Drainage Calculations

Drainage plan, details, sections, and calculations prepared by a Florida licensed engineer to demonstrate detention for the greater of the first 1 inch of runoff over the entire site or the total runoff from the 3-year 24-hour rainfall event; or retain the initial portion of runoff in an amount equal to one-half of that required to be detained

1. Signed and sealed survey illustrating existing topo, easements, and existing grades extending at least 5' outside all property lines
2. Grading plan clearly illustrating:
   - all existing and proposed improvements, materials, and dimensions (note: 2' minimum setback from property line or as required for swales/berms)
   - tabulation of pervious area (living sod/landscape), impervious areas (i.e. building slab, driveway, pool, deck, semi-impervious hardscaping such as pavers and artificial turf), and include the total decrease of pervious area.
   - existing and proposed grades in sufficient detail to drain away from building structures, drain along & within property line, and prevent runoff onto any adjacent privately held property
   - swales, berms, and/or retaining walls along with flow arrows (note: swales/berms slopes shall be 4:1, stabilized and sodded)
3. Cross sections at rear, sides, front property line (as applicable to scope of work) to illustrate:
   - property line
   - easements
   - dimensions and setbacks
   - existing and finished grade lines
   - grade of proposed top of berm/wall and bottom of swale in relation to slab grade and
   - call out and match existing grade at property line

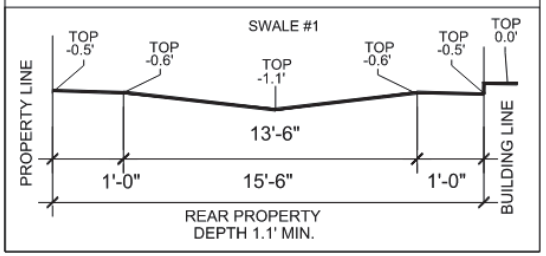
RETAIN EITHER 2.5" IMPERVIOUS AREA OR 1" OVER ENTIRE SITE

2.5"/12" X 3,869 (SQ.FT.)	= 806	CUBIC FEET
1"/12" X 7,358 (SQ.FT.)	= 613	CUBIC FEET
DRY REDUCTION 50%	= 403	CUBIC FEET

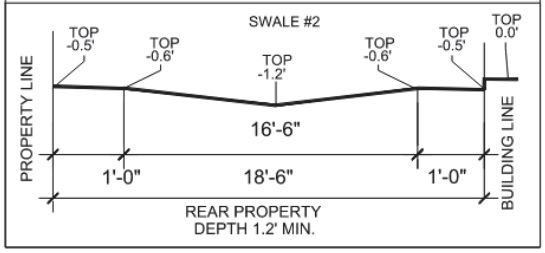
STORAGE PROVIDED:

REAR (SOUTH) SWALE #1	1/2 x 14.5' x 67' x 0.5	= 243 CUBIC FEET
LEFT (EAST) SWALE #2	1/2 x 16.5' x 32.5' x 0.6	= 161 CUBIC FEET
TOTAL STORAGE REQUIRED	403	CUBIC FEET
TOTAL STORAGE PROVIDED	404	CUBIC FEET

SWALE #1 DETAIL REAR (SOUTH)



SWALE #2 DETAIL LEFT (EAST)



GENERAL NOTES:

1) ALL TRADES SHALL BE RESPONSIBLE TO READ ALL DETAILS AND SPECIFICATIONS, AND PLANS -ARCHITECTURAL AND MECHANICAL-FOR PROPER COORDINATION. IF ANY CONFLICTS EXIST, THAT TRADE SHALL NOTIFY THE CONTRACTOR OF THE SAME, PRIOR TO

2) CONTRACTOR SHALL DIRECT ANY DISCREPANCIES TO ARCHITECT PRIOR TO CONSTRUCTION, AND CONTRACTOR SHALL BE RESPONSIBLE FOR WORK WHICH PROCEEDS WITHOUT DUE COURSE

SITE CALCULATION

LOT COVERAGE

AREA	SQ. F.	%
EXISTING HOUSE	1,600	
NEW ADDITION	1,044	
TOTAL PROPOSED	2,644	35.9 %

IMPERVIOUS

EXISTING CONC. DRIVEWAY/	1,093	
WALKWAY	92	
A.C. PAD	40	
	1,225	16.7 %

LANDSCAPE	3,498	47.4%
LOT	7,358	100.00 %

Drainage Calculations Example 1

Drainage Calculations Example 2

1) SITE PLAN DATA:

Total Lot Area = 16,244 sq.ft. ± (0.373 acres ±)

The drainage area is considered to be 0.373 acres (16,244 sq.ft.) which is the entire area. The drainage area has been evaluated as follows:

A) IMPERVIOUS AREAS (Per various plans in CADD with area takeoffs):

ITEM	PROPOSED
Buildings	4,375 sq.ft.
Drive/Walkways/Decks/Pool	4,868 sq.ft.
IMPERVIOUS (total):	9,243 sq.ft. (56.90%)

Note: square footage has been rounded upward in some instances for estimating purposes; assumes pavers as impervious and includes roof overhangs.

B) PERVIOUS AREAS:

TOTAL = (16,244 sq.ft. - 9,243 sq.ft.) (1 acre/43,560 sq.ft.) = 7,001 sq.ft. or 0.161 acres (43.10%)

2) SFWMD CRITERIA/DATA:
3 Year, 1 Day Storm = 5.0" (refer to rainfall map)

Soil Storage Factor (S)

$S_{DEVELOPED}$ = 10.9" assumes: coastal soils
compacted soils condition
maximum 4' depth to water table

3) ESTIMATED RUNOFF RATE

SFWMD Formula: $Q = \frac{(P-0.2S)^2}{P+0.8S}$

Where Q = Runoff rate in inches
S = Soil storage factor (see soil factor calculations)
P = Rainfall = 5.0" (3 year, 1 Day storm)

$S_{DEVELOPED} = \frac{10.9" \times 0.161 \text{ acres}}{0.373 \text{ acres}} = 4.70"$

$Q_{DEVELOPED} = \frac{[5.0" - 0.2\,(4.70")]^2}{5.0" + 0.8\,(4.70")} = 1.88"$

4) ESTIMATED RUNOFF VOLUME FOR 3 YEAR, 1 DAY STORM:

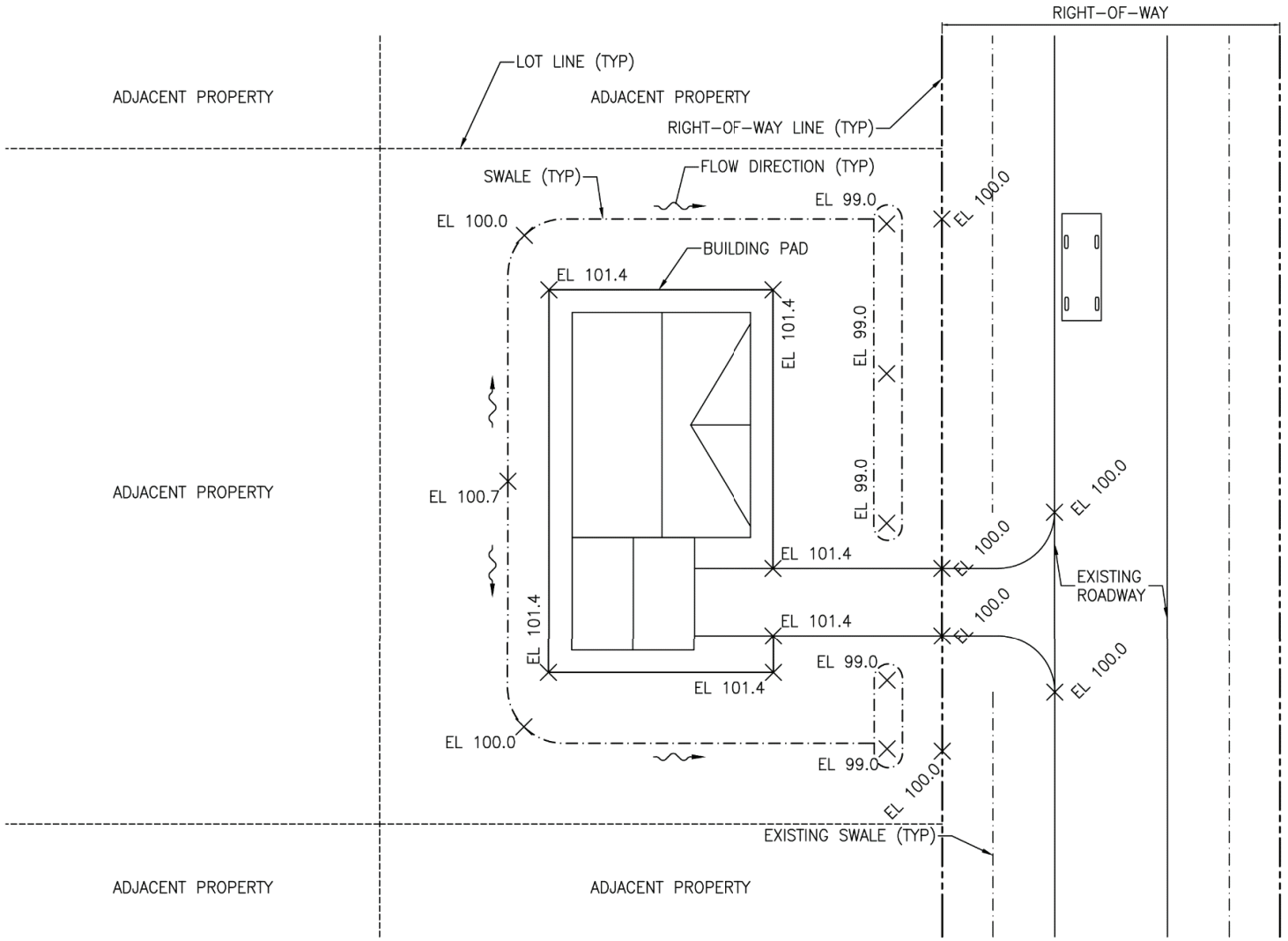
Runoff Volume = Runoff Rate x Area

$(\text{Runoff Volume})_{DEVELOPED} = 1.88" \times 0.373 \text{ acres} \times \frac{\text{ft}}{12 \text{ in.}} \times = 0.058 \text{ acre-ft}$

ZERO Discharge stage corresponding to 0.058 acre-ft 12.41 NAVD

