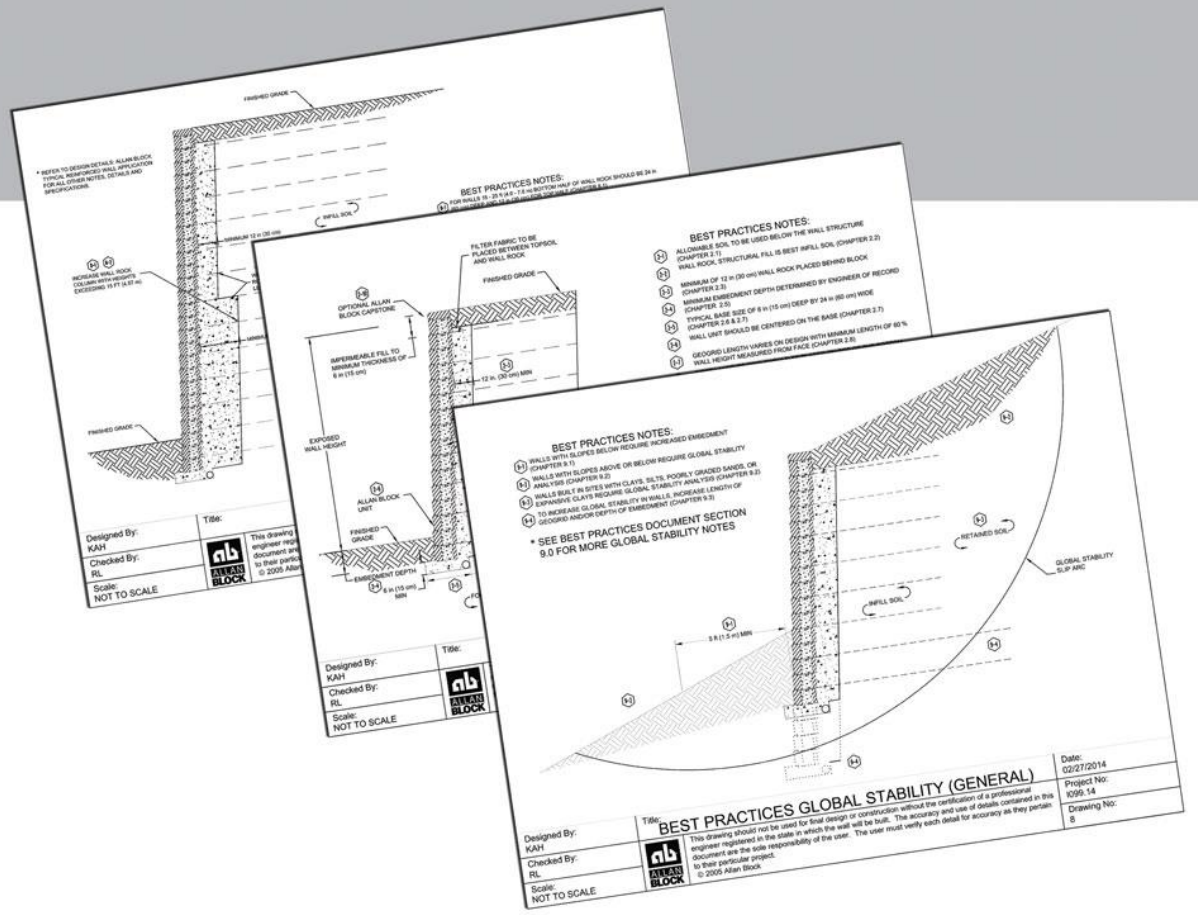
# Best Practices for SRW Design

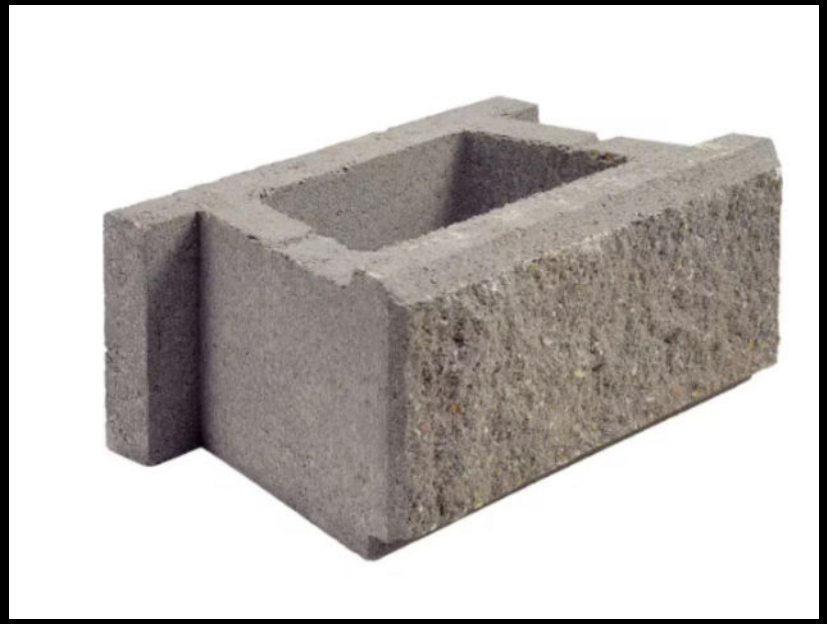


# Program Objectives

- Understand general best practices for constructing segmental block retaining walls and to develop proper construction methods
- Build a customer base familiar with how segmental walls work
- Raise professionalism throughout our industry

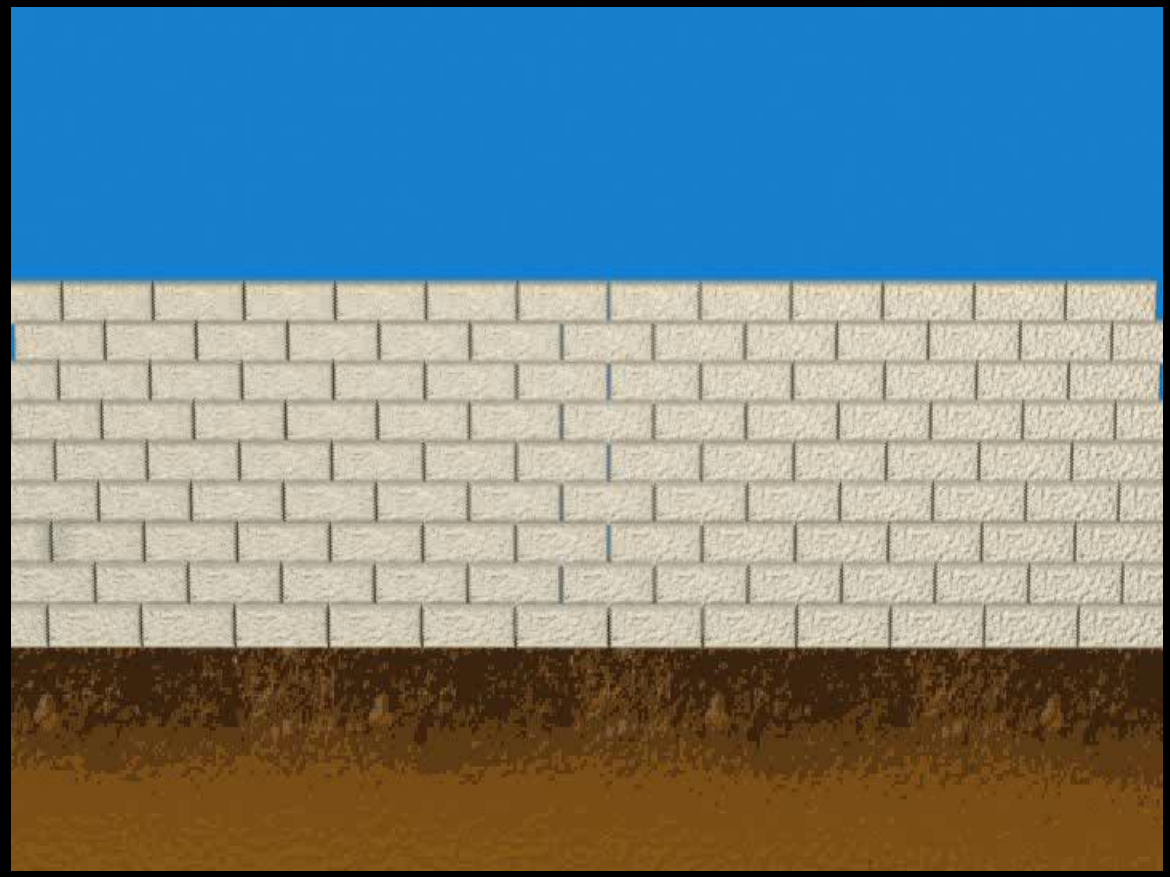
# History of Mortarless Construction

# SRW Units



# Segmental retaining wall

# The Ability to Bend but not Break



# Best Practices for Allan Block Segmental Retaining Wall Design For Residential and Commercial Applications

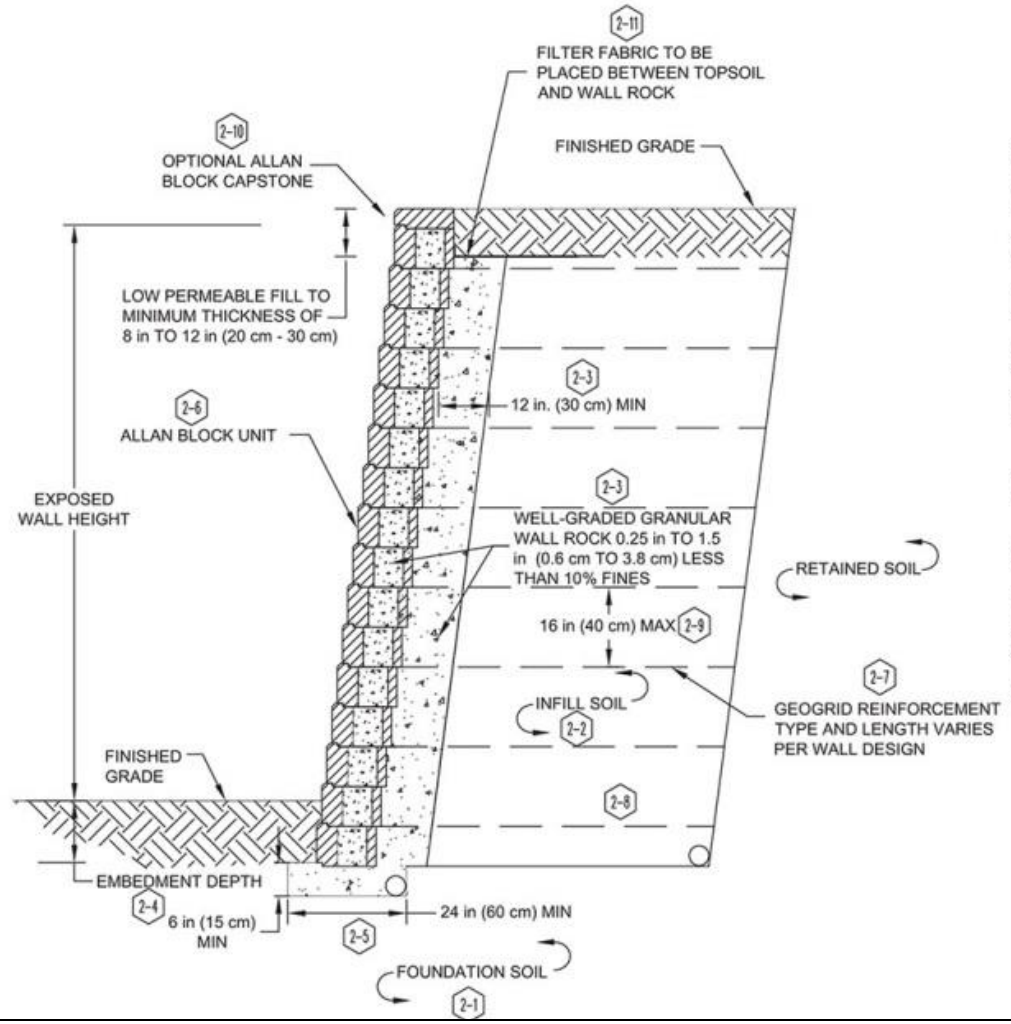
The intent of this document is to communicate the best practices for design of Segmental Retaining Walls (SRW) as determined by Allan Block Corporation based on 25 plus years of research, design and field experience. This is not meant to be a final authority as each project has their own set of unique situations. The local engineer of record must use their best engineering judgment to account for those situations that present themselves and provide a safe and efficient design for the customer. At no time does the contractor or local building official have the authority to override the approved plans and specifications provided from the local engineer of record. It is the recommendation of Allan Block Corporation that the local engineer of record work for and be paid by the project owner. It has been determined that the local engineer of record should be the Project Site Civil Engineer as they are best suited to take responsibility for the design, and how it affects the site, whether they do the design in-house or use an outside consultant to do the design for the project. The Project Site Civil Engineer has control of several of the overall aspects of the project and therefore is most able to properly handle the integration and communication required to ensure the performance of the wall complies with the needs of the site. For wall design applications that are outside of the experience level of the Project Site Civil Engineer a wall designer with the appropriate knowledge and experience should be contracted with by the Project Site Civil Engineer. It is recommended that the wall contractor not be responsible for securing the engineering.

