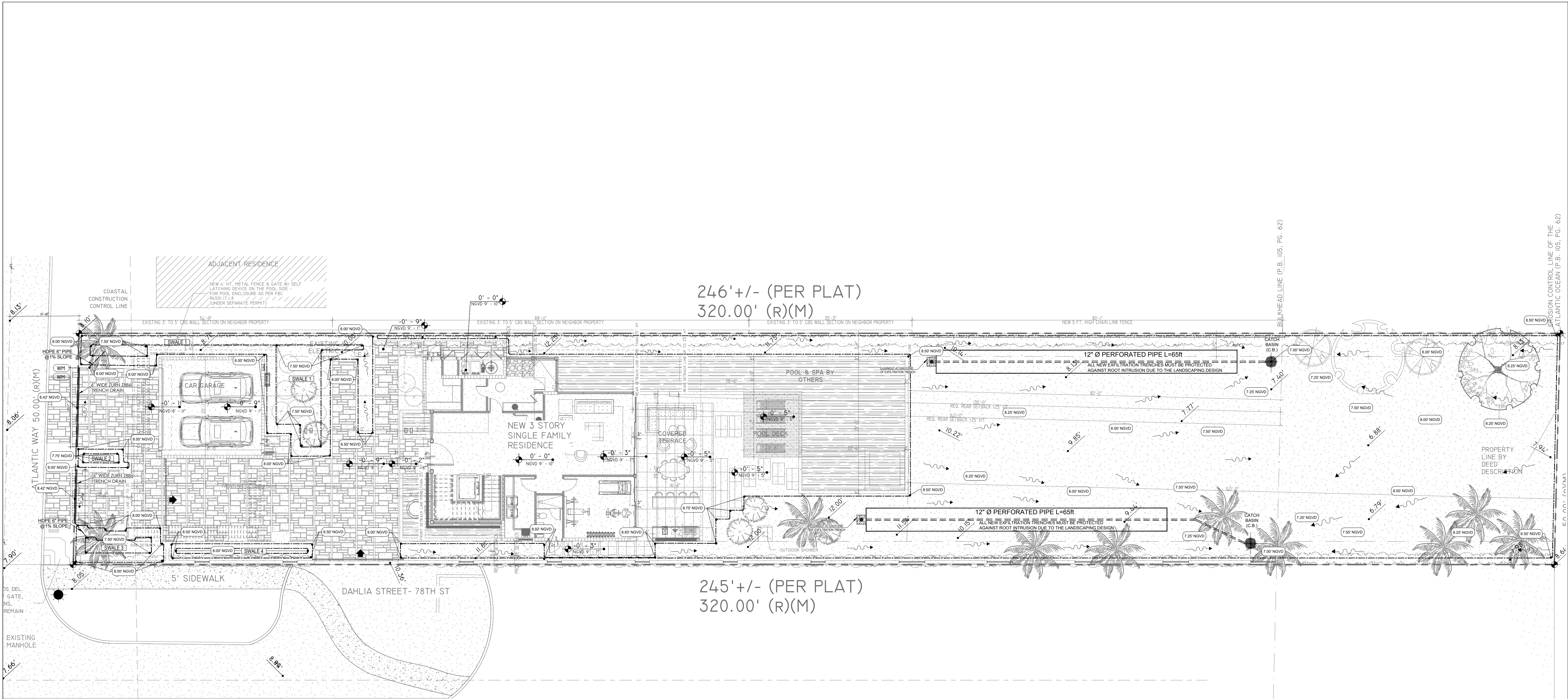




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CONSULTING ENGINEER

ALIOSKAR GANEM P.E.
FL. LIC. No. 74745

ALTOS DEL MAR
RESIDENCE
7801 ATLANTIC WAY, MIAMI
BEACH, FL 33141

OWNER

SEAL

NOTES/COMMENTS

REVISIONS / SUBMISSIONS

DRAINAGE PLAN

ALL DRAWINGS AND WRITTEN MATERIAL APPEARING HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF SDH STUDIO, AND MAY NOT BE DUPLICATED, USED, OR DISCLOSED WITHOUT THE EXPRESS WRITTEN CONSENT OF STEPHANIE D. HALPEN

