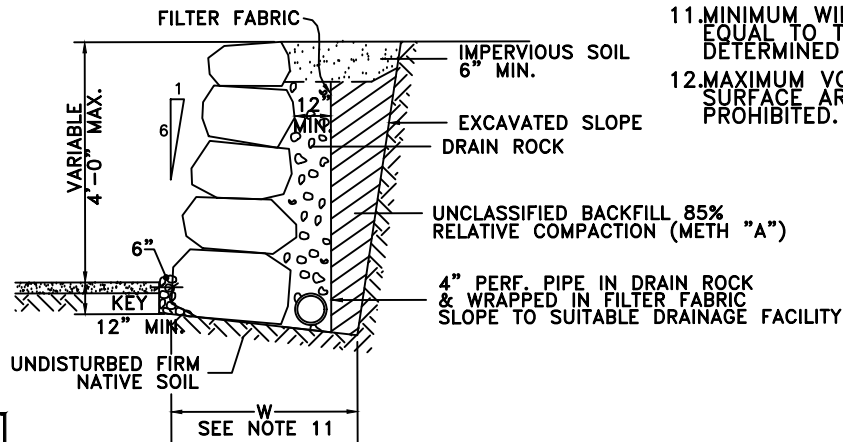
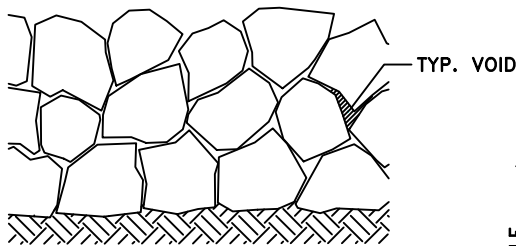


**DESIGN ASSUMPTIONS, CRITERIA, & EQUATIONS**

HEIGHT OF ROCKERY	H (ft)
MINIMUM SIZE ROCK	Rm = 1.5 ft
UNIT WEIGHT ROCK	UW = 141 pcf = 1.5 tons/cy
MAXIMUM ALLOWABLE VOIDS	V = 7%
MINIMUM ROCKERY DENSITY	Dr = 131 pcf
DESIGN SAFETY FACTOR	SF = 1.7
ROCK FRICTION FACTOR	fr = 0.77
UNIT WEIGHT QUARRY SPALLS	UW = 1.33 tons/cy
SOIL FRICTION FACTOR	fs = 0.75
UNIT WEIGHT OF BACKFILL	g = 120 pcf
RANKINE ACTIVE COEFFICIENT	Ka = 0.2234
ACTIVE SOIL PRESSURE	Pa = 27 pcf
PASSIVE SOIL PRESSURE	Pp = 300 pcf

**NOTES:**

1. THE FACE OF THE ROCKERY SHALL BE INSTALLED WITH A SMOOTH FACE.
2. THE LONG DIMENSION OF THE ROCKS SHALL EXTEND INTO THE EARTH TO PROVIDE MAXIMUM STABILITY.
3. THE ROCK SHALL BE PLACED SO AS TO LOCK INTO TWO ROCKS IN THE LOWER TIER.
4. CLASSIFIED BACKFILL SHOULD CONSIST OF QUARRY SPALLS RANGING FROM 2" TO 6" IN DIAMETER.
5. UNCLASSIFIED BACKFILL SHOULD BE FREE OF ORGANICS, CLAY SOILS, DEBRIS, AND OTHER DELETERIOUS MATERIALS. IT SHOULD BE PLACED AT OR BELOW THE OPTIMUM MOISTURE CONTENT.
6. PERF. DRAIN PIPE SHALL BE PLACED BEHIND ROCKERY, PROVIDED WITH A POSITIVE GRADIENT AND DIRECTED TO SUITABLE DISCHARGE FACILITIES.
7. CONTRACTOR SHALL CALL FOR INSPECTION PRIOR TO BASE COURSE BEING PLACED (FOR VERIFICATION OF ROCKERY HEIGHT, FOUNDATION MATERIAL AND ROCK SIZE).
8. THE BACKFILL BEHIND THE WALL SHALL BE FLAT AND THERE SHALL BE NO ROAD OR BUILDING SURCHARGE WITHIN 4 FEET OF THE WALL.
9. MAXIMUM ROCK WALL HEIGHT = 4 FEET.
10. ROCK SHOULD BE PLACED TO GRADUALLY DECREASE IN SIZE WITH INCREASING WALL HEIGHT.
11. MINIMUM WIDTH OF KEY WAY EXCAVATION, W, SHOULD BE EQUAL TO THE THICKNESS OF THE BASE ROCKS (AS DETERMINED BY THE ENGINEER'S DESIGN) PLUS 12" MIN.
12. MAXIMUM VOID RATIO SHALL NOT EXCEED 7% OF THE SURFACE AREA OF THE WALL. LARGE VOIDS ARE PROHIBITED.



