 5.94 in/hr. A geotechnical engineering report was prepared by GN Northern dated 4/30/2020. The infiltration rates measured at 47 in/hr in P-1 and 38 in/hr in P-2. Based on this soil type, measured infiltration rates and hydraulic conductivity, a design infiltration rate of 2.4 in/hr was utilized.

See Table 1 for a summary of the sub-catchments.



Figure 3. Site Plan and Sub-catchment Map.

Table 1. Subcatchment Summary.

Subcatchment	Description	Impervious Area	CN	Routed to
1S-A	Walkway area A	2,030 sf	98	1P
1S-B	Parking Area A	8,300 sf	98	1P
2S	Parking Area B	21,740 sf	98	2P
3S-A	Walkway area B	2,300 sf	98	3P
3S-B	Parking Area C	17,680 sf	98	3P
4S-A	Walkway area C	5,530 sf	98	4P
4S-B	Walkway area D	2,690 sf	98	4P
4S-C	Parking Area D	44,180 sf	98	4P

2.0 METHODOLOGY

The Stormwater Management Plan was developed in accordance with the City of Richland Stormwater Design Requirements and the Stormwater Management Manual for Eastern Washington (SMMEW).

The Stormwater modeling was performed using HydroCAD 10.0 and all Stormwater calculations were completed utilizing the SCS TR-20 method. The on-site design storm event was the 25-Year, Type IA Design Storm having a 24-hour rainfall total of 1.6 inches per the 25-Year 24-Hour Isoplethials by NOAA Atlas 2 as referenced in the SMMEW.

Based on the soil classification, all impervious areas have a CN value of 98. An assumed time of concentration (TC) of 5.0 minutes was used as a minimum value.

3.0 STORMWATER MANAGEMENT PLAN AND DESIGN

The stormwater produced by the design storm event will be managed by the on-site storm-water system which includes four bio-infiltration swales, three of which also contain a drywell infiltration system. The stormwater calculations anticipate that all on-site water will be directed to the infiltration systems.

Refer to Table 1 and 2 for the summary of the sub-catchments and infiltration system and Appendix A for the stormwater calculations in the HydroCAD Report. The scope of this report includes stormwater runoff only. Refer to the summary below on how the stormwater management plan meets the Core Elements of the SMMEW:

1. Stormwater Site Plan
The corresponding Construction Drawings for the Badger Mountain Community Park - Parking Improvements project provide a detailed stormwater site plan. Please refer to the Demolition and Erosion Control Plan (Sheet C005), Grading Plan (Sheet C111) and Utility Plan (Sheet C121). The HydroCAD Report in Appendix A specifically addresses the sub-catchment areas.
2. Construction Stormwater Pollution Prevention
The corresponding Construction Drawings for the Badger Mountain Community Park - Parking Improvements project provide a detailed Construction Stormwater Pollution Prevention Plan. Please refer to the Erosion Control Notes on the General Notes Sheet (Sheet C001) and the Demolition and Erosion Control Plan (Sheet C005).
3. Source Control of Pollution
Source control for the site includes operational source control to prevent and cleanup spills and maintaining the stormwater treatment facilities in accordance with the Stormwater System Operation and Maintenance notes provided on General Notes Sheet (Sheet C001) of the corresponding Construction Drawings for the Badger Mountain Community Park - Parking Improvements project. Furthermore, all runoff will be kept and infiltrated onsite.
4. Preservation of Natural Drainage Systems
All post-development stormwater runoff will be kept and disposed of on-site to preserve the natural drainage system.
5. Runoff Treatment
Per Table 5.23 of the SMMEW, pretreatment is required prior to the infiltration trench systems which have runoff from pollutant generating surfaces. The Washington Department of Ecology approved pretreatment options include a Bio-Infiltration Swale which will be used at this site as specified on the Sections and Details Sheet (Sheets C5.01 & C5.02) of the construction plans.
6. Flow Control
All site runoff will be captured and disposed of on-site via subsurface infiltration systems and surface infiltration swales, therefore flow control criteria has been met.
7. Operation and Maintenance
Control of oil in the stormwater entering the infiltration infrastructure is the critical component of sustained operation. The tees which shall be installed on the catch basin outlet pipes limits the amount of oil entering the subsurface infiltration trenches. The geotextile fabric placed around the infiltration trench rock pocket protects from external sediments clogging the system. The infiltration trenches are accessible from the catch basin lids for sediment removal in the event of decreased performance. The Bio-Infiltration Swales should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on-site activities than the size of the swale. Stormwater System Operation and Maintenance notes are included on Sheet C001 of the corresponding Construction Drawings for the Badger Mountain Community Park - Parking Improvements project.
8. Local Requirements

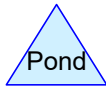
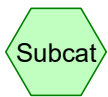
No additional requirements known.

Table 2. Infiltration System Summary.

Infiltration System	Description	Storage Description	Subcatchments	Available Storage	Peak Storage	Peak Elevation
1P	Bio-Infiltration Swale	1.0' deep irregular shaped swale,	1S-A, 1S-B	764 cf	113 cf	0.22'
2P	Infiltration System	1.0' deep irregular shaped swale, 6.0'x6.0'x5.0' deep rock pocket, & (1) 4' diameter drywell	2S	1,413 cf	212 cf	0.18'
3P	Infiltration System	2.0' deep irregular shaped swale, 6.0'x6.0'x5.0' deep rock pocket, & (1) 4' diameter drywell	3S-A, 3S-B, 3S-C	1,339 cf	153 cf	0.44'
4P	Infiltration System	2.0' deep irregular shaped swale, 6'x100'x4.0' deep rock pocket, & (1) 4' diameter drywell	4S-A, 4S-B, 4S-C	1,799 cf	1,117 cf	4.48'

APPENDIX A

HydroCAD Report



Routing Diagram for 19156-Storm
 Prepared by Knutzen Engineering, Printed 5/1/2020
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19156-Storm

Prepared by Knutzen Engineering

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
91,900	98	Paved parking, HSG A (1S-B, 2S, 3S-B, 4S-C)
12,550	98	Unconnected pavement, HSG A (1S-A, 3S-A, 4S-A, 4S-B)
104,450	98	TOTAL AREA

19156-Storm

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Page 3

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S-A: Walkway A	Runoff Area=2,030 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.02 cfs 233 cf
Subcatchment1S-B: Parking Lot A	Runoff Area=8,300 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.07 cfs 954 cf
Subcatchment2S: Parking Lot B	Runoff Area=21,740 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.18 cfs 2,498 cf
Subcatchment3S-A: Walkway B	Runoff Area=2,300 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.02 cfs 264 cf
Subcatchment3S-B: Parking Lot C	Runoff Area=17,680 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.15 cfs 2,031 cf
Subcatchment4S-A: Walkway C	Runoff Area=5,530 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.05 cfs 635 cf
Subcatchment4S-B: Walkway D	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.02 cfs 309 cf
Subcatchment4S-C: Parking Lot D	Runoff Area=44,180 sf 100.00% Impervious Runoff Depth=1.38" Tc=5.0 min CN=98 Runoff=0.37 cfs 5,076 cf
Pond 1P: Pond A	Peak Elev=537.72' Storage=113 cf Inflow=0.09 cfs 1,187 cf Outflow=0.03 cfs 1,187 cf
Pond 2P: Pond B	Peak Elev=534.18' Storage=212 cf Inflow=0.18 cfs 2,498 cf Outflow=0.14 cfs 2,498 cf
Pond 3P: Pond C	Peak Elev=536.94' Storage=153 cf Inflow=0.17 cfs 2,296 cf Outflow=0.15 cfs 2,296 cf
Pond 4P: Pond D	Peak Elev=540.48' Storage=1,117 cf Inflow=0.43 cfs 6,020 cf Outflow=0.16 cfs 6,020 cf

Total Runoff Area = 104,450 sf Runoff Volume = 12,001 cf Average Runoff Depth = 1.38"
0.00% Pervious = 0 sf 100.00% Impervious = 104,450 sf

19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Page 4

Summary for Subcatchment 1S-A: Walkway A

Runoff = 0.02 cfs @ 7.87 hrs, Volume= 233 cf, Depth= 1.38"

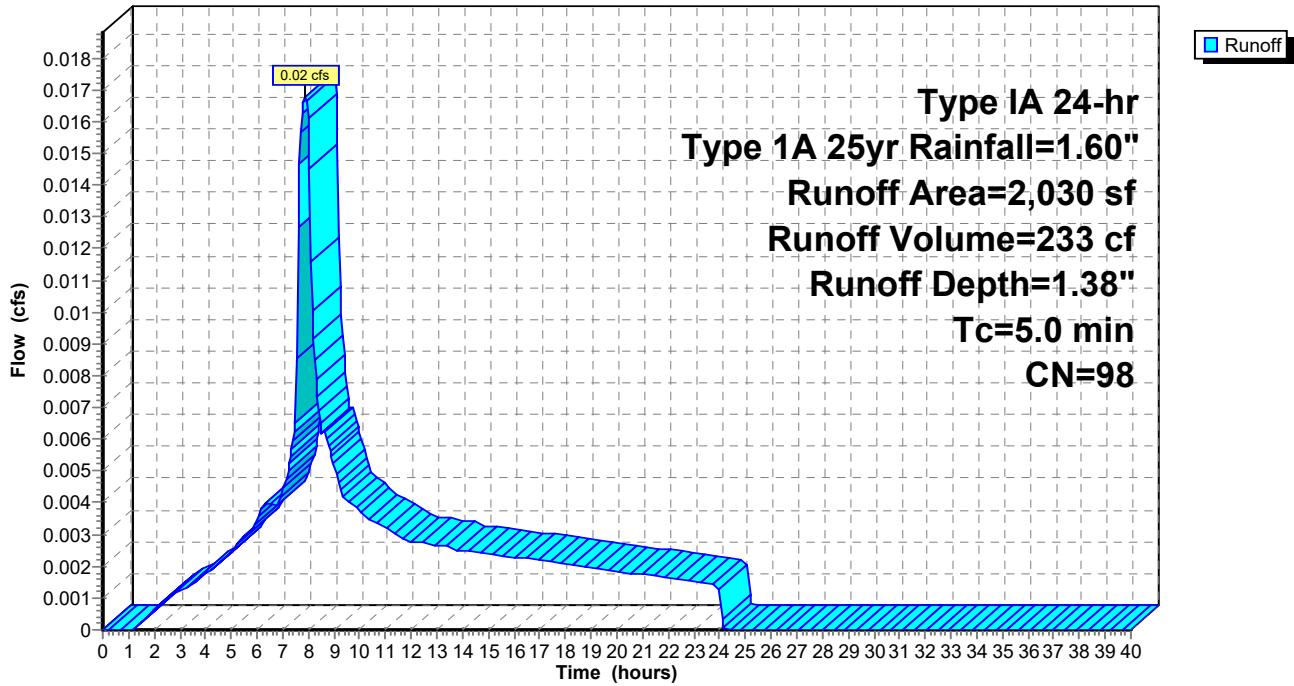
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
2,030	98	Unconnected pavement, HSG A
2,030		100.00% Impervious Area
2,030		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S-A: Walkway A

