

NNP-24-004

August 27, 2024

10 CFR 50.10(a)(1)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-001

Clinch River Project
NRC Docket No. 99902056

Subject: Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1) to the Permanent Backfill Underneath the Power Block Foundations

References:

1. "Final Safety Evaluation Report for the Early Site Permit Application for the Clinch River Nuclear Site," dated 06/2019 (ML19162A157)

This letter provides the Tennessee Valley Authority (TVA) assessment on the applicability of Section 50.10(a)(1) of Title 10 of the *Code of Federal Regulations* (10 CFR) to the permanent backfill underneath the foundations of structures adjacent to the deeply embedded Reactor Building, hereafter referred to as power block foundations. TVA is requesting the U.S. Nuclear Regulatory Commission provide a regulatory interpretation and assessment on the applicability of 10 CFR 50.10(a)(1) to the permanent backfill underneath the power block foundations for the proposed BWRX-300 Small Modular Reactor on TVA's Clinch River Nuclear Site.

There are no new regulatory commitments associated with this submittal.

Please address any questions regarding this request to Mr. Ray Schiele, Senior Manager Licensing, New Nuclear Program, at rschiele@tva.gov.

Sincerely,



Scott W. Hunnewell
Vice President, New Nuclear Program

Enclosure
cc: See Page 2

Enclosure:

Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1) to the
Permanent Backfill Underneath the Power Block Foundations

cc (Enclosure):

Andrea D. Veil, Director, Office of Nuclear Reactor Regulation
Greg Bowman, Deputy Director for New Reactors
Michele M. Sampson, Director, Division of New and Renewed Licenses
Chris M. Regan, Director, Division of Rulemaking, Environmental, and Financial Support
Samuel S. Lee, Deputy Director, Division of New and Renewed Licenses
John M. Moses, Deputy Director, Division of Rulemaking, Environmental, and Financial
Support
Michele Hayes, Branch Chief, New Reactor Licensing Branch
Daniel Barnhurst, Branch Chief, Environmental Review New Reactors Branch
Allen H. Fetter, NRC Project Manager, Clinch River Nuclear Site
Joe Giacinto, Project Manager, Environmental Review of New Reactors Branch

ENCLOSURE 1

**Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1)
to the Permanent Backfill Underneath the Power Block Foundations**

Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1) to the
Permanent Backfill Underneath the Power Block Foundations

The Tennessee Valley Authority (TVA) is requesting the U.S. Nuclear Regulatory Commission (NRC) provide a regulatory interpretation of the assessment on the applicability of Section 50.10(a)(1) of Title 10 of the *Code of Federal Regulations* (10 CFR) to the foundations of structures adjacent to the deeply embedded Reactor Building (RB), hereafter referred to as power block foundations. The structures adjacent to the RB for the BWRX-300 design are the Turbine Building, Radwaste Building, Control Building, and the Service Building.

Appendix A contains a series of representative figures that show a conceptual progression of the RB excavation design utilizing secant piles. The backfill is placed to raise the area to El 810' (bottom of the concrete mat portion of the power block foundations) prior to installation of secant piles. The backfill will support cranes and other equipment required for drilling and blasting through the competent rock (Benbolt formation). The image in Figure 5 is an illustration of the work that is proposed to be completed prior to Construction Permit (CP) issuance (i.e., placement of backfill, installation of secant piles, and excavation for the RB). After CP issuance, construction of the RB would commence (Figure 6) and placement of the caissons and mat foundations for the surrounding structures would be expected to commence in parallel with the RB (Figure 8).

The backfill itself does not directly perform any of the functions described as being construction activities as defined in 10 CFR 50.10(a)(1) and does not have the potential to adversely affect the structures, systems, and components (SSCs) that do. The structures surrounding the RB are not safety-related (SR), and the design of the foundations for the power block structures utilize caissons to transfer the load to the competent rock.

Based on the following evaluation, TVA does not consider the placement of permanent backfill underneath the power block foundations for the proposed BWRX-300 SMR on TVA's Clinch River Nuclear Site to meet the definition of construction as defined in 10 CFR 50.10(a)(1).

Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1) to the
Permanent Backfill Underneath the Power Block Foundations

Regulation:

§ 50.10 License required; limited work authorization.

- (a) Definitions. As used in this section, construction means the activities in paragraph (a)(1) of this section, and does not mean the activities in paragraph (a)(2) of this section.
- (1) Activities constituting construction are the driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of foundations, or in-place assembly, erection, fabrication, or testing, which are for:
 - (i) Safety-related structures, systems, or components (SSCs) of a facility, as defined in 10 CFR 50.2;
 - (ii) SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures;
 - (iii) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function;
 - (iv) SSCs whose failure could cause a reactor scram or actuation of a safety-related system;
 - (v) SSCs necessary to comply with 10 CFR 73;
 - (vi) SSCs necessary to comply with 10 CFR 50.48 and criterion 3 of 10 CFR part 50, appendix A; and
 - (vii) Onsite emergency facilities, that is, technical support and operations support centers, necessary to comply with 10 CFR 50.47 and 10 CFR part 50, appendix E.

Regulatory Analysis:

For the BWRX-300 design, the safety-related SSCs (Safety Class 1 (SC1) is the BWRX-300 terminology for SR) are contained within the RRB with the exception of fail-safe SC1 systems. The surrounding power block structures are Seismic Category II and are evaluated for interaction with the RB, with some augmented requirements, as necessary, for the Control Building and Radwaste Building. The design of the foundations for the surrounding power block structures utilize caissons to transfer the load to the competent rock, thus, the backfill is not a critical component of the foundation design. The indirect impacts the backfill has on the groundwater modeling, the Seismic Structure Interaction (SSI) analyses, and the caisson design will be evaluated and made available to the NRC. The backfill itself does not directly perform any of the functions described in 10 CFR 50.10(a)(1) and does not have the potential to adversely affect the SSCs that do.

Additionally, supplemental information on the backfill is required by the Combined Operating License Action Items associated with the Clinch River Early Site Permit (ESP). Both SSAR Section 2.5.4 and PSAR Section 2.5.4 require backfill to meet gradation requirements of Tennessee Department of Transportation Type A aggregate, detailed field and laboratory test program to evaluate backfill sources and properties, backfill be compacted to at least

Request for Regulatory Interpretation of the Applicability of 10 CFR 50.10(a)(1) to the
Permanent Backfill Underneath the Power Block Foundations

95% of maximum dry density, and backfill moisture content to be within 3% of its optimum moisture content. The field and laboratory test program and results, as well as the placement and testing specifications will be available for NRC review prior to placement of backfill.

Conclusion:

Backfill for the BWRX-300 powerblock structures at the CRN site is not considered a critical part of the foundation design because caissons will be utilized to transfer the powerblock loads to the competent rock. Thus, TVA does not consider the placement of permanent backfill underneath the power block foundations for the proposed BWRX-300 SMR on TVA's Clinch River Nuclear Site to meet the definition of construction activities defined in 10 FR 50.10(a)(1).

