

SECTION 7

GRADING (G)

7-1	General.....	G-1
7-2	Clearing and Grubbing.....	G-2
	A. Vegetation and Debris	G-2
	B. Disposal	G-2
7-3	Construction Staking.....	G-2
	A. Channel	G-2
	B. Storm Water Prevention Plan (SWPPP)/Sediment and Erosion Control Measures ...	G-3
	C. Pads	G-3
	D. Retaining and Sound Walls	G-3
	E. Roadways	G-3
7-4	Construction Requirements	G-3
	A. Channels.....	G-3
	B. Storm Water Pollution Prevention Plan (SWPPP)/Sediment and Erosion Control Measures	G-3
	1. Seeding and Soil Stabilization	G-3
	2. Construction Water	G-4
	3. Water Valve Operation.....	G-4
	C. Pads.....	G-4
	D. Retaining Walls.....	G-4
	1. Concrete/Masonry Walls.....	G-4
	2. Wood Retaining Walls.....	G-4
	E. Roadways	G-4
	1. Compaction.....	G-4
	2. Grade Control	G-4
	3. Stability Testing.....	G-4
	4. Unsuitable Materials	G-5
	F. Grading Around Trees and Protected Areas.....	G-5
	1. Fencing	G-5
	2. Grade Changes.....	G-5
	3. Native Ground Surface Fabric	G-5
	4. Preservation Devices	G-5
	5. Retaining Walls	G-5
	6. Roots.....	G-6
	a. Minor Roots.....	G-6
	b. Major Roots.....	G-6
	7. Trenching	G-6
7-5	Materials	G-6
	A. Dust Palliative	G-6
	B. Retaining Walls.....	G-6
	1. Concrete/Masonry Walls.....	G-6
	2. Wood Retaining Walls.....	G-6
	C. Tree Fencing.....	G-6
	1. Signs.....	G-6
7-6	Grading Details	G-7

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 7

GRADING (G)

7-1 **GENERAL** - All improvements within the City of Lincoln will be approved and permitted by the City and will conform to the City of Lincoln Design Criteria & Procedures Manual. Grading improvements will include clearing & grubbing, excavation and embankment work for channels, pads, roadways, erosion control measures, and retaining walls. These improvements will be installed in accordance with the following:

- Approved project improvement plans,
- City of Lincoln Public Facilities Improvement Standards
- California Building Code Appendix J
- City of Lincoln Ordinance 826B
- City of Lincoln Ordinance 876B
- County of Placer Grading Ordinance
- Caltrans Standard Specifications, latest edition

Should conflicts arise between documents, the approved project improvement plans will govern over these Public Facilities Improvement Standards. These Public Facilities Improvement Standards will govern over the latest edition of the CBC Appendix J and City of Lincoln Ordinances 826B and 876B, and the County of Placer Grading Ordinance. The CBC Appendix J, the City of Lincoln Ordinances 826B & 876B, and the County of Placer Grading Ordinance will govern over the Caltrans Standard Specifications. In the event of conflict between applicable documents and/or plans, the most restrictive will prevail.

Refer to the City of Lincoln's Design Criteria & Procedures Manual for design information.

The Project will comply with all applicable City, County, State, and Federal laws and regulations relating to construction of the improvements as required.

If the City Engineer determines that any work on private or public property constitutes a hazard to the health, safety, or welfare of the public; endangers property; adversely affects the safety, use or stability of adjacent property; an overhead or underground utility, or a public way, watercourse or drainage channel; or could adversely affect the air quality; or the water quality of any water bodies or water courses; the City Engineer may issue a stop work notice to the owner of the property upon which the condition is located, or other person or agent in control of such property. Upon receipt of such stop work notice, the recipient will, within the period specified therein, stop all work, obtain any necessary permits and conform to the requirements identified in the stop work notice. The City Engineer may require the submission of plans or other reports, detailed construction recommendations, studies, or other engineering data prior to and in connection with any corrective or proposed work or activity.

All improvements within the City of Lincoln will be performed by a contractor licensed in accordance with the California Contractors State license Law, Business and Professions Code Section 7000 et seq.

All persons, firms, partnerships, or corporations doing business of any nature in the City

of Lincoln will have a current Business License as stated in Chapter 5.04--License Tax, City of Lincoln Municipal Code. This includes developers, engineers, and contractors.

Prior to the start of any grading project of 50-cubic yards and greater, a grading permit will be obtained from the Community Development Director or City Engineer.

To obtain a grading permit, applicants will submit a Development Services – Development Application to the Community Development Department. Development Applications submitted for a Grading Permit also requires the submittal of a geotechnical report and a Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution Control Plan (WPCP). Prior to submitting a Development Services – Development Application for a Grading Permit, the applicant will consult with Development Service Department Staff regarding the submittal of a SWPPP or WPCP.

The City of Lincoln has coverage under the Phase II Small MS4 General Permit that was adopted by the State Water Resources Control Board (Order No. 2013-0001 DWQ). The Permit requires the City to have a stormwater program that controls the discharge of pollutants into the City's storm drainage system and our waterways. If the grading permit project results in the disturbance of one-acre or more, the applicant is required to comply with the Phase II Small MS4 General Permit and Section A of the Statewide National Pollution Discharge Elimination System (NPDES) General Permit for Construction Activity. Applicant will provide the City a copy of the Notice of Intent (NOI) and SWPPP that includes the Waste Discharge Identification (WDID) number.