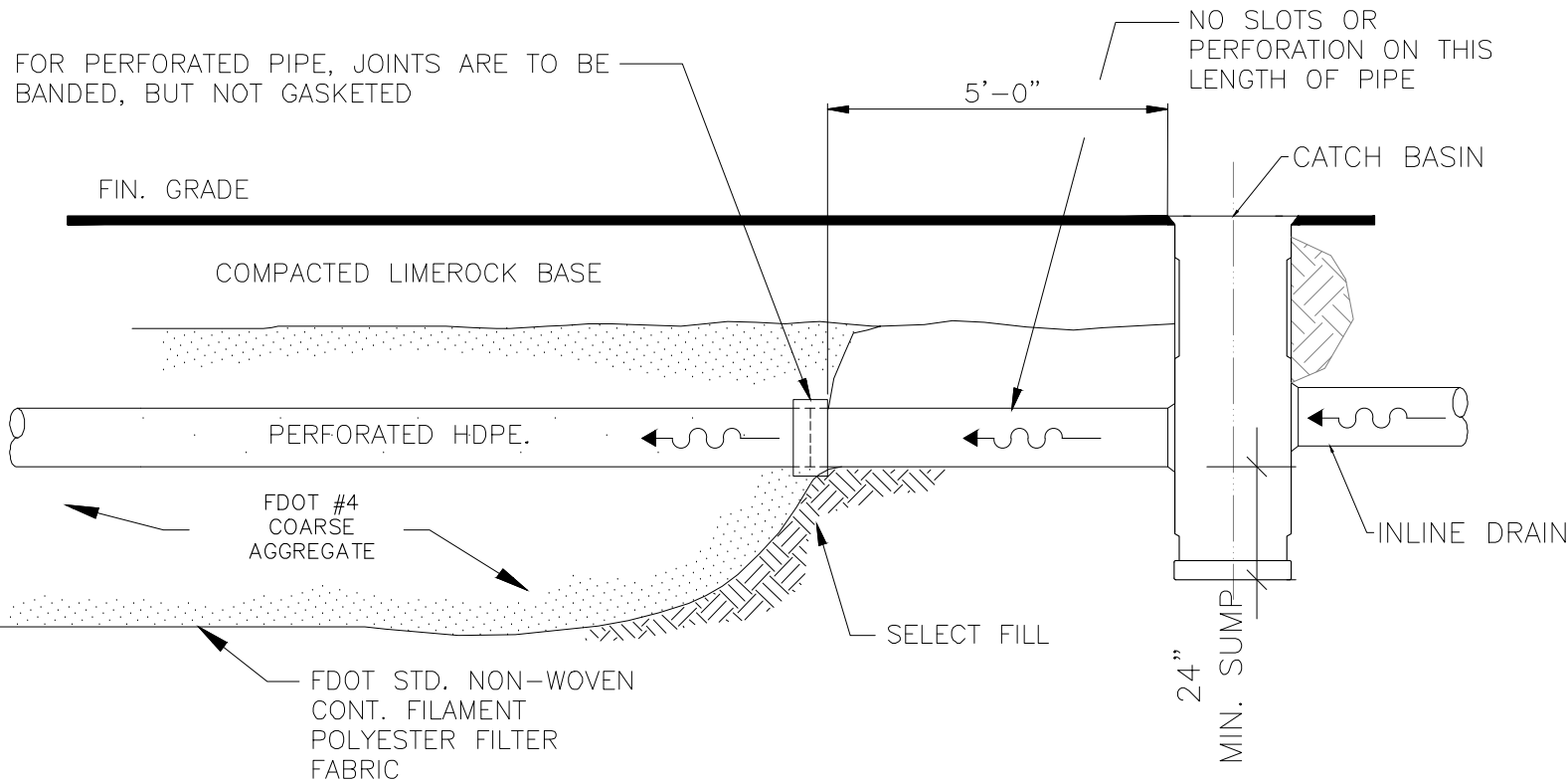
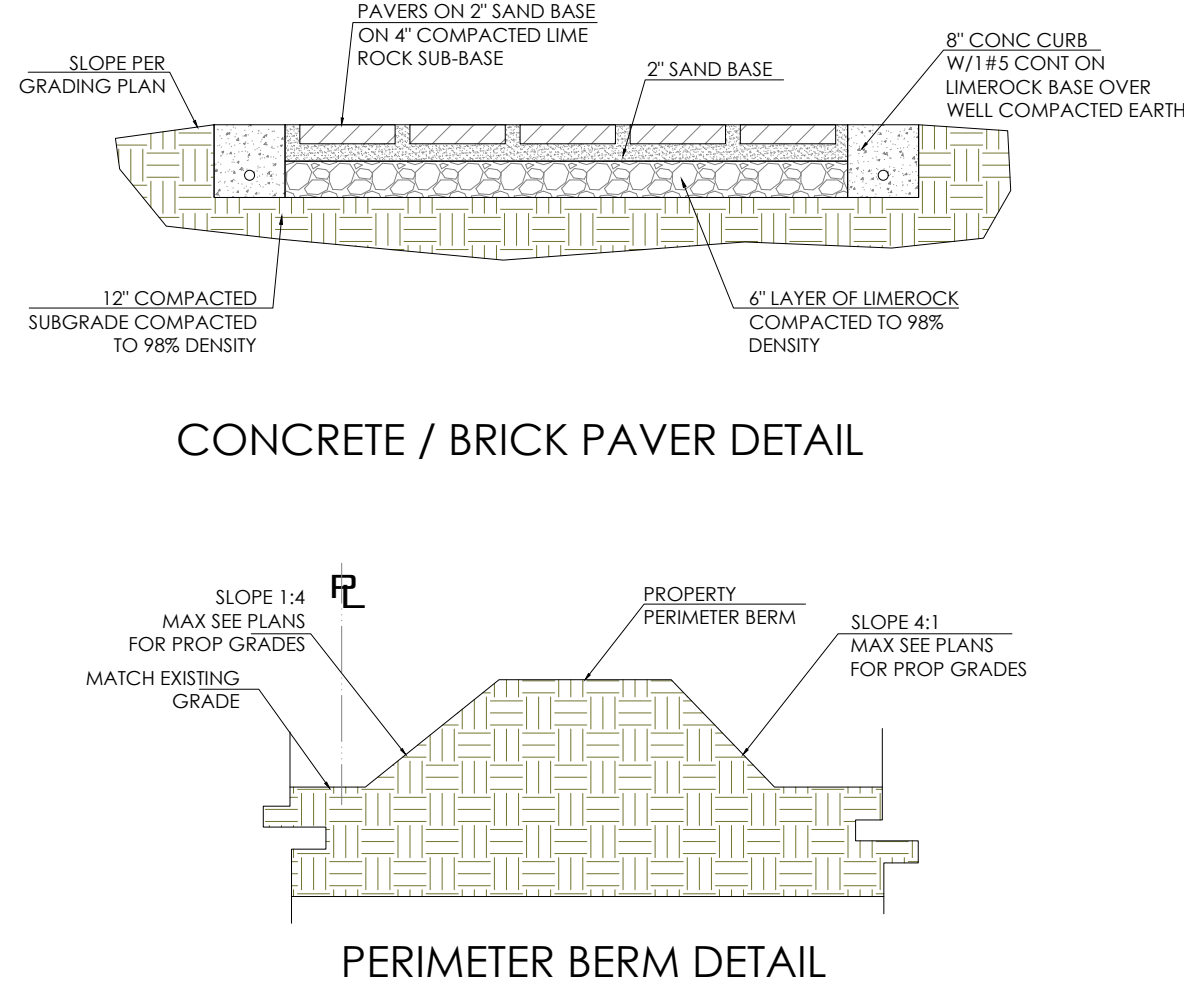
DRAWN BY: GCE
CHECKED BY: AG
INITIAL DRAWING
RELEASE DATE: ISSUE DATE