Appendix A

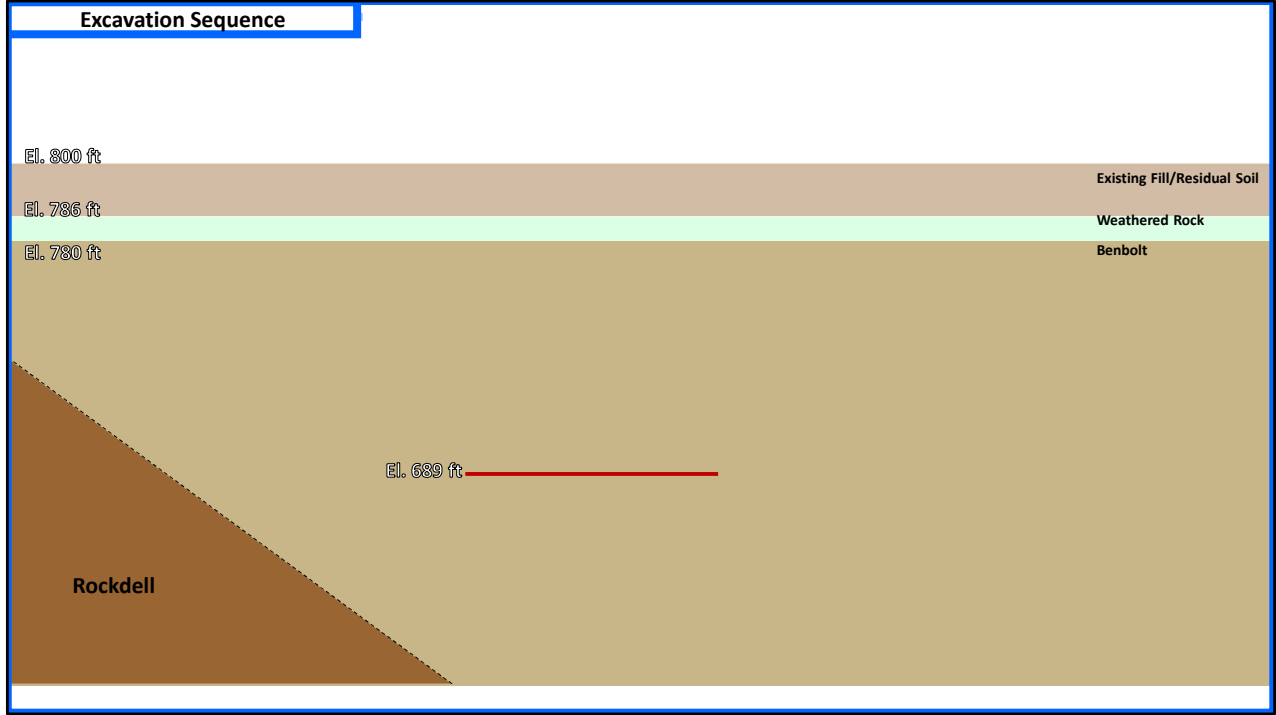


Figure 1 - Existing elevation view

*All dimensions are nominal and subject to change

Appendix A