How to use this document:

The Best Practice document contains drawings (Part 1) highlighting details associated with typical issues that may be present on any given project. Notes expanding on each topic are contained in the chapters that follow. Please refer to the Table of Contents Part 2 – Best Practice Considerations for a list of topics contained in this document.

## Part 1 – List of Drawings

## Part 2 – Best Practice Considerations




## BEST PRACTICES NOTES:

- 2-1 ALLOWABLE SOIL TO BE USED BELOW THE WALL STRUCTURE (CHAPTER 2.2)
- 2-2 WALL ROCK, STRUCTURAL FILL IS BEST INFILL SOIL (CHAPTER 2.3)
- 2-3 MINIMUM OF 12 in (30 cm) WALL ROCK PLACED BEHIND BLOCK (CHAPTER 2.4)
- 2-4 MINIMUM EMBEDMENT DEPTH DETERMINED BY ENGINEER OF RECORD (CHAPTER 2.6)
- 2-5 TYPICAL MINIMUM BASE SIZE OF 6 in (15 cm) DEEP BY 24 in (60 cm) WIDE (CHAPTER 2.7 & 2.8)
- 2-6 WALL UNIT SHOULD BE CENTERED ON THE BASE AND HAVE AN AVERAGE, FRONT TO BACK, DEPTH OF AT LEAST 10 in (25 cm) (CHAPTER 2.8 & 2.12)
- 2-7 GEOGRID LENGTH VARIES ON DESIGN WITH MINIMUM LENGTHS EQUAL TO 60% OF TOTAL WALL HEIGHT. GRID LENGTH MEASURED FROM WALL FACING (CHAPTER 2.9)
- 2-8 FIRST LAYER OF GRID SHOULD BE PLACED ON TOP OF THE BOTTOM BLOCK (CHAPTER 2.10)
- 2-9 16 in (40 cm) MAXIMUM SUGGESTED GRID SPACING (CHAPTER 2.11)
- 2-10 CAPPING SYSTEM SHOULD BE SECURED IN PLACE USING A HIGH QUALITY EXTERIOR GRADE MASONRY SEALANT (CHAPTER 2.13)
- 2-11 USE FILTER FABRIC ABOVE WALL ROCK COLUMN TO GUARD AGAINST LOW PERMEABLE SOILS INFILTRATING WALL ROCK (CHAPTER 2.4)

* SEE BEST PRACTICES DOCUMENT CHAPTER 2.0 FOR MORE TYPICAL NOTES

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2-11 USE FILTER FABRIC ABOVE WALL ROCK COLUMN TO GUARD AGAINST LOW PERMEABLE SOILS INFILTRATING WALL ROCK (CHAPTER 2.4)

(CHAPTER 2.8 & 2.12)

# Built In Setback

- Vertical Wall

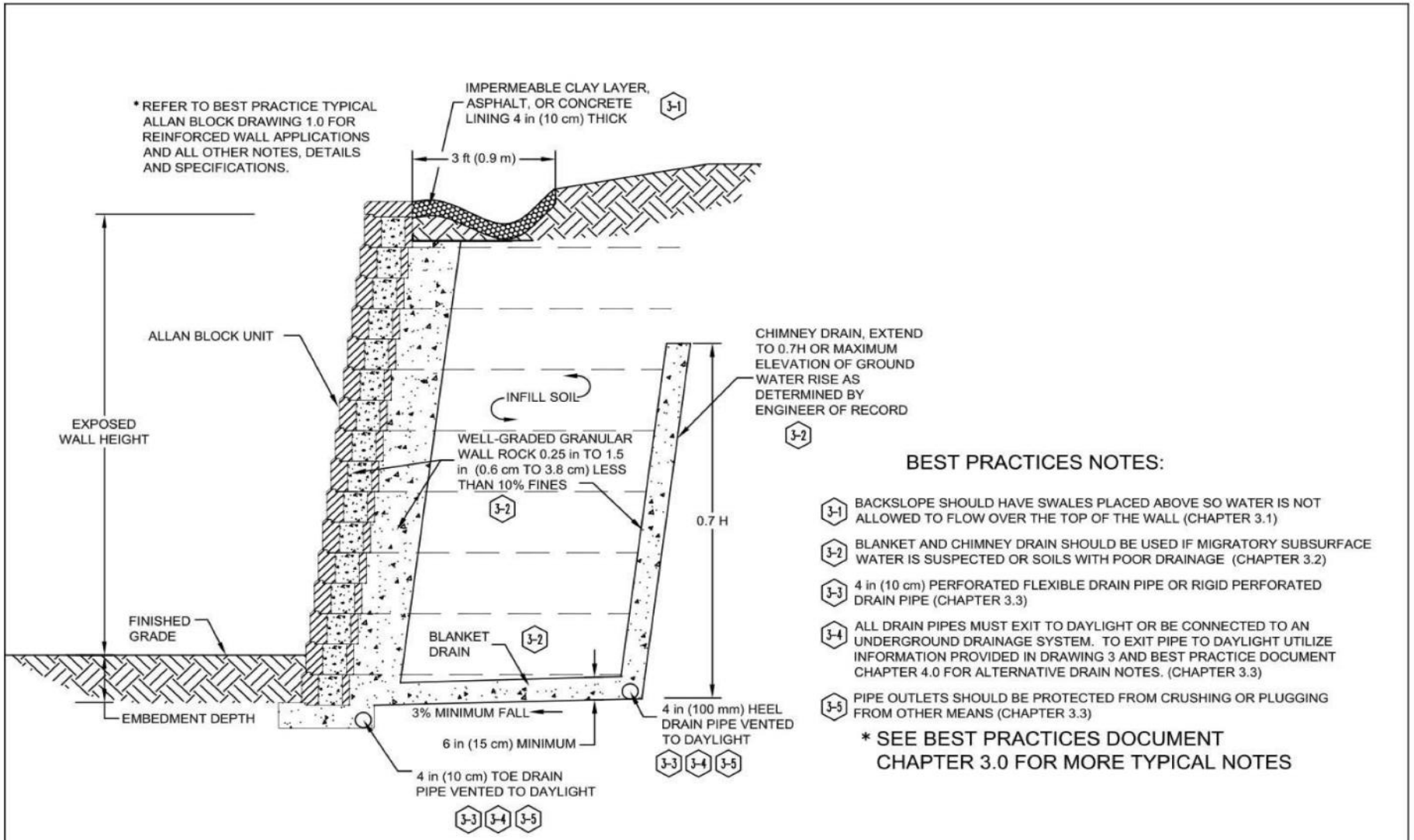
3.5’(1.1m) Tall Wall
Fa = 217 lb/ft (3165 N/m)
Ka = .2973

- Battered Wall

3.5’(1.1m) Tall Wall
Fa = 160 lb/ft (2334 N/m)
Ka = .2197

AB Classic – 6 degree or 1.25” per 1’

VL Standard – ¾” per unit

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3-5 PIPE OUTLETS SHOULD BE PROTECTED FROM CRUSHING OR PLUGGING FROM OTHER MEANS (CHAPTER 3.3)

## BEST PRACTICES NOTES:

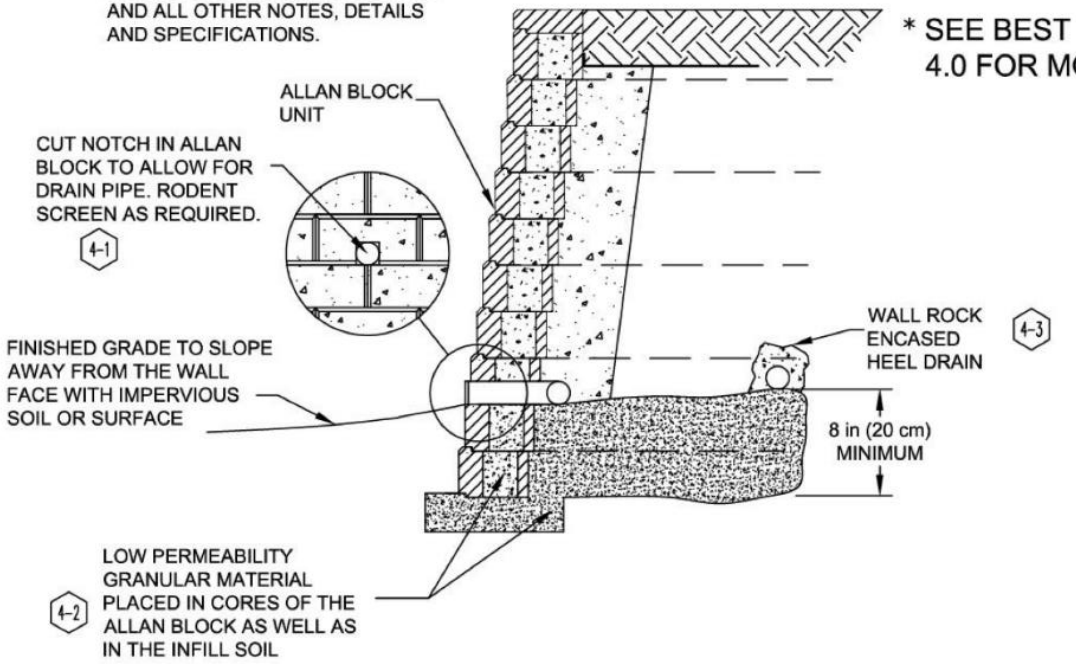
4-1 DRAIN PIPE RAISED TO ACCOMODATE OUTLETS THROUGH THE WALL FACE (CHAPTER 4.1)

4-2 LOW PERMEABILITY GRANULAR SOILS SHOULD BE PLACED TO CREATE A SHELF INSIDE THE MASS (CHAPTER 4.1)

4-3 1 ft^3/ft (0.3 m^3/m) OF ADDITIONAL WALL ROCK SHOULD BE PLACED AROUND HEEL DRAIN WHEN INFILL MATERIAL USED IS FINE GRAINED COHESIVE SOILS HAVING A PLASTICITY INDEX (PI) OF > 6 & LL > 30 (CHAPTER 4.2)

* REFER TO BEST PRACTICE TYPICAL ALLAN BLOCK DRAWING 1.0 FOR REINFORCED WALL APPLICATIONS AND ALL OTHER NOTES, DETAILS AND SPECIFICATIONS.