Hydrograph



19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 1S-B: Parking Lot A

Runoff = 0.07 cfs @ 7.87 hrs, Volume= 954 cf, Depth= 1.38"

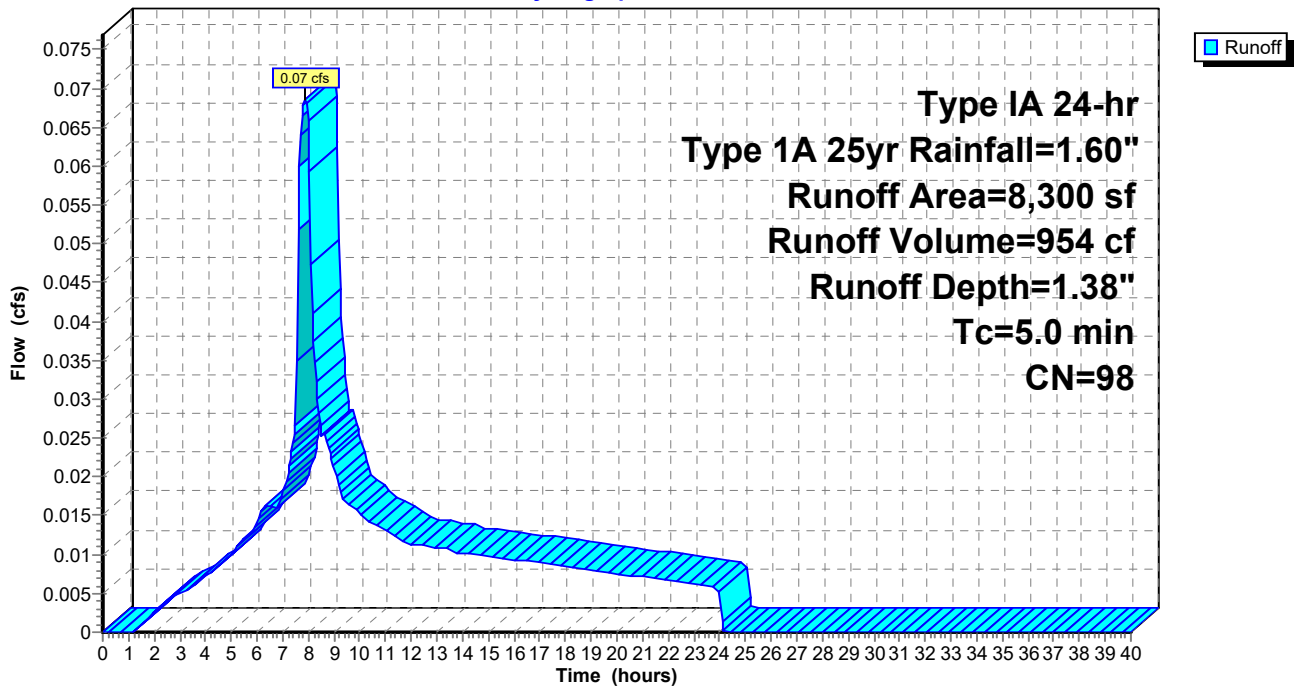
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
8,300	98	Paved parking, HSG A
8,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S-B: Parking Lot A

Hydrograph



19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Page 6

Summary for Subcatchment 2S: Parking Lot B

Runoff = 0.18 cfs @ 7.87 hrs, Volume= 2,498 cf, Depth= 1.38"

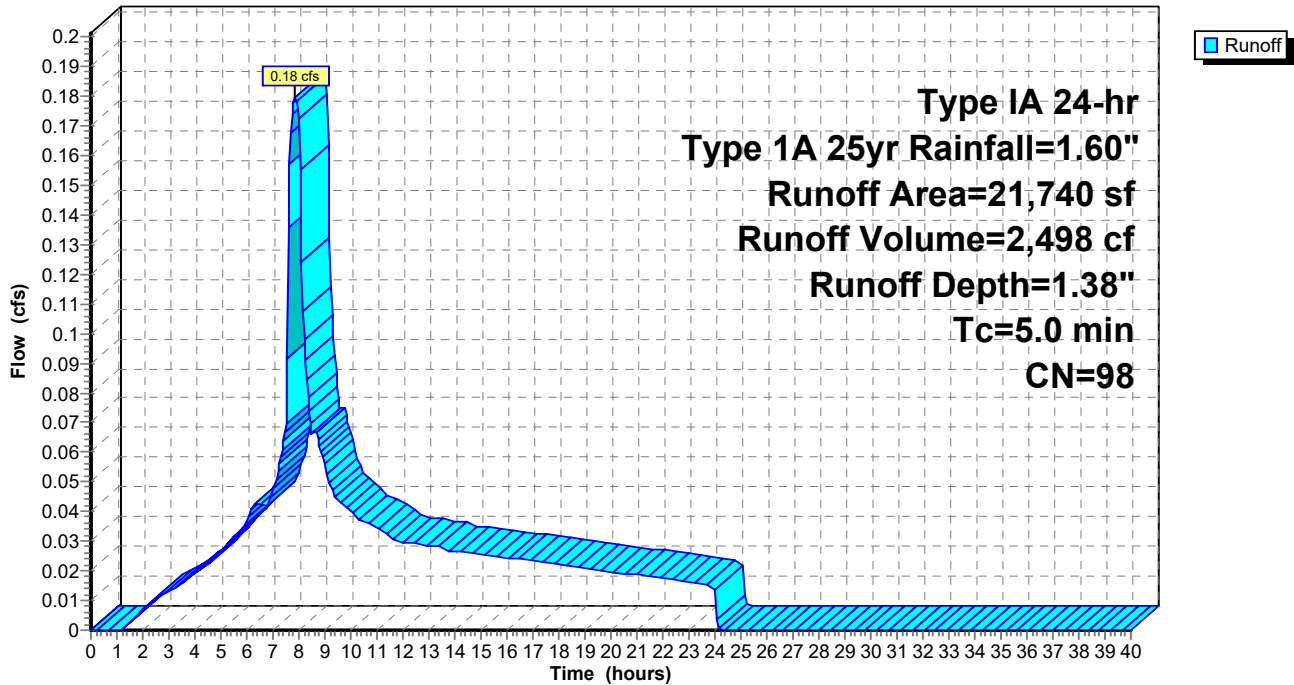
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
21,740	98	Paved parking, HSG A
21,740		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Parking Lot B

Hydrograph



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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 3S-A: Walkway B

Runoff = 0.02 cfs @ 7.87 hrs, Volume= 264 cf, Depth= 1.38"

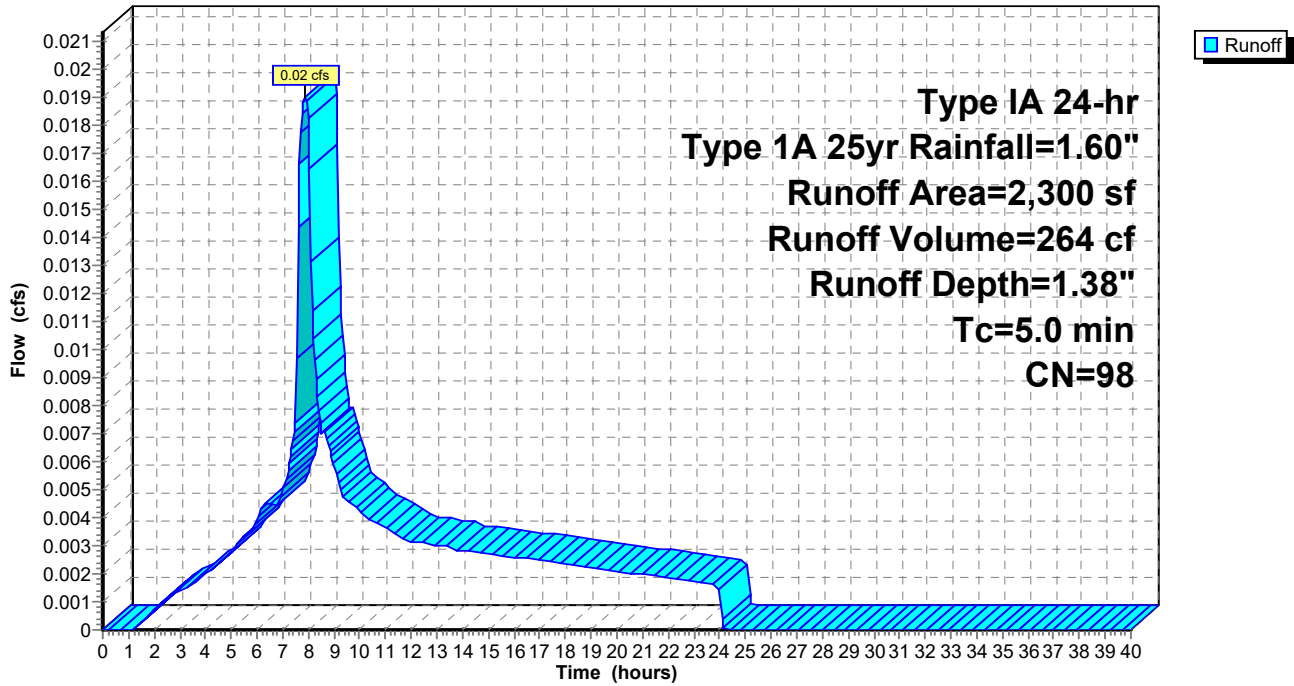
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
2,300	98	Unconnected pavement, HSG A
2,300		100.00% Impervious Area
2,300		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S-A: Walkway B

