



Certificate of No-Rise

This is to certify that I am a duly qualified registered Professional Engineer licensed to practice in the State of Colorado.

It is to further certify that the attached technical data supports the fact that the proposed River Bend project in Lyons, Colorado, located in the floodplain does not create an increase in water surface elevations compared to the existing conditions.

This conclusion was reached through analysis of the proposed project conditions in comparison to existing conditions and have attached a copy of this analysis for your review. I attest that all the attached documents were prepared by me or under my review, and are all true and accurate to the best of my knowledge.

Attached are the following documents that support my findings for this No-Rise Floodway Certification:

1. Hydraulic Study Report
2. HEC-RAS model



Stamp: _____

Printed Name: Nathaniel L Werner

Company Name: Werner Water Engineering, LLC

Date: 4/4/2024

**FLOOD PLAIN DEVELOPMENT PERMIT
APPLICATION INFORMATION**

COMPLETE ALL INFORMATION EXCEPT HIGHLIGHTED AREAS

CONTACT INFORMATION

PERMIT _____ DATE 4/4/2024
OWNER Lyons Properties TELEPHONE 720-938-1715
ADDRESS PO Box 312, Lyons, CO 80540
CONTRACTOR Werner Water Engineering TELEPHONE 970-232-6486
ADDRESS 1902 E 11th St, Loveland, CO 80537
PROJECT LOCATION / DIRECTIONS 501 W Main St, Lyons, CO 80540

- Any permit issued may be revoked because of breach of representation;
- Once a permit is revoked all work shall cease until the permit is reissued or a new permit is issued;
- A separate permit for construction will be issued;
- The applicant hereby gives consent to the Flood Plain Administrator or their designee to access the property and inspect activity covered under the flood plain regulations;
- A permit will only be issued for those items specifically applied for and represented;
- A permit will be revoked if no work is commenced within one year of issuance.
- Include all plans, reports and specifications with the application, see review checklist for reference

PROJECT DESCRIPTION (CHECK ALL THAT APPLY)

____ Single Family Residential ____ New Construction ____ Addition to Structure
____ Multi-Family Residential Substantial ____ Manufactured (Mobile) Home ____ Fill
____ Improvement (>50%) ____ Improvement (<50%) ____ Bridge/Culvert X ____ Nonresidential
____ Renovation/Repairs/Maintenance ____ Channelization ____ Accessory Structure
____ Materials/Equipment Storage ____ Bridge or Culvert ____ Demolition
____ Levee/Other/Explanations _____

PROJECT VALUE

If the proposed project is an addition, renovation, repair or maintenance to an existing structure, indicate the cost of the proposed construction: \$ _____.

- Provide contractors estimates for work when available

Value of structure only: \$ _____; Source: Boulder County/Other _____
Percentage of improvement/renovation to Value: _____

FLOOD HAZARD DATAWatercourse Name North St. Vrain CreekThe project is proposed in the Floodway _____ Flood Fringe XBase (100-year) flood elevation (s) at project site 5371.69 NGVD 88Elevation required for Lowest Floor 5373.69 NGVD / Flood proofing 5373.69 NGVDSource Documents: Reports/Maps CHAMP Model

- Use source documents for flood plain available at Town Hall in Lyons
- Information subject to verification by Flood Plain Administrator

FLOOD HAZARD NOTES TO APPLICANT

Approval or denial of a Floodplain Development Permit by the Floodplain Administrator shall be based on all of the provisions of **Ordinance 920**, as amended from time to time and the following relevant factors:

1. The danger to life and property due to flooding or erosion damage;
2. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
3. The danger that materials may be swept onto other lands to the injury of others;
4. The compatibility of the proposed use with existing and anticipated development;
5. The safety of access to the property in times of flood for ordinary and emergency vehicles;
6. The costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems;
7. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site;
8. The necessity to the facility of a waterfront location, where applicable;
9. The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;
10. The relationship of the proposed use to the comprehensive plan for that area.