**ROCKERY WALL WITH  
FLAT BACKSLOPE**

DEPTH (FROM TOP)	WALL WIDTH (INTO BANK)	MINIMUM WEIGHT OF WALL ABOVE (INCLUDING ROCK)
<b>4 FOOT WALL</b>		
1 FT	1.5 FT	196 LBS
2 FT	1.5 FT	392 LBS
3 FT	1.5 FT	588 LBS
4 FT	1.5 FT	784 LBS
KEY	12 IN. 1.5 FT	980 LBS

**DESIGN ASSUMPTIONS**

Clayey/Silty Soils  
 $\phi = 28$   
 Equivalent Fluid Pressure = 43 pcf

DRAWING APPENDIX G-1

ROCK WALL DETAIL

WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS

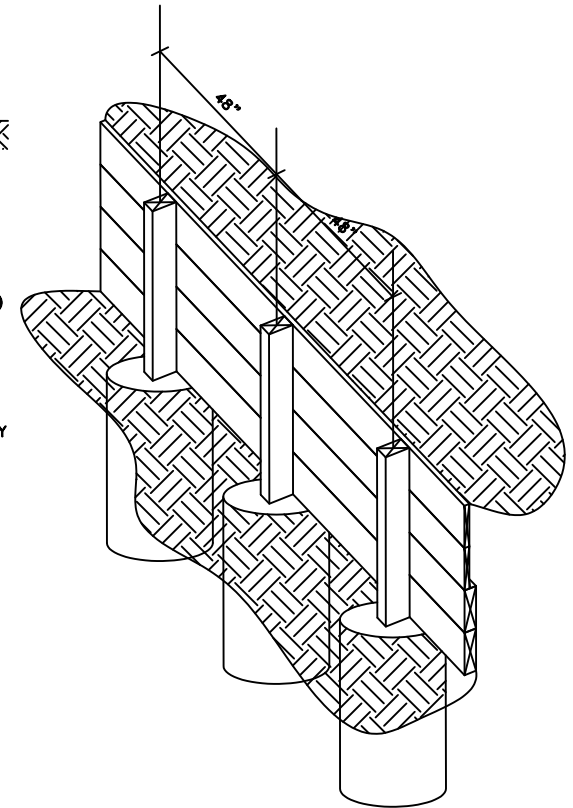
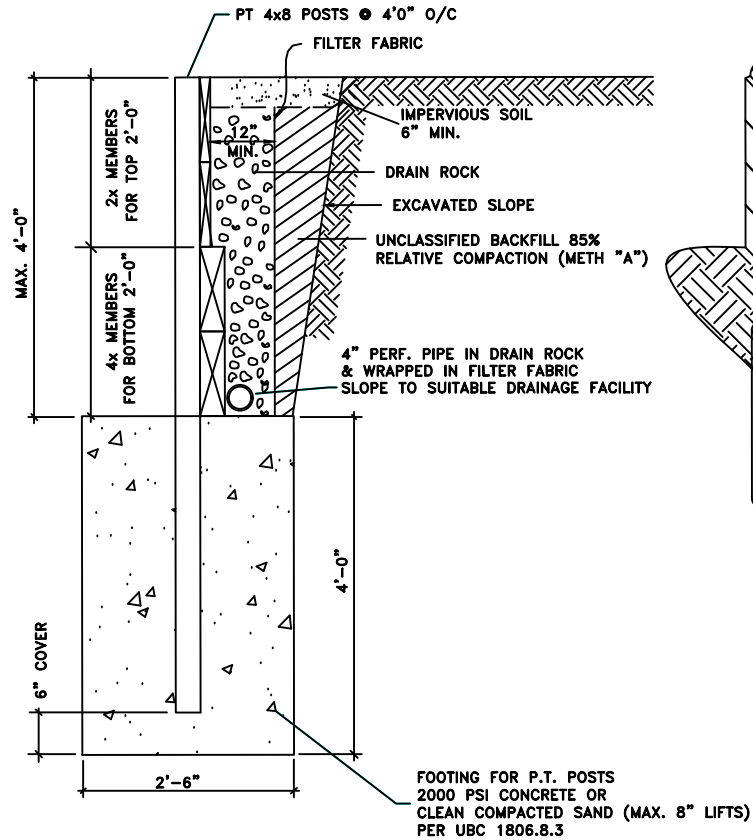
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**NOTES:**