Hydrograph



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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 3S-B: Parking Lot C

Runoff = 0.15 cfs @ 7.87 hrs, Volume= 2,031 cf, Depth= 1.38"

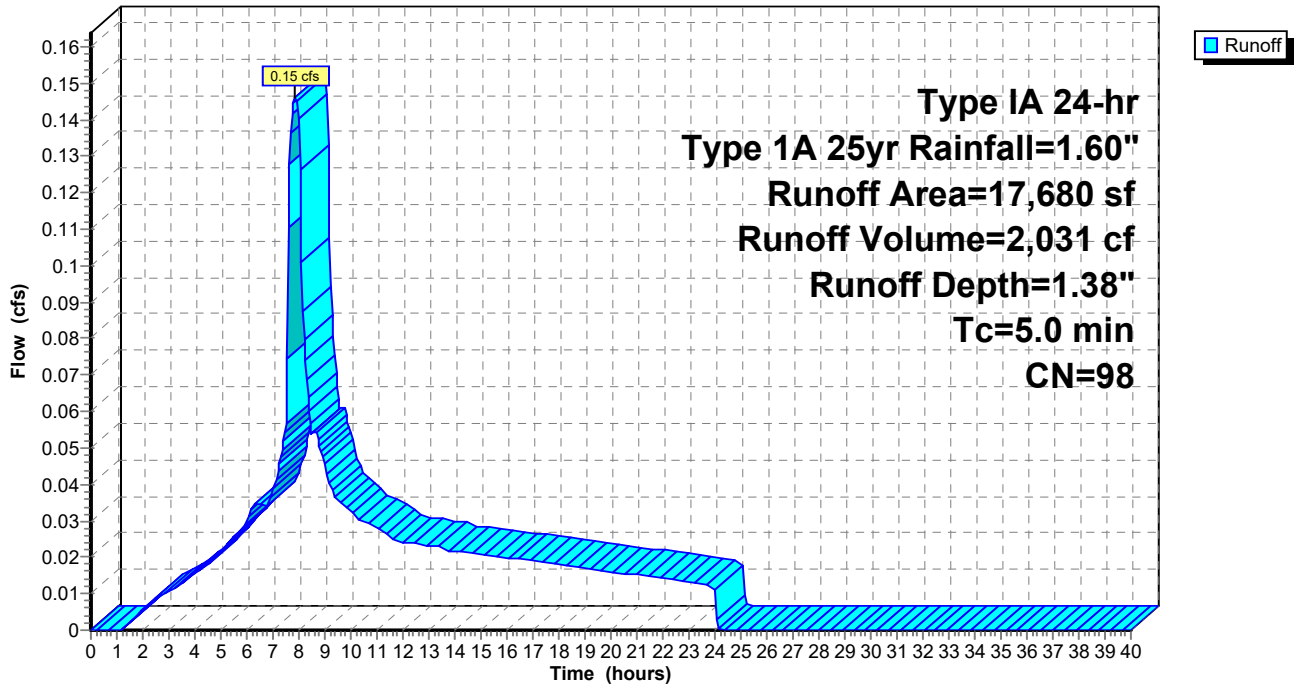
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
17,680	98	Paved parking, HSG A
17,680		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S-B: Parking Lot C

Hydrograph



19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 4S-A: Walkway C

Runoff = 0.05 cfs @ 7.87 hrs, Volume= 635 cf, Depth= 1.38"

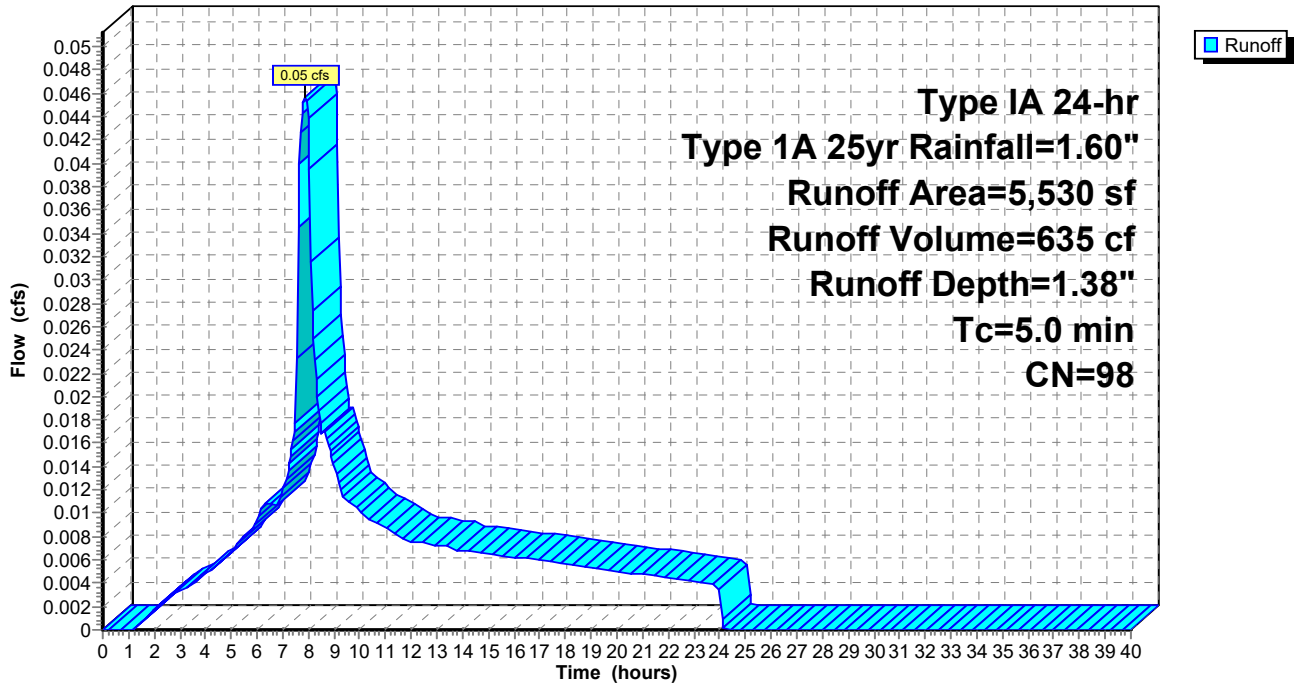
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
5,530	98	Unconnected pavement, HSG A
5,530		100.00% Impervious Area
5,530		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S-A: Walkway C

Hydrograph



19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 4S-B: Walkway D

Runoff = 0.02 cfs @ 7.87 hrs, Volume= 309 cf, Depth= 1.38"

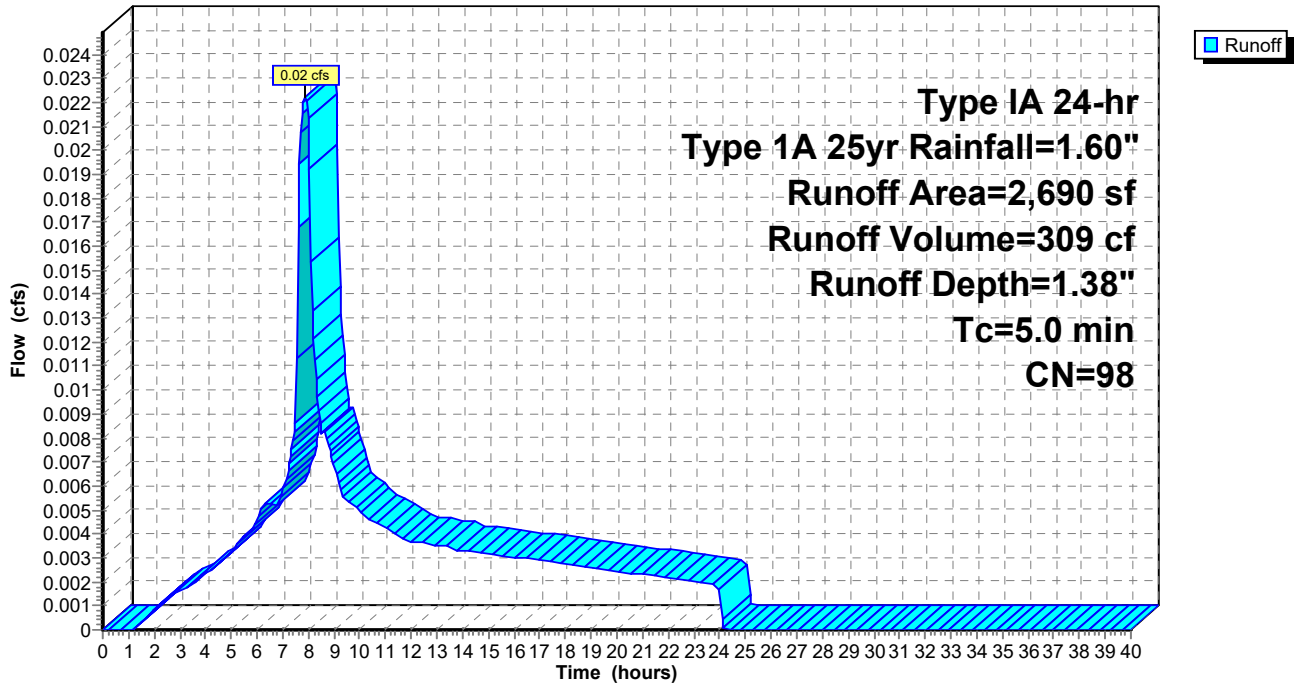
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
2,690	98	Unconnected pavement, HSG A
2,690		100.00% Impervious Area
2,690		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S-B: Walkway D