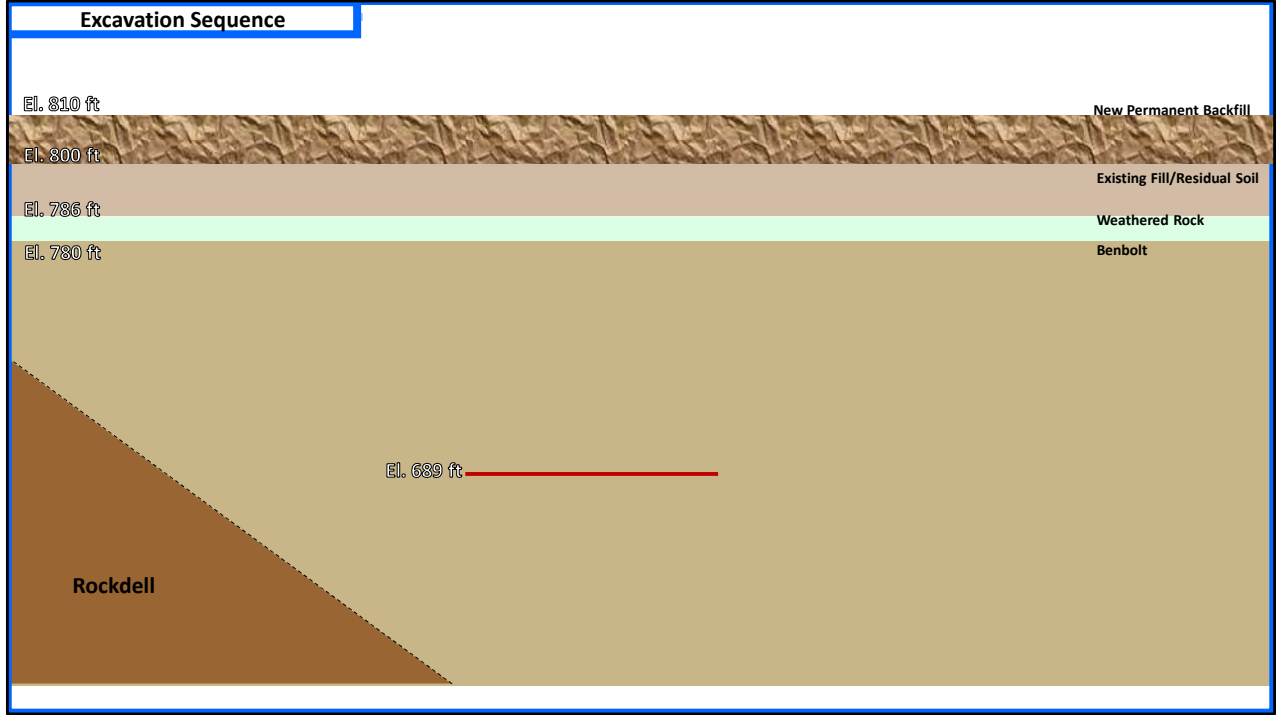


Figure 2 - Site raised with backfill to El. 810'
*All dimensions are nominal and subject to change