APPLICANTS SIGNATURE

I AGREE THAT ALL STATEMENTS MADE AND ALL ATTACHMENTS TO THIS APPLICATION ARE A TRUE AND ACCURATE DESCRIPTION OF THE PROPERTY FOR WHICH THIS APPLICATION FOR FLOOD PLAIN DEVELOPMENT IS MADE. I UNDERSTAND THE DEVELOPMENT IS LOCATED IN A SPECIAL FLOOD HAZARD AREA AND ACTIVITIES ARE SUBJECT TO THE ORDINANCE OF THE TOWN OF LYONS. I UNDERSTAND IT IS MY RESPONSIBILITY TO OBTAIN ANY OTHER APPLICABLE LOCAL, STATE OR FEDERAL PERMITS FOR THIS PROJECT.

APPLICANT

4/4/2024

Signature _____

Date _____

PROPOSAL REVIEW CHECKLIST

____ Properly scaled site development plans are complete and depict flood hazard data.

____ Engineering data is provided for proposed map and floodway revisions.

____ Floodway Certificate and data documents no increase in flood heights.

____ Subdivision proposals minimize flood damage and protect utilities.

____ Lowest floor elevations are above the base (100-year) flood level.

____ Manufactured homes address elevation and anchoring requirements.

____ A Flood-proofing Certificate and drawing notes certify flood-proofing designs.

____ Previous flood plain permit (temporary or permanent) issued for project.

____ CLOMR/LOMR _____

____ Other: _____

- Plans shall be drawing to scale with north arrow
- Show dimensions, property lines, flood way, flood plain
- Show location of existing improvements, proposed improvements
- Show areas of cuts and fills

PERMIT ACTION____ **PERMIT APPROVED:** The information submitted for the proposed project was reviewed and is in compliance with approved flood plain management standards (site development plans are on file).____ **PERMIT DENIED:** The proposed project does not meet approved flood plain management standards (explanation is on file).____ **VARIANCE GRANTED:** A variance was granted from the base (100-year) flood elevations established by FEMA consistent with variance requirements of NFIP regulations Part 60.6 (variance action documentation is on file).

FLOOD PLAIN ADMINISTRATOR

Signature _____

Date _____

Comments: _____

COMPLIANCE DOCUMENTATION____ **MAP REVISION DATA.** Certified documentation by a registered professional engineer of as-

built conditions for flood plain alterations were received and submitted to FEMA for flood insurance map revision.

_____ **FILL CERTIFICATE.** A community official certified the elevation, compaction, slope and slope protection for all fill placed in the flood plain consistent with NFIP regulations Part 65.5 for map revisions.

_____ **ELEVATION AND FLOODPROOFING CERTIFICATES.** The as-built elevation of the building's lowest floor was certified as _____ NGVD; or the building's floodproofing level was certified as _____ NGVD; by a registered professional engineer or licensed surveyor and is on file.

CERTIFICATE OF OCCUPANCY OR COMPLIANCE ISSUED ON _____

(Date)

FLOOD HAZARD DEVELOPMENT PERMIT

This permit is issued based on the documentation and information provided in the Flood Hazard Development Permit Application number _____, as approved by the Flood Plain Administrator on _____, and is in general compliance with Ordinance Number 920 and amendments thereto of the Town of Lyons.

Address or Property Location: _____

General Work Description: _____

The permittee understands and agrees that:

- An elevation certificate based on proposed construction is required;
- An elevation verification of the foundation forms is required by a licensed surveyor;
- An elevation certificate of the final construction is required;
- A LOMR (Letter of Map Revision) is required when a CLOMR (Conditional) was obtained as part of the application process;
- The permit is issued based on the representations made in the application;
- Once a permit is revoked, all work must immediately cease;
- The permit will not grant any right of privilege to erect any structure or use any premises described for any purposes or in any manner prohibited by the Codes or Regulations of the Town;
- The Permittee hereby gives consent to the Flood Plain Administrator to enter and inspect the activities covered under this permit and the provisions of the Flood Plain Ordinance of the Town;
- The permit must be posted in a readily accessible and visible location from the public right of way;
- The permit will expire within one year of issuance if no work has commenced, or within two years unless authorized through a development permit with the Town.