Hydrograph



19156-Storm

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Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Subcatchment 4S-C: Parking Lot D

Runoff = 0.37 cfs @ 7.87 hrs, Volume= 5,076 cf, Depth= 1.38"

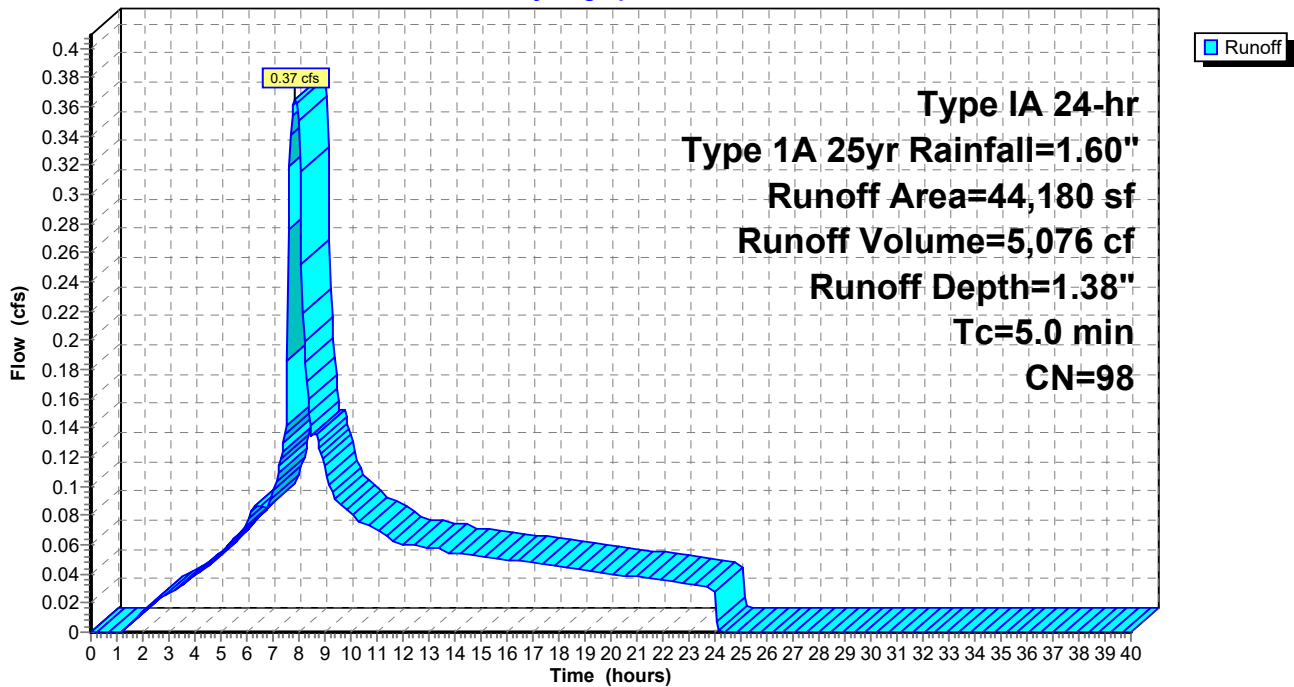
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (sf)	CN	Description
44,180	98	Paved parking, HSG A
44,180		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S-C: Parking Lot D

Hydrograph



19156-Storm

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Pond 1P: Pond A

Inflow Area = 10,330 sf, 100.00% Impervious, Inflow Depth = 1.38" for Type 1A 25yr event
 Inflow = 0.09 cfs @ 7.87 hrs, Volume= 1,187 cf
 Outflow = 0.03 cfs @ 8.42 hrs, Volume= 1,187 cf, Atten= 60%, Lag= 32.9 min
 Discarded = 0.03 cfs @ 8.42 hrs, Volume= 1,187 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Peak Elev= 537.72' @ 8.42 hrs Surf.Area= 583 sf Storage= 113 cf

Plug-Flow detention time= 15.3 min calculated for 1,185 cf (100% of inflow)
 Center-of-Mass det. time= 15.3 min (704.1 - 688.7)

Volume	Invert	Avail.Storage	Storage Description
#1	537.50'	764 cf	Custom Stage Data (Irregular) Listed below (Recalc)

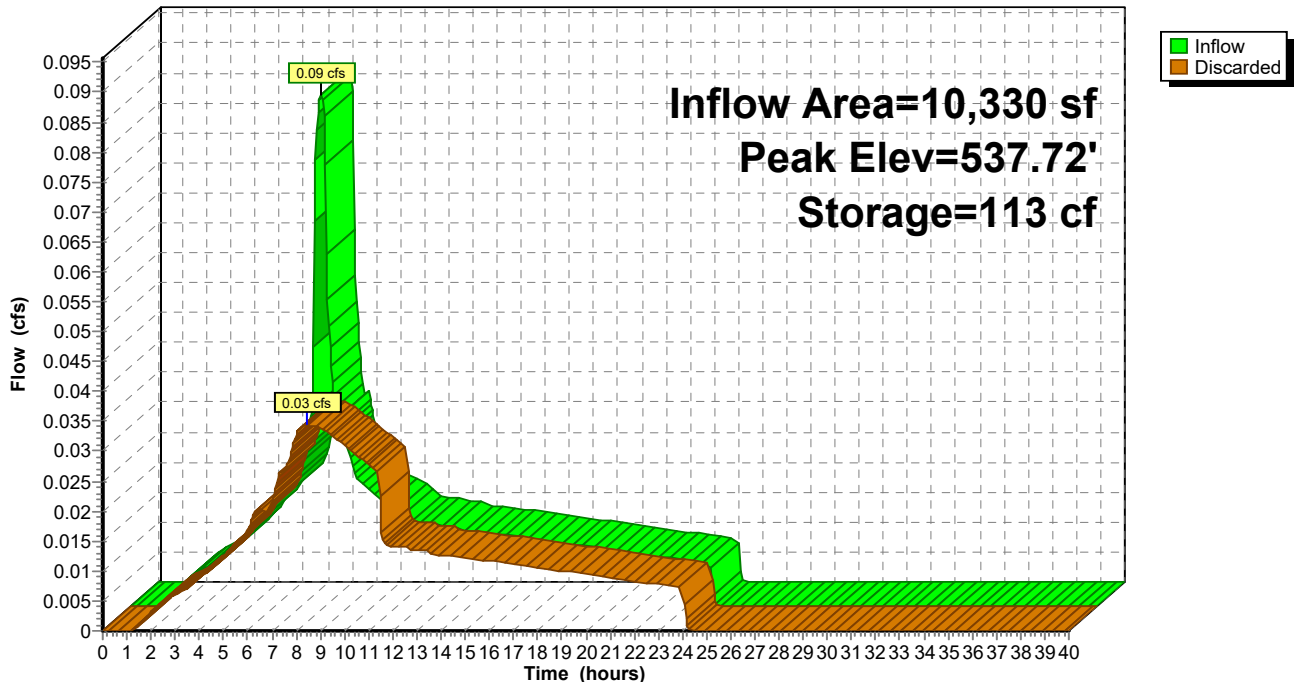
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
537.50	469	87.6	0	0	469
538.50	1,104	134.6	764	764	1,307

Device	Routing	Invert	Outlet Devices
#1	Discarded	537.50'	2.400 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.03 cfs @ 8.42 hrs HW=537.72' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Pond 1P: Pond A

Hydrograph



19156-Storm

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Pond 2P: Pond B

Inflow Area = 21,740 sf, 100.00% Impervious, Inflow Depth = 1.38" for Type 1A 25yr event
 Inflow = 0.18 cfs @ 7.87 hrs, Volume= 2,498 cf
 Outflow = 0.14 cfs @ 8.07 hrs, Volume= 2,498 cf, Atten= 20%, Lag= 11.9 min
 Discarded = 0.14 cfs @ 8.07 hrs, Volume= 2,498 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Peak Elev= 534.18' @ 8.07 hrs Surf.Area= 831 sf Storage= 212 cf

Plug-Flow detention time= 49.0 min calculated for 2,495 cf (100% of inflow)
 Center-of-Mass det. time= 49.3 min (738.0 - 688.7)

Volume	Invert	Avail.Storage	Storage Description
#1	534.00'	1,319 cf	Custom Stage Data (Irregular) Listed below (Recalc)
#2	529.50'	37 cf	6.00'W x 6.00'L x 5.00'H Prismaoid 180 cf Overall - 57 cf Embedded = 123 cf x 30.0% Voids
#3	530.00'	57 cf	4.00'D x 4.50'H Vertical Cone/Cylinder Inside #2
		1,413 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
534.00	569	128.2	0	0	569
535.00	2,256	520.4	1,319	1,319	20,815