C-I

GENERAL DESCRIPTION

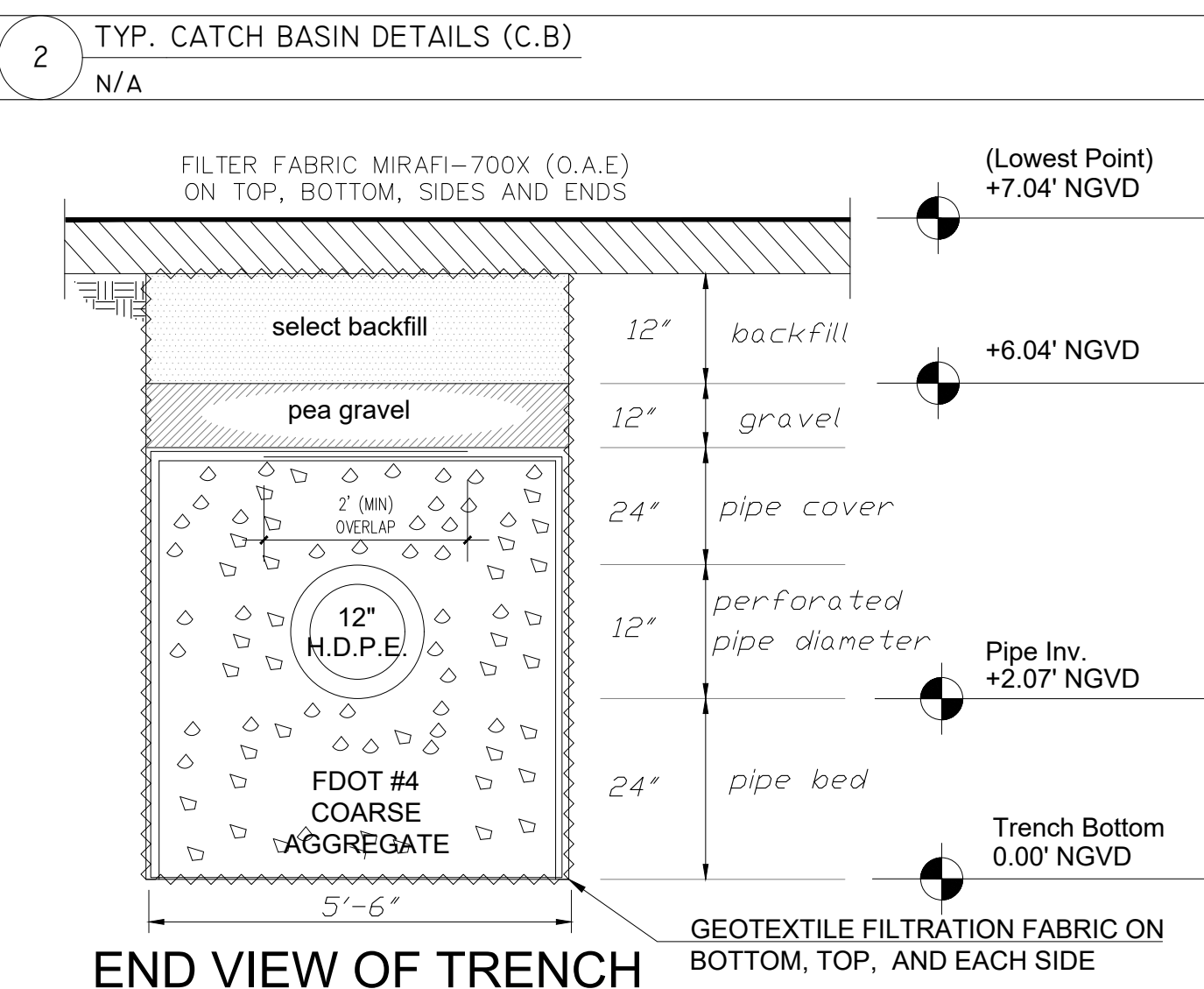
FIG. 5. OF CORRECTED PLAT ALTOS DEL MAR NO. 1, ACCORDING TO THE PLAT THEREOF, AS RECORDED IN PLAT BOOK 40, OF THE PUBLIC RECORDS OF MIAMI-DADE COUNTY, FLORIDA.