FLOOD PLAIN ADMINISTRATOR

Signature

Date

Comments: _____



River Bend 501 W Main Street Proposed Structure

HYDRAULIC STUDY REPORT

April 2024

Submitted by:



Werner Water Engineering, LLC
Loveland, CO



Introduction

This report summarizes the hydraulic analysis of the proposed barn structure located within the floodplain along the North St. Vrain Creek in Lyons, Colorado. The proposed project was analyzed in a hydraulic study completed by Werner Water Engineering under the guidance of a licensed professional engineer in the State of Colorado. The goal of this study is to ensure that the proposed barn complies with the requirements of the National Flood Insurance Program (NFIP) for construction located within a floodplain and to obtain a floodplain development permit that is required to advance to the construction phase of the project.

Project Location

The project location is at 501 West Main Street at River Bend along the North St. Vrain Creek in Lyons, Colorado. The project location is shown in Figure 1.

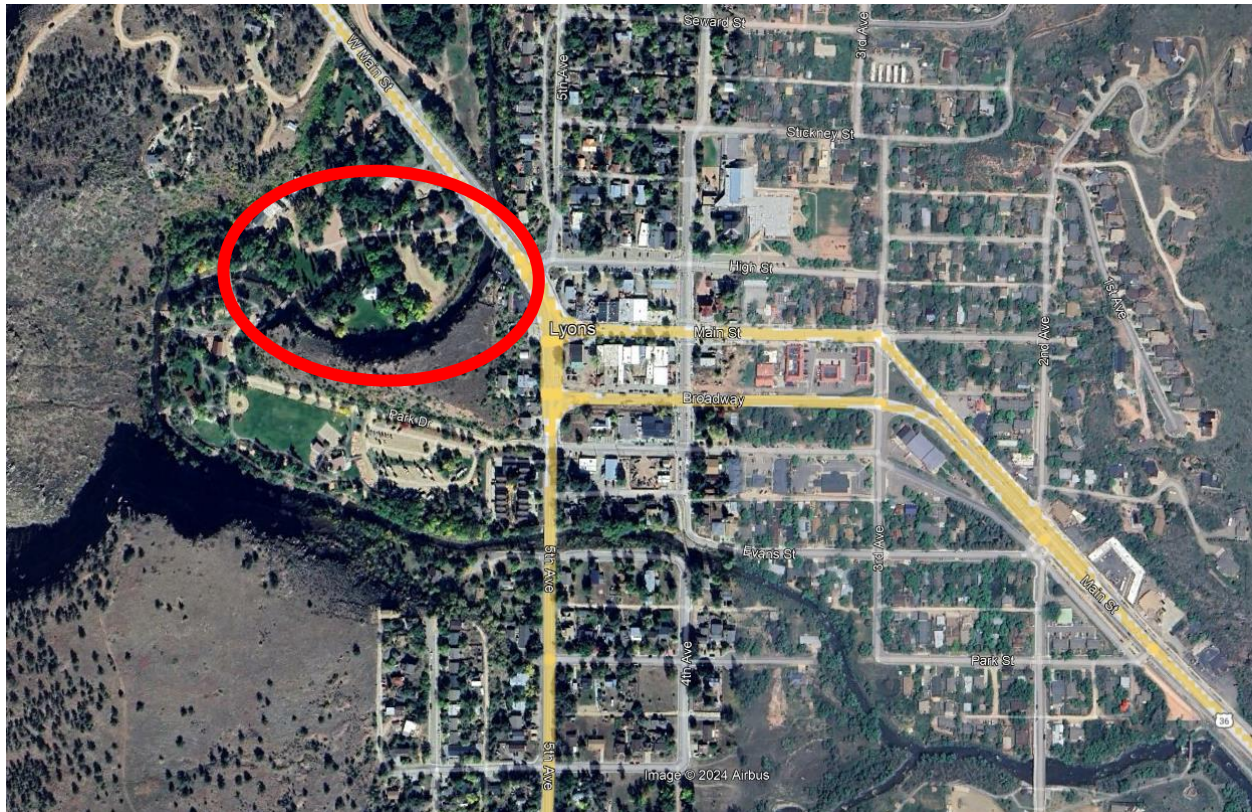


Figure 1: Project location map

Project Description

The proposed project is the addition of a 5,438 square foot barn structure with decks and stairs for access. There will be adjacent site grading required as well with a total disturbed area of 29,577 square feet. The proposed barn and disturbed area are shown in Figure 2., The floodway boundary is also shown on the figure.