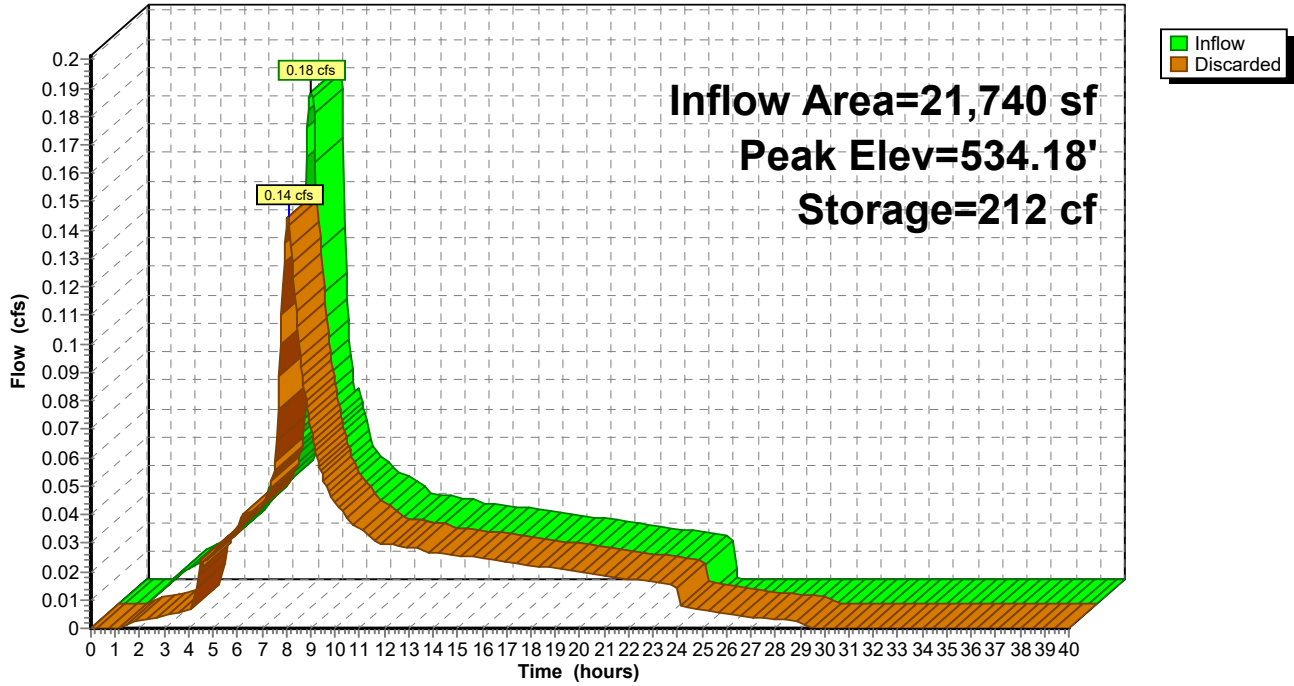
Device	Routing	Invert	Outlet Devices
#1	Discarded	529.50'	2.400 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.14 cfs @ 8.07 hrs HW=534.18' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

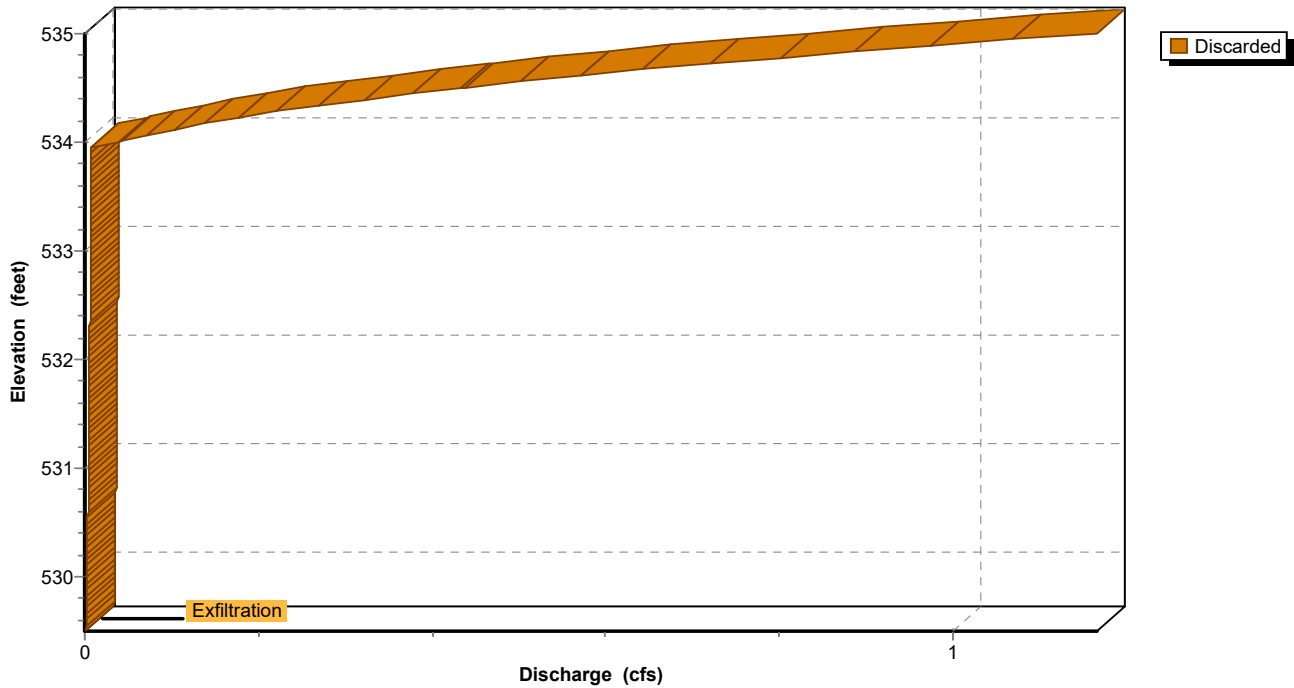
Pond 2P: Pond B

Hydrograph



Pond 2P: Pond B

Stage-Discharge



19156-Storm

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Pond 3P: Pond C

Inflow Area = 19,980 sf, 100.00% Impervious, Inflow Depth = 1.38" for Type 1A 25yr event
 Inflow = 0.17 cfs @ 7.87 hrs, Volume= 2,296 cf
 Outflow = 0.15 cfs @ 8.02 hrs, Volume= 2,296 cf, Atten= 8%, Lag= 9.2 min
 Discarded = 0.15 cfs @ 8.02 hrs, Volume= 2,296 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Peak Elev= 536.94' @ 8.02 hrs Surf.Area= 338 sf Storage= 153 cf

Plug-Flow detention time= 52.9 min calculated for 2,293 cf (100% of inflow)
 Center-of-Mass det. time= 53.2 min (741.9 - 688.7)

Volume	Invert	Avail.Storage	Storage Description
#1	536.50'	1,246 cf	Custom Stage Data (Irregular) Listed below (Recalc)
#2	532.00'	37 cf	6.00'W x 6.00'L x 5.00'H Prismaoid 180 cf Overall - 57 cf Embedded = 123 cf x 30.0% Voids
#3	532.50'	57 cf	4.00'D x 4.50'H Vertical Cone/Cylinder Inside #2
		1,339 cf	Total Available Storage

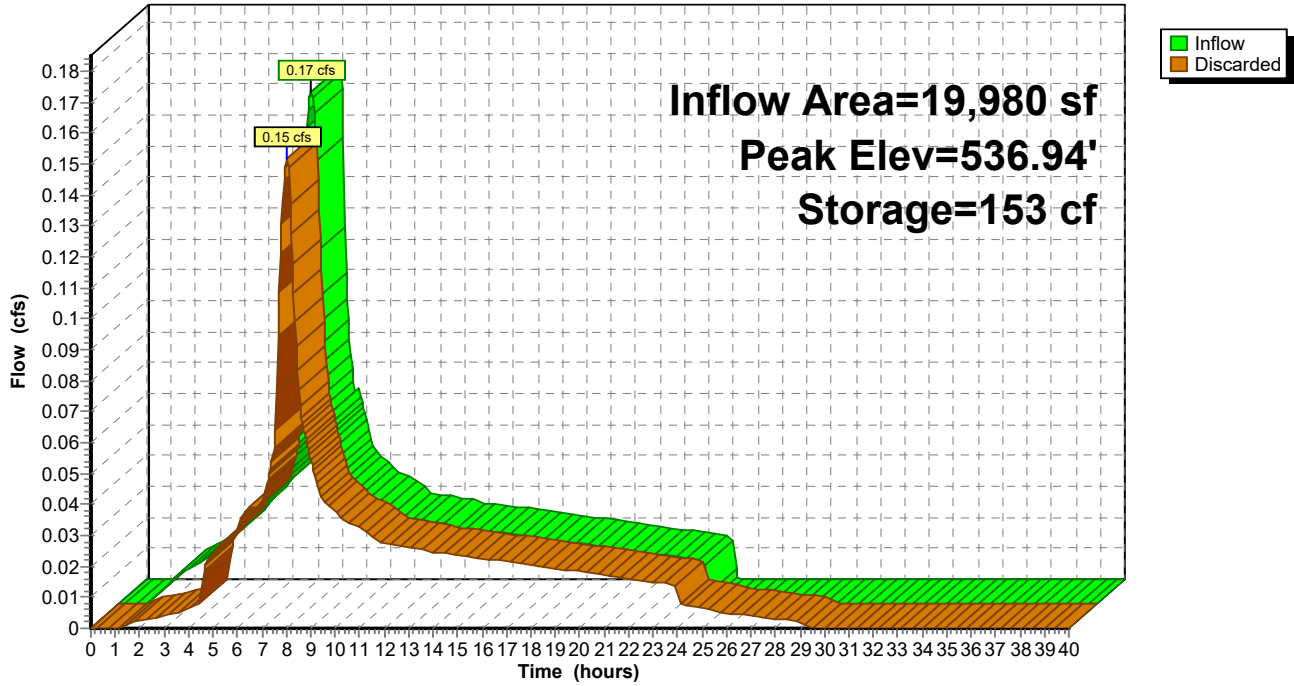
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
536.50	25	99.1	0	0	25
538.00	2,230	458.3	1,246	1,246	15,963

Device	Routing	Invert	Outlet Devices
#1	Discarded	532.00'	2.400 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.15 cfs @ 8.02 hrs HW=536.94' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

