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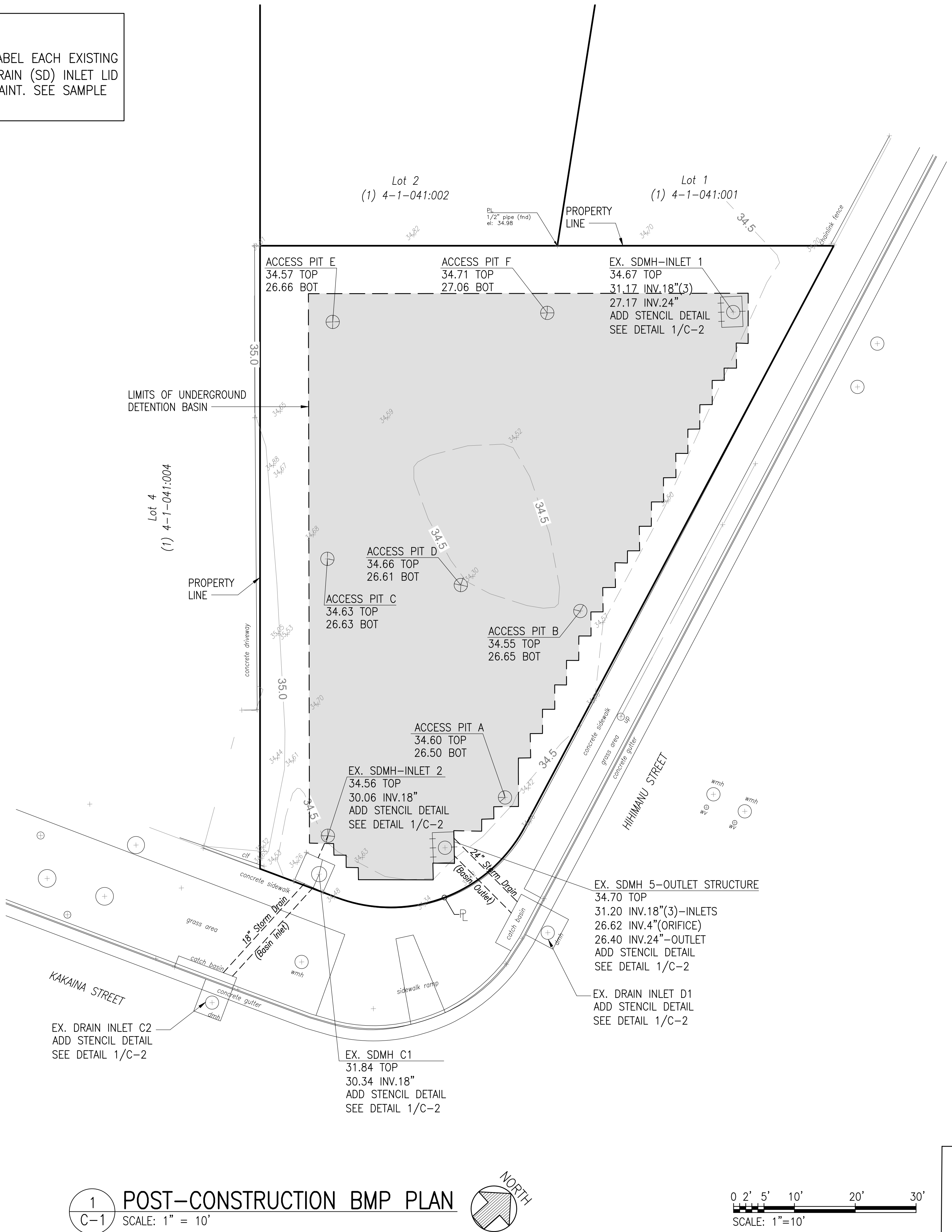
OWNER: DEPARTMENT OF DEPARTMENT OF HAWAIIAN HOME LANDS
ADDRESS: 91-5420 KAPOLEI PARKWAY, KAPOLEI, HAWAII 96707

EXISTING DETENTION BASIN - DHHL OWNED AND MAINTAINED
CUDO WATER STORAGE SYSTEM
BASIN AREA = 4,668 SF
BASIN HEIGHT = 6 FT
CAPACITY = 26,440 CF

