COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUILDING AND SAFETY DIVISION

RETAINING WALL
PLAN REVIEW LIST

GENERAL PROJECT INFORMATION

PLAN CHECK NO. ________________________ DISTRICT NO _________

JOB ADDRESS ______________________________________ CITY ______________________ ZIP _____________

NOTE: Numbers in the parenthesis ( ) refer to sections of the 2014 edition of the Los Angeles County Building Code (LACBC), Table (T), Building Code Manual (BCM), Residential Code Manual (RCM), 2010 Minimum Design Loads for Buildings and Other Structures (3rd Printing) including Supplement No.1 (ASCE7), 2008 AF&PA Special Design Provisions for Wind and Seismic (SDPWS), 2011 Building Code Requirements and Specification for Masonry Structures TMS 402-11/ACI 530-11(ACI 530) & TMS 602-11/ ACI 530.1-11(ACI 530.1), 2011 Building Code Requirements for Structural Concrete (ACI 318-11)

INSTRUCTIONS

- Corrections with circled item numbers apply to this plan check.
- In the left-hand margin of the circled corrections, please indicate the sheet number and detail or note number on the plans where the corrections are made. Resubmit marked original plans and two corrected sets of plans, calculations and this plan review list.
- Incomplete, unclear, or faded drawings or calculations will not be accepted.
- Incorporate all comments as marked on checked set of plans and calculations and these correction sheets.

STRUCTURAL CALCULATION

APPLICATION AND PERMITS

1. Valuation is low. It should be $ ___________. Correct the application and pay a supplemental plan check fee of $ _________ at the time resubmittal. (107.2)
2. Complete the permit application form to show the legal description, street address, owner, designer, _________________.
3. A separate permit is required for each retaining wall. (106.1)
4. A Certificate of Workers' Compensation Insurance must be presented to Building and Safety before a permit can be issued.

REFERRALS

5. Unless the design complies with the attached BCM 1807.2 Article 1 or RCM R404.4 Article 1, the following information shall be submitted for review and approval:
    a. Soils Report
    b. Geology Report
    c. Structural calculations addressing seismic forces in addition to all horizontal and vertical loads, including surcharges, when retaining walls are supporting a retained height greater than 6 feet.
6. A grading permit is required in accordance with Appendix J103.
7. Rough grading approval is required before a building permit can be issued.
8. Parcel/Tract Map ______________ must be recorded before a permit can be issued. Submit a copy of the recorded map.

SITE REQUIREMENTS

9. Show the building or structure setback from the top or bottom of the slope. Building/structure located at the top or bottom of the slope shall be set back _______ feet from the retaining wall. Edge of retaining wall footing at the top of the slope, shall be setback _______ feet from face of descending slope. (1808.7)
10. The maximum slope of cuts and fills is two horizontal to one vertical for buildings, structures, foundations, and retaining walls, unless justified by a soils report. (J107.6)

PLAN REQUIREMENTS

11. The address of the site, the name of the legal owner(s), and the name address of the person(s) preparing the plans are required on the first sheet of the plans. (106.4.3)
12. A complete plot plan showing:

    Lot dimensions/ yard setbacks/ street name(s)/ north arrow/ existing building to remain/ distance between buildings/ location of private sewage disposal system including expansion areas/ utilities/ easements/ _____________________ is required. (106.4.3)
13. Provide contours and/or elevations to define existing and proposed drainage patterns. Provide details of proposed drainage devices for contributory surface drainage including inlets, weep holes, and outlet details. Hydrology and hydraulic analysis (as applicable) is required for sizing of necessary drainage devices.

14. Show all detail and section references at their appropriate location on the plan views.

15. Provide an elevation profile showing the various wall heights and lengths or clearly show on the plot plan where each wall of each height is to be built.

16. Clearly show the location of the property line on the wall cross section. Neither the footing nor the drainage system for the wall is permitted to lie on adjacent property without written permission of the property owner.

17. Each sheet of the plans must bear the signature, registration number, and expiration date of an Architect or Engineer registered in the State of California.