1. PERF. DRAIN PIPE SHALL BE PLACED BEHIND ROCKERY, PROVIDED WITH A POSITIVE GRADIENT AND DIRECTED TO SUITABLE DISCHARGE FACILITIES.
2. THE BACKFILL BEHIND THE WALL SHALL BE FLAT AND THERE SHALL BE NO ROAD OR BUILDING SURCHARGE WITHIN 4 FEET OF THE WALL.
3. MAXIMUM WALL HEIGHT = 4 FEET.
4. UNCLASSIFIED BACKFILL SHOULD BE FREE OF ORGANICS, CLAY SOILS, DEBRIS, AND OTHER DELETERIOUS MATERIALS. IT SHOULD BE PLACED AT OR BELOW THE OPTIMUM MOISTURE CONTENT.
5. THE BACKFILL SHALL BE PLACED IN LIFTS OF NO MORE THAN 6" AND COMPACTED WITH HAND-OPERATED EQUIPMENT. NO OTHER CONSTRUCTION EQUIPMENT SHALL BE OPERATED BEHIND THE WALL.
6. ALL WOOD SHALL BE PRESSURE TREATED AND SHALL BE FOR USE IN GROUND CONTACT.

**DESIGN ASSUMPTIONS**

Clayey/Silty Soils  
 $\phi = 28^\circ$   
 Equivalent Fluid Pressure = 43 pcf

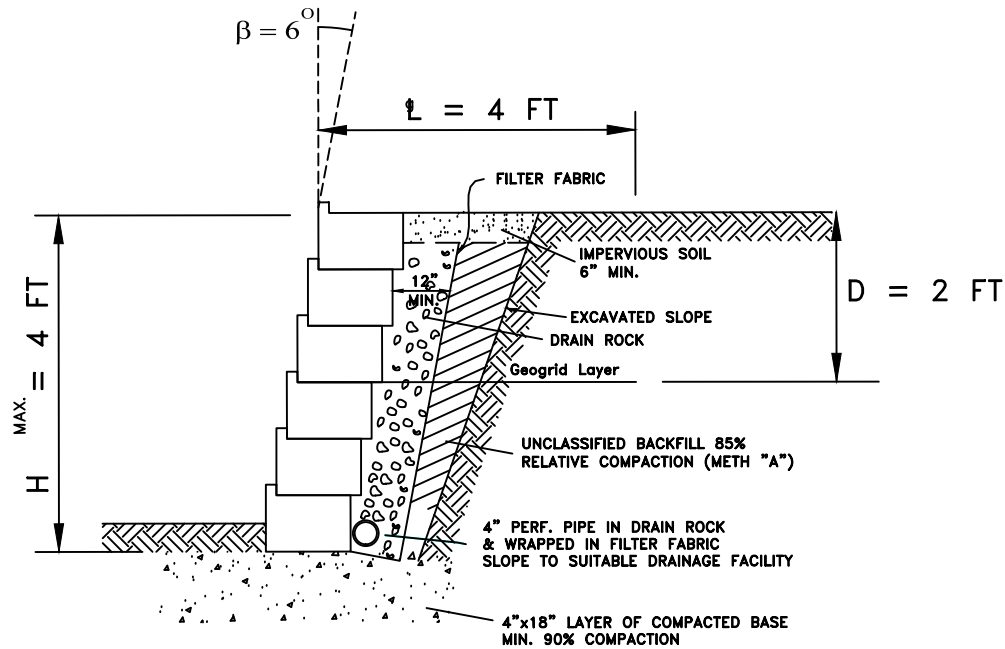


DRAWING APPENDIX G-2

WOOD WALL DETAIL

WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS

Not to Scale