7-2 **CLEARING AND GRUBBING** - Clearing and grubbing will consist of removing all objectionable material from within the right of way, construction areas, or other areas that may be specified in these public facilities improvement standards, which interferes with the work.

A. Vegetation and Debris - All vegetation such as weeds, grass, shrubbery, roots and stumps and debris such as broken concrete and trash will be removed. Tree branches that extend over the roadway will be trimmed to provide a minimum vertical clearance of 14-feet. The contractor will remove or trim other tree branches as directed by the engineer so that the trees present a balanced appearance. Trees, shrubbery, lawns and other vegetation adjacent to the work that is not to be removed, will be protected from injury or damage resulting from the Contractors operations. Existing facilities such as pavements, curb and gutters, lawn sprinklers, mailboxes, and fences that interfere with the work will be removed under the item of clearing and grubbing unless the improvement plans provide for separate items.

B. Disposal - Material resulting from clearing and grubbing operations that are not salvaged or otherwise used will be disposed of outside the project limits in compliance with State and Federal law, and at the expense of the contractor.

7-3 **CONSTRUCTION STAKING** – Construction staking will be provided for all grading improvements listed below. Prior to construction, the City Engineer will be supplied with two sets of cut sheets and/or AutoCAD Drawing files in .DWG format that includes 3D surface features.

A. Channels - Channel staking will provide the station and offset, and the cut to the nearest 0.1-foot. Stakes will be provided at a minimum of every 50-feet in tangent

sections and every 25-feet in curved sections.

- B. Storm Water Prevention Plan (SWPPP) / Erosion Control Measures –** Erosion and sediment control measured will be staked as needed.
- C. Pads -** Pad staking will provide the station and offset, and the cut to the nearest 0.1-foot. Stakes will be provided at each property corner, front and rear.
- D. Retaining and Sound Walls -** Retaining walls will be staked for line and grade to the nearest 0.1-foot.
- E. Roadways -** Roadway excavation staking will provide the station and offset, and the cut to the nearest 0.1-foot. Minimum staking intervals will be 50-feet in tangent sections and 25-feet in curves. Stakes will also be placed at curve beginnings, ends, point of reverse curvature, point of compound curve, horizontal angle points and at changes of grade.

7-4 CONSTRUCTION REQUIREMENTS –

- A. Channels -** All fill areas in channels will receive suitable fill material to be compacted to a minimum of 90 percent relative compaction or more depending on proposed use after development. Suitable fill material will be determined by the Developer’s geotechnical engineer. Unsuitable materials will be removed from the channel and replaced with suitable backfill material based on recommendations provided by the Developer’s licensed geotechnical engineer.
- B. Storm Water Pollution Prevention Plan (SWPPP / Sediment and Erosion Control Measures) -** If required, a copy of the filed NOI and acceptable Storm Water Pollution Prevention Plan (SWPPP) with WDID number will be available on site at all times. Construction activities occurring between October 1st and April 30th will have erosion and sediment control measures in place, or capable of being placed within 24-hours. The Contractor will ensure that the construction site is prepared prior to the onset of any storm. Waterways under the jurisdiction of governmental agencies other than the City of Lincoln may be subject to additional erosion control measures or criteria, and this is the responsibility of the Developer and/or Contractor. The City of Lincoln erosion control provisions will include:
 - 1. Seeding and Soil Stabilization -**Where required, seeding and soil stabilization will be site-specific as shown on the approved project improvement plans and Storm Water Pollution Prevention plan NOI. The proposed mix and application rate will be submitted in writing to the City Engineer for approval. Where required, broadcast seed will be applied as follows:

Brando Brome	12 lbs/acre
Rose Clover	9 lbs/acre

Areas with sandy, dry soil will receive:

Zorro Annual Fescue	6 lbs/acre
Rose Clover	9 lbs/acre

A fertilizer consisting of 16-20-0 will be applied at a rate of 500 pounds per acre. If hydroseeding/mulching is used, seed quantities will be increased by 30 percent.

- 2. Construction Water** - All construction water will be metered and paid for by the Developer or Contractor. The Contractor will obtain a hydrant meter permit from the City Support Services Department for the use of construction water.

To obtain use of a City hydrant meter, contact the Support Services Department . All meters will be read by the Contractor, and the usage reading given monthly to the City Engineer or his/her delegated representative. Prior to project completion, the construction meter will be brought to the Support Services Department for a final reading and payment of all charges in full.

- 3. Water Valve Operation** - After the water system has been tied-in to the City of Lincoln water system, only City of Lincoln Public Services Water Division personnel will operate water valves. The only exception is when the Contractor has obtained written permission from the City Engineer.

- C. Pads** - All pads will be compacted to a minimum of 90-percent relative compaction. Unsuitable materials will be removed from the pad areas per the recommendations of the Developer's licensed geotechnical engineer. The Developer will submit a letter from the Geotechnical Engineer stating that the grading was performed in substantial conformance with the geotechnical report (and subsequent updates}.

D. Retaining Walls

- 1. Concrete/Masonry Walls** - All concrete masonry walls are to be installed in accordance with the manufactures and/or design Engineer's recommendations. (Refer to the Public Facilities Improvement Standards Details G-4 and G-4a).
- 2. Wood Retaining Walls** – All wood retaining walls will be installed in accordance with the Public Facilities Improvement Standards Details G-1, G-2, and G-3.