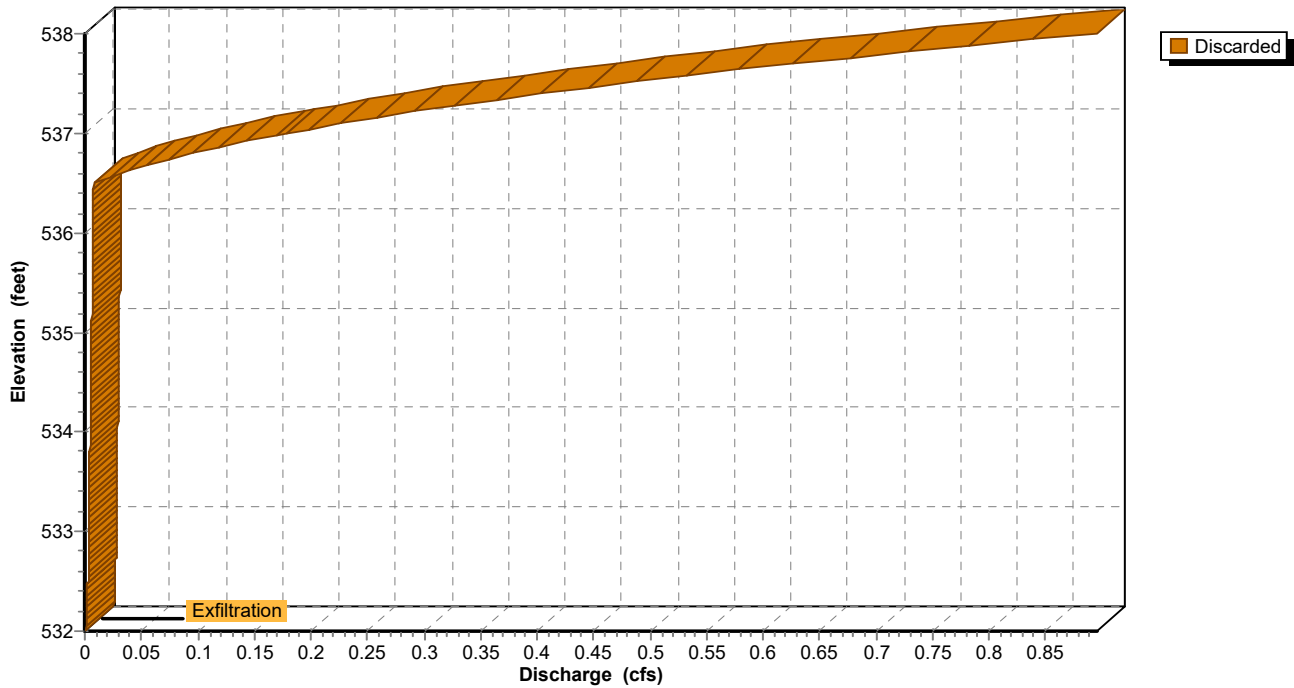
Pond 3P: Pond C

Hydrograph



Pond 3P: Pond C

Stage-Discharge



19156-Storm

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

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Summary for Pond 4P: Pond D

Inflow Area = 52,400 sf, 100.00% Impervious, Inflow Depth = 1.38" for Type 1A 25yr event
 Inflow = 0.43 cfs @ 7.87 hrs, Volume= 6,020 cf
 Outflow = 0.16 cfs @ 8.68 hrs, Volume= 6,020 cf, Atten= 63%, Lag= 48.7 min
 Discarded = 0.16 cfs @ 8.68 hrs, Volume= 6,020 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
 Peak Elev= 540.48' @ 8.68 hrs Surf.Area= 1,491 sf Storage= 1,117 cf

Plug-Flow detention time= 94.4 min calculated for 6,013 cf (100% of inflow)
 Center-of-Mass det. time= 94.4 min (783.1 - 688.7)

Volume	Invert	Avail.Storage	Storage Description
#1	540.00'	942 cf	Custom Stage Data (Irregular) Listed below (Recalc)
#2	536.00'	720 cf	6.00'W x 100.00'L x 4.00'H Prismaoid 2,400 cf Overall x 30.0% Voids
#3	536.00'	57 cf	4.00'D x 4.50'H Vertical Cone/Cylinder Inside #4
#4	535.50'	37 cf	6.00'W x 6.00'L x 5.00'H Prismaoid 180 cf Overall - 57 cf Embedded = 123 cf x 30.0% Voids
#5	537.15'	44 cf	8.0" Round Pipe Storage L= 125.0'
		1,799 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
540.00	280	375.0	0	0	280
541.00	1,830	400.1	942	942	1,876

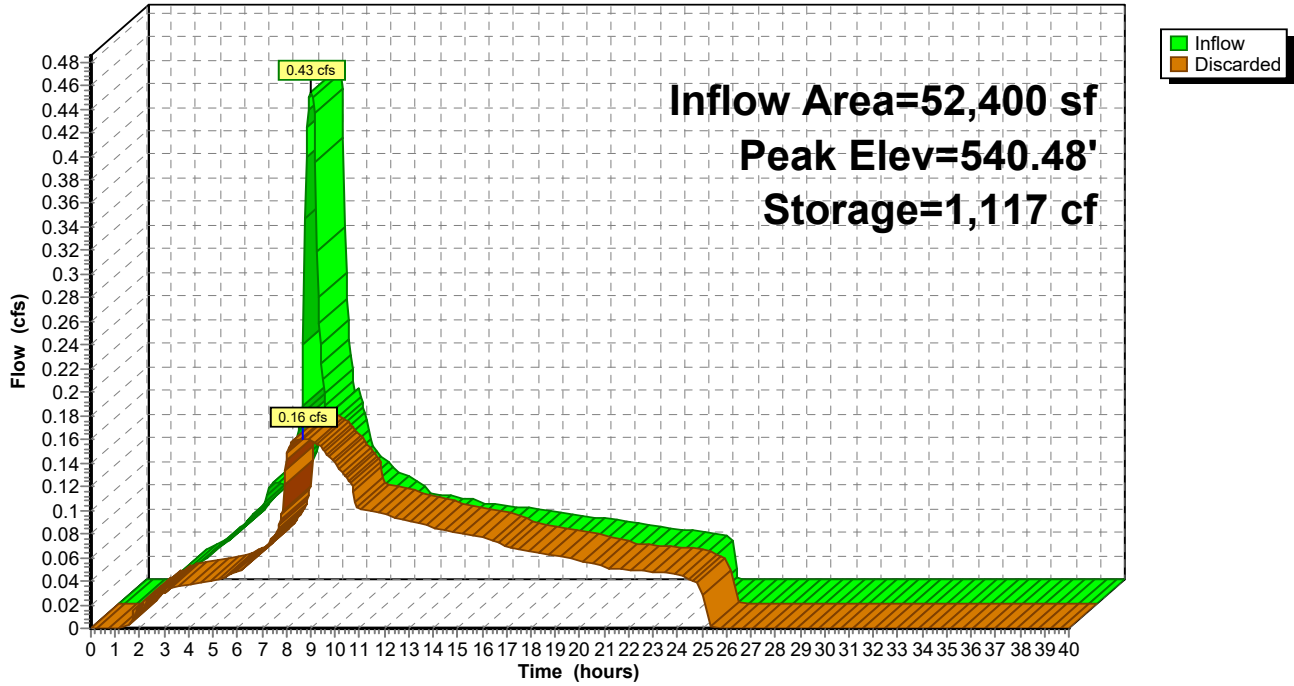
Device	Routing	Invert	Outlet Devices
#1	Discarded	535.50'	2.400 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.16 cfs @ 8.68 hrs HW=540.48' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.16 cfs)

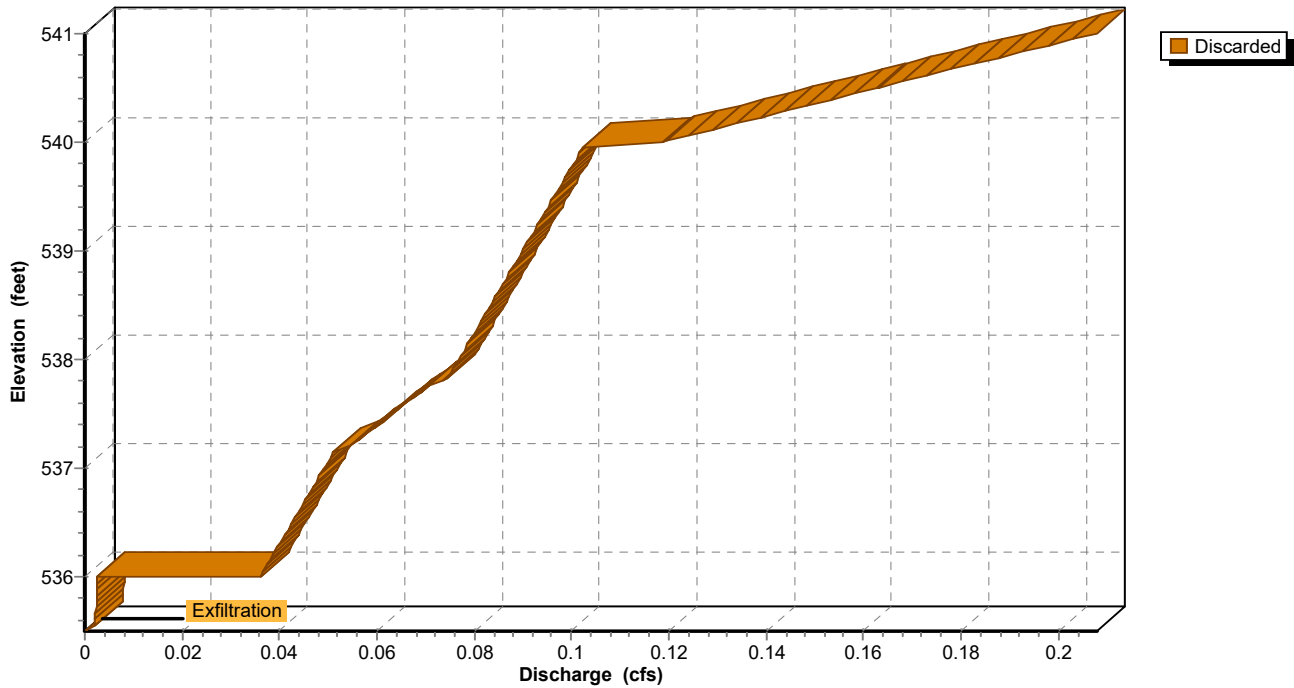
Pond 4P: Pond D

Hydrograph



Pond 4P: Pond D

Stage-Discharge



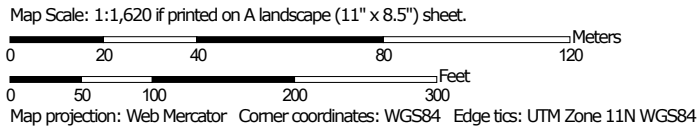
APPENDIX B

USDA NRCS Web Soil Results

Soil Map—Benton County Area, Washington



Soil Map may not be valid at this scale.