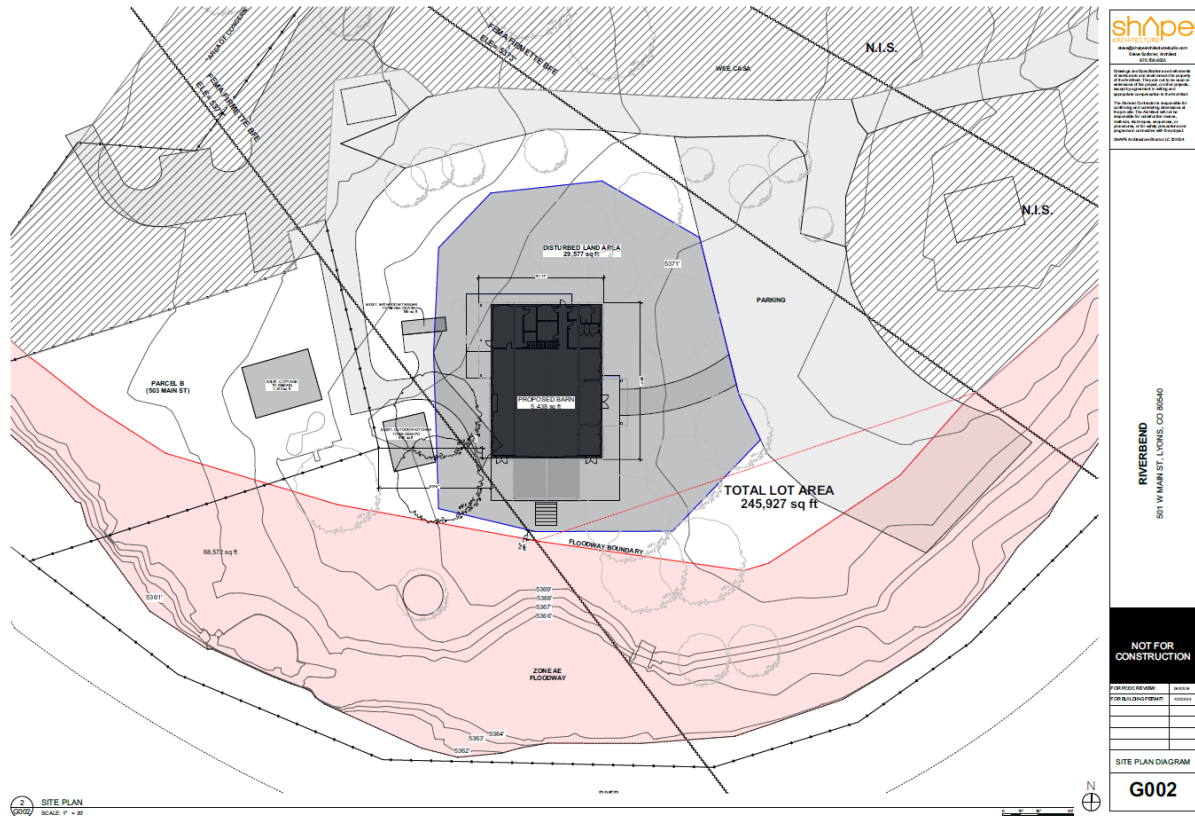


Figure 2 Proposed site plan.

National Flood Insurance Program Compliance

The proposed project is located within a FEMA regulated and mapped floodplain and must comply with the local and federal floodplain development regulations. The Town of Lyons is the floodplain manager for the proposed project.

As discussed in the Hydraulic Design Process below, the comparison for compliance is being made based on a Letter of Map Revision (LOMR), that was submitted by Boulder County. This is the effective model for this area and it was based on and updated from the Colorado Hazard Mapping Program (CHAMP) study completed for the St. Vrain Creek.



Hydraulic Design Process

The hydraulic design process is described in this section that supports the projects compliance with the Town of Lyons Municipal Code, State of Colorado Rules and Regulations for Floodplain, and NFIP regulations.

The improvements have been located outside of the floodway, and have been located to be within the ineffective flow area of the CHAMP model. Intuitively, locating improvements within an ineffective flow area should not have any impact on the water surface elevations in the model. The typical modeling methodology was still used to prove this to be the case and discussed within this section.