* SEE BEST PRACTICES DOCUMENT CHAPTER 4.0 FOR MORE ALTERNATIVE DRAIN NOTES

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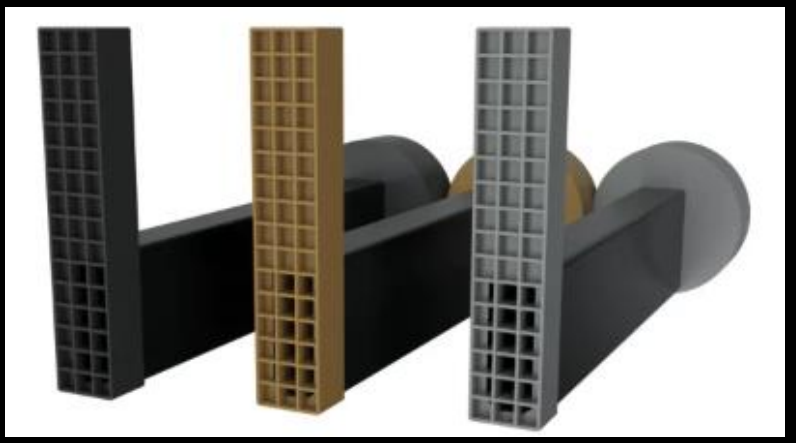
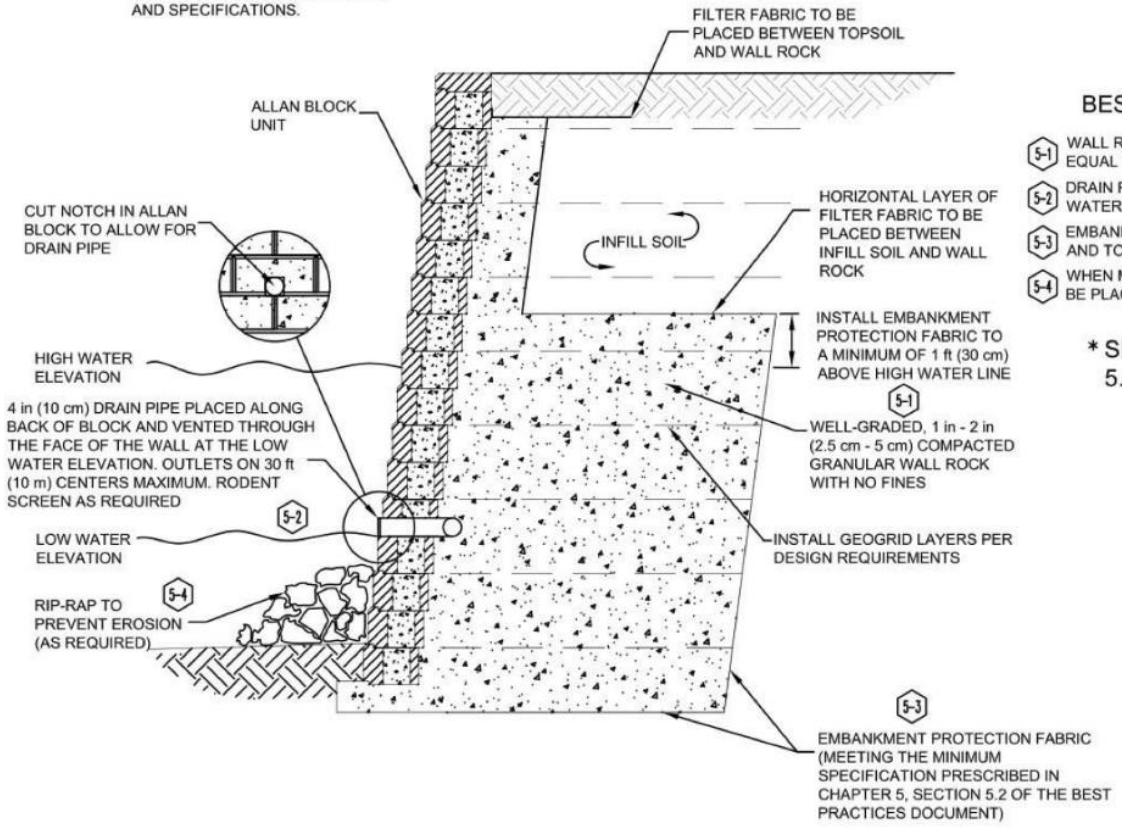
4-3 1 ft^3/ft (0.3 m^3/m) OF ADDITIONAL WALL ROCK SHOULD BE PLACED AROUND HEEL DRAIN WHEN INFILL MATERIAL USED IS FINE GRAINED COHESIVE SOILS HAVING A PLASTICITY INDEX (PI) OF > 6 & LL > 30 (CHAPTER 4.2)

# Wall Drain Pro

- Increases profitability by reducing cuts
- Provides cleaner aesthetics

• REFER TO BEST PRACTICE TYPICAL ALLAN BLOCK DRAWING 1.0 FOR REINFORCED WALL APPLICATIONS AND ALL OTHER NOTES, DETAILS AND SPECIFICATIONS.




## BEST PRACTICES NOTES:

5-1 WALL ROCK PLACED TO THE LIMITS OF THE GEOGRID UP TO A HEIGHT EQUAL TO 12 in (30 cm) HIGHER THAN ANY WATER SOURCE (CHAPTER 5.1)

5-2 DRAIN PIPE RAISED TO THE LOW WATER ELEVATION TO AID IN EVACUATION OF WATER DURING WATER FLUCTUATION (CHAPTER 5.2)

5-3 EMBANKMENT PROTECTION FABRIC SHOULD BE USED UNDER THE INFILL MASS AND TO A HEIGHT OF 12 in (30 cm) HIGHER THAN HIGH WATER MARK (CHAPTER 5.2)

5-4 WHEN MOVING WATER IS DETERMINED, RIP-RAP IN FRONT OF THE WALL SHOULD BE PLACED TO PROTECT THE WALL FROM SCOUR EFFECTS (CHAPTER 5.2)

* SEE BEST PRACTICES DOCUMENT CHAPTER 5.0 FOR MORE WATER APPLICATION NOTES

| Designed By: | Title: BEST PRACTICES WATER APPLICATION | Date: |
|---|---|---|
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5-4 WHEN MOVING WATER IS DETERMINED, RIP-RAP IN FRONT OF THE WALL SHOULD BE PLACED TO PROTECT THE WALL FROM SCOUR EFFECTS (CHAPTER 5.2)

## BEST PRACTICES NOTES:

6-1 UNDERSTANDING SITE SOILS AND PROPER MINIMUM SOIL PARAMETERS FOR INFILL SOIL AS WELL AS PROPER DRAINAGE REQUIREMENTS ARE ESSENTIAL TO DESIGNING AND CONSTRUCTING A WALL PROPERLY. (CHAPTERS 6.1, 6.2, 6.3, 6.4, AND 6.5)

6-2 ALLOWABLE SOILS TO BE USED BELOW THE WALL STRUCTURE FACE (CHAPTER 6.2)

6-3 ALLOWABLE SOILS TO BE USED IN REINFORCED MASS (CHAPTER 6.3)

6-4 WALL ROCK COLUMN SIZE OF MATERIAL USED (CHAPTER 6.4)

6-5 TESTING FREQUENCY SHOULD BE SET TO REACH PROPER COMPACTION REQUIREMENTS (CHAPTER 6.6)

6-6 HAND OPERATED PLATE COMPACTOR ONLY TO BE USED IN THE CONSOLIDATION ZONE (CHAPTER 6.7)

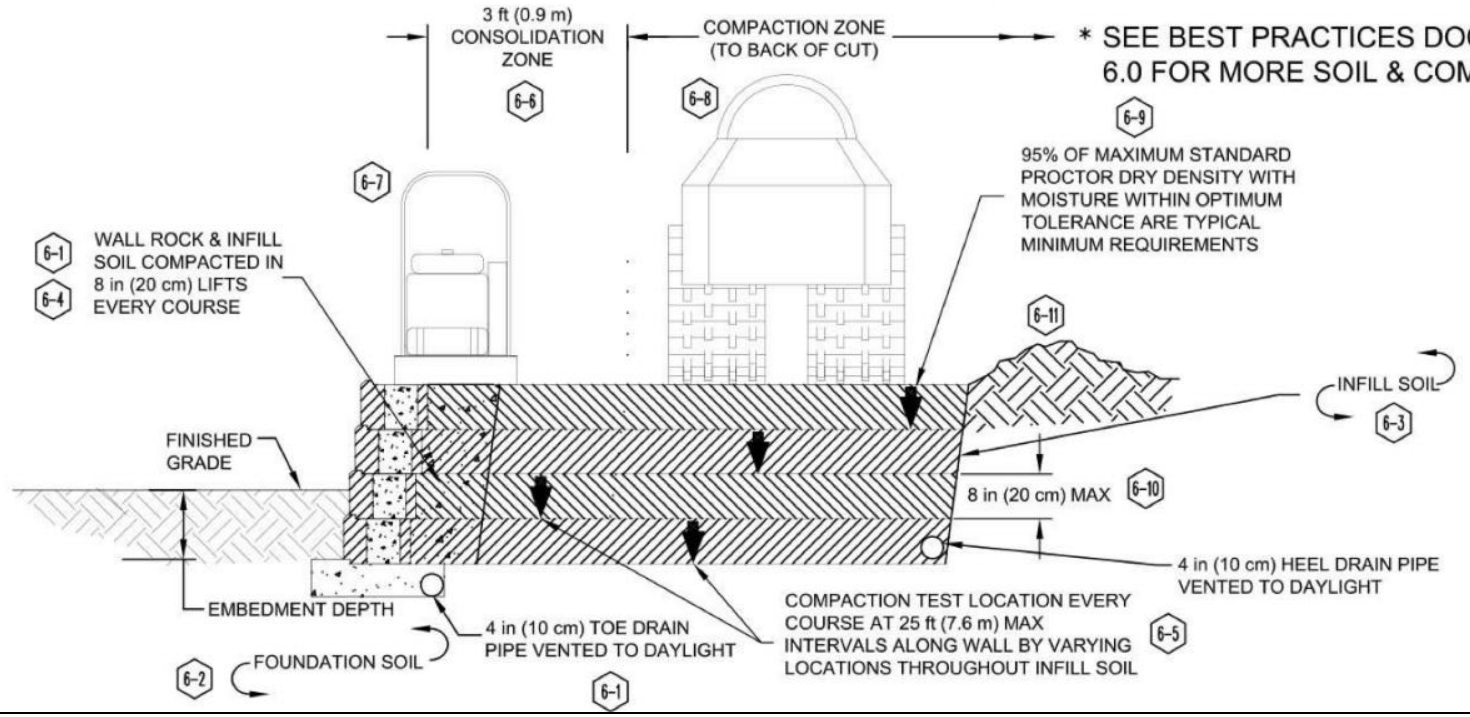
6-7 COMPACTION OF SECOND COURSE AND ABOVE WILL BEGIN BY RUNNING THE PLATE COMPACTOR DIRECTLY ON THE BLOCK FACING (CHAPTER 6.7)

6-8 HEAVY COMPACTION EQUIPMENT MAY BE USED BEHIND THE CONSOLIDATION ZONE (CHAPTER 6.7)

6-9 TYPICAL DENSITY TESTING SHOULD FOLLOW ENGINEER OF RECORDS SPECIFICATIONS (CHAPTER 6.7 & 6.9)

6-10 MAXIMUM FILL AND COMPACTION LIFTS OF 8 in (20 cm) WITH NO EXCEPTIONS (CHAPTER 6.8)

6-11 IMPLEMENT TEMPORARY BERM OR GRADE THE BACKFILL AT DAY'S END TO AVOID WATER ACCUMULATION BEHIND THE WALL (CHAPTER 6.11)