Appendix A

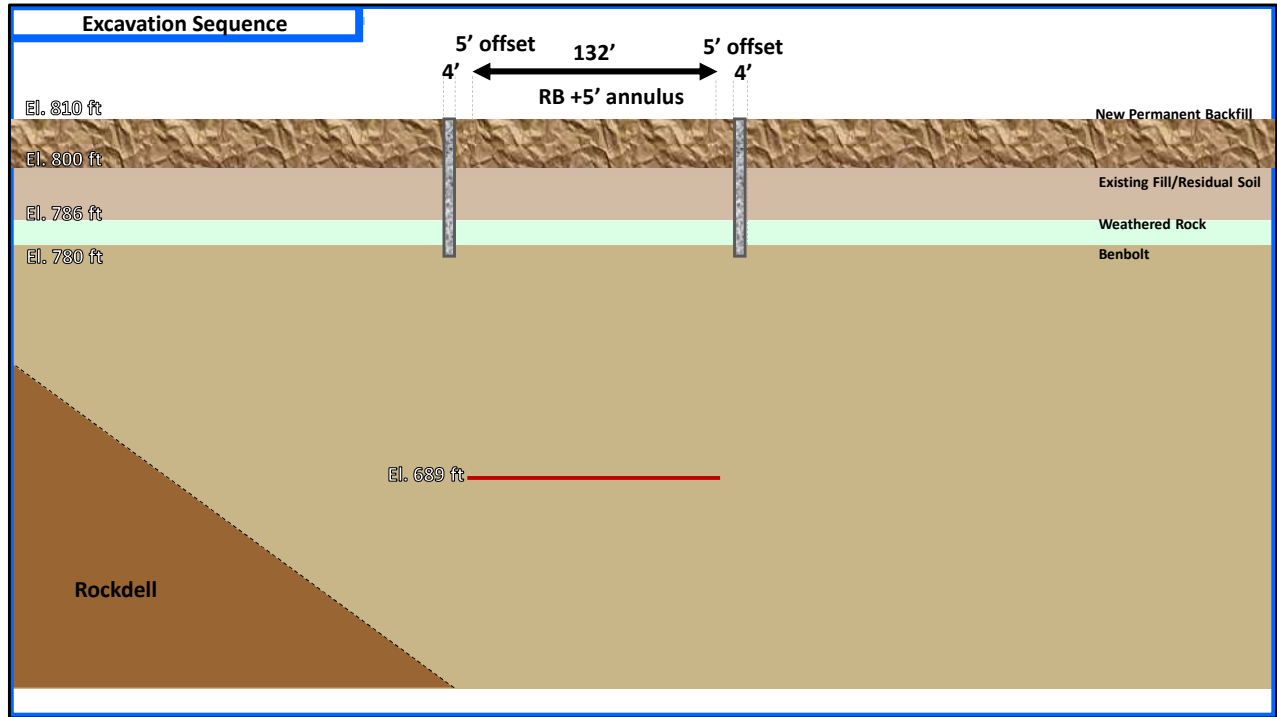


Figure 3 - Secant piles installed

*All dimensions are nominal and subject to change

Appendix A

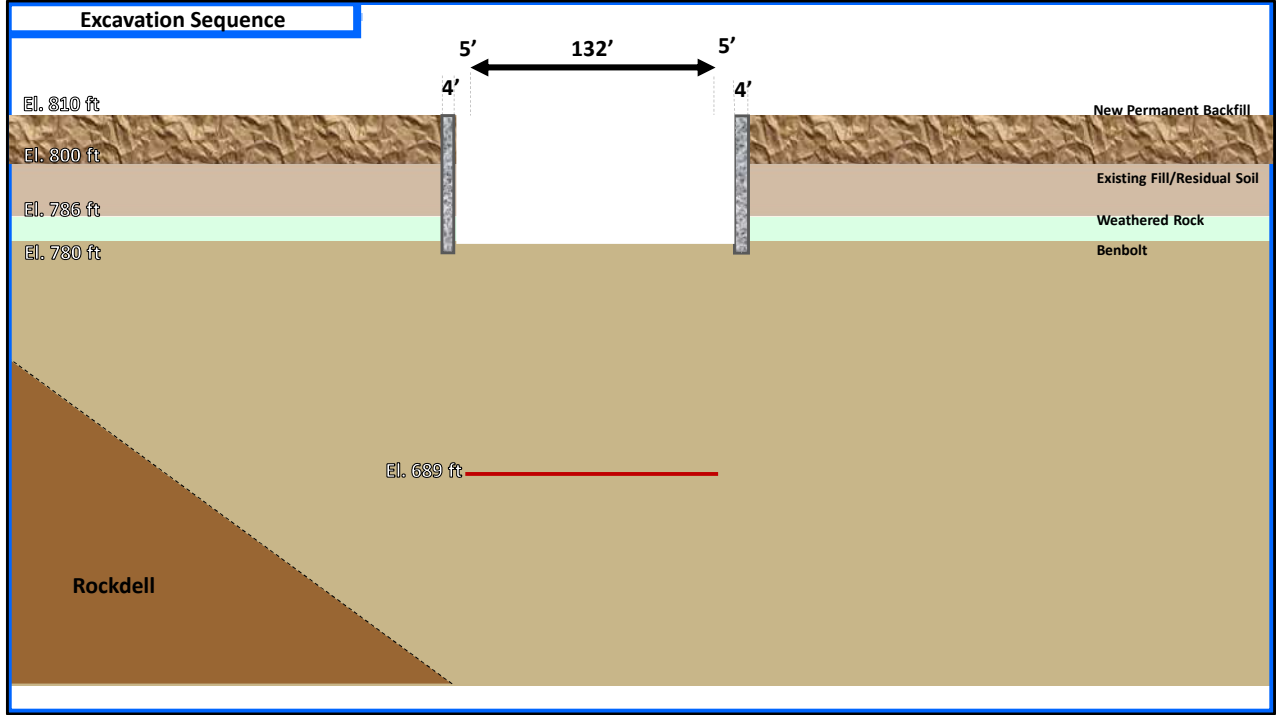


Figure 4 - Excavation to competent rock complete
*All dimensions are nominal and subject to change