LOT 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 82



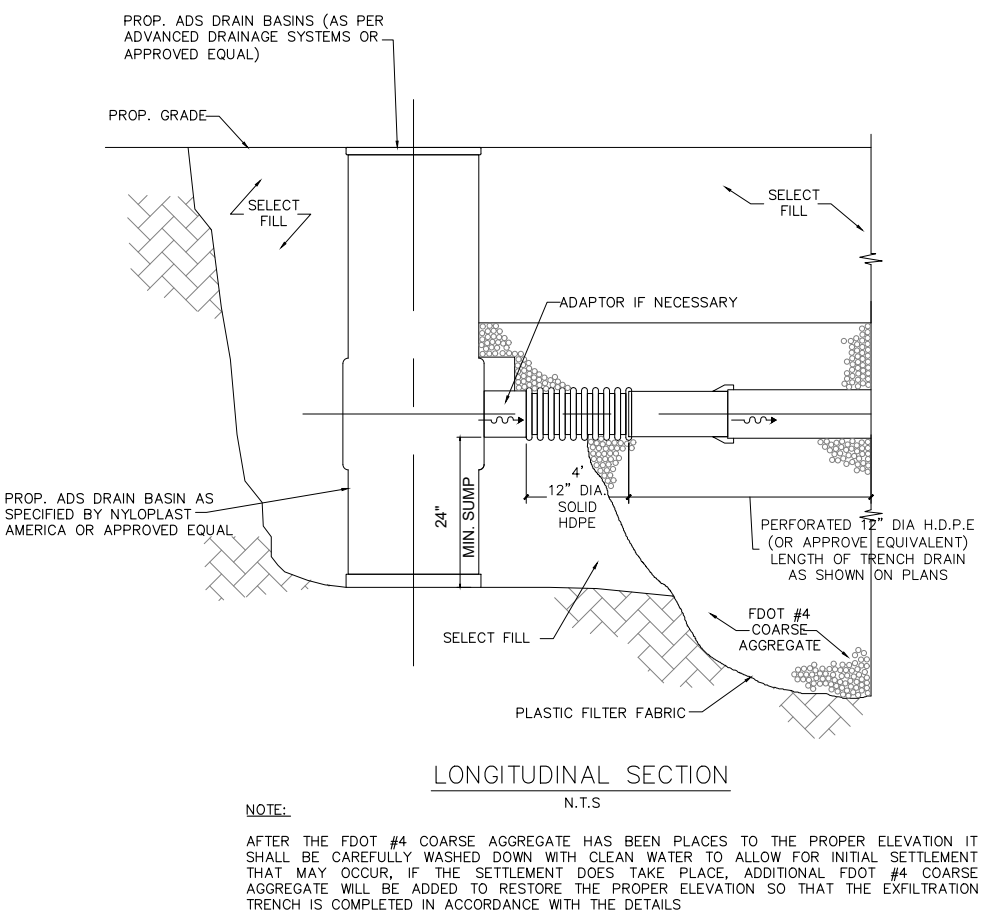
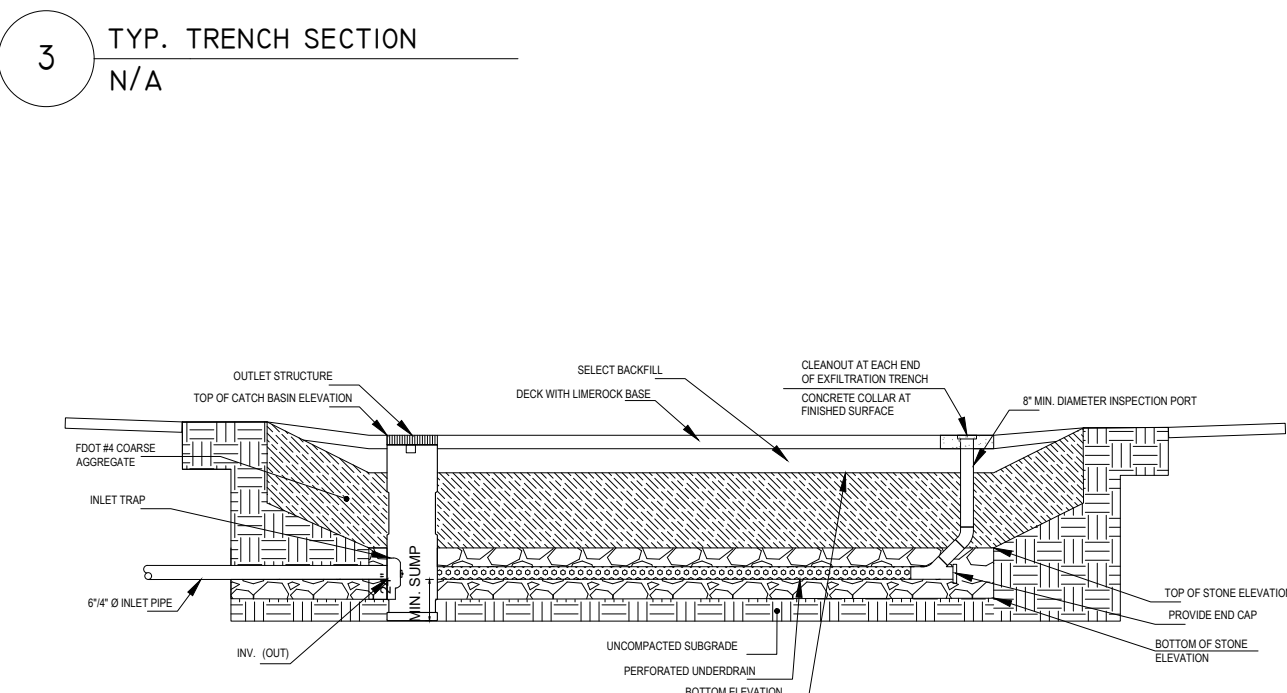
EXFILTRATION NOTES:

1. PLASTIC FILTER FABRIC (AT EACH SIDE, TOP & BOTT.) SHALL BE USED IN SANDY AREAS AS NOTED ON PLANS AND/OR DIRECTED BY THE ENGINEER.



NOTES:

1. PLASTIC FILTER FABRIC (AT EACH SIDE, TOP & BOTTOM) SHALL BE USED IN THE TRENCH.
2. THE BOTTOM OF THE EXFILTRATION TRENCH SHALL BE A MIN 7.00' BELOW EXISTING GROUND ELEVATION.
3. AFTER THE FOOT #4 COARSE AGGREGATE HAS BEEN PLACED TO THE PROPER ELEVATION, IT SHALL BE CAREFULLY WASHED DOWN WITH CLEAN WATER IN ORDER TO ALLOW FOR INITIAL SETTLEMENT THAT MAY OCCUR. IF IT DOES TAKE PLACE, ADDITIONAL FOOT #4 COARSE AGGREGATE WILL BE ADDED TO RESTORE THE FOOT #4 COARSE AGGREGATE TO THE PROPER ELEVATION, SO THAT THE EXFILTRATION TRENCH WILL BE COMPLETED IN ACCORDANCE WITH THE DETAILS.
4. AVERAGE OCTOBER GROUND WATER ELEV = +2.0' NVD.
5. FILTER FABRIC SHALL BE FILTER X, POLY FILTER X, FILTERWEAVE 70, EXXON GTF-400E, MIRAFI 700X, BELTON AEF 650W, OR ARMOCO 1199.
6. DESIGN VALUES:
 - 6.1. H2= 5.00'
 - 6.2. D_U= 4.00'
 - 6.3. D_S= 2.00'
 - 6.4. K= 1.54E-04



NOTE: N.T.S

AFTER THE FDOT #4 COARSE AGGREGATE HAS BEEN PLACED TO THE PROPER ELEVATION IT SHALL BE CAREFULLY WASHED DOWN WITH CLEAN WATER TO ALLOW FOR INITIAL SETTLEMENT THAT MAY OCCUR. IF THE SETTLEMENT DOES TAKE PLACE, ADDITIONAL FDOT #4 COARSE AGGREGATE WILL BE ADDED TO RESTORE THE PROPER ELEVATION SO THAT THE EXFILTRATION TRENCH IS COMPLETED IN ACCORDANCE WITH THE DETAILS



PROPOSED LAND USED : 7801 ATLANTIC WAY, MIAMI BEACH, FL 33141**IMPERVIOUS AREA**

Building 2056.0 sf
Paver/Conc./Asphalt 3453.0 sf
Pool & Pond 1274.0 sf

Total Impervious Area: 6783.0 sf

TOTAL AREA : 15995.0 sf

PERVIOUS AREA

Green Areas: 9212.0 sf
Permeable Decks: 0.0 sf

Total pervious Area: 9212.0 sf

P = 8.75 in

STORAGE REQUIRED

Total Area = 15995.0 sf

Rainfall Amount P = 8.75 in

a) Total Storage To Contain

SFWMD 10-yr/24-hr

(P in X 1Ft/12inxTotal Area) = (11663.02 CF)

The Volume that you need to contain in your property (V) is equal to Total Site Area per the Accumulated Direct Runoff in Feet: $V=A \times Q/12$

Accumulated Direct Runoff (Q) = $(P-0.2S)^2/(P+0.8S)$

$S= (\text{Total Pervious Area}/\text{Total Site Area}) \times (\text{Compacted Water Storage})$

