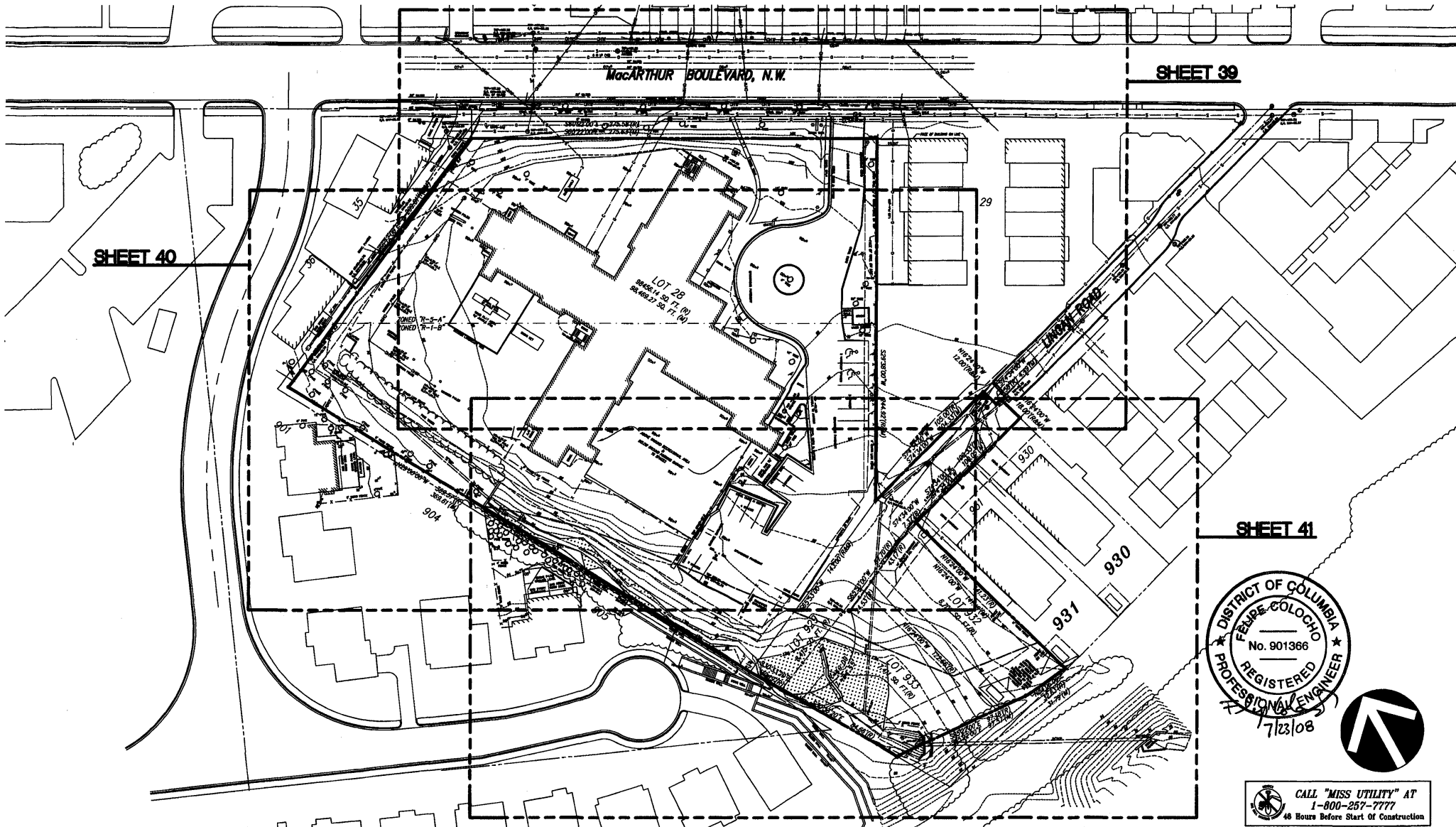
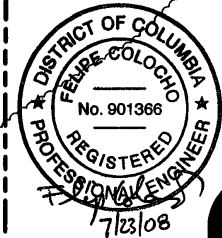




SHEET 39

SHEET 40

SHEET 41



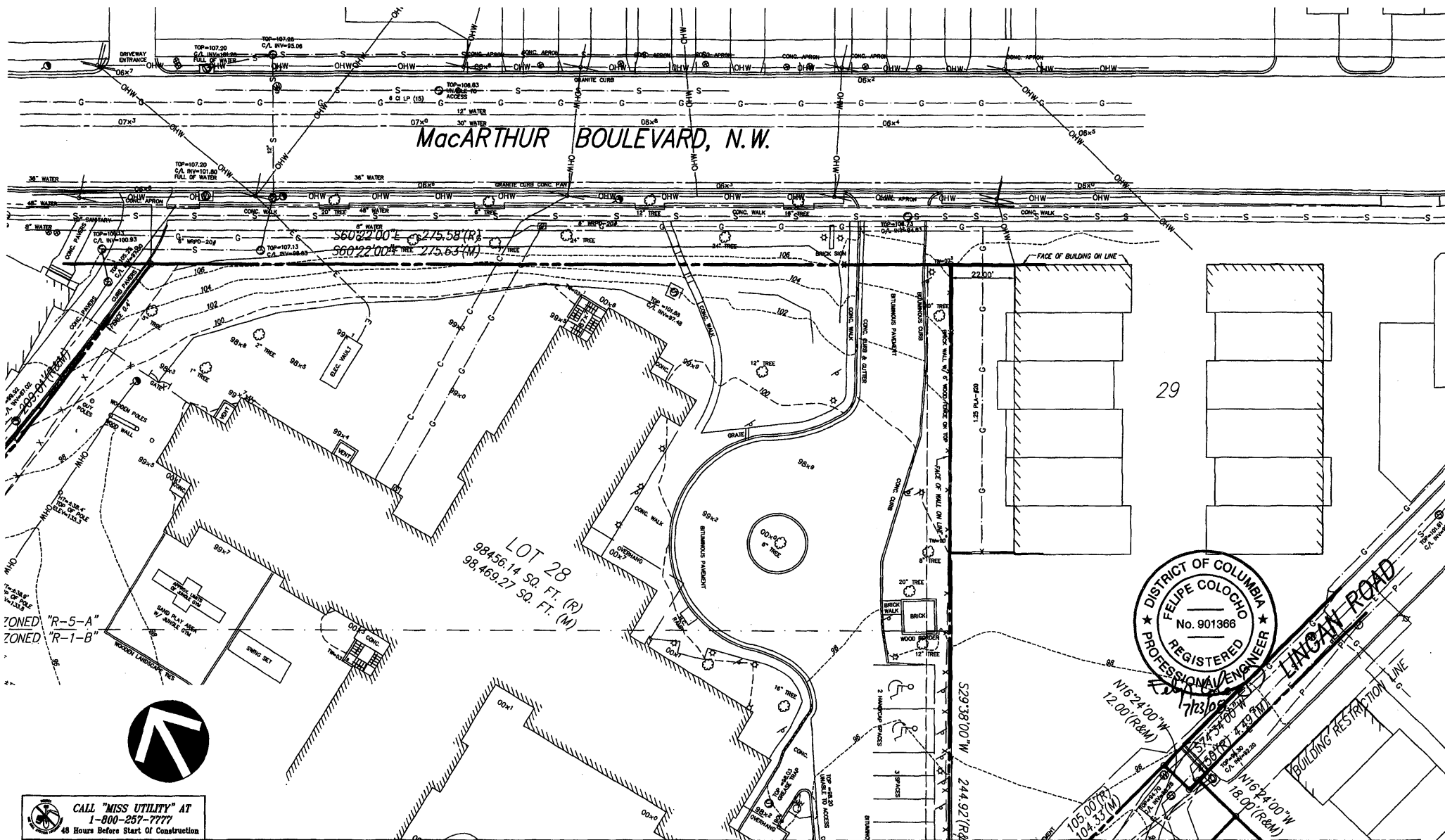
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OVERALL EXISTING CONDITIONS PLAN