E. Roadways

- 1. Compaction** - Relative compaction of not less than 95-percent will be obtained for a minimum depth of 0.5-feet below the subgrade grading plane for the width between the outer edges of shoulders, including curb and gutter areas, whether in excavation, embankment or at original ground level. All other material will be compacted to a relative compaction of 90-percent, including subgrade prior to placement of aggregate base under sidewalk areas.
- 2. Grade Control** - When the next layer to be placed on the subgrade is an asphalt concrete pavement, asphalt concrete base or asphalt concrete subbase, the subgrade grading plane at any point will not vary more than 0.05-foot above or below the grade established by the project surveyor.
- 3. Stability Testing** - Subgrade will be stable. Proof rolling will be performed on the subgrade and aggregate base grade to assure stability. This will normally be tested with a heavy wheel load such as a full 4000-gallon water truck but will be at the

direction of the Project geotechnical engineer and approved by the City Engineer. There will be no movement of the aggregate base prior to paving. The geotechnical engineer will approve the stability and readiness for the next course of work.

- 4. Unsuitable Materials** - Any unsuitable material encountered will be removed and replaced with a suitable backfill material. Suitable backfill materials and methods for placement are to be reviewed and approved by the on-site geotechnical engineer. Other methods for subgrade stability may be used upon review and approval of the Developer's geotechnical engineer.

F. Grading around Trees and Protected Areas - Grading activities within the protected zone of a Native Oak Tree or Landmark Tree will be conducted under the conditions set forth under the Grading Permit and Tree Permit Conditions. Preserve and/or protect any trees, plant materials, or areas specifically designated on the approved project improvement plans, or beyond the limits of clearing, grubbing, and grading activities. No filling, excavating, trenching, or stockpiling of materials will be permitted within the dripline of these trees or plant materials. To prevent soil compaction within the dripline area, no equipment will be permitted within this area. These conditions shall also be met:

- 1. Fencing** - A minimum 4-foot high orange barrier fence, or equal approved by the Community Development Department, will be installed at the outermost edge of the protected zone of each protected tree or group of trees. The fence will not be removed until written authorization is received from the Community Development Department. Fences must be installed in accordance with the approved fencing plan prior to the start of any grading operations. The Contractor will call the Community Development Department for an inspection of the fencing prior to grading operations. Signs must be installed on the fence in four locations, equidistant around the tree. On fencing around a grove of trees, the signs will be placed at approximately 50-foot intervals. Sign verbiage is indicated in Section 7-5.
- 2. Grade Changes** - No grade changes are permitted which cause water to drain to within twice the longest radius of the protected zone of any protected tree, tree group, or plant materials.
- 3. Native Ground Surface Fabric** - Removal of any native ground surface fabric from the protected zone of the tree shall require protection of the tree within 48-hours of removal.
- 4. Preservation Devices** - Preservation devices (such as aeration systems, oak tree wells, drains, special paving and cabling systems) will be installed as shown on the approved project improvement plans and certified by the Developer's arborist. A copy of the certification will be provided to the City Engineer.
- 5. Retaining Walls** - The Contractor will provide immediate protection against moisture lost to exposed roots due to construction of a retaining wall within the protected zone of the tree. The retaining wall will be constructed within 72-hours after completion of grading in the protected zone

6. Roots -

- a. **Minor Roots** - Minor roots (less than 1-inch in diameter) may be cut. Damaged roots will be traced back and cleanly cut behind any split, cracked or damaged area.
- b. **Major Roots** - Major roots (over 1-inch in diameter) will not be cut without written approval and supervision of the Developer's arborist. The written approval and report will be submitted to the City Engineer.

- 7. **Trenching** - Trenching within the protected zone of a tree, group of trees, or plant materials, when permitted, will only be conducted with hand tools, to avoid root damage. The Contractor will follow provisions approved in the Utility Trenching Pathway Plan, submitted by the Developer to the Community Development Department.

7-5 MATERIALS

- A. **Dust Palliative** – Prior to using any chemical additives for dust control, or for the use of any dust palliative, written approval from the City Engineer through the submittal process will be obtained. The City Engineer will consider only products whose performance has been certified by the California Air Resources Board for approval. (Refer to Caltrans Standard Specifications Sections 17 and 18 for additional information).

B. Retaining Walls

- 1. **Concrete/Masonry Walls** - All concrete or masonry wall materials will conform to the materials and specifications provided by the wall manufacturer or design engineer and as detailed on the approved project improvement plans.
- 2. **Wood Retaining Walls** - All wood retaining wall materials will conform to Standard Detail G-2.

