Swimming Pool

TABLE OF CONTENTS

JOSEPH J. DOMINOSKI
STATE OF WASHINGTON
21428
REGISTERED
PROFESSIONAL ENGINEER

10-20-25

Calculations required to be provided by the Permittee on site for all Inspections

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
SKinnear
02/11/2026
10:53:12 AM

CITY OF PUYALLUP
STATE OF WASHINGTON

PRPO20260015

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

BASIS FOR DESIGN

BUILDING CODE: International Building Code, 2021

LOADS: Active Earth Pressure = 35 PCF (Equivalent Fluid Pressure)

CONCRETE: Minimum 28 Day Strength = 4000 psi

REINFORCING: Bars #5 and Larger; FY = 40000 psi
Bars #3 and Larger; FY = 40000 psi

ASSUMPTIONS

1. Pool full case is okay by inspection.

2. Bars placed in the center of the wall.

3. Lap splices in reinforcing bars
   a. Non-contact splices shall have 2 inch minimum clear between bars.
   b. Contact splices must be constructed with the bars aligned so that a line through the center of the two spliced bars is perpendicular to the surface of the concrete wall.

CASE ONE ANALYSIS

Analyze the pool shallow end:

Vertical Wall Height = 3.50 feet

Radius = 1.50 feet

Simplified Conservative Depth Assumption: 3.50 feet + 1.50/2 feet = 4.25 feet

γh = 35 pcf (4.25 ft) = 148.75 psf

P = 148.75 psf (4.25 ft)(1/2) = 316.1 plf

y = 1/3 (4.25 ft) = 1.42 ft

M_A = 1.42 ft (316.10 ft) = 447.9 lb-ft/ft

Determine the Ultimate Moment M_U:

M_U = 1.7 (447.9 lb-ft/ft) = 761.4 lb-ft/ft

A_S = Area of steel per foot for #4 Bars at 12 inch spacing (A Bars)

Rebar Cross-Sectional Area = 0.1963 square inches

A_S = (0.1963 sq. inches) (12 /12) = 0.1963 square inches/ft

$$a = \frac{A_S F_Y}{0.85 f_c b} = \frac{(0.1963)(40000)}{0.85 (4000) (12)} = 0.1925 \text{ inches}$$

Determine the Allowable Moment ϕM_N:

$\phi M_N = \phi A_S F_Y (d - a/2) = 0.90 (0.1963) (40000) (3 - 0.1925 / 2) (1/12) = 1710.0$ lb-ft/ft

$\phi M_N > M_U$ 1710.0 > 761.4 OK

Steel is acceptable for a wall height up to 5.00 feet

CASE TWO ANALYSIS

Analyze the deep end of the pool (depth up to 7.50 feet)

Vertical Wall Height = 4.00 feet

Radius = 4.50 feet (7.50 feet to main drain)

Simplified Conservative Depth Assumption:
4.00 feet
+4.50/2 feet
6.25 feet

γh = 35 pcf (6.25 ft) = 218.75 psf

P = 218.75 psf (6.25 ft)(1/2) = 683.6 plf

y = 1/3 (6.25 ft) = 2.08 ft

M_A = 2.08 ft (683.60 ft) = 1423.9 lb-ft/ft

Determine the Ultimate Moment M_U:

M_U = 1.7 (1423.9 lb-ft/ft) = 2420.6 lb-ft/ft

Try using #4 Bars at 12 inches O.C. (A Bars)

A_S = Area of steel per foot for #4 Bars at 12 inch spacing

Rebar Cross-Sectional Area = 0.1963 square inches

A_S = (0.1963 sq. inches) (12 /12) = 0.1963 square inches/ft

$$a = \frac{A_S F_Y}{0.85 f_c b} = \frac{(0.1963)(40000)}{0.85 (4000) (12)} = 0.1925 \text{ inches}$$

Determine the Allowable Moment ϕM_N:

$\phi M_N = \phi A_S F_Y (d - a/2) = 0.90 (0.1963) (40000) (4 - 0.1925 / 2) (1/12) = 2275.4$ lb-ft/ft

$\phi M_N > M_U$ 2275.4 < 2420.6 Not OK

Try using #4 Bars at 6 inches O.C. (A Bars plus intermediate B Bars)

A_S = Area of steel per foot for #4 Bars at 6 inch spacing

Rebar Cross-Sectional Area = 0.1963 square inches

A_S = (0.1963 sq. inches) (12 /12) = 0.3925 square inches/ft

$$a = \frac{A_S F_Y}{0.85 f_c b} = \frac{(0.3925)(40000)}{0.85 (4000) (12)} = 0.3848 \text{ inches}$$

Determine the Allowable Moment ϕM_N:

$\phi M_N = \phi A_S F_Y (d - a/2) = 0.90 (0.3925) (40000) (4 - 0.3848 / 2) (1/12) = 4436.3$ lb-ft/ft

$\phi M_N > M_U$ 4436.3 > 2420.6 OK

Steel is acceptable for a wall height up to 7.50 feet