Appendix A

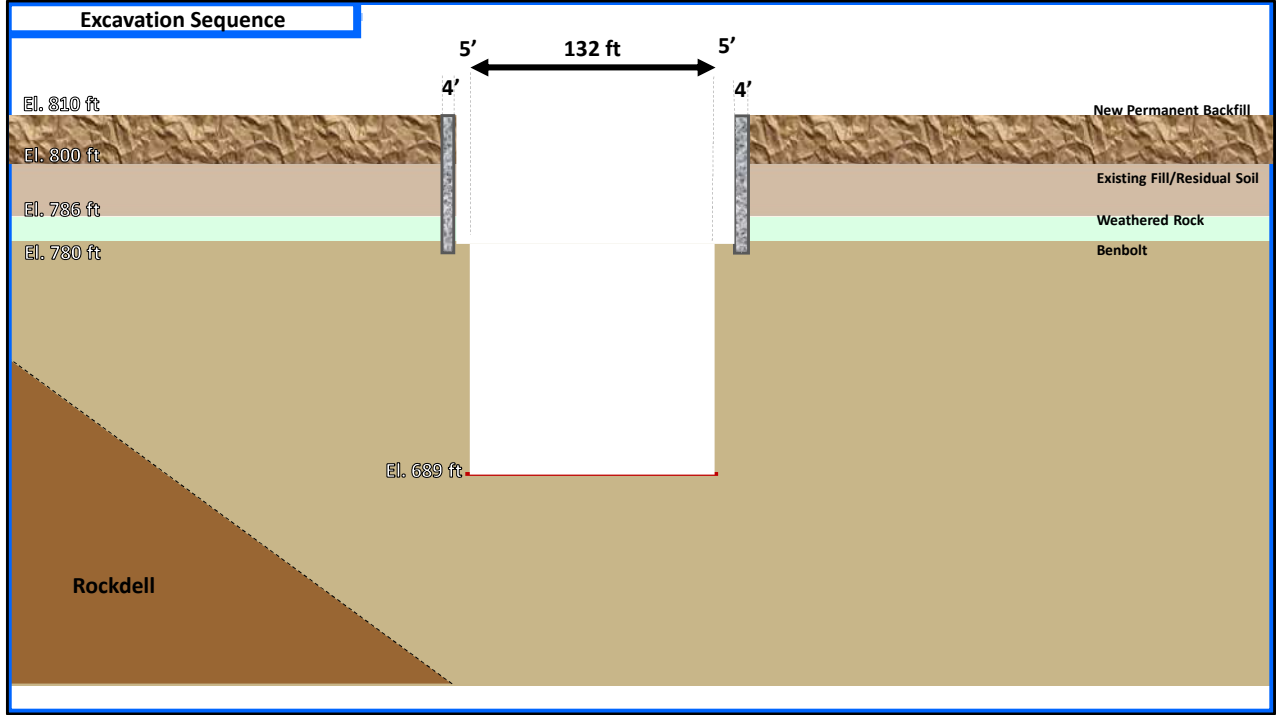


Figure 5 - Excavation complete

*All dimensions are nominal and subject to change

Appendix A

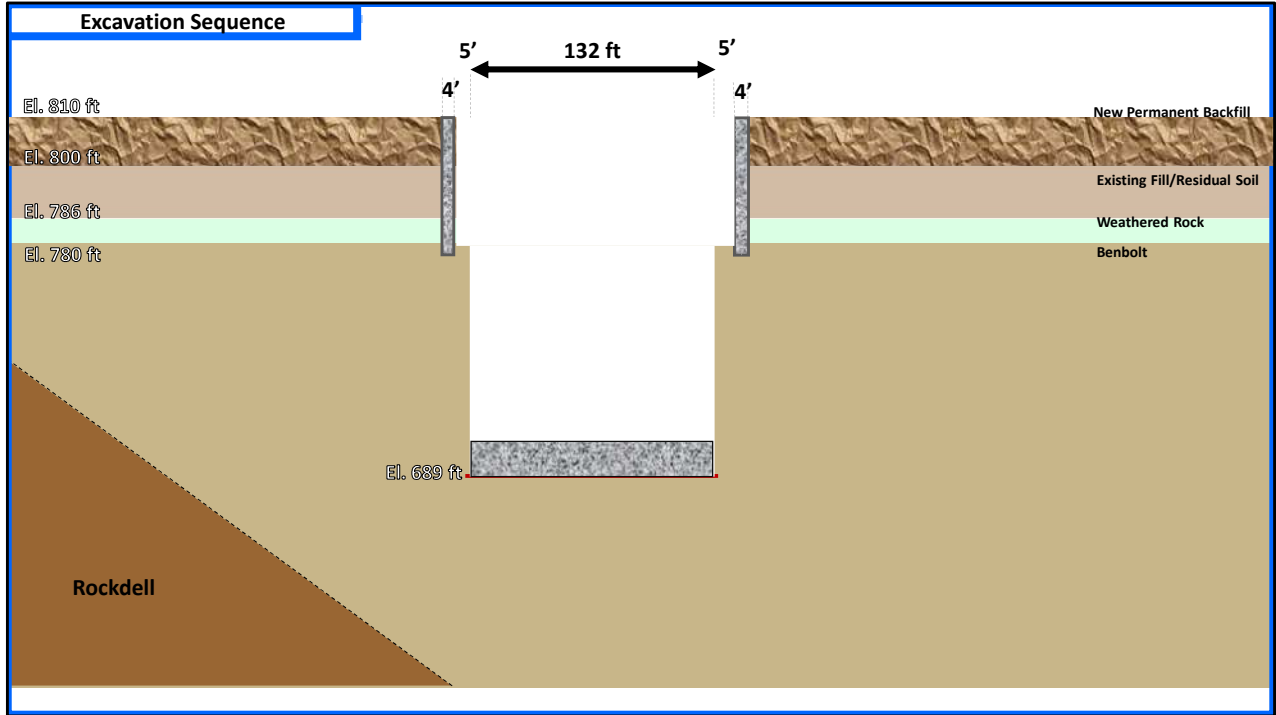


Figure 6 - RB Basemat installed (after CP Issuance)