C. Tree Fencing

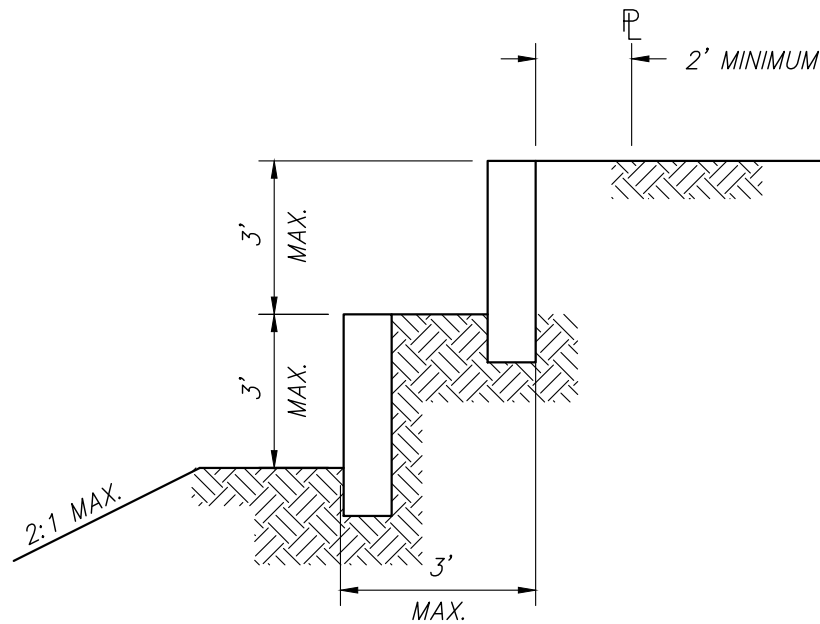
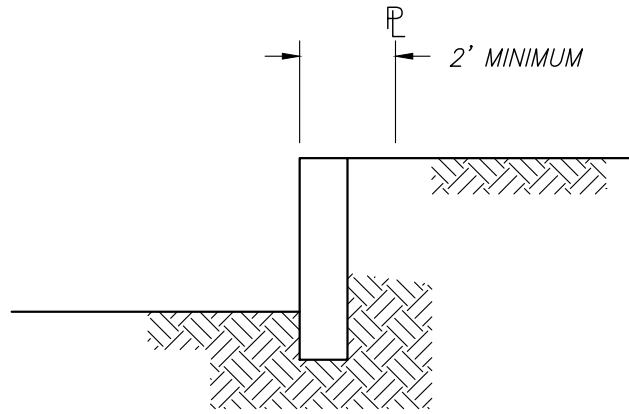
- 1. **Signs** – The size of each sign will be a minimum of 2-feet by 2-feet and will contain this language:

**WARNING
THIS FENCE WILL NOT BE REMOVED
OR RELOCATED WITHOUT WRITTEN
AUTHORIZATION FROM THE
COMMUNITY DEVELOPMENT DEPARTMENT**

GRADING DETAILS

Interior Property Line Grading G-1
Wood Retaining Wall G-2
Exterior Perimeter Property Line Grading and Walls..... G-3
Exterior Perimeter Property Line Grading..... G-3A
Masonry or Concrete Retaining Wall G-4
Masonry or Concrete Retaining Wall G-4A

[THIS PAGE INTENTIONALLY LEFT BLANK]



RETAINING WALLS

NOTES:

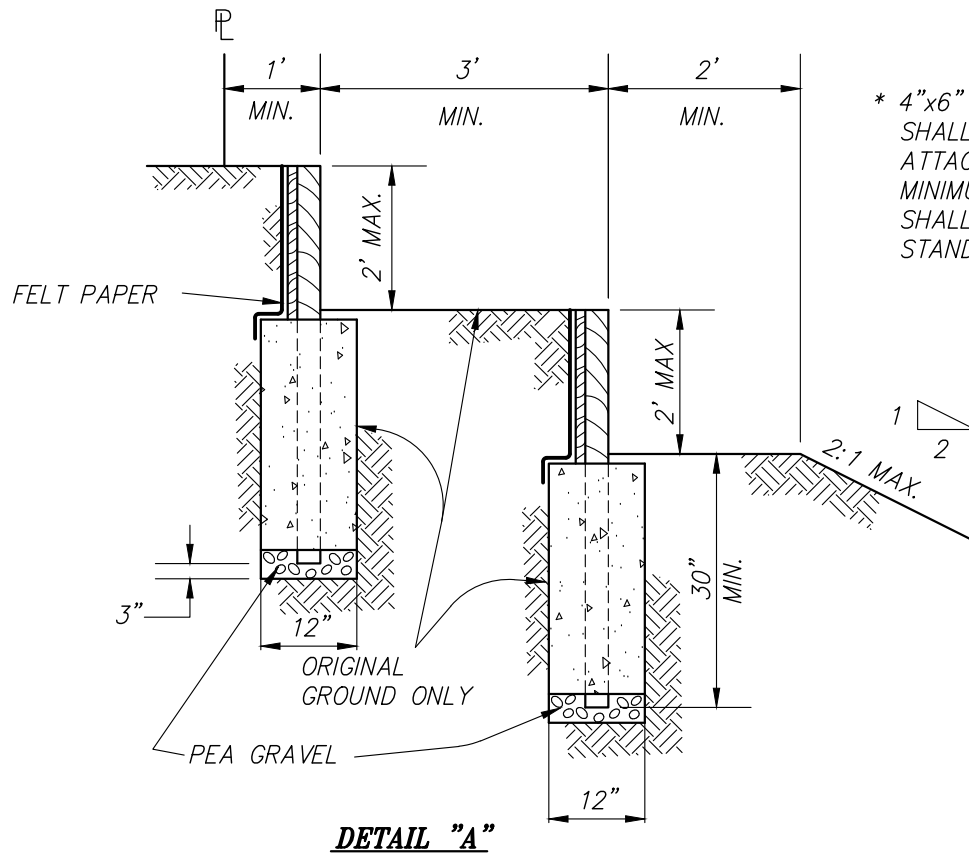
1. NO DOUBLE RETAINING WALLS TO BE CONSTRUCTED ON SIDE YARDS FOR LOTS TO BE IN CONFORMANCE TO F.H.A. STANDARDS.
2. FOOTING DESIGN BY STRUCTURAL ENGINEER AND SHALL NOT ENCROACH ON PROPERTY LINE.