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1"=60'



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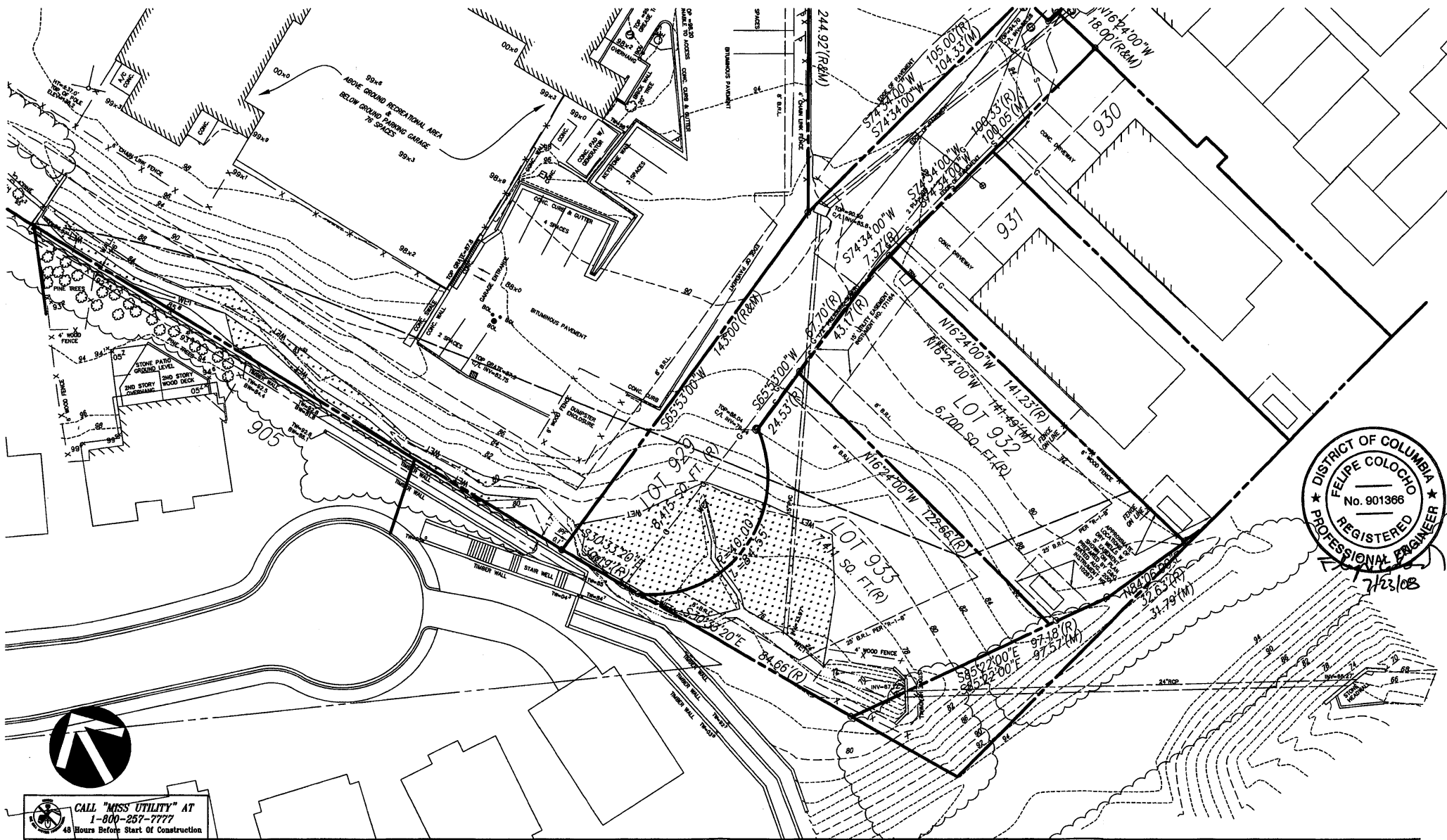
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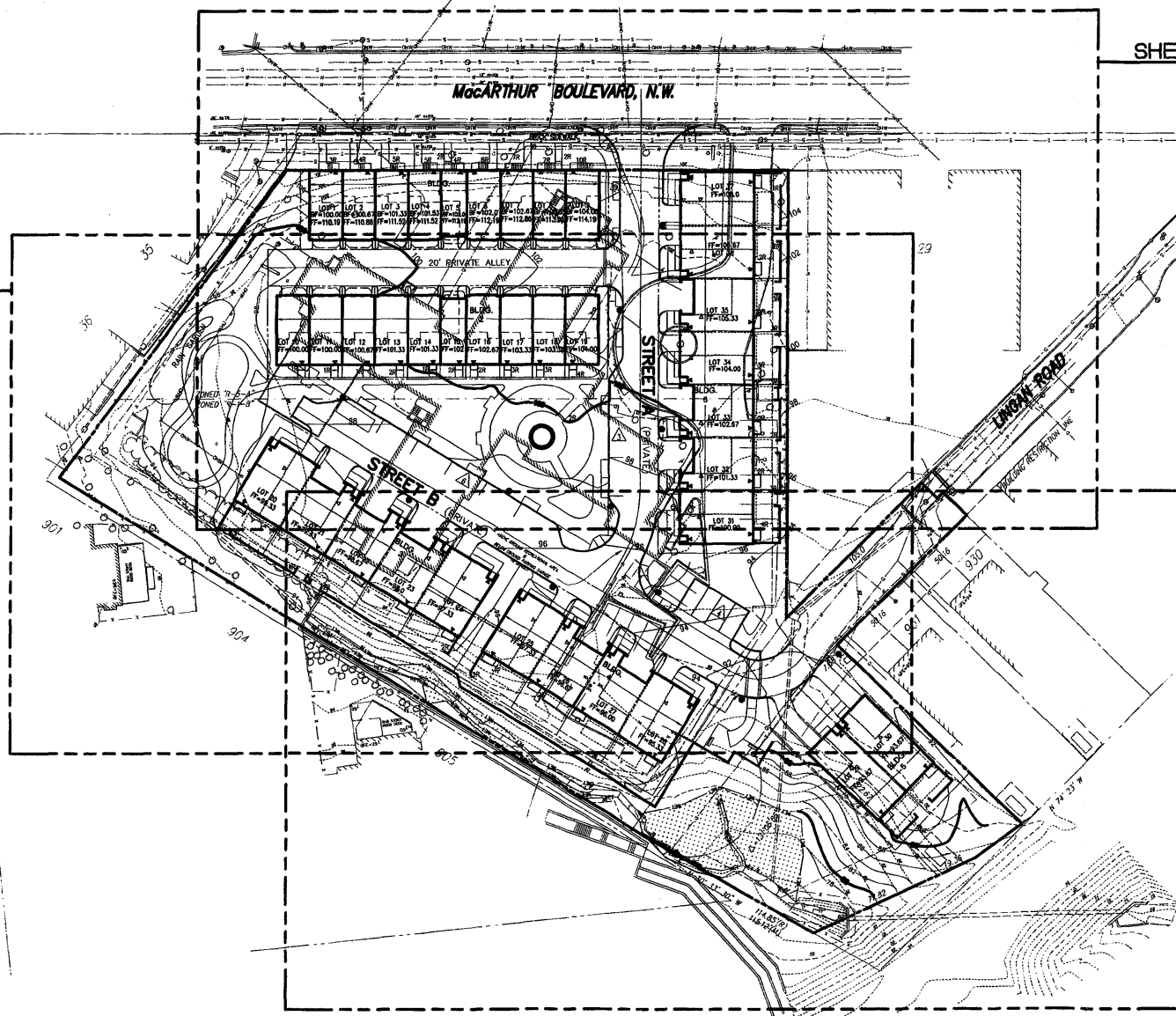
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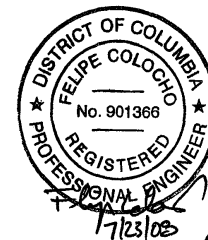
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SHEET 42