*All dimensions are nominal and subject to change

Appendix A

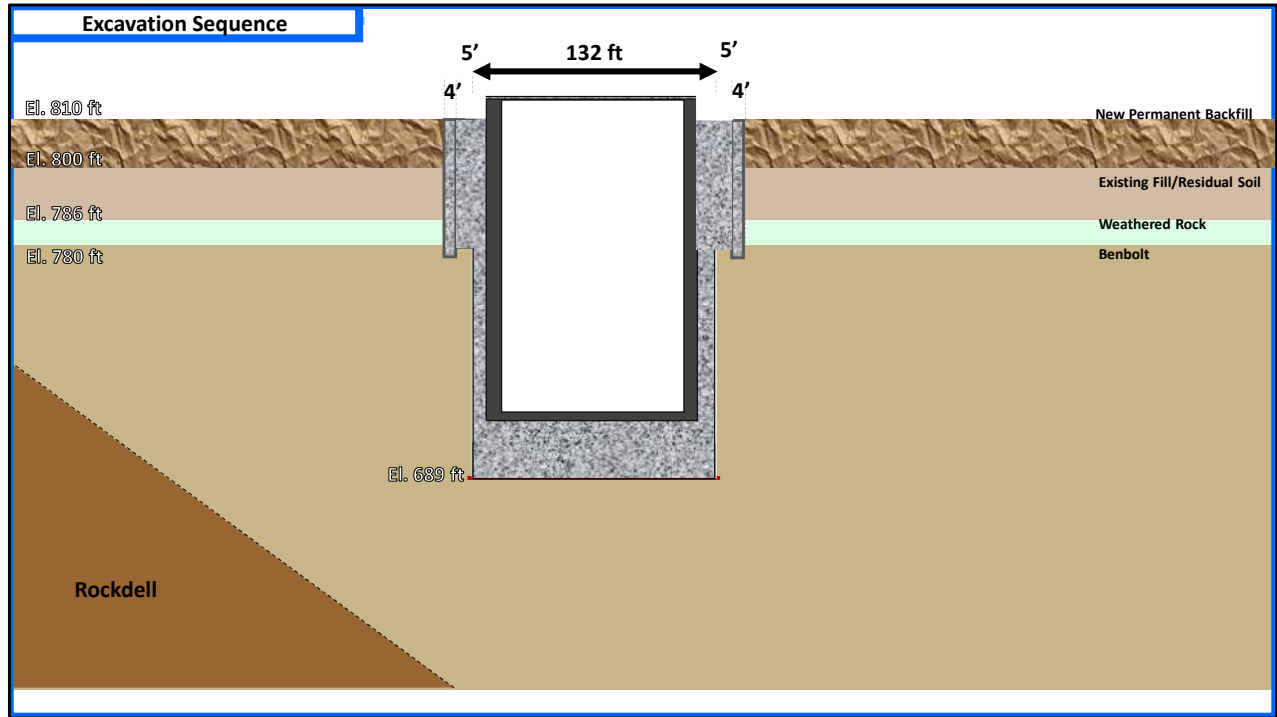


Figure 7 - RB installation commences and annulus area filled with lean concrete (after CP Issuance)

*All dimensions are nominal and subject to change