CITY OF LINCOLN
ENGINEERING DEPARTMENT

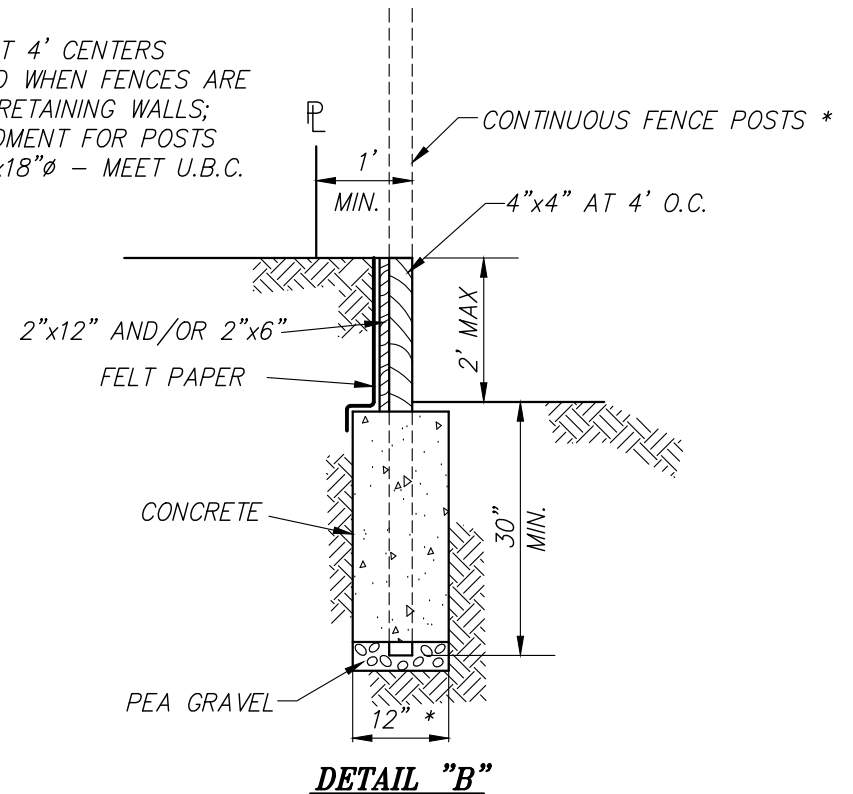
**INTERIOR
PROPERTY LINE
GRADING**

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER DATE

SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.



* 4"x6" POSTS AT 4' CENTERS SHALL BE USED WHEN FENCES ARE ATTACHED TO RETAINING WALLS; MINIMUM EMBEDMENT FOR POSTS SHALL BE 3.0'x18"Ø - MEET U.B.C. STANDARDS.



NOTES:

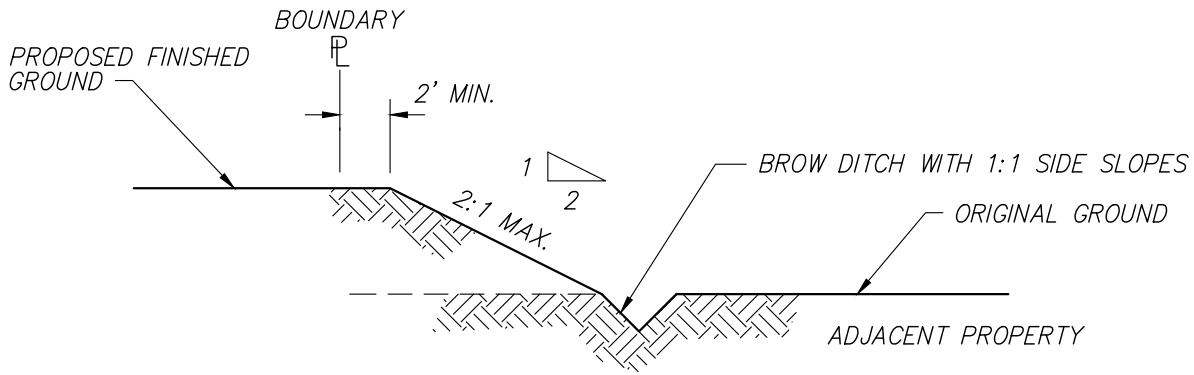
1. ALL MATERIAL FOR WOODEN WALLS SHALL BE REDWOOD OR PRESSURE TREATED DOUGLAS FIR.
2. ALL WOODEN MATERIALS SHALL BE GRADE NO. 2 OR BETTER WITH NO OPEN GRAIN MATERIAL ALLOWED.
3. WOODEN WALLS SHALL NOT BE USED ADJACENT TO STREET RIGHT-OF-WAYS.
4. CONCRETE, CONCRETE BLOCK AND OTHER WALL DETAILS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
5. A BUILDING PERMIT SHALL BE OBTAINED FOR ALL RETAINING WALLS.
6. A BUILDING PERMIT SHALL BE OBTAINED FOR ALL TERRACED WALLS.
7. REINFORCED CONCRETE OR MASONRY WALLS ARE REQUIRED IF EXISTING STRUCTURES ARE LOCATED LESS THAN 10' FROM THE HIGHER WALL (DETAIL "A").