The current study for the North St. Vrain Creek is the Colorado Hazard Mapping Program (CHAMP) study. This study is not effective yet; however, it is the best available data to base the hydraulic design on.

As a part of the design effort, several model plans have been created to evaluate the flood impacts of the proposed project as a part of the floodplain development permit process. The models are the effective, duplicate effective, and proposed. A brief description of each model follows:

Effective—The effective model is the CHAMP model for the North St. Vrain Creek.

Duplicate Effective—the Duplicate Effective model was a recreation of the effective model in HEC-RAS 6.4.1. A new plan was created with all model inputs unaltered.

Proposed—the proposed geometry of the project. The existing model was used as the base model. This plan in the model is named Proposed.

Modeling Software

The hydraulic modeling for the project has been computed using HEC-RAS version 6.4.1.

Topographic Data

All topographic data in the model is retained from the CHAMP model.

Structures

A barn is proposed with the project. The barn will be located within the floodplain and will be designed to have a finished flood elevation of at least BFE plus two feet.

Boundary Conditions

The boundary conditions of the model were unchanged from the CHAMP model. The model is run with only subcritical conditions and does not require an upstream boundary condition.

Hydrology

The hydrology is based on the Hydrologic Evaluation of the St. Vrain Watershed Post September 2013 Flood Event prepared by Jacobs in August 2014. The hydrology was unchanged in the hydraulic model and matches the CHAMP model.

Geometry

The cross section locations from the effective model were used. Cross section 4573 cuts through the proposed building so additional cross sections were not added to model the structure. The geometry of the duplicate effective model was the same as the effective model. The proposed barn was modeled as a blocked obstruction on cross section 4573. The barn is not perpendicular to the cross section so the obstruction was projected onto the cross section. The proposed cross section with the blocked obstruction is shown in Figure 3.