SHEET 43



SHEET 44



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OVERALL SITE & GRADING PLAN

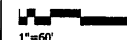
PUD Prehearing Submission July 23, 2008

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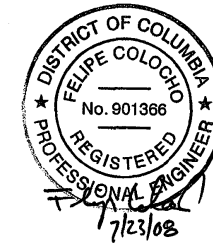
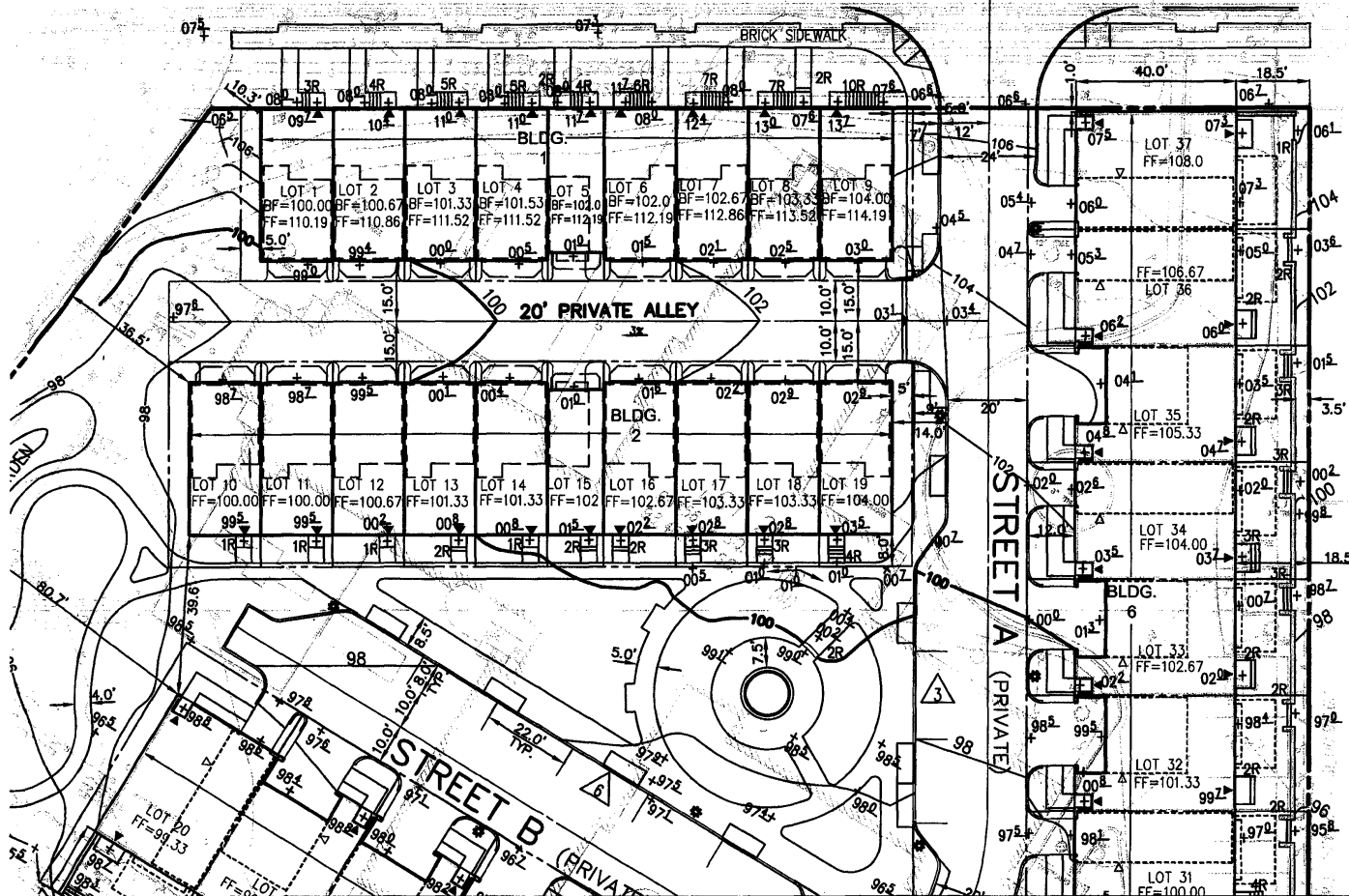
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42

MacARTHUR BOULEVARD, N.W.