CITY OF LINCOLN
ENGINEERING DEPARTMENT

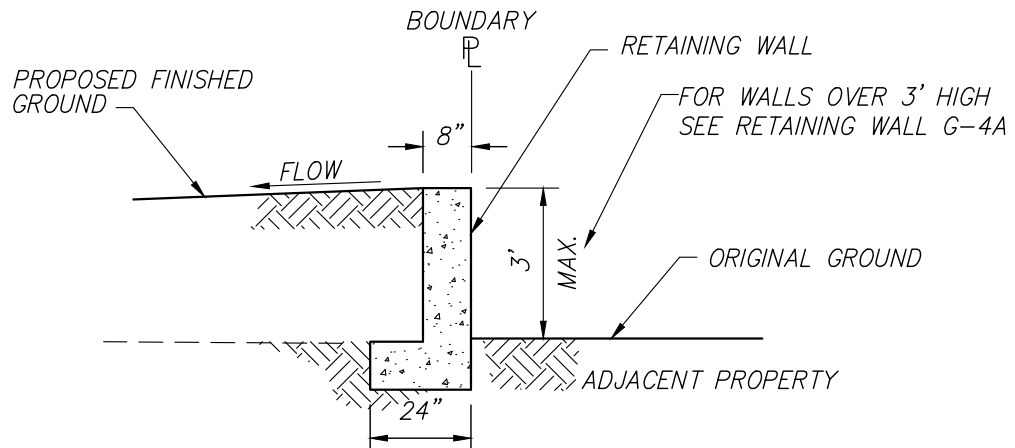
WOOD RETAINING WALL

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER DATE

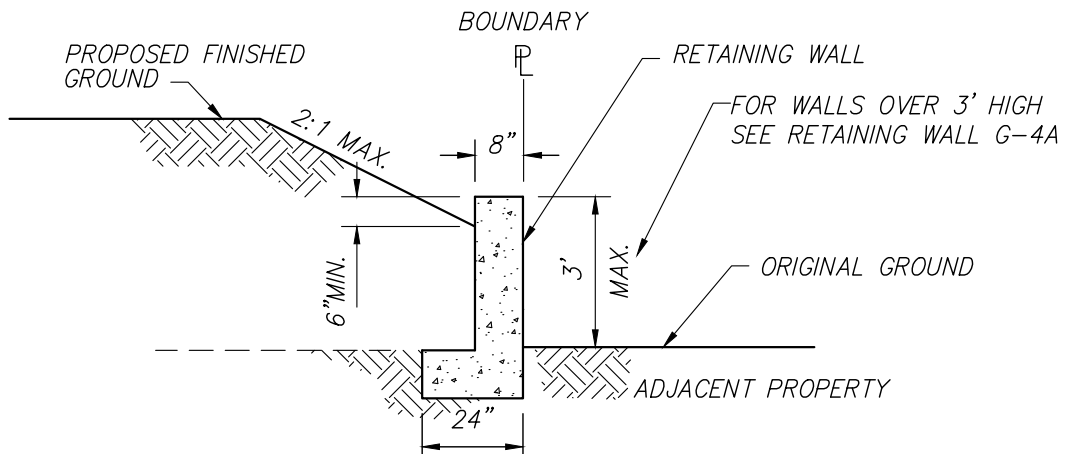
SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.



MOST DESIRABLE
ALTERNATE "A"



ALTERNATE "B"



ALTERNATE "C"

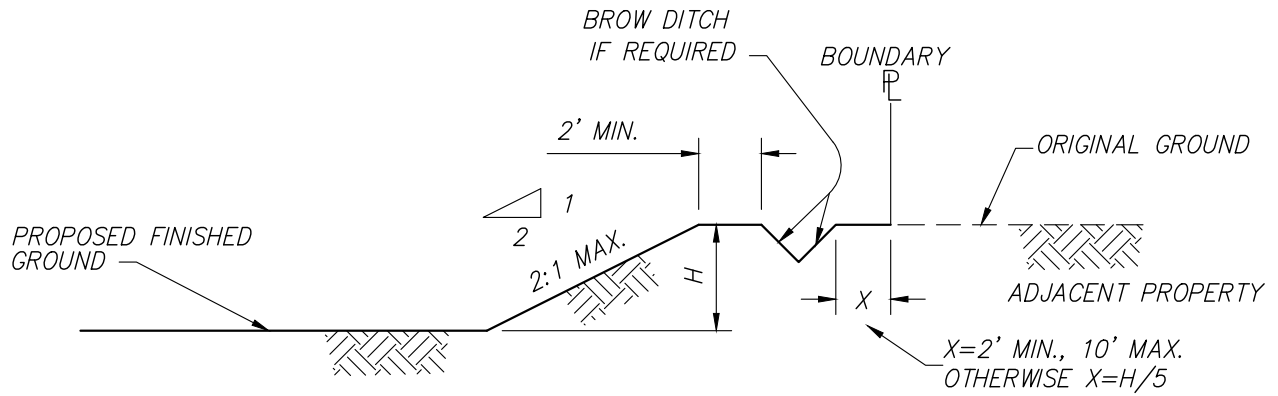
NOTES:

1. SEE G-3A FOR CUTS ADJACENT TO EXTERIOR PERIMETER PROPERTY LINES.
2. ALTERNATE "A" REQUIRES CONSTRUCTION EASEMENT FROM ADJACENT PROPERTY OWNER.
3. RIGHT OF ENTRY FROM ADJACENT PROPERTY OWNER IS REQUIRED FOR ALTERNATES "B" & "C".
4. BROW DITCH TO BE SIZED BY HYDROLOGY CALCULATIONS.