6-11 IMPLEMENT TEMPORARY BERM OR GRADE THE BACKFILL AT DAY'S END TO AVOID WATER ACCUMULATION BEHIND THE WALL (CHAPTER 6.11)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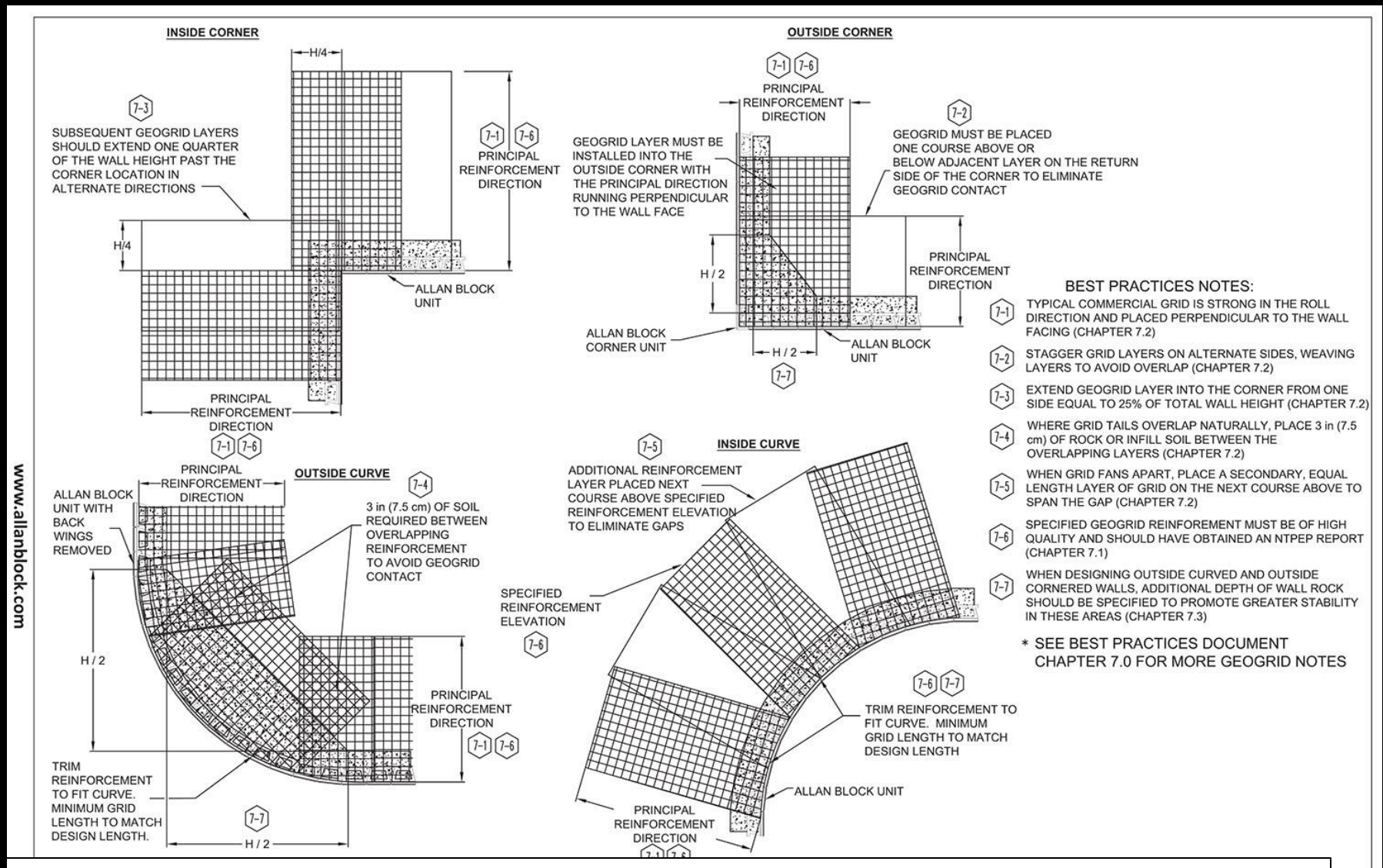


7-7

WHEN DESIGNING OUTSIDE CURVED AND OUTSIDE CORNERED WALLS, ADDITIONAL DEPTH OF WALL ROCK SHOULD BE SPECIFIED TO PROMOTE GREATER STABILITY IN THESE AREAS (CHAPTER 7.3)


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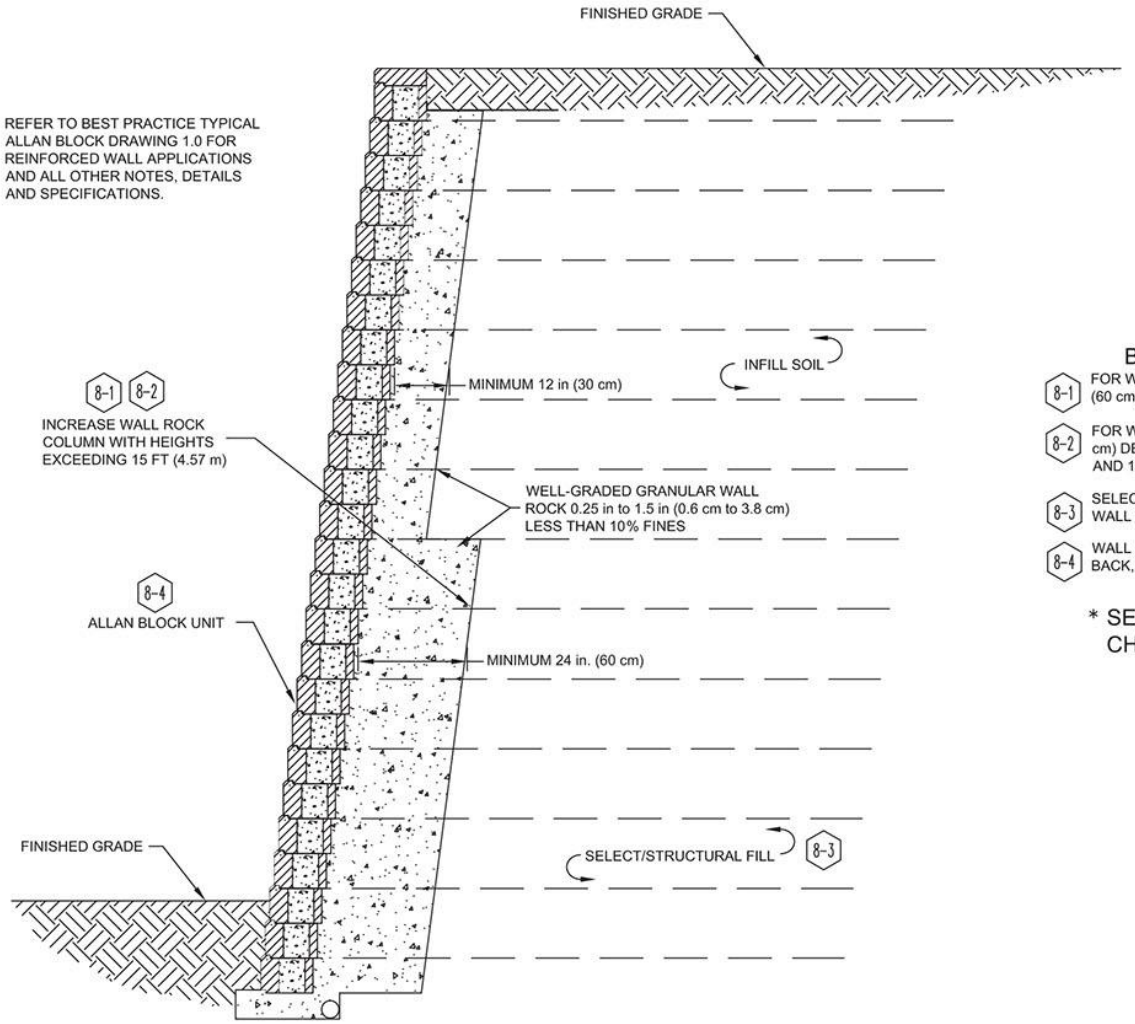


BEST PRACTICES NOTES:

8-1 FOR WALLS 15 - 25 ft (4.0 - 7.6 m) BOTTOM HALF OF WALL ROCK SHOULD BE 24 in (60 cm) DEEP AND 12 in (30 cm) FOR TOP HALF (CHAPTER 8.2)

8-2 FOR WALLS OVER 25 ft (7.6 m) TALL, THE BOTTOM HALF OF WALL ROCK IS 36 in (90 cm) DEEP AND THE TOP HALF OF WALL ROCK IS DIVIDED IN TWO WITH 24 in (60 cm) AND 12 in (30 cm) DEEP COLUMNS (CHAPTER 8.2)

8-3 SELECT/STRUCTURAL FILL SHOULD BE USED FOR A MINIMUM OF 1/3 THE HEIGHT OF THE WALL TO EXTEND TO THE ENTIRE LENGTH OF THE REINFORCEMENT (CHAPTER 8.3)

8-4 WALL UNIT SHOULD BE CENTERED ON THE BASE AND HAVE AN AVERAGE, FRONT TO BACK, DEPTH OF AT LEAST 10 in (25 cm) (CHAPTER 8.7)

* SEE BEST PRACTICES DOCUMENT CHAPTER 8.0 FOR MORE TALL WALL NOTES

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8-4 WALL UNIT SHOULD BE CENTERED ON THE BASE AND HAVE AN AVERAGE, FRONT TO BACK, DEPTH OF AT LEAST 10 in (25 cm) (CHAPTER 8.7)