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HeD	Hezel loamy fine sand, 2 to 15 percent slopes	0.4	14.8%
QuD	Quincy loamy sand, 2 to 15 percent slopes	2.5	85.2%
Totals for Area of Interest		2.9	100.0%

Report—Chemical Soil Properties

Chemical Soil Properties—Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
HeD—Hezel loamy fine sand, 2 to 15 percent slopes								
Hezel	0-3	5.0-10	—	7.4-7.8	0	0	0	0
	3-16	5.0-10	—	7.4-7.8	0	0	0	0
	16-60	5.0-10	—	7.4-9.0	5-20	0	0.0-2.0	0
QuD—Quincy loamy sand, 2 to 15 percent slopes								
Quincy	0-9	2.0-7.0	—	7.4-8.4	0	0	0	0
	9-60	1.0-6.0	—	7.4-8.4	0-3	0	0.0-2.0	0

Data Source Information

Soil Survey Area: Benton County Area, Washington
 Survey Area Data: Version 15, Sep 16, 2019

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
HeD—Hezel loamy fine sand, 2 to 15 percent slopes														
Hezel	100	C	0-3	Loamy fine sand	SM	A-2	0- 0- 0	0- 0- 0	100-100-100	100-100-100	50-68-85	15-25-35	0-5 -10	NP
			3-16	Loamy fine sand, loamy sand, fine sand	SM	A-2	0- 0- 0	0- 0- 0	100-100-100	100-100-100	50-63-75	15-25-35	0-5 -10	NP
			16-60	Stratified fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	50-65-80	15-20-25	NP-3 -5
QuD—Quincy loamy sand, 2 to 15 percent slopes														
Quincy	100	A	0-9	Loamy sand	SM	A-2	0- 0- 0	0- 0- 0	100-100-100	100-100-100	65-83-100	15-23-30	0-5 -10	NP
			9-60	Loamy fine sand, fine sand, sand	SM	A-2	0- 0- 0	0- 0- 0	100-100-100	100-100-100	65-73-80	10-20-30	0-5 -10	NP

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
HeD—Hezel loamy fine sand, 2 to 15 percent slopes														
Hezel	0-3	-80-	-17-	2- 4- 5	1.25-1.35 -1.45	42.00-92.00-14 1.00	0.09-0.11-0. 13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.32	5	2	134
	3-16	-81-	-17-	0- 3- 5	1.40-1.50 -1.60	42.00-92.00-14 1.00	0.08-0.10-0. 12	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.43	.43			
	16-60	-34-	-59-	5- 7- 8	1.30-1.40 -1.50	1.40-3.00-4.00	0.13-0.17-0. 21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
QuD—Quincy loamy sand, 2 to 15 percent slopes														
Quincy	0-9	-80-	-16-	1- 4- 6	1.45-1.55 -1.65	42.00-92.00-14 1.00	0.09-0.11-0. 12	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.15	.15	5	2	134
	9-60	-79-	-17-	1- 4- 7	1.50-1.60 -1.70	42.00-92.00-14 1.00	0.08-0.10-0. 12	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.32			

Data Source Information

Soil Survey Area: Benton County Area, Washington
 Survey Area Data: Version 15, Sep 16, 2019

APPENDIX C

US Ecology Well Log



WELL LOG CHANGE FORM

Instructions Record any change made to the well log record on this form Append this form to the well log image File with the original

WCL Log ID (Required) _____ Well Log ID _____

Regional Office CRO ERO NWRO SWRO

Type of Well Water Resource

Notice of Intent _____ Ecology Well ID Tag No _____

Property (Well) Owner's Name _____
Well Street Address _____
City _____ County _____ Zip Code _____

Location ____ 1/4-1/4 ____ 1/4 Sec ____ Twn ____ R ____ E or W (Circle One)

Lat /Long (Required) Lat Deg ____ Lat Min/Sec ____
Long Deg ____ Long Min/Sec ____
Horizontal Collection Method Code _____

Tax Parcel No _____

Type of Work New Well Reconditioned Deepened

Well Log Received Date __/__/__

Well Diameter ____ (in inches) Well Depth ____ (in feet) Well Completed Date __/__/__

Driller's Ecology License No _____

Trainee's Ecology License No _____

Reason/Source of Change (Required)

INTERNAL CORRECTION-not changing IMAGE

Signature of Well Log Tracker (Required) Evan C Gutierrez Date 10/29/02

The Department of Ecology does NOT warrant the Data and/or the Information on this Well Report.

File Original with
Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent 241154
UNIQUE WELL I.D.# AAS 913

Water Right Permit No. _____

210630

(1) OWNER: Name Brad & Julie Lake Address 8438 W Hage Blv. Kennewick WA 98366

(2) LOCATION OF WELL: County Benton NW 1/4 SW 1/4 Sec. 26 T 9 N.R. 28E WM

(2a) STREET ADDRESS OF WELL: (or nearest address) 310 Keene Ct, Richland, Wa 99352

TAX PARCEL NO.: 1-2698-200-0004 M

(3) PROPOSED USE: Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
 New Well Method:
 Deepened Dug Bored
 Reconditioned Cable Driven
 Decommission Rotary Jetted

MATERIAL	FROM	TO
Silt	0	25
Silt & gravels	25	33
Sandy Tan Clay	33	43
Tan Clay & gravels	43	76
Tan Clay	76	85
visicular Basalt	85	93
Black Basalt med	93	118
Red cinders	118	135
Black Basalt med	135	186
Blue Clay	186	219
Blue Clay & sandstone	219	237
Red visicular	237	246
Black Basalt	246	264

(5) DIMENSIONS: Diameter of well 8 inches
Drilled 264 feet. Depth of completed well 264 ft.

(6) CONSTRUCTION DETAILS
Casing Installed:
 Welded 8 Diam. from 7 1/2 ft. to 10 3/4 ft.
 Liner installed 4 1/2 PVC Diam. from 4 ft. to 264 ft.
 Threaded _____ Diam. from _____ ft. to _____ ft.

Perforations: Yes No
Type of perforator used SK-1 JAW
SIZE of perforations 1/8 x 6 in. by _____ in.
60 perforations from 244 ft. to 264 ft.

Screens: Yes No K-Pac Location _____
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand _____
Material placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? 107 ft.
Material used in seal Bentonite 0-20 cement 20-107
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 73 ft. below top of well Date 5-18-06
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 507 gal./min. with 264 ft. drawdown after 4 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 59° Was a chemical analysis made? Yes No

DEPT. OF ECOLOGY
FISCAL YEAR 2006
RECEIVED
JUN 02 2006
DEPARTMENT OF ECOLOGY
WELL DRILLING UNIT
OAS
JUN 07 2006
REGIONAL OFFICE

Work Started 5-16 06 Completed 5-18 06

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.
Type or Print Name Brandon Brown License No. 2758
(Licensed Driller/Engineer)
Trainee Name _____ License No. _____
Drilling Company Water Well Developers
(Signed) [Signature] License No. 2758
(Licensed Driller/Engineer)
Address _____
Contractor's Registration No. _____ Date _____

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.



Consulting Engineers Environmental Scientists Construction Materials Testing

April 30, 2020

Knutzen Engineering
5401 Ridgeline Drive Suite 160
Kennewick, WA 99338

Attn: Nathan Machiela, PE, Senior Engineer

Subject: Report of Soil Infiltration Testing & Grading Recommendations
City of Richland Badger Mountain Park – North Parking Lot
Englewood Drive, Richland, WA

GNN Project No. 220-1234

Dear Mr. Machiela,

As requested, this report presents the results of soil infiltration testing and provides grading recommendations for the proposed new parking lot at the Badger Mountain Park located on the south side of Englewood Drive in the City of Richland. Based on the *Overall Site Plan* (dated 3/17/20) prepared by Knutzen Engineering, we understand that a total of 266 parking spaces with associated paved drive-lanes are planned for project. Our services were performed in general accordance with our *Proposal for Limited Geotechnical Services* dated March 19, 2020; notice to proceed was provided on March 20th in the form of a signed copy of our proposal.

Site Conditions

The project lies within a relatively large parcel identified by the Benton County Assessor as Parcel No. 126982000001000. The existing unpaved parking area is located south of a dog park and north of the baseball fields within the Badger Mountain Community Park. Surface conditions include a thin layer of gravel. Rows of ecology blocks were noted between the parking area and ball fields. Known underground utilities include, but may not be limited to, water, gas, electric, and sewer.

Infiltration Testing & Subsurface Soil Conditions

Our field exploration/testing, including two (2) soil infiltration tests, was performed on April 29, 2020. A private utility locate service was conducted by Utilities Plus at both of the proposed test pit locations. Infiltration tests were completed at a depth of 4 feet below ground surface (BGS) at locations shown on the annotated *Overall Site Plan* you provided (see Figure 1). Test-holes were excavated by Einar Frimodt & Sons using a John Deere 310B backhoe. Test-pits were excavated an additional 5 feet below the bottom of the test depth to examine the underlying soil profile and were loosely backfilled upon completion.

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Native site soils typically consist of fine- to medium-grained Poorly Graded Sand with Silt (SP-SM) that appeared ‘medium dense’ with ‘moist’ in-situ moisture. Both test-pits encountered artificial fill material in the upper 2 feet consisting of gravel, wood chips, and basalt cobbles. Due to the cohesionless nature of the sands, test-pit excavations encountered significant caving and sloughing. Groundwater was not encountered to a total depth of approximately 9 feet BGS. Test-pit logs are attached to this report.