BASIN STORAGE VOLUME FOR A 10 YR - 1 HR STORM:
SV(provided) = 18,430 CF > SV(Required)
DISCHARGE AT PROVIDED STORAGE VOLUME:
Q(@ 4" orifice) = 0.88 CFS < q(o), PEAK OUTFLOW RATE

NOTE:

THE CONTRACTOR SHALL LABEL EACH EXISTING ACCESS PIT AND STORM DRAIN (SD) INLET LID USING A TRAFFIC-GRADE PAINT. SEE SAMPLE SHOWN ON DETAIL 2/C-2.



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C-1

POST-CONSTRUCTION BMP PLAN

SCALE: 1" = 10'

LEGEND:

— 35.0 — EXISTING CONTOURS

34.59 EXISTING SPOT ELEVATION

0 2' 5' 10' 20' 30'

SCALE: 1"=10'

HAWAII ENGINEERING GROUP, Inc.
Civil & Structural Engineers

Licensed Professional Engineer
14472-C
Hawaii, U.S.A.
Exp. Date: 4-30-20

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PROJECT

DHHL - KAKAIA DETENTION BASIN
POST-CONSTRUCTION BMP PLANS

WAIMANALO, HAWAII 96795

T.M.K. : 4-1-041:003

SHEET TITLE

POST-CONSTRUCTION BMP PLAN

ISSUANCE/REVISIONS

Date	04/21/2020
Scale	AS NOTED
Drawn By	GS
Design By	GS
Checked By	GS
Job	19-122

Sheet

C-1

1 Of 2 Sheets

DRAINAGE CALCULATIONS:

RUNOFF COEFFICIENT

PRE–DEVELOPMENT

SITE AREA = 8.34 acres – Undeveloped

Runoff Coefficient, C(pre) = 0.20

POST DEVELOPMENT

SITE AREA = 8.34 acres

Runoff Coefficient, C(post) = 0.05 + 0.009 * I where I=percent of impervious cover
C(post) = 0.05 + 0.009(50) = 0.50

PEAK INFLOW, q(i) and PEAK OUTFLOW, q(o) – 10 yr Recurrence Interval

1. Compute the peak inflow rate in cfs under post–developed conditions.

$q(i) = C(post) * i * A$ (Allowable detention basin inflow release rate)

Area, "A" = 8.34 acres
Runoff Coefficient, "C" = 0.50
Peak Rainfall Intensity (10 yr – 1 hr storm), "i" = 2.81 in/hr

$q(i) = 0.50 * 2.81 * 8.34 = 11.72$ cfs

For a 50 yr Recurrence Interval (Check):
 $q(i) = C(post) * i * A$ where A = 8.34 acres, C = 0.50, and i = 3.86 in/hr
 $q(i) = 0.50 * 3.86 * 8.34 = 16.10$ cfs

2. Compute the peak outflow rate in cfs under pre–developed conditions.

$q(o) = C(pre) * i * A$ (Allowable detention basin outflow release rate)

Area, "A" = 8.34 acres
Runoff Coefficient, "C" = 0.20
Peak Rainfall Intensity (10 yr – 1 hr storm), "i" = 2.81 in/hr

$q(o) = 0.20 * 2.81 * 8.34 = 4.69$ cfs

Undetained Flow at Orifice Pipe, q(u)
 $q(u) = C(d) * A [2*g*H]^{1/2}$

Coefficient of Discharge, C(d) = 0.60
Area of Opening (Cross–Sectional Area of 4"dia), $A = \pi*r^2$
Head, H = 31.20 – (26.62 Inv.4" + 2") = 4.41'

$q(u) = 0.60 * [\pi*(2"/12)^2] * (2*32.2*4.41)^{1/2} = 0.88$ cfs < q(o)

Undetained Flow at Outlet Pipe, Q(u)
 $Q(u) = C(d) * A [2*g*H]^{1/2}$

Coefficient of Discharge, C(d) = 0.60
Area of Opening (Cross–Sectional Area of 24"dia), $A = \pi*r^2$
Head, H = (31.20 Inv.18" + 9") – (26.40 Inv.24" + 1') = 4.55'