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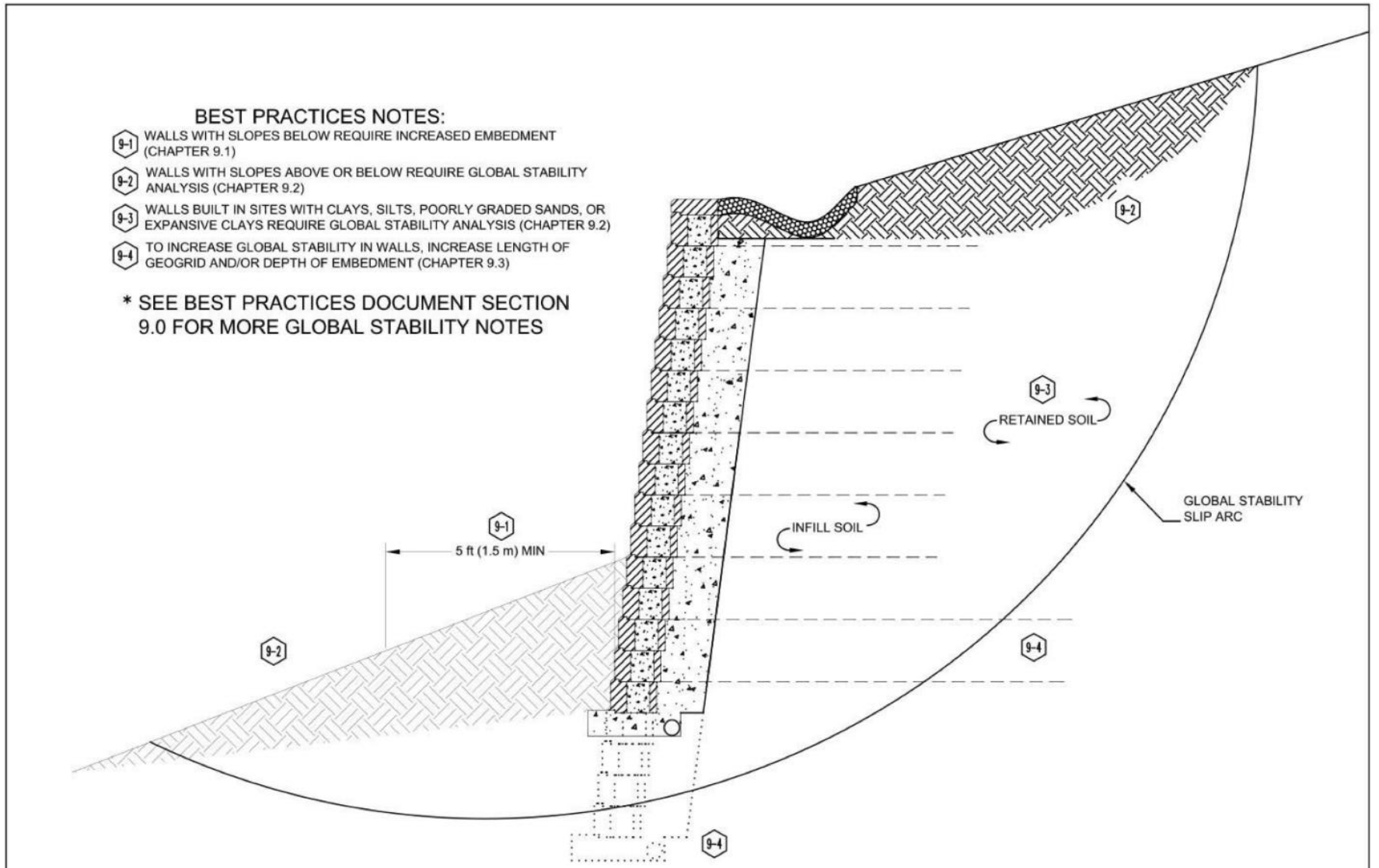
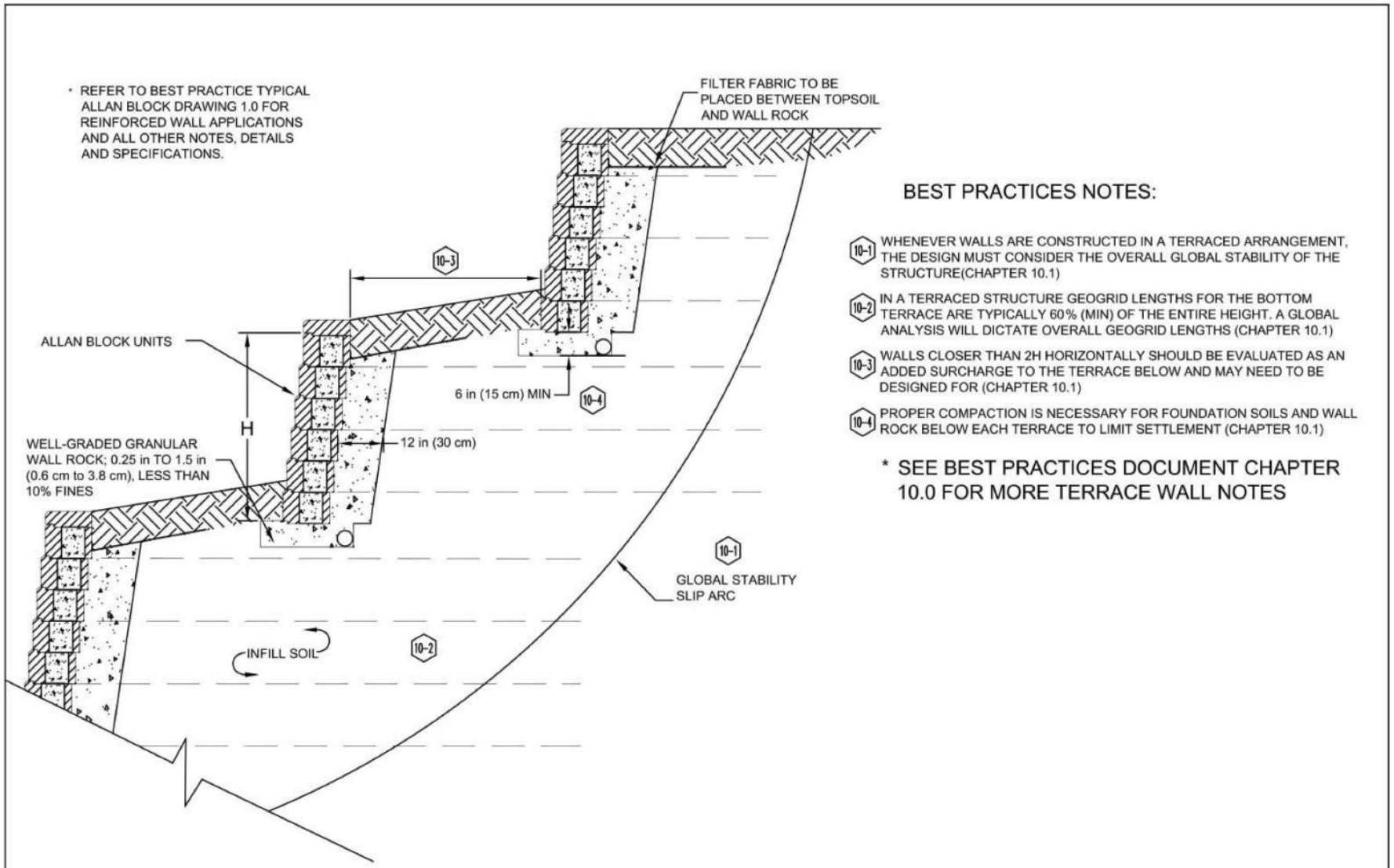



9-4 TO INCREASE GLOBAL STABILITY IN WALLS, INCREASE LENGTH OF GEOGRID AND/OR DEPTH OF EMBEDMENT (CHAPTER 9.3)




BEST PRACTICES NOTES:

10-1 WHENEVER WALLS ARE CONSTRUCTED IN A TERRACED ARRANGEMENT, THE DESIGN MUST CONSIDER THE OVERALL GLOBAL STABILITY OF THE STRUCTURE(CHAPTER 10.1)

10-2 IN A TERRACED STRUCTURE GEOGRID LENGTHS FOR THE BOTTOM TERRACE ARE TYPICALLY 60% (MIN) OF THE ENTIRE HEIGHT. A GLOBAL ANALYSIS WILL DICTATE OVERALL GEOGRID LENGTHS (CHAPTER 10.1)

10-3 WALLS CLOSER THAN 2H HORIZONTALLY SHOULD BE EVALUATED AS AN ADDED SURCHARGE TO THE TERRACE BELOW AND MAY NEED TO BE DESIGNED FOR (CHAPTER 10.1)

10-4 PROPER COMPACTION IS NECESSARY FOR FOUNDATION SOILS AND WALL ROCK BELOW EACH TERRACE TO LIMIT SETTLEMENT (CHAPTER 10.1)

* SEE BEST PRACTICES DOCUMENT CHAPTER 10.0 FOR MORE TERRACE WALL NOTES

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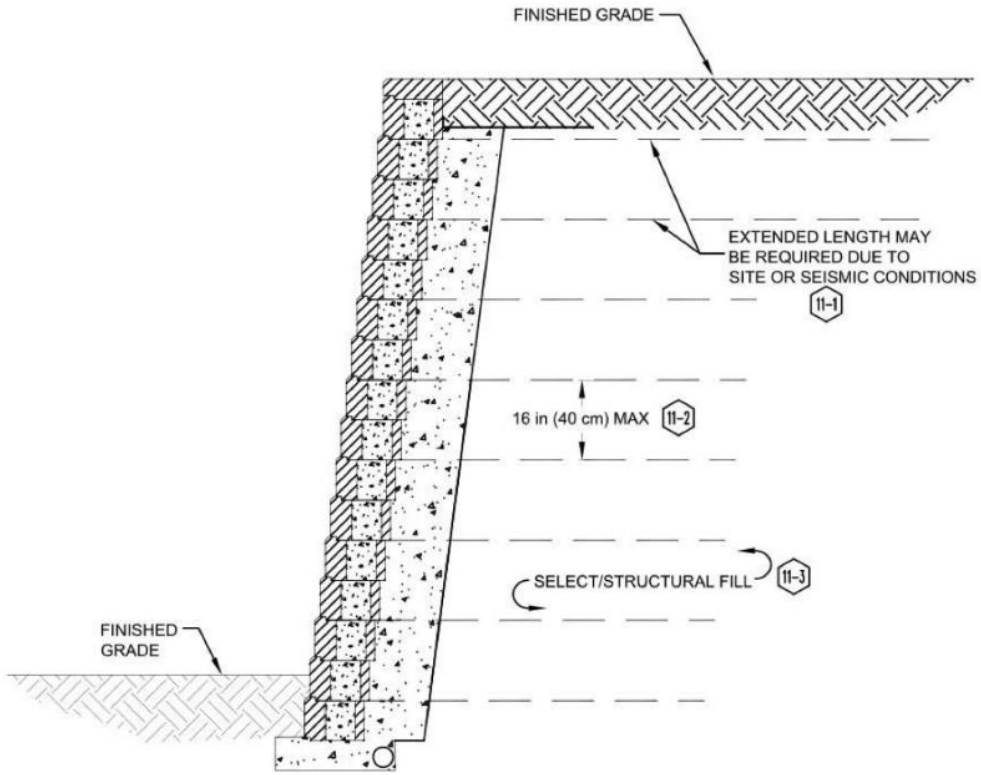
10-4 PROPER COMPACTION IS NECESSARY FOR FOUNDATION SOILS AND WALL ROCK BELOW EACH TERRACE TO LIMIT SETTLEMENT (CHAPTER 10.1)




BEST PRACTICES NOTES:

11-1 TYPICALLY THE TOP LAYER(S) OF GEOGRID WILL BE EXTENDED TO ROUGHLY 90% OR MORE (MIN EXTENSION OF 3 ft (0.9 m)) OF THE TOTAL WALL HEIGHT TO SATISFY SEISMIC DESIGN REQUIREMENTS (CHAPTER 11.1)

11-2 TWO COURSE (16 in (40 cm)) MAXIMUM SPACING IS RECOMMENDED IN ALL DESIGNED WALLS (CHAPTER 11.1)

11-3 USING SELECT BACKFILL WILL REDUCE THE EFFECTS OF THE DYNAMIC LOADING (CHAPTER 11.1)

* SEE BEST PRACTICES DOCUMENT CHAPTER 11.0 FOR MORE SEISMIC NOTES

11-3 USING SELECT BACKFILL WILL REDUCE THE EFFECTS OF THE DYNAMIC LOADING (CHAPTER 11.1)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## BEST PRACTICES NOTES:

12-1 GEOGRID LENGTH EXTENDED TO 90% WALL HEIGHT OR ADDITIONAL 3 ft (0.9 m) WHICH EVER IS GREATER (CHAPTER 12.1)

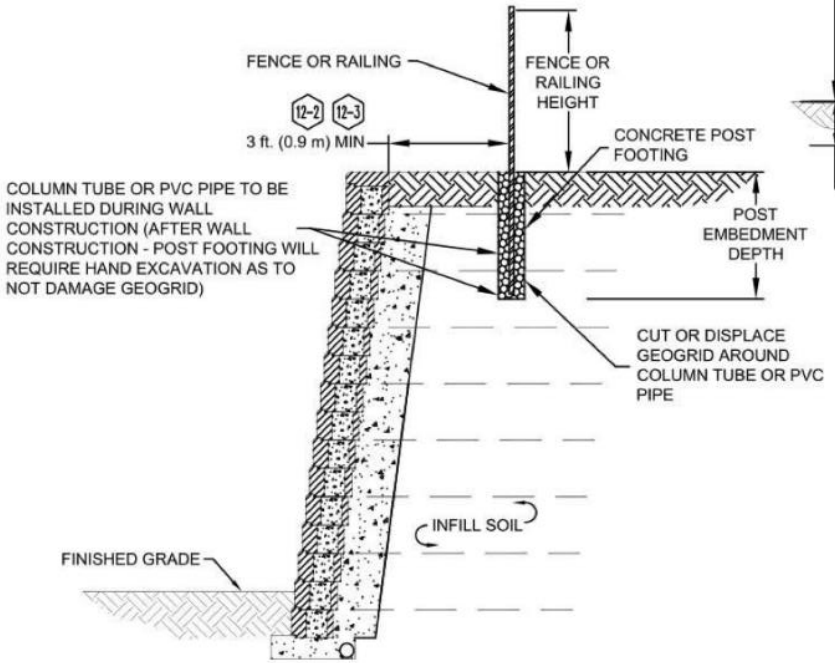
12-2 STRUCTURES SHOULD BE POSITIONED 3 ft (0.9 m) BEHIND THE TOP COURSE TO ALLOW PROPER OVERTURNING DESIGN (CHAPTER 12.2)