Infiltration tests were performed using a single ring infiltrometer consisting of a 10-inch diameter steel pipe driven into the ground at the test depth. After an initial pre-soak period, a constant water level was maintained in the ring with the use of a float valve and timed intervals of the water demand volumes were recorded. Continuous readings of the infiltration rates of water volumes required to maintain the constant head were recorded until a relatively constant rate was achieved. The following table presents the results of infiltration tests performed, indicative of the infiltration characteristics of the soils encountered at the test locations/depths using the specified test method:

Test ID	Test Location (Approx. GPS Coords.)	Test Depth (BGS)	Soil Tested	% Fines	Field Soil Infiltration Rate
P-1	46.237782°, -119.280140°	4 feet	Sand w/ Silt (SP-SM)	8%	47 inches/hour
P-2	46.236960°, -119.278240°	4 feet	Sand w/ Silt (SP-SM)	10%	38 inches/hour

An appropriate factor of safety should be applied to the field infiltration rates to determine long-term design infiltration rates. Determination of safety factors for long-term infiltration design should consider the following: pretreatment, potential for bio-fouling, system maintainability, horizontal and vertical variability of soils, and type of infiltration testing. A factor of safety of 2 to 3 is considered appropriate for long-term design.

Geotechnical Recommendations

Site Grading

Site grading shall incorporate the requirements of IBC 2015 Appendix J as adopted by City of Richland Building Department. The project Geotechnical Engineer or Record (GER) or a representative of the GER should observe site clearing, grading, and the bottoms of excavations before placing fills. Local variations in soil conditions may warrant increasing the depth of over-excavation and recompaction. Seasonal weather conditions may adversely affect grading operations. Soil conditions shall be evaluated by in-place density testing, visual evaluation, probing, and proof-rolling of the imported fill and re-compacted on-site soil as it is prepared to check for compliance with recommendations of this report. A moisture-density curve shall be established in accordance with the ASTM D1557 method for all onsite soils and imported fill materials used as structural fill.

Suitability of the Onsite Soils for Reuse

The onsite native sandy soils are considered suitable for use as engineered fill and utility trench backfill, provided they are free of significant organic or deleterious matter, and oversize rocks (>4 inches). Suitable onsite soils shall be placed in maximum 8-inch lifts (loose) and compacted to at least 95%

relative compaction (ASTM D1557) near its optimum moisture content. Compaction of the suitable onsite soils shall be performed within a range of $\pm 2\%$ of optimum moisture to achieve the proper degree of compaction. The artificial fill soils that are present onsite are not suitable for reuse as engineered fill.

Temporary Excavations

It shall be the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is at the job site, able to observe the nature and conditions of the slopes and be able to monitor the subsurface conditions encountered. Unsupported vertical cuts deeper than 4 feet are not recommended if worker access is necessary. The cuts shall be adequately sloped, shored or supported to prevent injury to personnel from caving and sloughing. The contractor and subcontractors shall be aware of and familiar with applicable local, state and federal safety regulation including the current OSHA Excavation and Trench Safety Standards, and OSHA Health and Safety Standards for Excavations, 29 CFR Part 1929, or successor regulations.

According to chapter 296-155 of the Washington Administrative Code (WAC), it is our opinion that the near-surface soil encountered at the site is classified as Type C soils. We recommend that temporary, unsupported, open cut slopes shall be no steeper than 1.5 feet horizontal to 1.0 feet vertical (1.5H:1V) in Type C soils. No heavy equipment should be allowed near the top of temporary cut slopes unless the cut slopes are adequately braced. Where unstable soils are encountered, flatter slopes may be required.

The native sandy soil is prone to significant caving and sloughing in open excavations. We anticipate excavation bank stability problems will be encountered due to the non-cohesive granular nature of the on-site soils. Excavation stability may be achieved by sloping excavation banks or widening shallow excavations in the anticipation of caving. Deeper excavations will require external support such as shoring or bracing to provide excavation bank stability.

Utility Excavation, Pipe Bedding and Trench Backfill

To provide suitable support and bedding for the pipe, we recommend the utilities be founded on suitable bedding material consisting of clean sand and/or sand & gravel mixture. To minimize trench subgrade disturbance during excavation, the excavator should use a smooth-edged bucket rather than a toothed bucket.

Pipe bedding and pipe zone materials shall conform to Section 9-03.12(3) of the Washington State Department of Transportation (WSDOT) 2018 Standard Specifications. Pipe bedding should provide a firm uniform cradle for support of the pipes. A minimum 4-inch thickness of bedding material beneath the pipe should be provided. Prior to installation of the pipe, the pipe bedding should be shaped to fit the lower part of the pipe exterior with reasonable closeness to provide uniform support along the pipe. Pipe bedding material should be used as pipe zone backfill and placed in layers and tamped around the pipes to obtain complete contact. To protect the pipe, bedding material should extend at least 6 inches above the top of the pipe.

Placement of bedding material is particularly critical where maintenance of precise grades is essential. Backfill placed within the first 12 inches above utility lines should be compacted to at least 90% of the maximum dry density (ASTM D1557), such that the utility lines are not damaged during backfill placement and compaction. In addition, rock fragments greater than 1 inch in maximum dimension should be excluded from this first lift. The remainder of the utility excavations should be backfilled and compacted to 95% of the maximum dry density as determined by ASTM D1557.

Onsite soils are considered suitable for utility trench backfill provided they are free of oversize rocks and can be adequately compacted. All excavations should be wide enough to allow for compaction around the haunches of pipes and underground tanks. We recommend that utility trenching, installation, and backfilling conform to all applicable federal, state, and local regulations such as OSHA and WISHA for open excavations.

Compaction of backfill material should be accomplished with soils within $\pm 2\%$ of their optimum moisture content in order to achieve the minimum specified compaction levels recommended in this report. However, initial lift thickness could be increased to levels recommended by the manufacturer to protect utilities from damage by compacting equipment.

If you have any questions regarding this report, please contact us at 509-734-9320.

Respectfully submitted,

GN Northern, Inc.




M. Yousuf Memon, PE
Geotechnical Engineer



Attachments:

- *Infiltration Test Location Map (Figure 1)*
- *Test Pit Logs*
- *Site & Infiltration Testing Photographs*



LEGEND
 = Infiltration test

NOTE
 Base aerial image from *Google Earth*; overlaid *Overall Site Plan* dated March 17, 2020 prepared by Knutzen Engineering

FIGURE 1: INFILTRATION TEST LOCATION MAP



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TEST PIT NUMBER TP-P1

CLIENT Knutzen Engineering **PROJECT NAME** Badger Mountain Park - North Parking Lot
PROJECT NUMBER 220-1234 **PROJECT LOCATION** Englewood Drive, Richland, WA
DATE STARTED 4/29/20 **COMPLETED** 4/29/20 **GROUND ELEVATION** 534 ft **TEST PIT SIZE** 24 x 72 inches
EXCAVATION CONTRACTOR Einar Frimodt & Sons **GROUND WATER LEVELS:**
EXCAVATION METHOD John Deere 310B Backhoe **AT TIME OF EXCAVATION** ---
LOGGED BY MBB **CHECKED BY** MYM **AT END OF EXCAVATION** ---
NOTES Approx. GPS Coords.: 46°14'16.02"N, 119°16'48.51"W **AFTER EXCAVATION** ---

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 4/30/20 15:56 - C:\USERS\GN NORTHERN\DR\OP\BOX15-ACTIVE PROJECTS\220-1234 BADGER MOUNTAIN PARK PARKING LOT, RICHLAND - INFILTRATION\220-1234 LOGS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION
0.0						
0.3			SM		~4" CRUSHED GRAVEL	533.7
2.0					FILL: SILTY SAND WITH GRAVEL, (SM) brown, fine grained, damp, appears loose to medium dense, with landscaping wood chips	
2.5						532.0
5.0	GB	MC = 6% Fines = 8%	SP-SM		POORLY GRADED SAND WITH SILT, (SP-SM) grayish brown, fine to medium grained, damp to moist, appears medium dense, trace gravel	
7.5					- becomes moist	
9.0						525.0

- Groundwater not encountered at time of excavation
 - Referenced elevations are approximate and based on Google Earth topography
 Bottom of test pit at 9.0 feet.



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TEST PIT NUMBER TP-P2

CLIENT Knutzen Engineering
PROJECT NUMBER 220-1234
DATE STARTED 4/29/20 **COMPLETED** 4/29/20
EXCAVATION CONTRACTOR Einar Frimodt & Sons
EXCAVATION METHOD John Deere 310B Backhoe
LOGGED BY MBB **CHECKED BY** MYM
NOTES Approx. GPS Coords.: 46°14'13.06"N, 119°16'41.66"W

PROJECT NAME Badger Mountain Park - North Parking Lot
PROJECT LOCATION Englewood Drive, Richland, WA
GROUND ELEVATION 538 ft **TEST PIT SIZE** 24 x 72 inches
GROUND WATER LEVELS:
AT TIME OF EXCAVATION ---
AT END OF EXCAVATION ---
AFTER EXCAVATION ---

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 4/30/20 15:56 - C:\USERS\GN NORTHERN\DR\BOX15-ACTIVE PROJECTS\220-1234 BADGER MOUNTAIN PARK PARKING LOT, RICHLAND - INFILTRATION\220-1234 LOGS.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0					~10" CRUSHED GRAVEL
			GM		0.8 SILTY GRAVEL WITH SAND, (GM) brown, angular, damp to moist, appears medium dense, with basalt cobbles 537.2
2.5					2.0 POORLY GRADED SAND WITH SILT, (SP-SM) grayish brown, fine to medium grained, damp to moist, appears medium dense, trace gravel 536.0
	GB	MC = 6% Fines = 10%			
5.0			SP-SM		
7.5					- becomes moist
					9.0

- Groundwater not encountered at time of excavation
 - Referenced elevations are approximate and based on Google Earth topography
 Bottom of test pit at 9.0 feet.



View of site conditions looking northeast



Infiltration test setup at test pit P-1



Exposed subsurface soil profile to ~9' BGS within test pit P-1



Excavation of test-pit P-2, looking west



Infiltration test setup at test pit P-2



Exposed subsurface soil profile to ~9' BGS within test pit P-2