### NOTES:

1. PERF. DRAIN PIPE SHALL BE PLACED BEHIND ROCKERY, PROVIDED WITH A POSITIVE GRADIENT AND DIRECTED TO SUITABLE DISCHARGE FACILITIES.
2. THE BACKFILL BEHIND THE WALL SHALL BE FLAT AND THERE SHALL BE NO ROAD OR BUILDING SURCHARGE WITHIN 4 FEET OF THE WALL.
3. MAXIMUM WALL HEIGHT = 4 FEET.
4. UNCLASSIFIED BACKFILL SHOULD BE FREE OF ORGANICS, CLAY SOILS, DEBRIS, AND OTHER DELETERIOUS MATERIALS. IT SHOULD BE PLACED AT OR BELOW THE OPTIMUM MOISTURE CONTENT.
5. THE BASE MATERIAL SHALL BE WELL GRADED COMPACTIBLE AGGREGATE, 1/4" TO 1" WITH NO MORE THAN 10% PASSING THE #200 SIEVE.
6. THE BLOCK CORES SHALL BE FILLED WITH CRUSHED GRAVEL WITH SAME PROPERTIES AS BASE MATERIAL.
7. THE 4" COVER IN FRONT OF THE WALL SHALL CONSIST OF THE BASE MATERIAL WITH MIN. 90% COMPACTION.
8. THE GEOGRID SHALL EXTEND TO THE FACE OF THE WALL.
9. THE BACKFILL SHALL BE PLACED IN LIFTS OF NO MORE THAN 6" AND COMPACTED WITH HAND-OPERATED EQUIPMENT. NO OTHER CONSTRUCTION EQUIPMENT SHALL BE OPERATED BEHIND THE WALL.
10. THE WALL SHALL BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.