LINGAN ROAD



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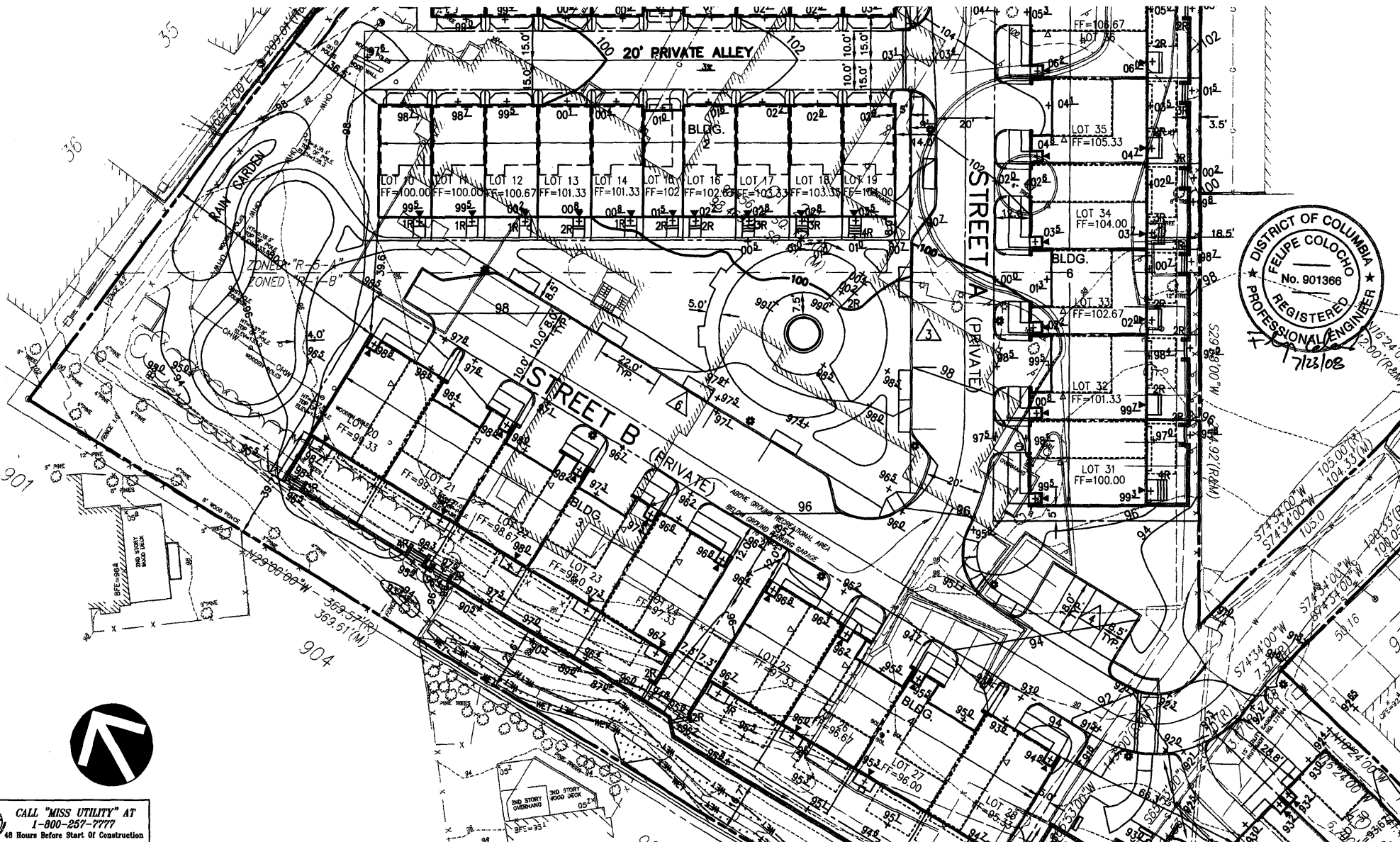
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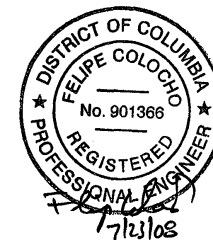
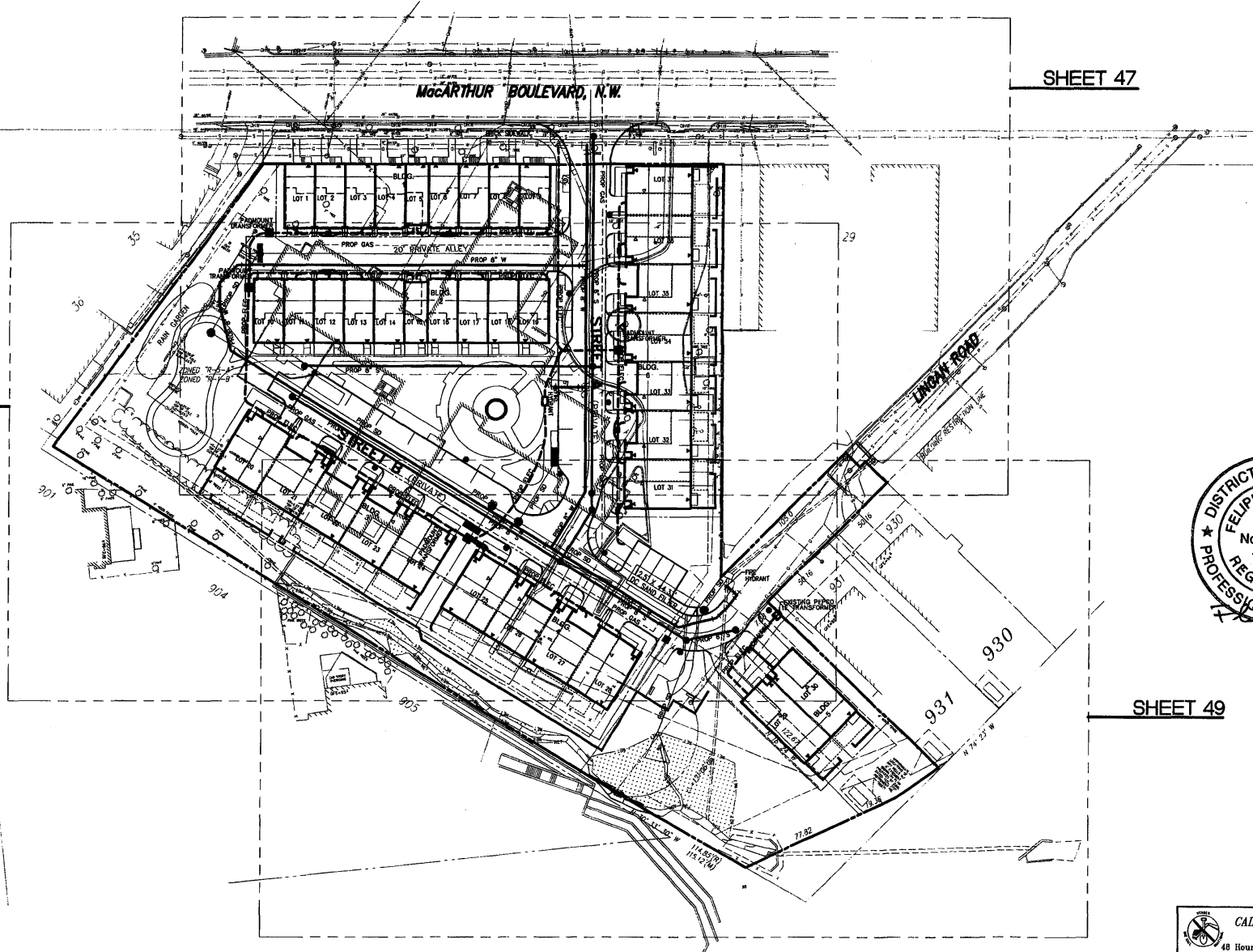
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1"=30'