GENERAL DESIGN REQUIREMENTS

18. Specify on the plans the design compressive strength of concrete and masonry units, mixes and types of mortar and grout, yield strength of steel reinforcement and ASTM designations, and design soil pressure. Reference any soils report used or provided. (106.4.3)

19. Hydrostatic pressure shall be included in the design unless subsurface water is properly diverted away from the wall. Subsurface water will need to be diverted to an adequate outlet. (106.4.3)

20. Special inspection for masonry is required as specified by TMS 402 – 11/ACI 530-11, Section 1.19 – Quality Assurance Program.

21. Specify the compressive strength of the masonry by either the Unit strength method or the Prism test method. (2105.2.2)

22. Specify on the cross section the design dimensions of wall, footing, keyway, reinforcing steel size and spacing, location of steel and clear cover, and _________________________. For masonry wall, indicate on the cross section if the wall is either fully or partially grouted.

23. Provide detail and spacing of construction/contraction joints and specify filler material.

24. Per soils report, provide _________ feet of freeboard and/or swale behind the retaining wall.

25. Retaining walls that are unrestrained and free to move at the top shall be permitted to be designed for active pressure. (1610.1)

26. Foundation walls or basement walls where the top is restrained against horizontal movement shall be designed for at-rest pressure, except where walls that do not extend more than 8 feet below grade and are laterally supported at the top by flexible diaphragms shall be permitted to be designed for active pressure.

(1610.1)

27. The use of expansive soils as backfill materials behind the retaining walls or basement walls shall not be permitted. (T1610.1, Footnote b)

28. Calculated load demands at the critical sections in the wall and footing for flexure and shear shall be factored accordingly using appropriate load combinations per Code. (1605)

SURCHARGES

29. The slope as shown creates a surcharge on the wall. Use an equivalent fluid soil pressure of __________ pcf instead of __________ pcf used in the calculations.

30. A concentrated or uniform load adjacent to the wall causes a surcharge. Design lateral pressure from the surcharge load shall be added to the lateral earth pressure load. The structure or load shown on Sheet ________ creates an additional surcharge on the retaining wall. Revise the calculations and design on the plans as needed. (1610.1)

MASONRY STEM WALL

31. The design of masonry structures using allowable stress design shall comply with Sections 2106 and 2107.1.

32. The minimum length of lap splices for straight reinforcing bars in tension or compression shall be $l_d = 0.002 d_b f_s$ but not less than 12". In no case shall the length of the lapped splice be less than 40 bar diameters. When epoxy coated bars are used, lap length shall be increased by 50 percent. (2107.2.1)

33. In regions of moment where the design tensile stresses in the reinforcement f_s are more than 80 percent of the allowable steel tension stress, F_s , the lap length of splices shall be increased by 50 percent.

(2107.2.1)

34. The bar diameter shall not exceed one-eight of the nominal wall thickness and shall not exceed one-quarter of the least dimension of the cell, course, or collar joint in which it is placed. (2107.4)

35. The design of masonry structures using strength design shall comply with Sections 2106 and 2108.1.

36. If fence wall is located at top of the retaining wall, justify by calculations the effect of the wind load to the fence and retaining wall.

37. Minimum masonry wall cover is ≥ 2 inches for bars larger than #5, and ≥ 1.5 inches for #5 bars or smaller. Show minimum clear covers (measured from the exterior surface of masonry wall to the outermost surface of the reinforcement) on the wall sections and details. (TMS 402-11/ACI 530-11)

CONCRETE STEM WALL

38. Flexural reinforcement for cantilever concrete retaining walls shall be designed in accordance with the flexural design provisions of ACI318 Chapter 10. (ACI 14.1.2)

39. Show horizontal reinforcement in the stem wall on the sections and/or details. Minimum horizontal reinforcement shall be in accordance with ACI 318 Section 14.3.3. (ACI 14.1.2)

40. Concrete walls more than 10 inches thick, except basement walls, shall have reinforcement for each direction placed in two layers parallel with wall faces.