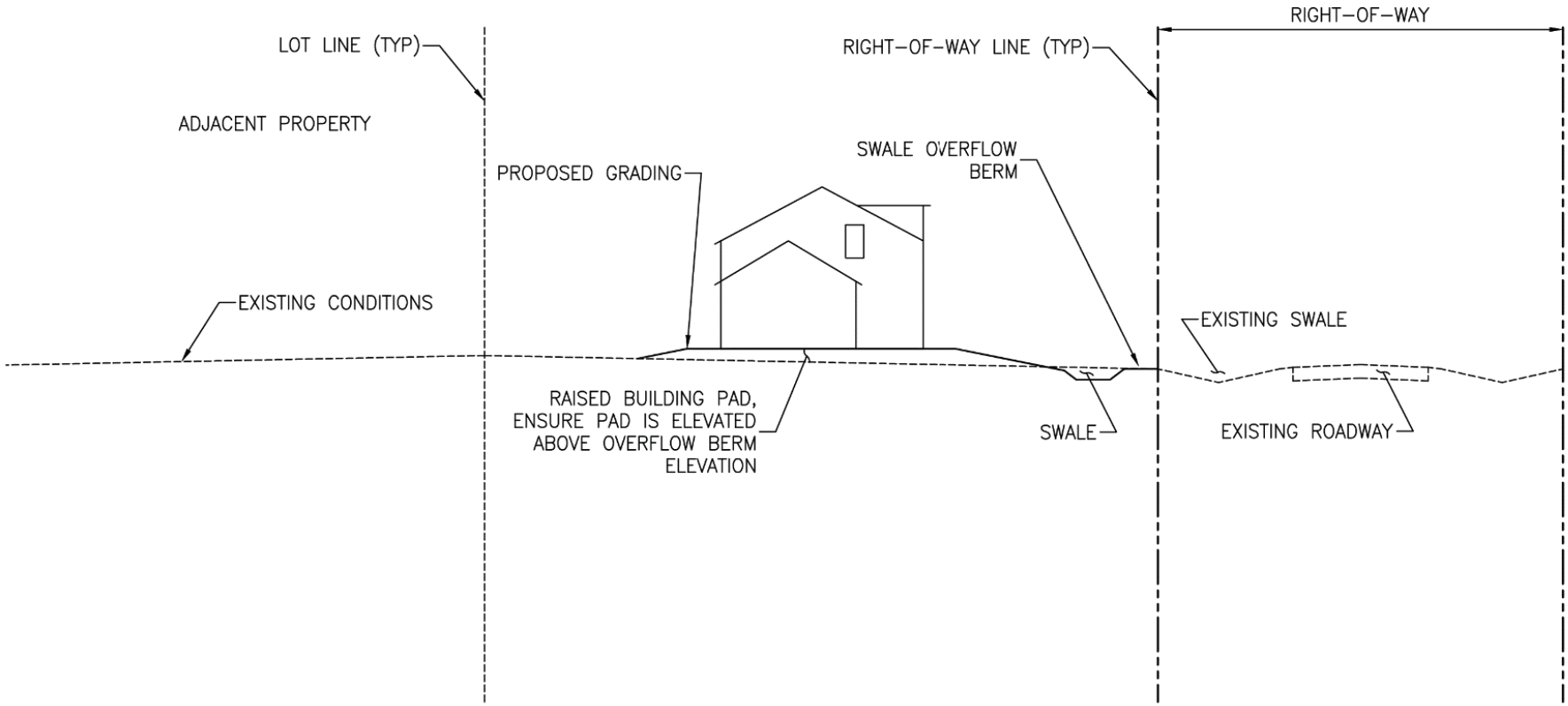
Existing site contours and recontouring of contours near proposed residential construction will "manage" this volume on-site within designated berm and high percolation rate soils.