McARTHUR BOULEVARD, N.W.

SHEET 47

SHEET 48



SHEET 49



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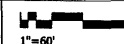
OVERALL UTILITIES PLAN

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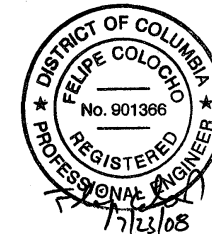
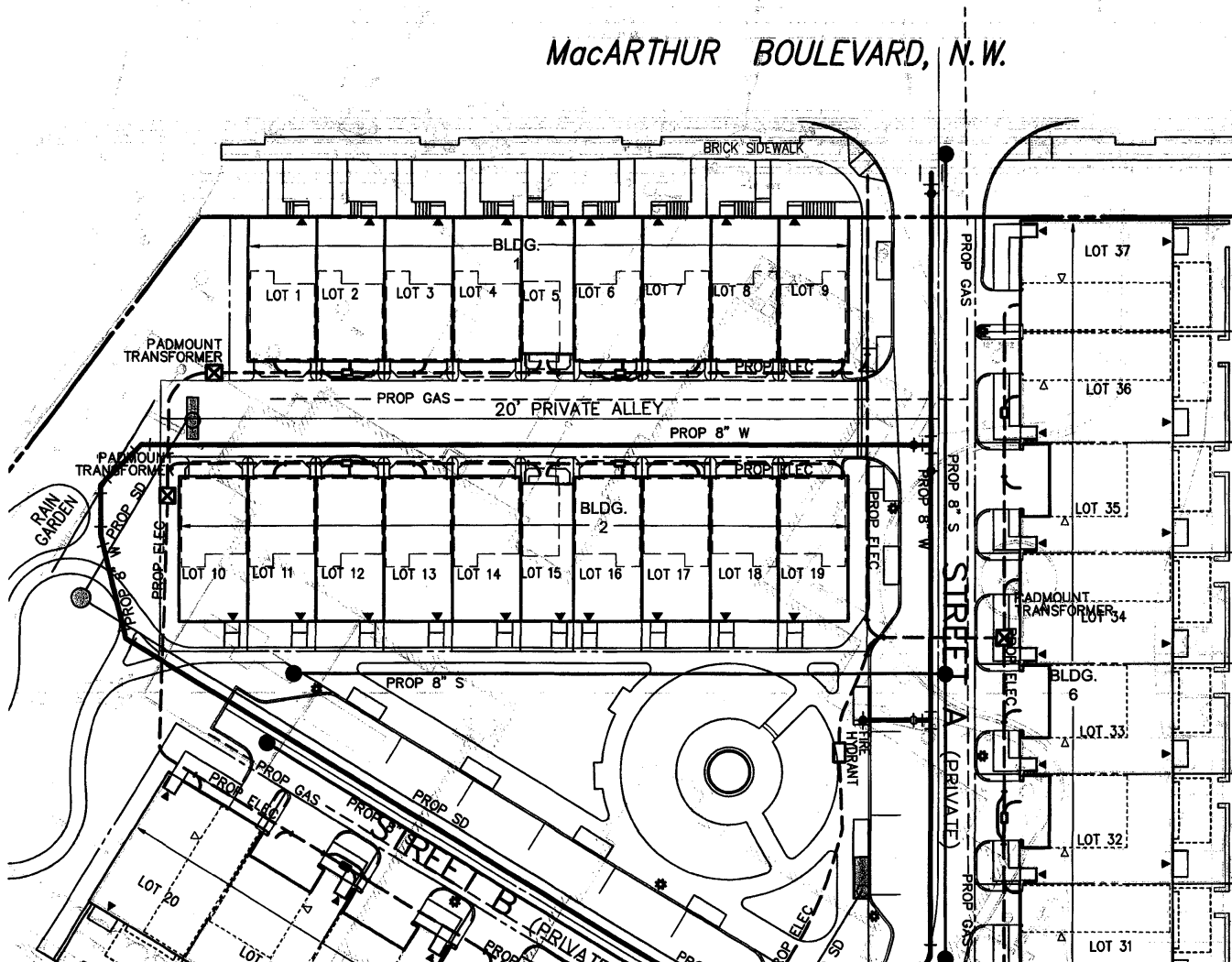
46