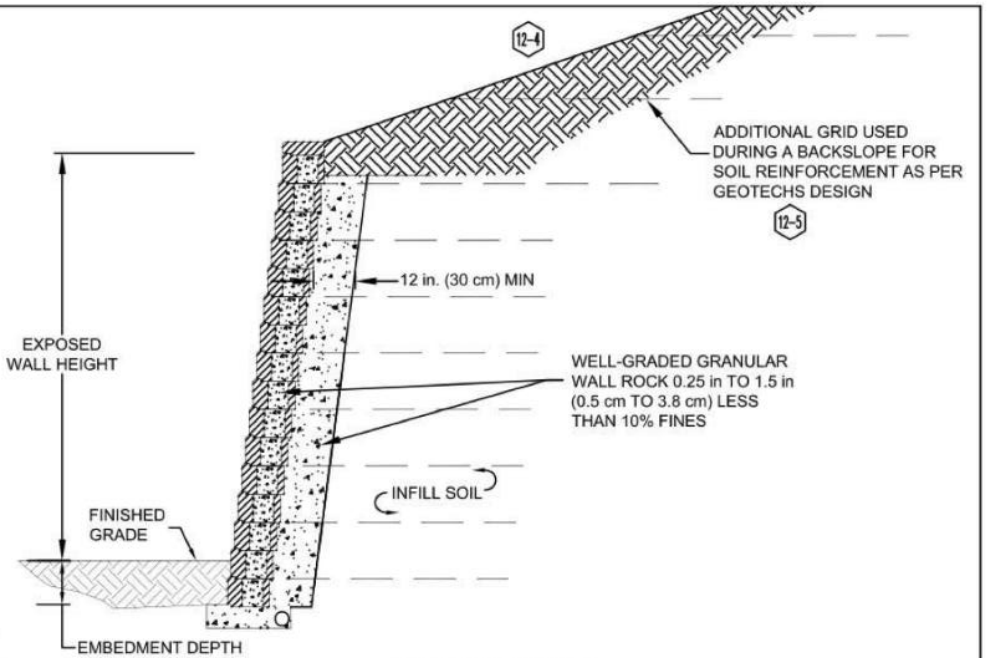
12-3 FENCE POSTS WITHIN 3 ft (0.9 m) NEED TO CONSIDER THE LOCAL OVERTURNING FORCES APPLIED TO THE WALL FACING (CHAPTER 12.2)

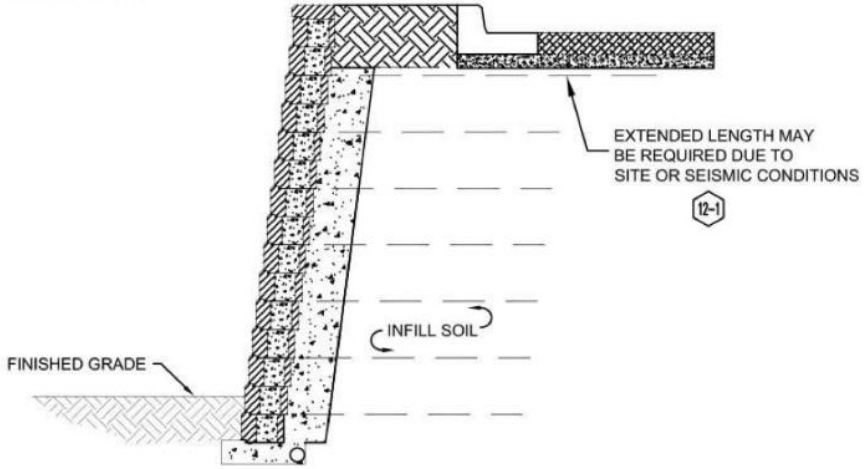
12-4 PROPER LIFT AND COMPACTION OF SLOPE SHOULD FOLLOW GEOTECHNICAL RECOMMENDATIONS (CHAPTER 12.3)

12-5 BACKSLOPES GREATER THAN 3:1 SHOULD INCLUDE REINFOCEMENT IN SLOPE USING GRID LENGTHS THAT MATCH THE STANDARD GRID LENGTHS IN THE WALL (CHAPTER 12.4)

* SEE BEST PRACTICES DOCUMENT CHAPTER 12.0 FOR MORE ABOVE WALL NOTES




12-5 BACKSLOPES GREATER THAN 3:1 SHOULD INCLUDE REINFOCEMENT IN SLOPE USING GRID LENGTHS THAT MATCH THE STANDARD GRID LENGTHS IN THE WALL (CHAPTER 12.4)

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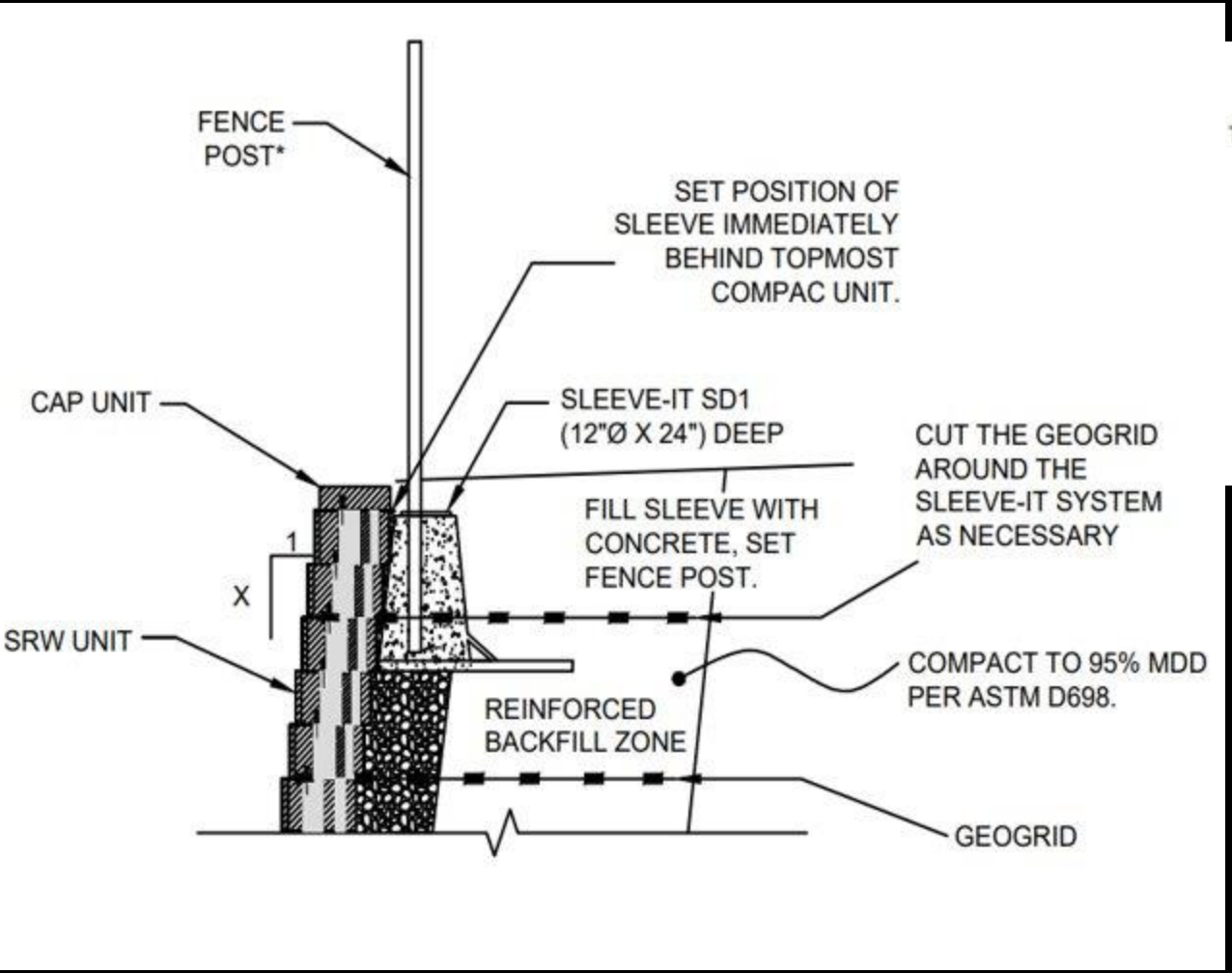
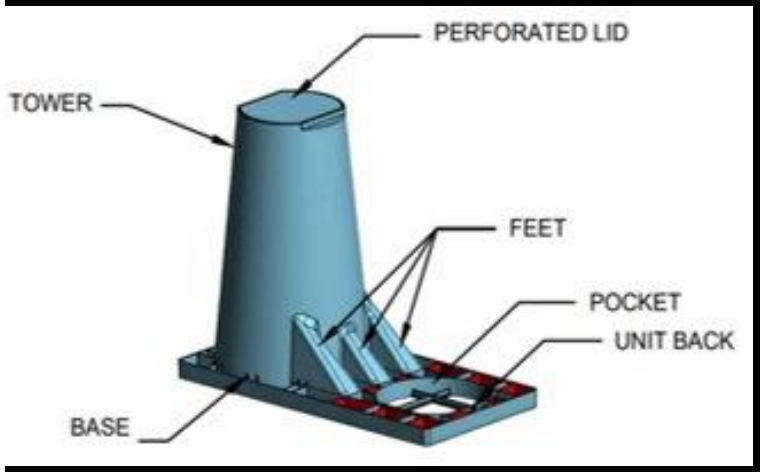
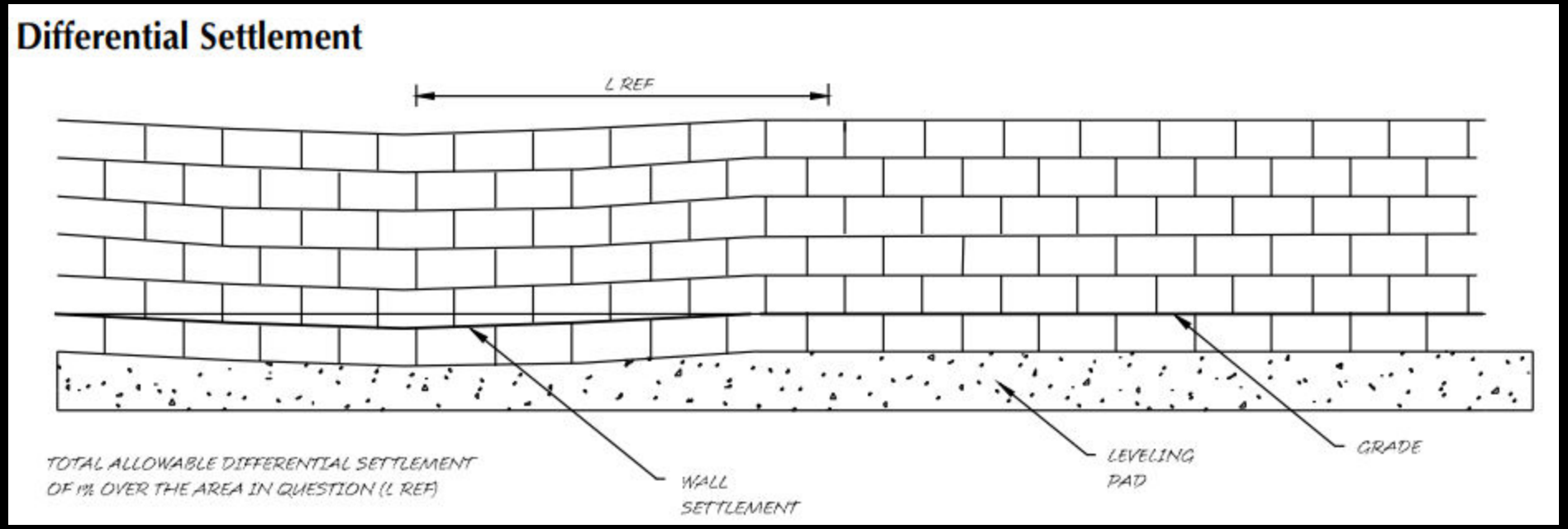
# Sleeve It System