D. Sample Site Plans and Profiles



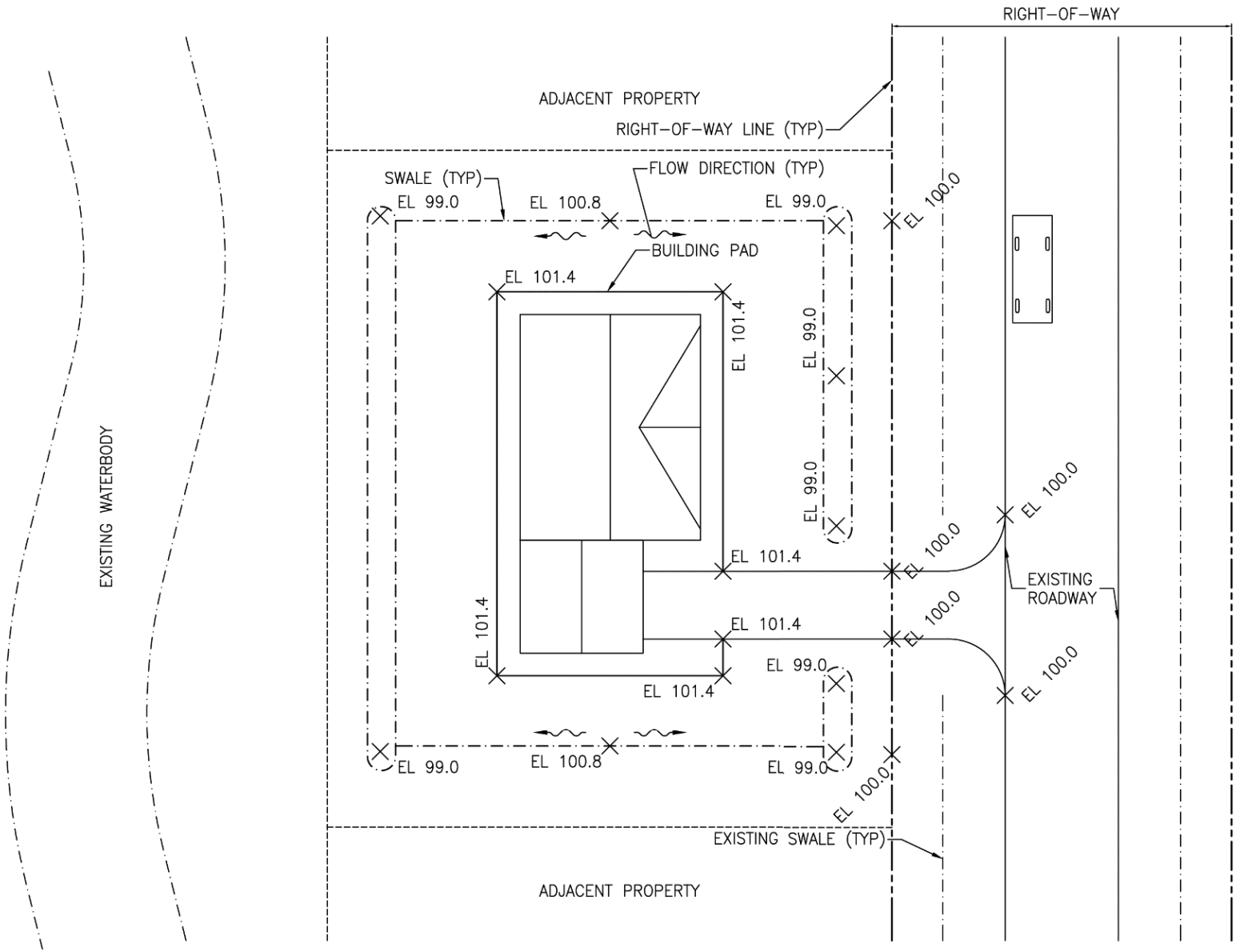
Example Grading Sheet

Original source: Village of Tequesta, Palm Beach County, Residential Stormwater Guidelines Brochure



Example Cross Section

Original source: Village of Tequesta, Palm Beach County, Residential Stormwater Guidelines Brochure



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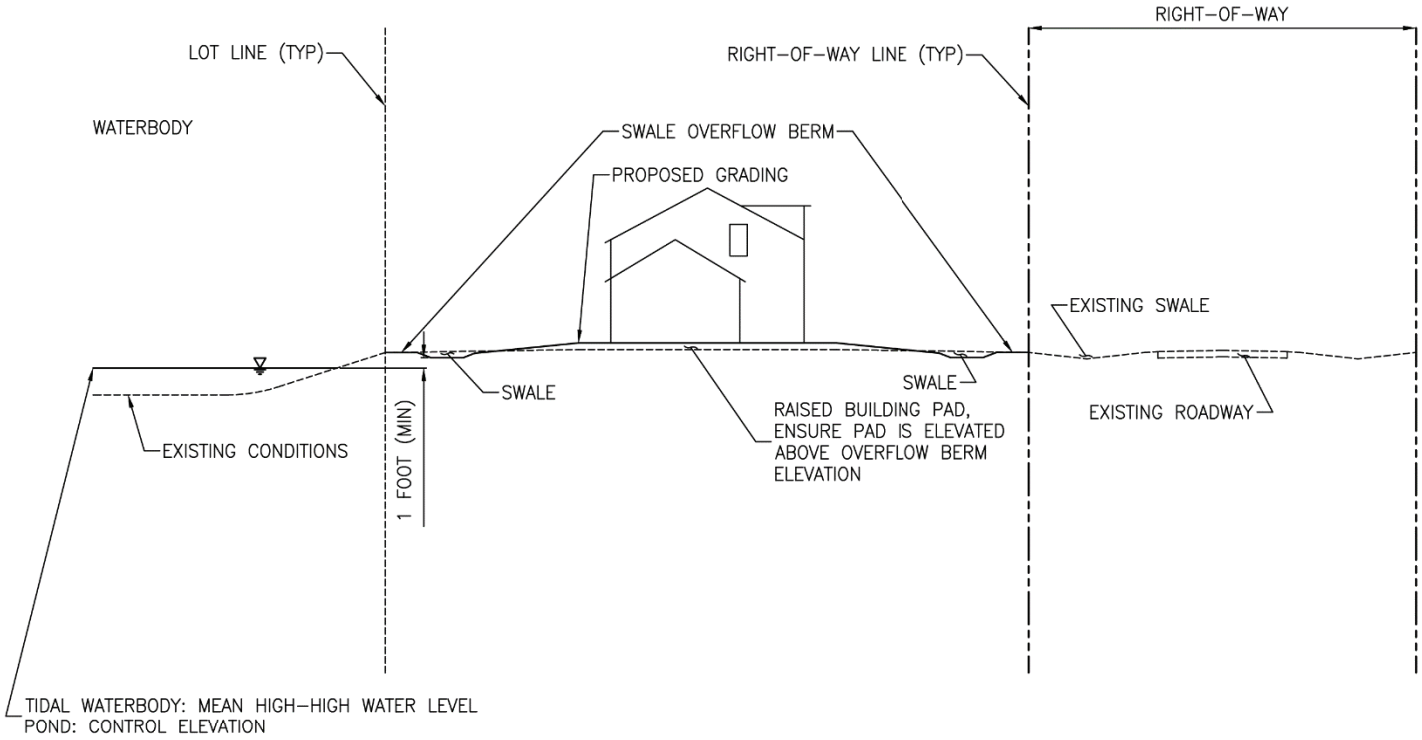

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