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F.E.M.S ACCESS ONLY

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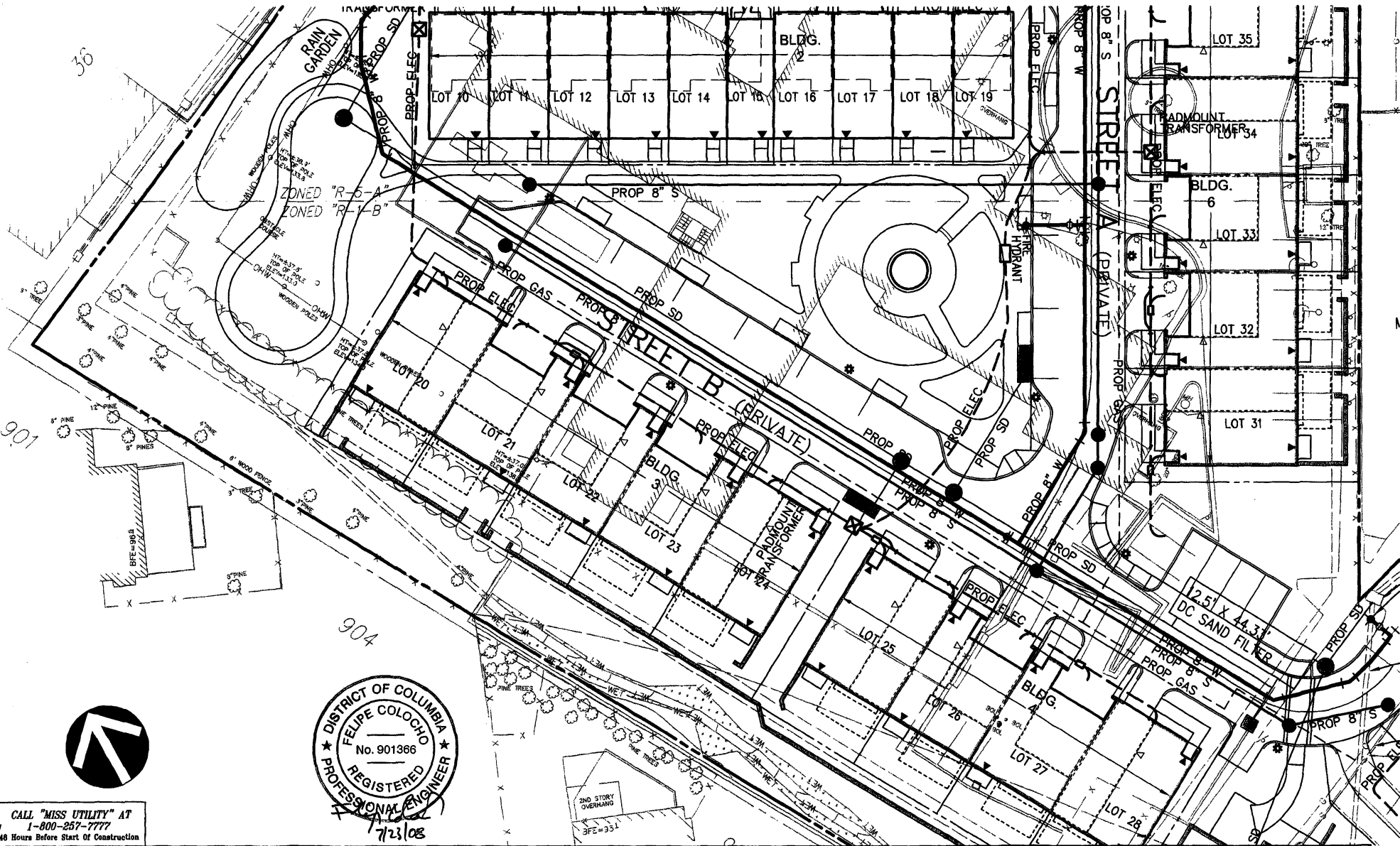
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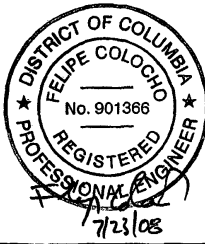
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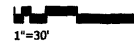


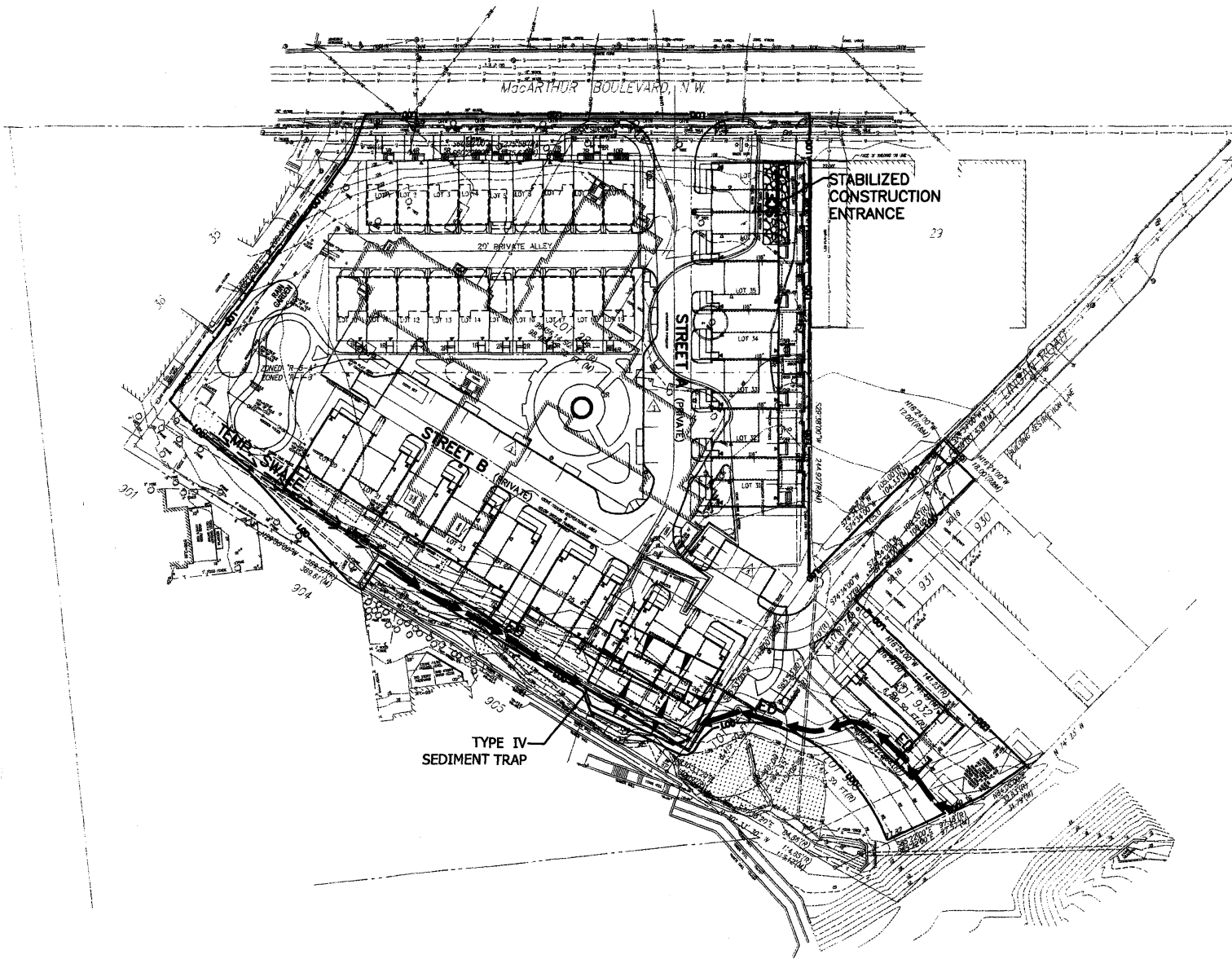
UTILITIES PLAN ENLARGEMENT

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LEGEND

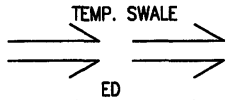
STABILIZED CONSTRUCTION ENTRANCE WITH MOUNTABLE BERM AND WASH RACKS



LIMITS OF DISTURBANCE



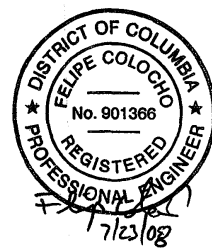
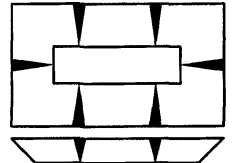
TEMPORARY SWALE