$Q(u) = 0.60 * [\pi*(1.00)^2] * (2*32.2*4.55)^{1/2} = 32.27$ cfs > q(i)=16.10 cfs (50 yr Recurrence Interval)

DETENTION BASIN STORAGE VOLUME

$SV(Required) = 3630 * PA [1 - q(o)/q(i)]$

Design Storm Runoff Depth, P = 1 inch
Area, A = 8.34 acres

$SV(Required) = 3630 * 1(8.34)[1 - 4.69/11.72] = 18,164$ CF
 $SV(Provided) = 18,430$ CF > 18,164 CF

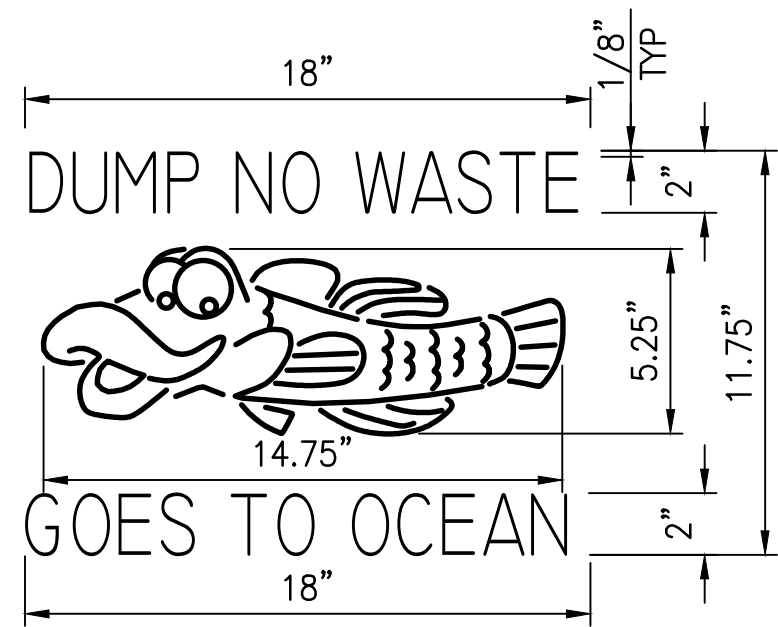
PERMANENT POST CONSTRUCTION BMP'S:

THE KAKAINA SUBDIVISION WILL INCORPORATE THE FOLLOWING SOURCE CONTROL BMP'S:

- LANDSCAPED AREAS
- OUTDOOR TRASH STORAGE
- STORM DRAIN INLETS WITH STENCILS – "NO DUMPING – FLOWS TO OCEAN" SIGNS AT TWO (2) EXISTING DRAIN INLETS (INLET AND OUTLET) AT THE EXISTING DETENTION BASIN
- USE OF ONLY ENVIRONMENTALLY–SAFE FERTILIZERS AND HERBICIDES/PESTICIDES

THE KAKAINA SUBDIVISION WILL INCORPORATE THE FOLLOWING TREATMENT CONTROL BMP'S:

- DETENTION BASIN



SPECIFICATIONS:

MATERIAL: ALUMINUM ALLOY (CAST ALUMINUM), LEAD, OR EQUAL

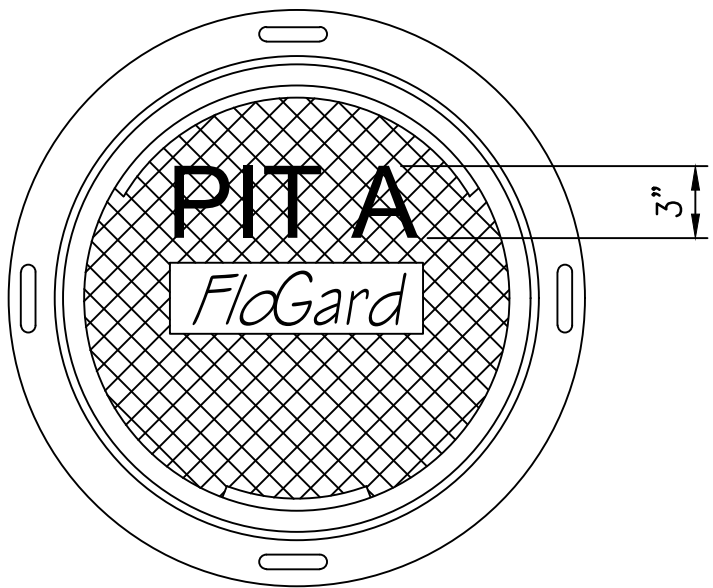
LETTERING: HEIGHT OF LETTERS SHALL BE 2" HIGH AND 1/8" WIDE. THE UNDER SIDE OF ALL LETTERING SHALL BE V-SHAPED.