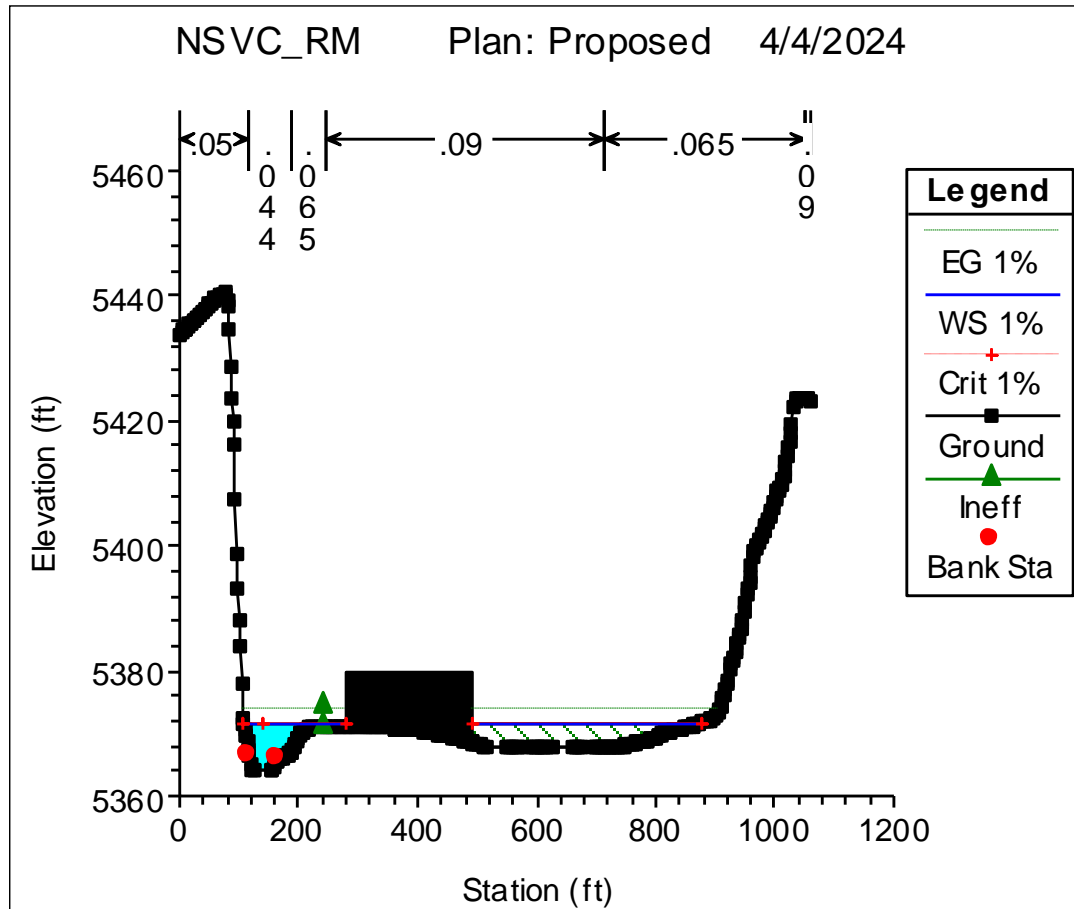


Figure 3 Model Cross Section with blocked obstruction.

Results

CHAMP Model

The CHAMP Model is the plan named NSVC_RM2_MultipleProfiles. This plan was opened and computed. The model was not truncated so the model contains all the cross sections, however, for ease of comparison only the data for cross sections in the vicinity of the project are shown in Table 1.

Table 1 Effective Water Surface Elevations

Reach	River Sta	W.S. Elev (ft)
NSVC_RM2	5949	5381.89
NSVC_RM2	5546	5380.44
NSVC_RM2	5128	5379.51
NSVC_RM2	5052 NSVC_04, W. MAIN	
NSVC_RM2	4963	5375.55
NSVC_RM2	4573	5371.69
NSVC_RM2	4129	5366.25
NSVC_RM2	3847	5364.17
NSVC_RM2	3680	5363.1

Duplicate Effective Model

The duplicate effective model was a new plan within the HEC-RAS model with the same inputs and settings as the CHAMP model. The results of the duplicate effective reproduced the same results as the effective model plan. The results in the project area are shown in Table 2.

Table 2 CHAMP and Duplicate CHAMP Results

		CHAMP	Dup Eff	
Reach	River Sta	W.S. Elev (ft)	W.S. Elev (ft)	CHAMP - Dup Eff (ft)
NSVC_RM2	5949	5381.89	5381.89	0.00
NSVC_RM2	5546	5380.44	5380.44	0.00
NSVC_RM2	5128	5379.51	5379.51	0.00
NSVC_RM2	5052 NSVC_04, W. MAIN			0.00
NSVC_RM2	4963	5375.55	5375.55	0.00
NSVC_RM2	4573	5371.69	5371.69	0.00
NSVC_RM2	4129	5366.25	5366.25	0.00
NSVC_RM2	3847	5364.17	5364.17	0.00
NSVC_RM2	3680	5363.1	5363.1	0.00

Proposed Conditions Model

The proposed conditions geometry was added to the duplicate effective model as a blocked obstruction. The resulting water surface elevations and comparisons to the existing are shown in Table 3. The proposed barn does not impact base flood water surface elevations. The proposed improvements are located within the ineffective flow area that exists in the CHAMP model and that is why the obstruction does not impact water surface elevations. The model verifies this as true.

Table 3 Proposed Condition Comparisons

		CHAMP	Proposed	
Reach	River Sta	W.S. Elev	W.S. Elev	Proposed - CHAMP
		(ft)	(ft)	
NSVC_RM2	5949	5381.89	5381.89	0
NSVC_RM2	5546	5380.44	5380.44	0
NSVC_RM2	5128	5379.51	5379.51	0
NSVC_RM2	5052	NSVC_04, W. MAIN		0
NSVC_RM2	4963	5375.55	5375.55	0
NSVC_RM2	4573	5371.69	5371.69	0
NSVC_RM2	4129	5366.25	5366.25	0
NSVC_RM2	3847	5364.17	5364.17	0
NSVC_RM2	3680	5363.1	5363.1	0

Floodway

The proposed improvements are located outside of, and will have no impact on, the floodway.

NFIP Compliance

For NFIP compliance the existing versus proposed water surface elevations were compared for the 100-year flow rates. As shown in Table 3, there are no rises or decreases with the proposed conditions versus the existing.

The proposed barn will be used for commercial purposes. Therefore, the foundation and barn will be floodproofed to an elevation of BFE plus two feet.