(ACI 14.3.4)

41. Wall vertical and horizontal reinforcements shall not be spaced more than three times the wall thickness or 18 inches, whichever is less. (ACI 14.3.5)

42. Clearly show the minimum concrete covers on the sections and/or details. For formed cast in place concrete exposed to earth or weather, cover ≥ 2 inches for #6 bars or larger, and ≥ 1.5 inches for #5 bars or smaller. For concrete cast against and permanently exposed to earth (i.e. footing), cover ≥ 3 inches. (ACI 7.7.1)

43. Transfer of force to footing at base of wall shall be accordance with ACI318 Sec. 15.8. (ACI 14.2.8)

44. Show calculations and determine the development length l_d of straight bars in tension, where minimum $l_d \geq$ 12 inches. (ACI 12.2)

45. Show calculations and determine the development length of hook bars l_{dh} in tension, where l_{dh} shall not be less than the larger of $8d_b$ or 6 inches. (ACI 12.5)

46. Specify the minimum lap length of reinforcement where splices are used. Provide Class B lap splices ≥ $1.3l_d$ but not less than 12 inches for deformed bars in tension, unless it can be justified by calculations that Class A lap splices ≥ $1.0l_d$ can be used. (ACI 12.15.2)

47. Specify the length of dowels extending from the top of footing into the stem wall. Minimum dowel length shall not be less than the required lap length for continuous rebars plus the larger of $12d_b$ or effective depth d. Show on the cross sections and/or provide a schedule. (ACI 12.10.3 and ACI 12.15.2)

48. Concrete wall shall not be backfilled and compacted until the minimum compressive design strength has been attained. Provide note on the plans.

SPREAD FOOTINGS

49. The soil bearing pressure used in the structural calculations exceeds the maximum code allowable of 1500 psf without a soils report. Provide a soils report to substantiate the design load or redesign using 1500 psf. (T-1806.2)

50. Clearly show by calculations that the minimum factor of safety (FS) against sliding and overturning is 1.5. Where seismic loads are included, minimum FS ≥ 1.1 for both sliding and overturning. (1807.2.3)

51. The formula used to determine the soil bearing pressure (P/A ± M/S) is not appropriate when the least pressure is negative and where eccentricity $e > L/6$. This means that the soil is not in contact with the base of the retaining wall. Submit revised design and calculations.

52. Where a keyway is provided below the footing base to resist sliding, lateral soil pressures on both sides of the keyway shall be considered in the sliding analysis. (1807.2.1)

53. Minimum reinforcement required in footings shall comply with ACI318 Sec. 7.12.2.1. Maximum spacing of reinforcement shall not exceed three times the thickness or 18 inches. (ACI 10.5.4)

54. Provide calculations and design the required flexural reinforcements for the toe and/or heel portions of the footing.

TORSION BEAMS

55. The concrete grade beam supporting the retaining wall is subjected to combined torsion and biaxial bending. Provide a structural analysis and design of the beam to verify the adequacy of the stirrups, longitudinal steel, and concrete stresses. (ACI 11.5)

56. Provide connection details that transfer lateral forces from the wall through the grade beam to the pile foundation.

PILE AND PIER FOOTINGS

57. Where deep foundations are proposed, a geotechnical investigation shall be conducted and a soils report shall be provided for review. (1803.5.5)

58. Note on the plan that special inspections for existing site soil conditions shall be required. The soil creep was considered in the design and the piles/piers are to be installed into favorable bedding. (1705.6)

59. Note on the plan that special inspections shall be performed during installation and testing of pile/pier foundations as required by Table 1705.7 or Table 1705.8. (1705.7 and 1705.8)

60. Piles standing unbraced in air, water, or in fluid soils shall be designed as columns. Point of fixity for piles shall be in accordance with Section 1810.2.1 or as recommended by soils report. (1810.1.3)

61. Provide calculations and details of the piles on the plans to justify adequacy for shear and bending stresses.

ADDITIONAL COMMENTS