LINE OF WORK: ALL LINE WORK FOR THE FISH DIAGRAM SHALL BE 1/8" THICK. THE UNDER SIDE OF THE LINE WORK SHALL BE V-SHAPED.

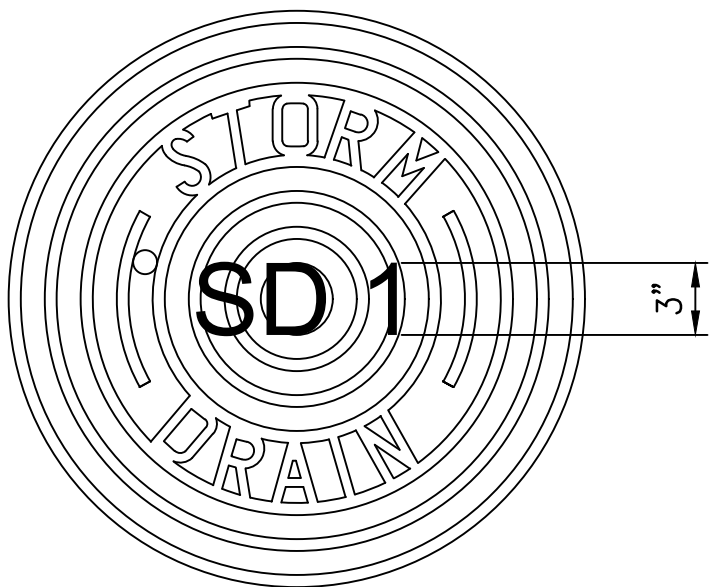
PLACEMENT: THE STENCIL SHOULD BE CENTERED ON THE TOP DECK OF THE CATCH BASIN AND SHALL BE A MINIMUM OF 8" AWAY FROM THE FRONT FACE OF THE INLET.

IMPRESSION: THE STENCIL SHALL BE PRESSED 1/4" INTO THE GREEN CONCRETE WHEN THE INLET IS MADE.

1 STENCIL DETAIL FOR DRAIN INLET
C-2 NOT TO SCALE



FOR ACCESS PIT

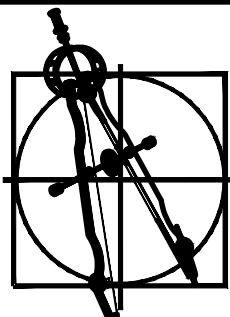


FOR STORM DRAIN

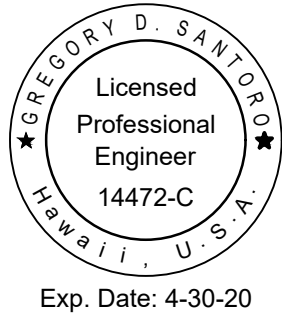
2 TYPICAL PAINT LABEL
C-2 NOT TO SCALE

REFERENCE NOTE:

THE EXISTING KAKAINA SUBDIVISION WAS DEVELOPED UNDER THE HAWAIIAN HOMES COMMISSION ACT. THE MASS GRADING PLANS FOR KAKAINA SUBDIVISION WERE PREPARED BY AKINAKA & ASSOCIATES, LTD., WERE SIGNED AND APPROVED ON OCTOBER 3, 2012.



HAWAII
ENGINEERING
GROUP, Inc.
Civil & Structural Engineers



Gregory D. Santodomingo
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PROJECT
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POST–CONSTRUCTION BMP PLANS

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