### DESIGN ASSUMPTIONS

Clayey/Silty Soils

$\phi = 28^{\circ}$

Equivalent Fluid Pressure = 43 pcf

DRAWING APPENDIX G-3

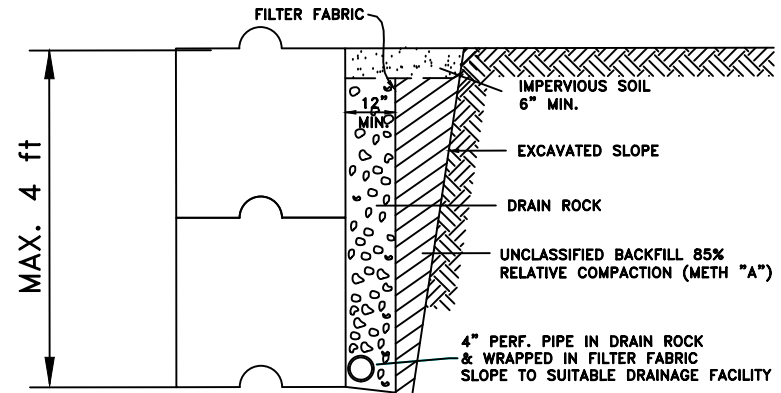
ALLEN BLOCK DETAIL

WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS

Not to Scale

**NOTES:**

1. PERF. DRAIN PIPE SHALL BE PLACED BEHIND ROCKERY, PROVIDED WITH A POSITIVE GRADIENT AND DIRECTED TO SUITABLE DISCHARGE FACILITIES.
2. THE BACKFILL BEHIND THE WALL SHALL BE FLAT AND THERE SHALL BE NO ROAD OR BUILDING SURCHARGE WITHIN 4 FEET OF THE WALL.
3. MAXIMUM WALL HEIGHT = 4 FEET.
4. UNCLASSIFIED BACKFILL SHOULD BE FREE OF ORGANICS, CLAY SOILS, DEBRIS, AND OTHER DELETERIOUS MATERIALS. IT SHOULD BE PLACED AT OR BELOW THE OPTIMUM MOISTURE CONTENT.
5. THE BACKFILL SHALL BE PLACED IN LIFTS OF NO MORE THAN 6" AND COMPACTED WITH HAND-OPERATED EQUIPMENT. NO OTHER CONSTRUCTION EQUIPMENT SHALL BE OPERATED BEHIND THE WALL.



**DESIGN ASSUMPTIONS**

Clayey/Silty Soils

$\phi = 28^\circ$

Equivalent Fluid Pressure = 43 pcf

Not to Scale

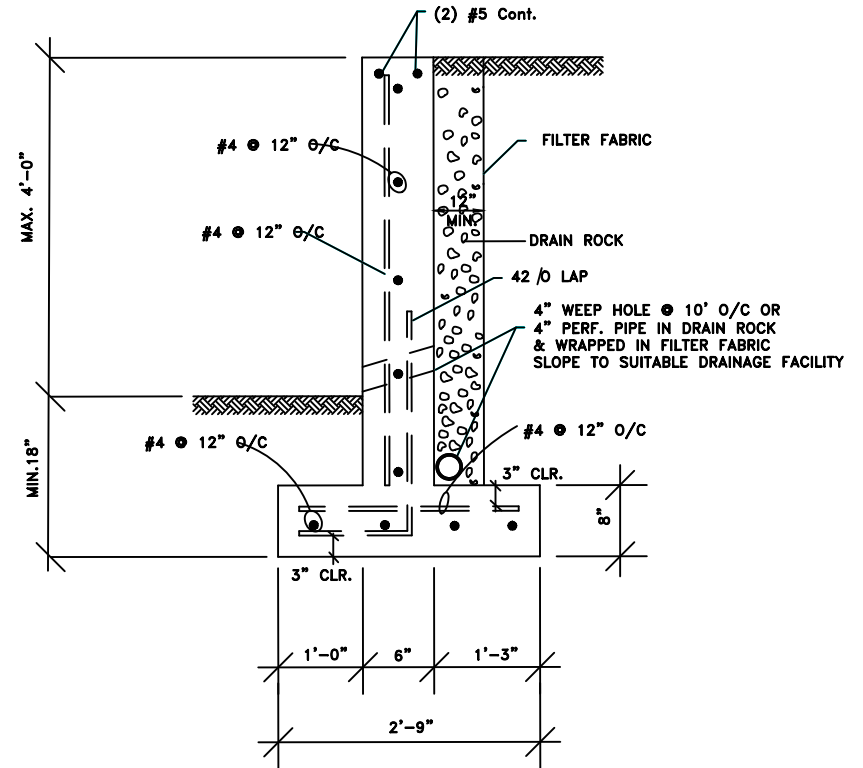
DRAWING APPENDIX G-4
ECOLOGY OR ULTRA BLOCK DETAIL
WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS

**NOTES:**

1. CONCRETE SHALL DEVELOP A MINIMUM OF 2500 PSI COMPRESSIVE STRENGTH IN 28 DAYS UNLESS NOTED AND SHALL HAVE A CEMENT CONTENT OF NOT LESS THAN 376 POUNDS (4 SACKS) PER CUBIC YARD. THE PROPORTIONS OF THE MIX SHALL BE IN CONFORMITY WITH ACI 211.1 AND 301.
2. GENERALLY, THE AGGREGATE SIZE SHALL NOT BE MORE THAN 1-1/2" FOR THE FOOTINGS. PROPORTIONS OF AGGREGATE TO CEMENT FOR ANY CONCRETE MIX SHALL BE SUCH AS TO PRODUCE A MIXTURE WHICH, CONSISTENT WITH THE METHOD OF PLACING, WILL WORK READILY INTO CORNERS AND ANGLES OF THE FORMS AND AROUND THE REINFORCEMENT WITHOUT PERMITTING THE MATERIALS TO SEGREGATE OR EXCESS WATER TO COLLECT ON THE SURFACE.
3. MAXIMUM WATER/CEMENT RATIO FOR 2500 PSI CONCRETE SHALL NOT EXCEED 0.67 FOR NON-AIR ENTRAINED CONCRETE AND 0.54 FOR AIR ENTRAINED, AS PER ASTM C260.
4. AIR ENTRAPMENT SHALL BE 5 PERCENT (+/- 1.5 PERCENT UNLESS OTHERWISE NOTED).
5. CONCRETE SLUMP SHALL BE BETWEEN 2 & 4 INCHES, PER ASTM C94-81.
6. THE BACKFILL SHALL BE PLACED IN LIFTS OF NO MORE THAN 6" AND COMPACTED WITH HAND-OPERATED EQUIPMENT. NO OTHER CONSTRUCTION EQUIPMENT SHALL BE OPERATED BEHIND THE WALL.

**REINFORCEMENT**

7. REINFORCING STEEL SHALL BE NEW, DEFORMED BARS CONFORMING TO ASTM A615-86 GRADE 40 FOR ALL MAIN REINFORCING AND GRADE 40 FOR ALL TIES AND STIRRUPS.
8. BAR DETAILING AND SUPPORT OF REINFORCING BARS IN FORMS SHALL CONFORM TO THE CRSI MANUAL OF STANDARD PRACTICE, UNLESS SHOWN OTHERWISE ON THE PLANS.
9. PROVIDE A MINIMUM COVER OF 3 INCHES FOR REINFORCING STEEL WHEN THE CONCRETE IS PLACED DIRECTLY AGAINST THE GROUND.
10. PROVIDE A MINIMUM COVER OF 2 INCHES FOR BARS LARGER THAN NO. 5 AND 1 1/2" FOR NO. 5 BARS OR SMALLER IF FORMS ARE USED AND CONCRETE IS TO BE EXPOSED TO THE WEATHER OR WILL BE IN CONTACT WITH THE GROUND.
11. PERF. DRAIN PIPE SHALL BE PLACED BEHIND THE WALL, PROVIDED WITH A POSITIVE GRADIENT AND DIRECTED TO SUITABLE DISCHARGE FACILITIES.
12. THE BACKFILL BEHIND THE WALL SHALL BE FLAT AND THERE SHALL BE NO ROAD OR BUILDING SURCHARGE WITHIN 4 FEET OF THE WALL.
13. MAXIMUM WALL HEIGHT = 4 FEET.



**DESIGN ASSUMPTIONS**

Clayey/Silty Soils  
 $\phi = 28^\circ$   
 Equivalent Fluid Pressure = 43 pcf

Not to Scale

DRAWING APPENDIX G-5
CONCRETE WALL DETAIL
WHATCOM COUNTY DEPARTMENT OF PUBLIC WORKS