EARTH DIKE



SEDIMENT TRAP



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CONCEPT SEDIMENT & EROSION CONTROL PLAN

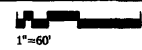
PUD Prehearing Submission July 23, 2008

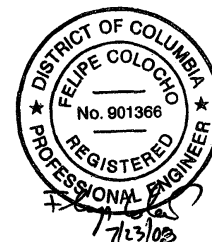
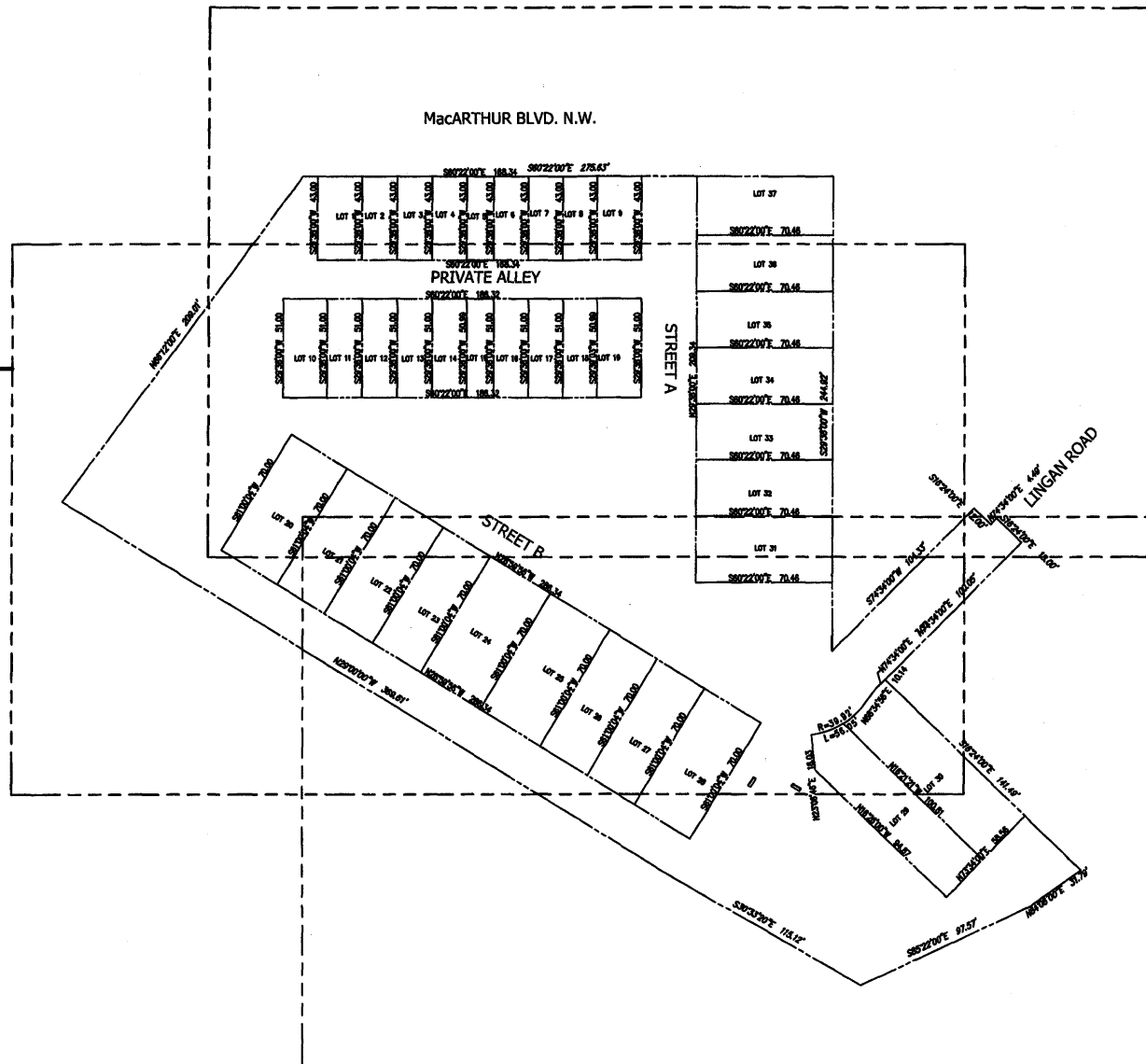
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PROPOSED RAIN
GARDEN

MCCARTHER BOULEVARD, N.W.

PROPOSED GREEN
ALLEY WITH PERVIOUS
PAVEMENT

PROPOSED PERVIOUS
PAVEMENT

PROPOSED D.C.
SAND FILTER

EXISTING WETLANDS
AND WATERS OF THE
U.S. TO REMAIN



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CONCEPT SWM PLAN

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LAYOUT: PROP-SWM PLAN-(56). Plotted By: grom
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Depth of First Flush:

Roofs and Sidewalks 0.30 Inches
Parking Lots and Roadways 0.50 Inches

Rain Intensity*

2-Year 5.28 In/Hr
15-Year 7.56 In/Hr

C Factor

Impervious 0.90
Pervious 0.35

Enter Site Details (Post Developed Values)

Impervious Area (Acres): 0.65 *Roofs and Sidewalks
0.60 *Parking Lots and Roadways

Pervious Area (Acres): 0.51

Total Site Area (Acres): 1.76

CSO Area (yes or no) yes

Determine Site Impervious Factor:

C= 0.74

Determine Flow Rates for Q2(pre) and Q15(post)

Q2(pre)= 3.25248 CFS
Q15(post)= 11.97504 CFS

Determine Quantity and Quality Control Volumes

Vquality= 1796.85 CF
Vquantity= 3270.96 CF

Correction Factor 1.25
Time of Concentration (Tc) 5 min
or 300 sec

Determine Flow Rate for First Flush (Qff)

Qff= 0.4455 CFS

Determine Number of Cartridges Required (N)

N= 13.5 Use 14 Cartridges

Determine Rate of Release (Qr) for the system at 50% Clogged

Qr= 0.231 CFS

Determine Time of Discharge (Td)

Td= 3.933333 Hr

SWM COMPUTATIONS

DESIGN OF SAND FILTER
WATER QUALITY STRUCTURE
PROJECT: Riverside

DATE: 3/30/2007
PRINTED: 10/9/2007

STORM FREQUENCY = 15 years
STORM DURATION = 24 hours
TIME OF CONCENTRATION : Tc = 5 min.
RAINFALL INTENSITY: i = 7.56 in/hr