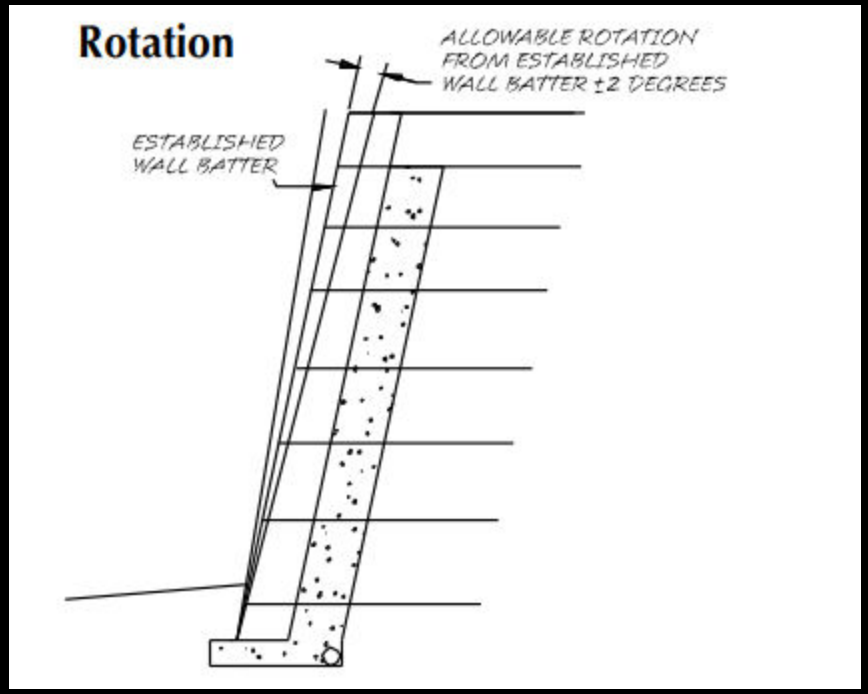
# Construction Tolerances

- Differential Settlement – 1% over the area in question



# Construction Tolerances

- Rotation - +/- 2 degrees from established wall batter



# Construction Tolerances

- Horizontal and Vertical Control - +/- 1.25 in of tolerance in a 10 ft area

**Figure 11: Vertical Control**

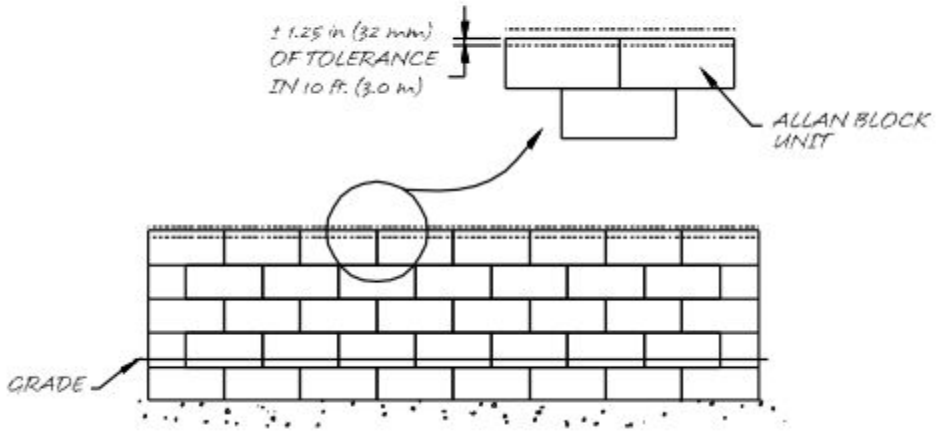
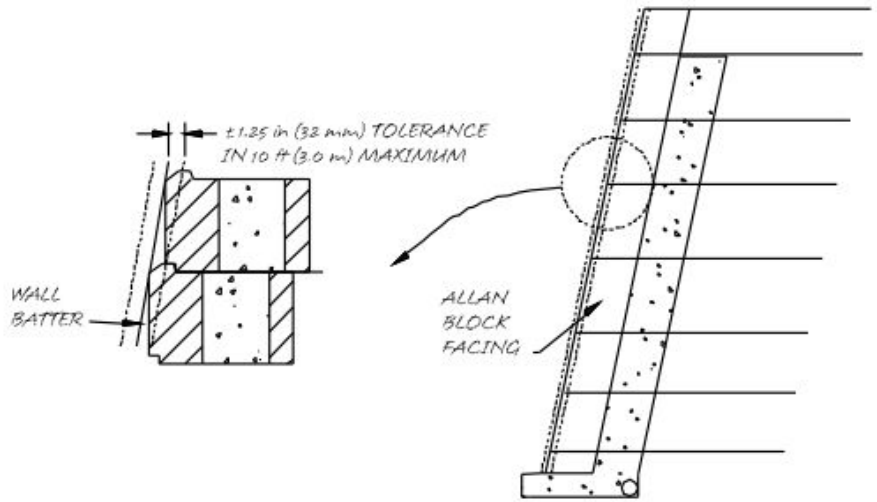
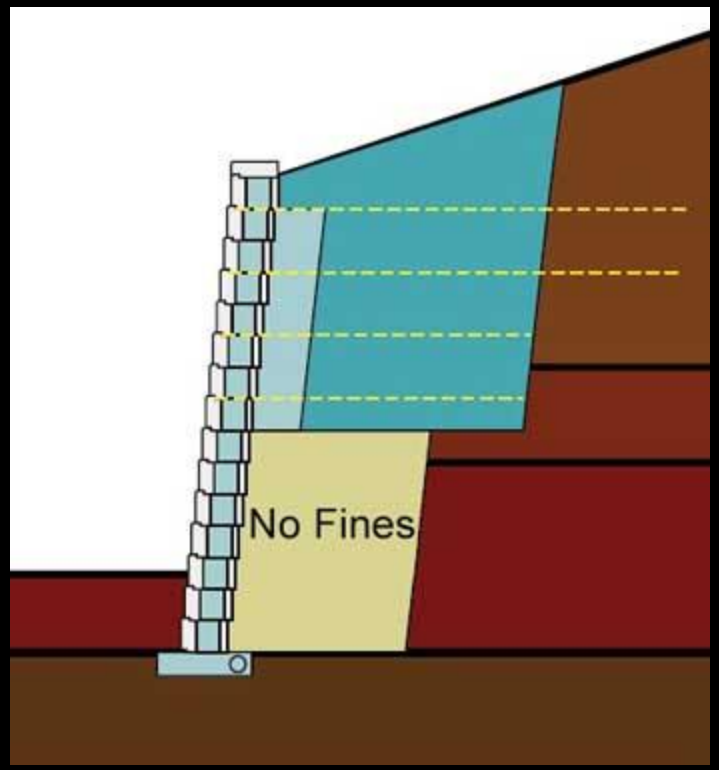



**Figure 13: Horizontal Control**



# “Big Block Wetcast” VS “Modular Drycast Block”

# No-Fines Concrete




- No-Fines Concrete backfill typically consists of cement, fly ash, water and coarse aggregate
- Can reduce cut by up to 50%
- Used in Complex Composite Structures (multiple reinforcement methods)
- Engineered for up to 15ft

1.5) Obtain a thorough geotechnical report in the area where the wall will be located.

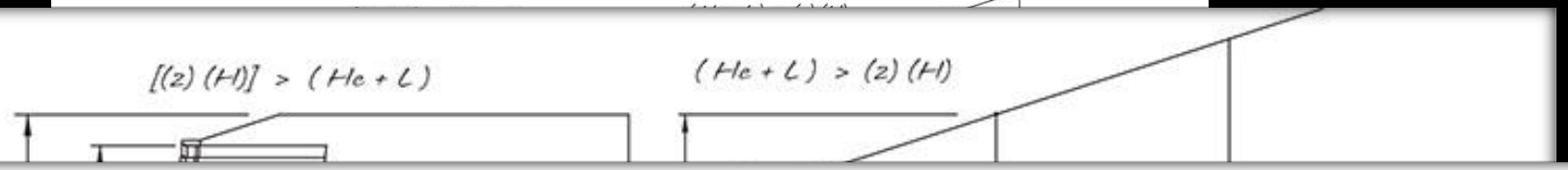
a) Geotechnical report should be available to all parties doing design work and should be an all-encompassing document covering all aspects of the site such as the following:

i.) Soil strength – preferably the tested friction angle of the on-site soils
ii.) Clear description of on-site soils
iii.) Gradation of soils
iv.) Groundwater conditions
v.) Settlement
vi.) Soil unit weights
vii.) Plasticity Index (PI) and Liquid Limit (LL)
viii.) Site specific seismic coefficients
ix.) Global stability recommendations

b) The geotechnical investigation and report should be paid for by the owner.

c) If no other guidance has been provided, a geotechnical investigation should include soil borings with sampling and logs at an interval of not more than 100 ft (30 m) along the centerline of the proposed retaining wall(s) and at 150 ft (46 m) along the back of the reinforced soil zone.

all-encompassing document covering all aspects of the site such as the following:
i.) Soil strength – preferably the tested friction angle of the on-site soils
ii.) Clear description of on-site soils
iii.) Gradation of soils
iv.) Groundwater conditions
v.) Settlement
vi.) Soil unit weights




1.12) Require that Contractors must be trained and certified by local manufacturer or equivalent accredited organization.

a) Allan Block and NCMA have certification programs that are accredited. Identify when advanced certification levels are appropriate based on complexity and criticality of project application.

b) Require contractors to provide a list of projects they have completed.

whole and on the individual parts of the system. None more so than the connection between the geogrid and the wall facing. More information on the actual connection test method can be found in ASTM D 6638. It has been determined that walls constructed using 60% minimum lengths of grid and a two course (16 in (40 cm)) maximum vertical spacing builds a high quality reinforced mass that easily distribute the calculated internal pressures. Testing has also proven that actual internal forces within a properly constructed reinforced mass are much less than the theoretical design loads based on active earth pressure calculations. Internal Compound Stability (ICS) calculations provide an analysis from a global stability perspective within the design envelope defined in Section 1.9b above.

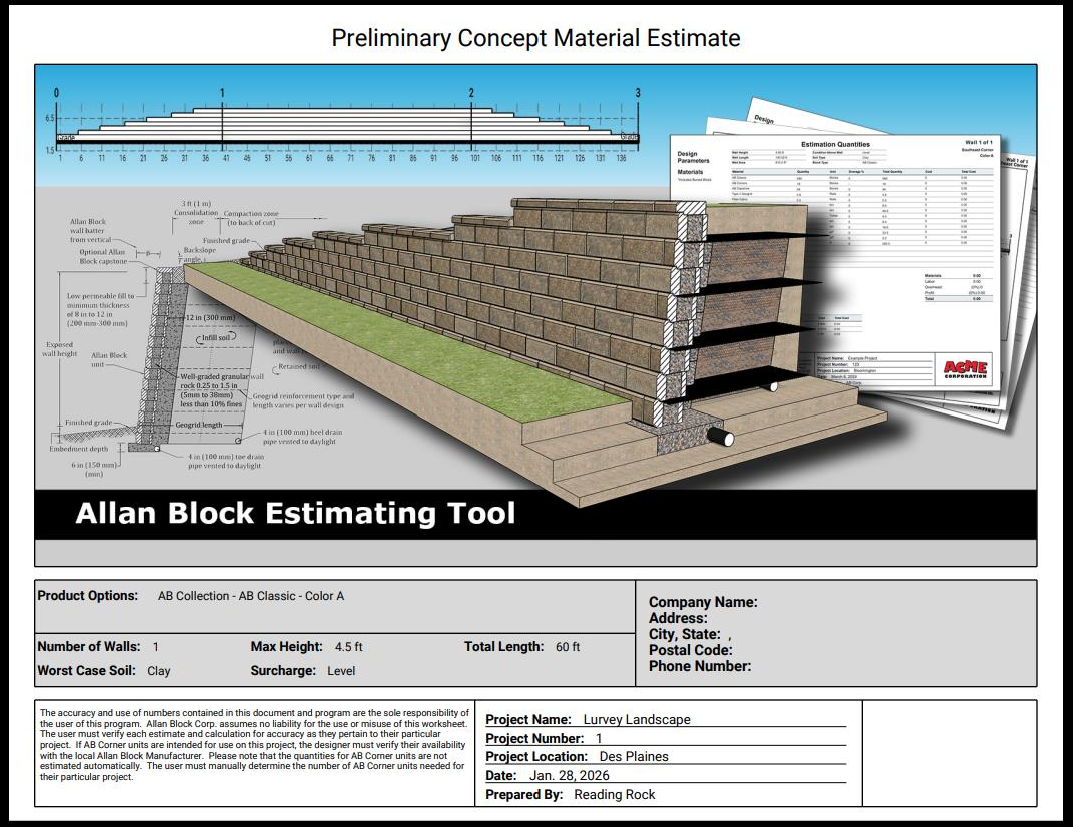
| | | |
|---|---|---|
| f) | Pullout from Block | Minimum Safety Factor > 1.5 |
| g) | Internal Compound Stability | Minimum Safety Factor > 1.3 |
| h) | Global | Minimum Safety Factor > 1.3 |
| i) | Seismic | Minimum Safety Factor > 75% of static or 1.1 minimum |

For a thorough discussion and design methodology of each, see the Allan Block Engineering Manual.

tion levels are appropriate based on complexity and criticality of project application.
b) Require contractors to provide a list of projects they have completed.