CITY OF LINCOLN ENGINEERING DEPARTMENT	
EXTERIOR PERIMETER PROPERTY LINE GRADING & WALLS	

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER _____ DATE _____

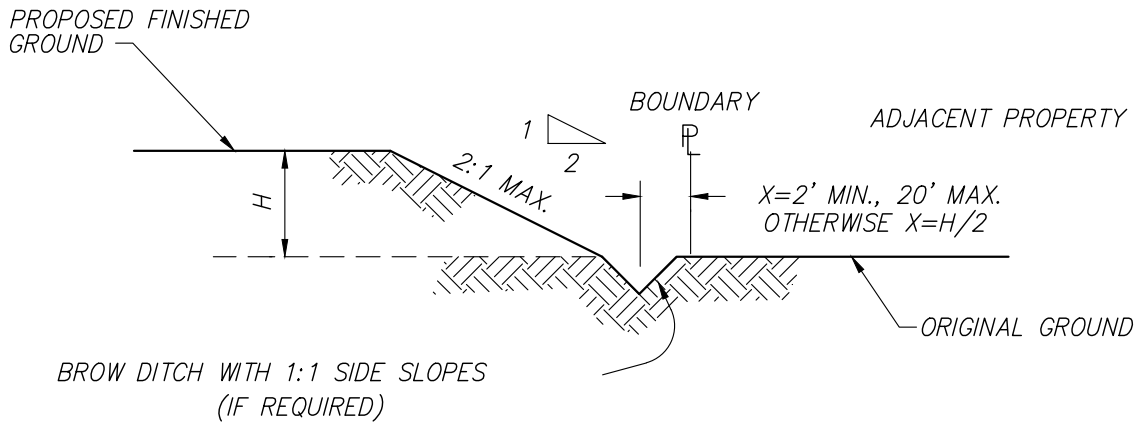
SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.



CUT AREAS
(OPTIONAL)

NOTES:

1. IF BROW DITCH IS NOT REQUIRED,
X=2' MIN. FROM THE TOP OF
THE SLOPE.
2. IF REQUIRED BY
CITY ENGINEER.



FILL AREAS

ALTERNATE "D"

NOTES:

1. BROW DITCH TO BE SIZED BY HYDROLOGY
CALCULATIONS.

CITY OF LINCOLN
ENGINEERING DEPARTMENT

**EXTERIOR PERIMETER
PROPERTY LINE
GRADING**

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER _____ DATE _____

SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.

G-3A

DESIGN NOTES:

1. THE DESIGN REQUIRES A NON-SATURATED BACKFILL. SURFACE AND SUBSURFACE DRAINAGE CONTROL IS REQUIRED TO PREVENT SATURATION OF THE BACKFILL, OR TO RELIEVE HYDROSTATIC PRESSURES. DRAINAGE CONTROL SHALL BE AS SPECIFIED IN THE CONSTRUCTION DRAWINGS, PROJECT PLANS OR AS DIRECTED BY THE ENGINEER.
2. THE DESIGN IS BASED ON THE FOLLOWING ASSUMPTIONS:
 - A. ALLOWABLE SOIL BEARING 2500 PSF
 - B. EQUIVALENT FLUID WEIGHT 35 PCF
 - C. SOIL FRICTION FACTOR 0.3
 - D. SURCHARGE OVER HEEL 250 PSF
 - E. SOIL DENSITY 125 PCF
 - F. LEVEL BACKFILL

THESE ASSUMPTIONS SHOULD BE VERIFIED BY THE PROJECT GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.

CONSTRUCTION NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 psi IN 28 DAYS.
2. REINFORCING STEEL SHALL BE GRADE 60.
3. THE BACK OF WALL SHALL BE SPRAYED WITH A WATER SEAL COMPOUND.
4. LAP ALL HORIZONTAL STEEL AT LEAST 40 BAR DIAMETERS AT SPLICES.
5. USE CONCRETE MASONRY BLOCK TYPE N PER ASTM C-90.
6. MORTAR SHALL BE TYPE S OR M AND SHALL CONFORM TO ASTM C 270.
7. GROUT SHALL BE A 6 SACK MIX AND SHALL CONFORM TO ASTM C 476.
8. FULLY GROUT (SOLID) ALL CELLS AND CONSOLIDATE PER 1996 U.B.C.
9. $f'm = 2,500$ psi. NO SPECIAL INSPECTION IS REQUIRED.
10. THE FOUNDATION SOIL SHALL BE FIRM AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY, AS DETERMINED BY ASTM D-1557.
11. COMPACTION WITHIN 3 FEET OF THE BACK FACE OF THE WALL SHALL BE ACHIEVED BY LIGHTWEIGHT MECHANICAL TAMPERS, ROLLERS, OR VIBRATORY SYSTEM ONLY.
12. NO BACKFILL SHALL BE PLACED AGAINST THE WALL UNTIL THE CONCRETE OR GROUT HAS REACHED THE DESIGN STRENGTH.
13. OMIT MORTAR FROM VERTICAL JOINT IN FIRST COURSE ABOVE PROPOSED GROUND LINE AT 32" CENTERS FOR WEEP HOLES. FILL ALL CELLS WITH GROUT.
14. SEE DETAIL G-4A