1. FINAL SURFACE ELEVATION, INVERT IN, & INVERT OUT

INV. IN 84.55
INV. OUT 79.35
HEAD DIFFERENCE 5.20
INFLOW PIPE DIAMETER 1.5 ft.
COVER OVER CROWN OF PIPE 3.95 ft.
FINAL SURFACE ELEVATION 90.00

DEPTH OF FILTER LAYER 3 ft.
AREA TO SAND FILTER, 'A' 1.76 acres
GREEN AREA ON SITE, C = 0.35 0.61 acres
IMPERVIOUS AREA ON SITE, C = 0.90 1.25 acres
RUNOFF COEFFICIENT, 'C' 0.7406

FIRST FLUSH RUNOFF 0.5 inches
(0.3 ROOF & SIDEWALK, 0.5 DRIVEWAYS)

2. PEAK DISCHARGE: Q(PKAK, 15 yr.) Q(PKAK, 15 yr.) = CIA 9.85 cfs

3. VOLUME OF STORAGE NEEDED: Vv

Vv = Q1 x Aisp - F x T x A2
F = 1.18 ft/hr; T = 1 hr.
A2 = 50 + (1a - 0.1) x 167

A2 = 242.05 USE 350 sq. ft.

A1 = A2 / 3 = 116.67 USE 150 sq. ft.

Therefore

Vv = (0.5 in.)(1 ft./12 in.)(Aisp) - [(1.18 ft/hr) x (1 hr) x (A2)]
Vv = 1855.8 **USE 2127.26 cu. ft.

**Adjust Vv per formula for combined Q1 & Qn vault.

3a. Quantity Control:

Site Area= 1.76 acres
Tc= 5 minutes
Q15 Post= 9.85 cfs
Q2 Pre= 4.18 cfs
Vreq'd = 2127.26 cf

4. VOLUME OF FILTER LAYER: V2b

V2b = A2 x d x Vv
Vv = void ratio for sand + gravel + perforated pipe

Vv = 0.6
d = 3
V2b = 630 USE 630 cu. ft.

V media = 1050 cu. Ft.

5. BOTTOM VOLUME OF FIRST CHAMBER: V1b

V1b = A1 x d

V1b = 450 USE 450 cu. ft.

6. TOP VOLUME OF FIRST AND SECOND CHAMBER: (V1t + V2t)

(V1t + V2t) = Vv - (V2b + V1b)
(V1t + V2t) = 1047.3 cu. ft.

7. HEIGHT DIFFERENCE AVAILABLE BETWEEN TOP OF FILTER LAYER AND BOTTOM OF SECOND CHAMBER WEIR: H

V1t + V2t = A1 x H + A2 x H
Therefore
H = (V1t + V2t) / (A1 + A2) = 2.09 ft.

8. WEIR HEIGHT ABOVE INVERT OUT: D
D = H + d
D = 5.09 ft. (5.2 ft (Good))
USE 5.09 ft. for
conservative
storage volume

8.5. DESIGN INVERT OUT: INV. IN - D
DESIGN INVERT OUT = 79.35
DESIGN INVERT OUT = 79.35 (from 1)

WEIR INV. = INV. OUT + d + H = 84.44 ft. USE 83.5

9. SIZE OF OVERFLOW WEIR OPENING IN SECOND CHAMBER:

L = 2 ft. (Assume) N=7
Q = CL(H^{1.5})
L = 2
C = 3.33
Q = 9.05 H = 1.30 ft.
USE 1.5 ft.

10. SUBMERGED WEIR IN FIRST CHAMBER

L = 7
Assume h = 1 ft.
Q = C x A x (Square Root of (2 x g x H))
Q = 9.85 cfs
C = 0.6
h = 1 ft.
g = 32.2 ft./sec/sec.
H = Hydraulic Head((inv. in - inv. out) - h/2)
H = 1.7 ft.

Solve for A, based on the above equation
A = 0.94 sq. ft.
L = A/h = 0.94 USE 1 ft.
for clogging safety

11. STRUCTURE DIMENSIONS: (INTERNAL ONLY)

A2 = L2 x W2
AVG. W2 = 12.5 ft.
AVG. W2 = 12.5 ft.
Therefore L2 = A2 / W2 = 28.00 USE 28 ft.
L2 = A2 / W2 = 12.00 USE 12 ft.
(Min L2 = 5.67')

L2 = 3 ft.
(Min L2 = 3.0')

L2 = L1 + L2 + L3 = 43.00 ft.
Total L2 (ALONG EAST WALL) = 43.32 ft.
(Assume 8" walls between L2s/L3s)

11.5. TO PREVENT 'SHORT CIRCUITING' IN THE FILTER CHAMBER

L1 + L2 + L3 = 3 x W
40.00 = 37.5

TOTAL INNER HEIGHT

D = D + Inflow Pipe Diameter + Freeboard
D = 5.2 ft.
Inflow Pipe Dia. (assumed) = 1.5 ft.
Freeboard = 1 ft.
D = 7.7 ft.

12. FLOW AND DETENTION TIME AFTER STORAGE VOLUME FILLS UP

Q = K x A1 x L
K = K x A1 x (H^{0.5} / 1) / S
S = Sand Layer = 2 ft.
L = Vv / Q

H^{0.5} = (d + H) - [(spec. pipe dia.)/2] = 4.84 ft.
avg. head = H^{0.5} / 2

Therefore
Q = 254.32 cu. ft./hr.
Q = 0.0706 cu. ft./s

DETENTION TIME = tv = Vv / Q = 8.36 hr. = 72 hr. Good

13. INFLOW AND OUTFLOW HYDROGRAPHS

A. INFLOW : Q = CIA

t(min)	I(in/hr)	Q(cfs)
0	0	0.00
5	7.56	9.85
10	6.3	8.21
15	5.44	7.08
20	4.82	6.28
30	3.95	5.15
45	3.16	4.13
60	2.64	3.47

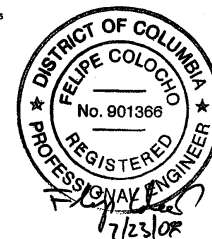
B. TIME AT WHICH OUTFLOW HYDROGRAPH BEGINS

Ts = Qpeak / 2 x Vv
Qpeak = 9.85 cfs at 5 min.
Vv = 2127.3 cu. ft.

Therefore Ts = Qpeak / 2 x Vv
2956.34 cfs = 4254.535 cfs

T = 2xTs - [(2xTs x Tc) - (2xVv x Tc / Qpeak)]^{0.5} = 375.32 sec. 6.26 min.

T = 6.26 min.
for Q = 0.07065 cfs



SWM COMPUTATIONS

SWM COMPUTATIONS

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CONCEPT SITE TABULATIONS

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NTS

57

LAYOUT: SITE/TABULATIONS(57), Plotted By: User
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