Total pervious Area : 9212.0 sf

Total Site Area : 15995.0 sf

Average Water Elev. 2.07 ft NGVD

Average finished site grade (pervious areas) : 7 ft NGVD

Depth to Water table : 4.9 ft

Compacted Water Storage : 8.18 in (interpolation)

S : 4.71 in

Accumulated Direct Runoff (Q) : 4.87 in

Depth to Water	Compacted Water Storage [Inches]
1 FT	0.45 Inches
2 FT	1.88 Inches
3 FT	4.95 inches
4 FT	8.18 inches

Ref. SFWMD Soil Storage Table

Volume Of Runoff (V)

Note: The Volume of Runoff generated during a 10 year 24 hours storm (V) must be contained within the Property Boundaries. $V=AQ/12$

Volume of Runoff (V) : 6490.7 cf Soil Storage = 11663.02 - 6490.7 = (5172.31 CF)

Swale	Top Area (sf)	Bottom Area (sf)	Average Area (sf)	Height (ft)	Volume (cf)
1	629	228.02	428.51	0.5	214.26
2	39.96	15.17	27.565	0.25	6.89
3	136.31	42.99	89.65	0.5	44.83
4	93.74	30.61	62.175	0.25	15.54
5					
Total Swale Areas:					281.52

Volume of Runoff treated By Swale Areas : 281.5 cf

Volume of Runoff treated By Exfiltration Trench : 6209.2 cf

TRENCH CALCULATION FOR THE STANDARD SFWMD TRENCH

EXFILTRATION TRENCH CALCULATION

PROPOSED CONDITION

H₂ = 5.0 ft

Water Table Elevation : 2.07 ft NGVD

D_u = 4.0 ft

Average Finish Site Grade : 7.07 ft NGVD

D_s = 2.0 ft

(From Pervious Areas)

W = 5.5 ft

Ex. Trench on Pervious Area 100.0%

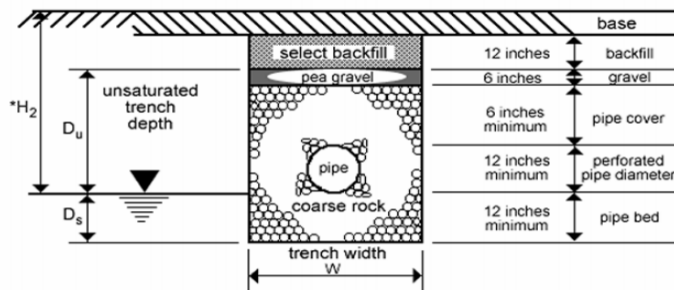
K (Soil) = 1.54E-04

Ex. Trench on Impervious Area 0.0%

Depth Of Trench = 7.0 ft

SFWMD - TYPICAL EXFILTRATION TRENCH SECTION

TYPICAL EXFILTRATION TRENCH



L = Length of Trench Required (feet)

V = Volume Treated (acre – inches)

W = Trench Width (feet)

K = Hydraulic Conductivity (cfs/ft.² – ft. head)

***H₂ = Depth to Water Table (feet)**

D_u = Non-Saturated Trench Depth (feet)

D_s = Saturated Trench Depth (feet)

$$L = \frac{V}{K (H_2 W + 2 H_2 D_u - D_u^2 + 2 H_2 D_s) + (1.39 \times 10^{-4}) W D_u}$$

* The value of H₂ to be used in the equation is the effective head on the saturated surface. A weir must be installed at the downstream end of the trench, to create true retention and to establish H₂. To achieve the design retention and exfiltration, the crest of the weir must be no lower than the top of the trench pipe.

SFWMD-LENGTH OF TRENCH REQUIRED

Exf. when D_s > D_u 0.00983 Using $[K * (2 * H_2 * D_u - D_u^2 + 2 * H_2 * D_s) + (1.39 \times 10^{-4}) * W * D_u]$

Exf. when D_s ≤ D_u 0.01407 Using $[K * (H_2 * W + 2 * H_2 * D_u - D_u^2 + 2 * H_2 * D_s) + (1.39 \times 10^{-4}) * W * D_u]$

Used Exf For Design = 0.01407

Required Retention Volume in (CF) : 6209.20 Amount of water (V) contained on the Trench

Required Retention Volume (ac-in) : 1.711

Required L.F. of French Drain = 121.6 ft from equation L=V/Exf.

Use Length = 130.0 ft [OK] 1.07 Safety Factor