Appendix A

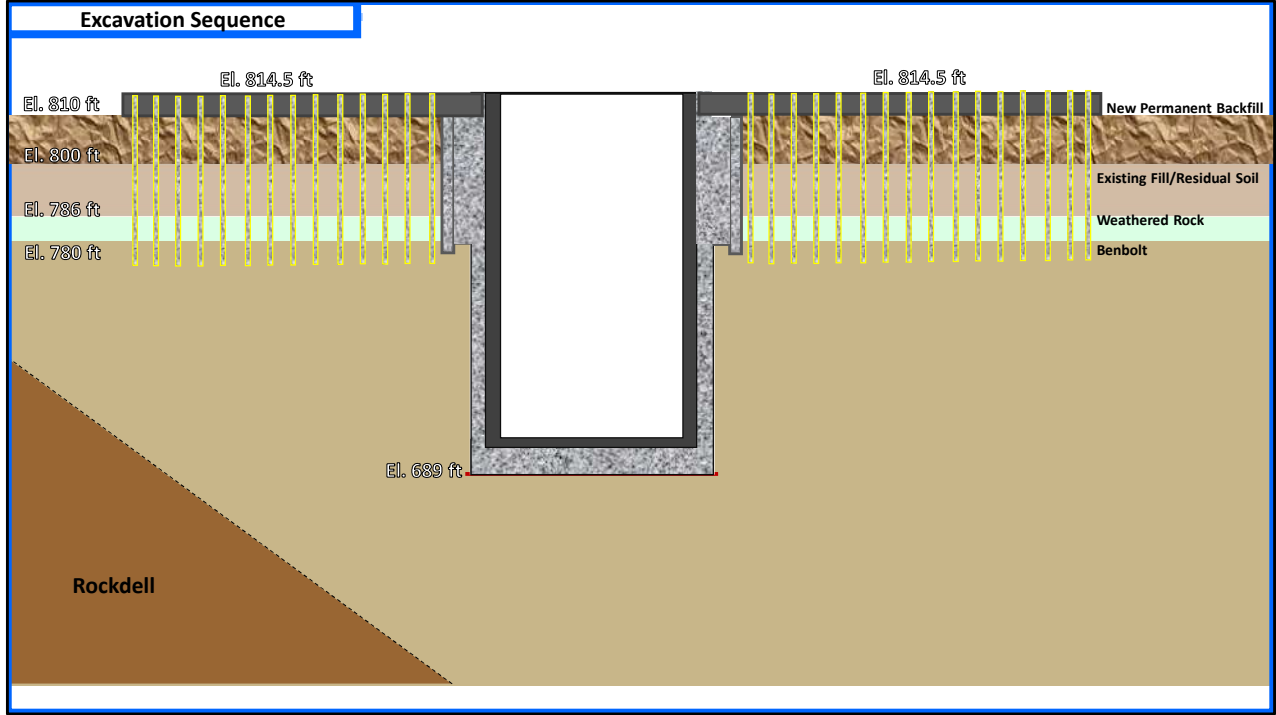


Figure 8 - Surrounding powerblock foundations installed in parallel with RB installation (after CP Issuance)

*All dimensions are nominal and subject to change