# Allan Block Estimating Tool

- *Preliminary Concept*
- *Pull data from site plan or walking site*
- *Quantity Estimation*
- *Professional Contractor Drawings*



Preliminary Concept Material Estimate

Allan Block Estimating Tool

| | | | |
|---|---|---|---|
| **Product Options:** | AB Collection - AB Classic - Color A | | |
| **Number of Walls:** | 1 | **Max Height:** 4.5 ft | **Total Length:** 60 ft |
| **Worst Case Soil:** | Clay | **Surcharge:** Level | |

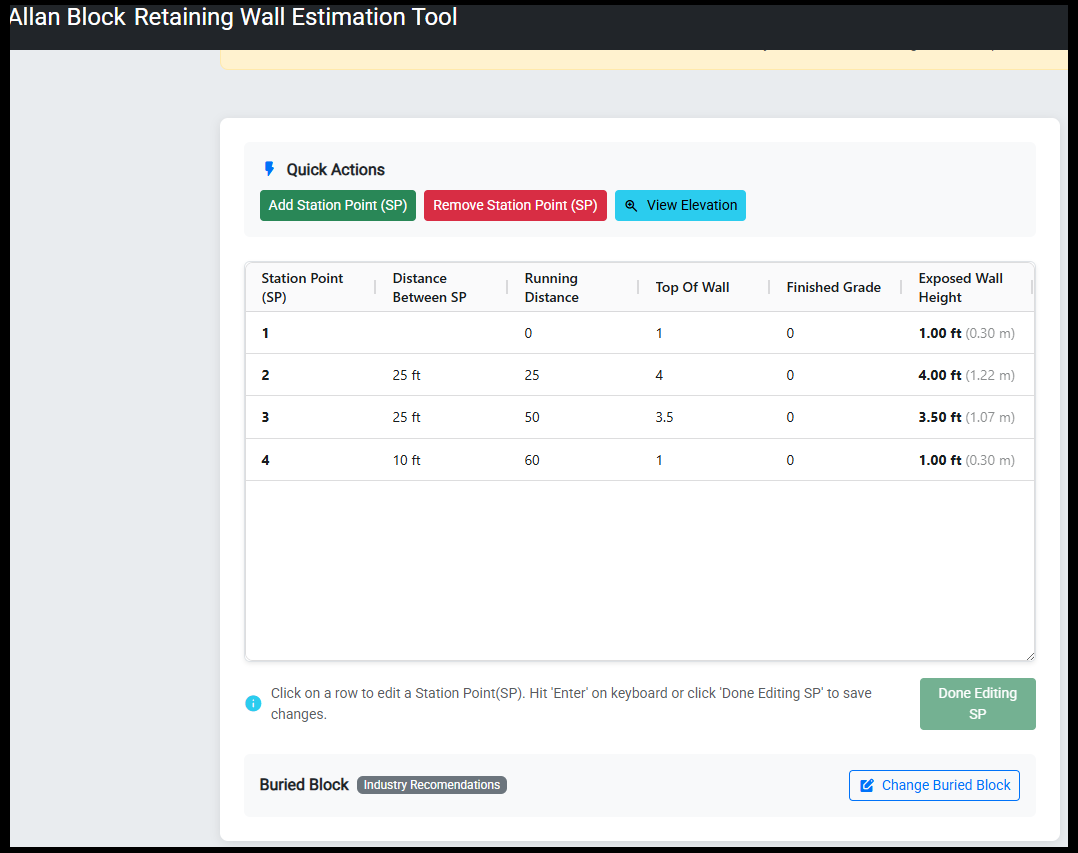
**Company Name:**
**Address:**
**City, State:** ,
**Postal Code:**
**Phone Number:**

The accuracy and use of numbers contained in this document and program are the sole responsibility of the user of this program. Allan Block Corp. assumes no liability for the use or misuse of this worksheet. The user must verify each estimate and calculation for accuracy as they pertain to their particular project. If AB Corner units are intended for use on this project, the designer must verify their availability with the local Allan Block Manufacturer. Please note that the quantities for AB Corner units are not estimated automatically. The user must manually determine the number of AB Corner units needed for their particular project.

**Project Name:** Lurvey Landscape
**Project Number:** 1
**Project Location:** Des Plaines
**Date:** Jan. 28, 2026
**Prepared By:** Reading Rock

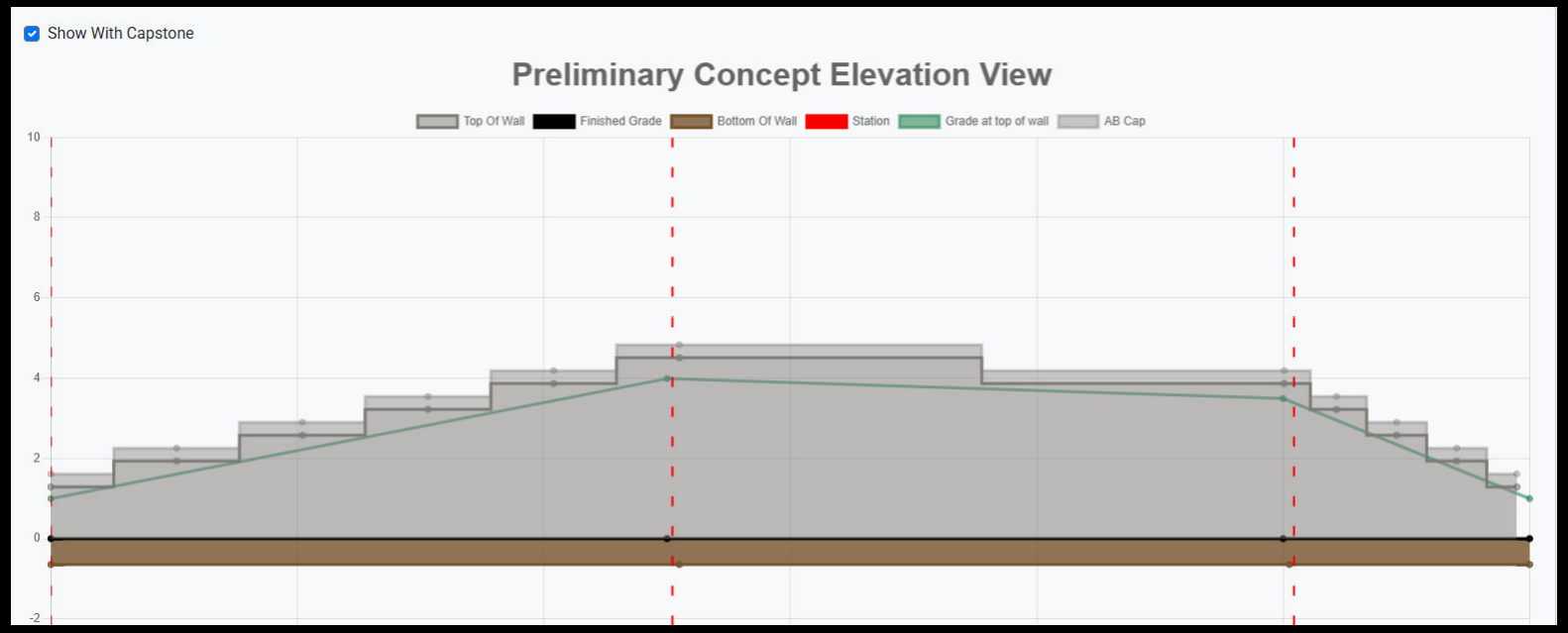
# Tools – AB Estimating Program

## Add station points:



# Tools – AB Estimating Program

Shows preliminary elevation views

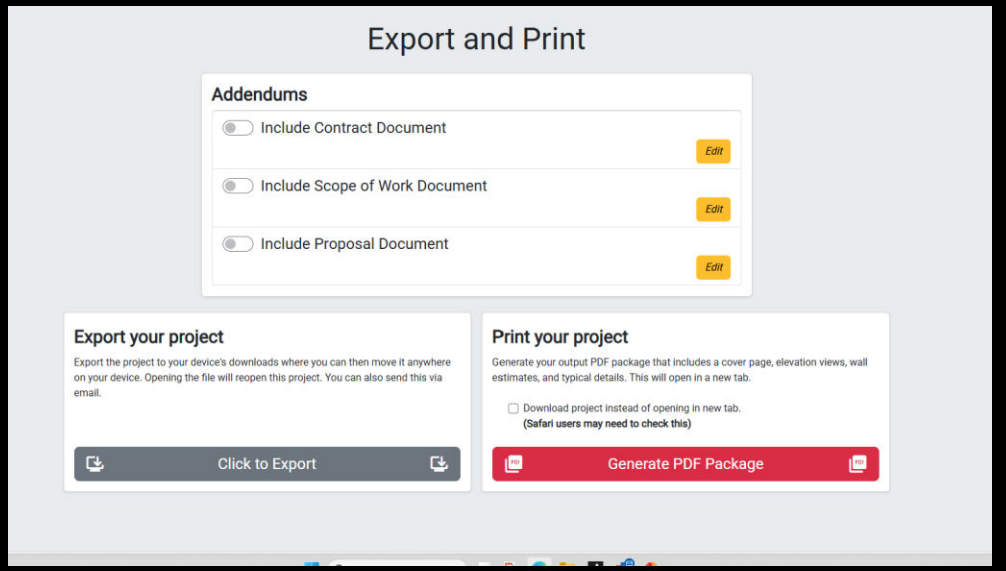


# Tools – AB Estimating Program

*Material Quantity Estimate & Ability to export PDF*

| Material | Quantity | Unit | Overage % | Total |
|---|---|---|---|---|
| AB Classic | 223 | Blocks | 0 | 223 |
| AB Cap - 18 in(450mm) | 40 | Caps | 0 | 40 |
| Type 1 Geogrid | 0 | $yd^2$ | 0 | 0 |
| Type 2 Geogrid | 67 | $yd^2$ | 0 | 67 |
| Type 3 Geogrid | 0 | $yd^2$ | 0 | 0 |
| Base Rock | 4 | ton | 0 | 4 |
| Wall Rock | 18 | ton | 0 | 18 |
| Blanket Drain | 5 | ton | 0 | 5 |
| Chimney Drain | 7 | ton | 0 | 7 |
| Infill Soil | 17 | $yd^3$ | 0 | 17 |
| Structural Fill | 0 | $yd^3$ | 0 | 0 |
| Filter Fabric | 15 | $yd^2$ | 0 | 15 |
| Drain Pipe | 122 | ft | 0 | 122 |
| Cap Adhesive - 28 ft.oz. | 2 | Tu | 0 | 2 |

Pricing



# Thank You