TABLE OF REINFORCING STEEL, DIMESNONS AND DATA

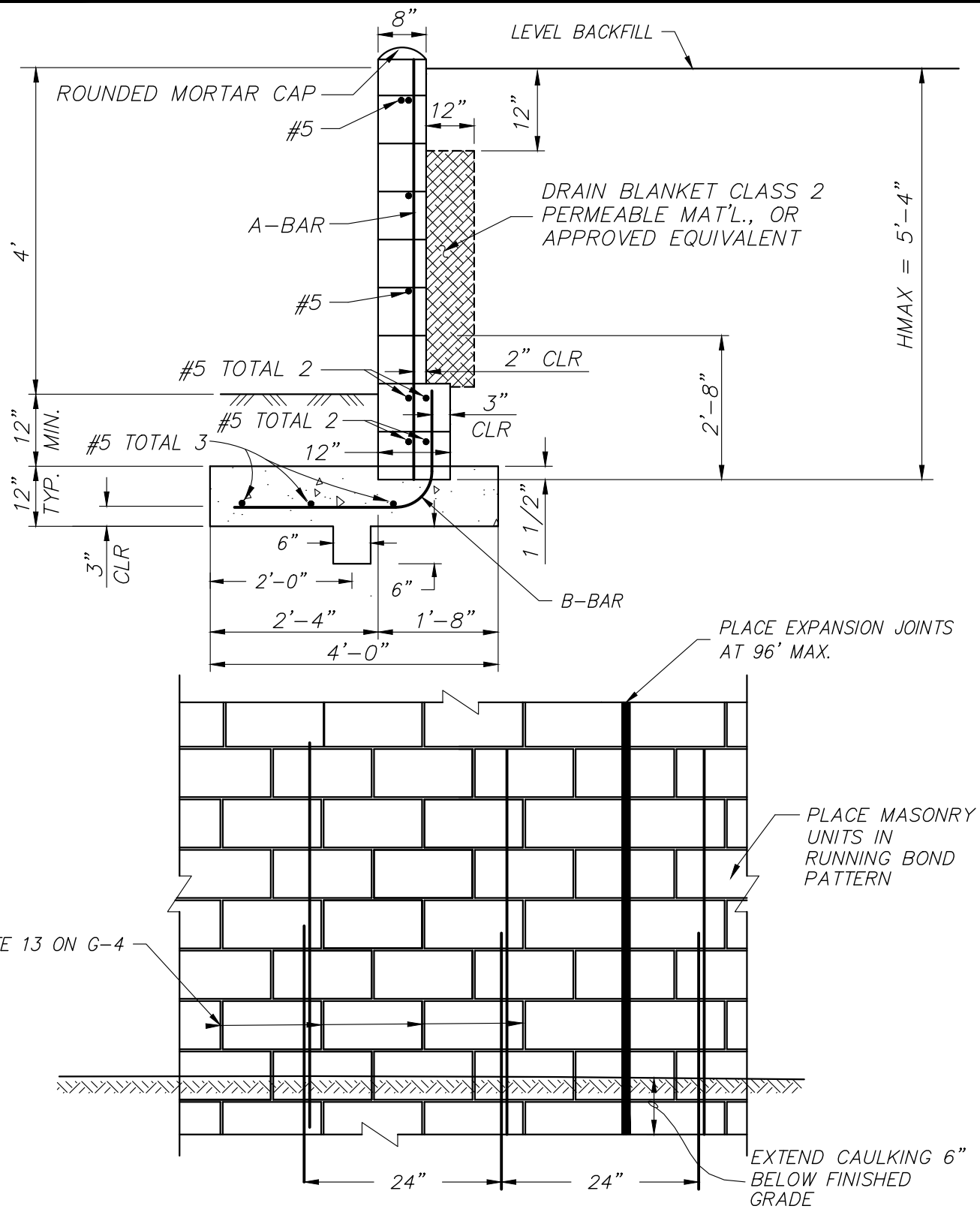
DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
W	3'-8"	4'-1"	4'8"	5'-3"	6'-9"
F	1'-0"	1'-1"	1'-2"	1'-3"	1'-4"
@ BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"
@ BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"

CITY OF LINCOLN
ENGINEERING DEPARTMENT

**MASONRY OR CONCRETE
RETAINING WALL**

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER DATE

SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.



RETAINING WALL DETAIL

NOTES:

1. REFER TO CALTRANS STD. DWG. B3-7B, TYPE 6A WALL.

CITY OF LINCOLN
ENGINEERING DEPARTMENT

**MASONRY OR CONCRETE
RETAINING WALL**

REVISIONS:	DATES:	APPROVED:
		CITY ENGINEER DATE

SCALE: NONE
DATE: SEPTEMBER 2019
DRAWN BY: C.G.

G-4A