Universal Engineering Sciences, Inc.

Universal Engineering Sciences, Inc. Phone (386)756-1105
911 Beville Road Suite 3 Fax (386)760-4067
South Daytona, FL 32119

Suntree Technologies Baffle Box Sediment Test

J. Michael Dunne

Lab Manager

MD/JJ:md

Jeff Jackson, P.E.

P.E. Number 51979

Scope of Field Work:

Observe sediment test of Suntree Technologies' Nutrient Separating Baffle Box. Confirm procedures are followed to insure that an accurate account of material captured is recorded. Further insure that the system is operated at as close to maximum capacity as possible.

Additionally, Universal Engineering Sciences, Rockledge provided an initial gradation curve of a split sample of aggregate in a range of two (2) millimeters (very coarse sand) to zero point one-two-five (0.125) millimeters (very find sand) with an initial weight of three thousand six hundred (3600) lbs. They further provided a final gradation curve of a split sample of aggregate captured in the test.

Record of Field Observations and Tests:

We arrived on site, and observed pumps, pipes, and baffle box to be constructed as indicated on attached print. Checked calibration of balance on site with a balance calibrated on 24 August 2004 Model # FG-60K Serial # H3803448. The weight and volume of aggregate to be used was computed at 3600 lbs and 1.2249 cubic yards. Pumps with a capacity of 4200 Gallons per Minute and 4800 Gallons per minute were used to produce a flow of 9000 Gallons per Minute into a collection box. From this box water passed through a three (3) foot diameter pipe to the baffle box. Sand was introduced into the flow approximately three (3) feet to five (5) feet from the collection box. This was started after the maximum flow had been achieved and stabilized. Flow through the baffle box stabilized with the water approximately nineteen (19) inches from the inside top of chamber one (1) and approximately twenty (20) inches from the inside top of chamber three (3). Sixty (60) buckets of aggregate, consisting of a mix of 2 millimeter to 0.125 millimeter particles of sand, each bucket weighing sixty-three (63) lbs, including a bucket weight of three (3) lbs, were poured into the three (3) foot diameter pipe.

After all sixty (60) buckets were emptied into the system, flow was continued at a reduced rate to flush the aggregate remaining in the three (3) foot pipe into the baffle box. After completion of the test, water was removed from the baffle box, with due care taken to not remove any aggregate. A sample bucket of sand was taken from chamber one (1). Additionally a drive sleeve test was taken, to determine density and moisture content of the aggregate. The result of the Speedy™ moisture test was three point seven (3.7) percent. The sample taken in the five (5) gallon bucket was of equal volume to what was observed in each bucket introduced into the test. The wet weight of the sample was fifty-eight and one-half (58.5) lbs including the bucket, [Tare three (3) lbs.] It was determined that the entire content of the baffle box would have to be reclaimed and dried in order to determine the amount of material captured This process was undertaken by Universal Engineering Sciences and Suntree Technologies. The drying process was completed and a spread sheet (attached) was compiled of all the weights. Sixty-three (63) buckets of material were recovered from the baffle box. The weight after drying was three thousand six hundred and thirty-six (3,636) lbs. Subtracting the weight of the buckets, one hundred and eighty-nine (189) lbs, we are left with an net weight recovered of three thousand four hundred and forty-seven (3,447) lbs. Dividing this by the start weight of three thousand six hundred (3600) lbs, we arrive at a net return of ninety-five point seventy-five (95.75) percent aggregate returned. This exceeds the required return of eighty (80) percent by fifteen point seventy-five (15.75) percent.

It was noted that the baffle box trapped the coarser material in the first chamber, and progressively finer material in each successive chamber. Most material was in the first chamber, to about eighty (80) to ninety (90) percent of its capacity. The second chamber captured approximately twenty (20) to thirty (30) percent of its capacity. The third chamber was less than five (5) percent of its capacity.

Record of Man-hours by Universal Engineering Sciences, Daytona

Task	Man-hours
Observing Test	10.0
Drying Samples	3.75
Compiling Report	4.0

Keith Harris and J. Michael Dunne were the observers. Drying of fifteen (15) Buckets was accomplished by J. Z. Bosquez and J. Michael Dunne. Report was compiled by J. Michael Dunne and completed by Linda Lambert.

Attachments:

Drawing of Suntree Technologies Baffle Box
Gradations
- Initial Gradation Curve
- Final Gradation Curve

Excel Spreadsheet of recovered aggregate
Pictures of setup and test in progress

Pumps and Baffle Box Test Setup

Buckets of Aggregate and Balance

Introduction of Aggregate to System

Continuation of Introduction of Aggregate

Inlet of Baffle Box with flow at 9000 GPM

Outlet of Baffle Box at 9000 GPM

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences •
Construction Materials Testing • Threshold Inspection
820 Brevard Avenue • Rockledge, Florida 32955
(321) 638-0808 Fax (321) 638-0978

ORDER NO.: 4854/5106
PROJECT NO.: 34184-001-01
REPORT NO.: 003GA-0311
DATE: 3/24/05

Report on
GRADATION OF FINE AGGREGATE
Sieve Analysis (ASTM C 136)

CLIENT: Mr. Henry Happel
Suntree Technologies
798 Clearlake Road
Cocoa, FL 32922

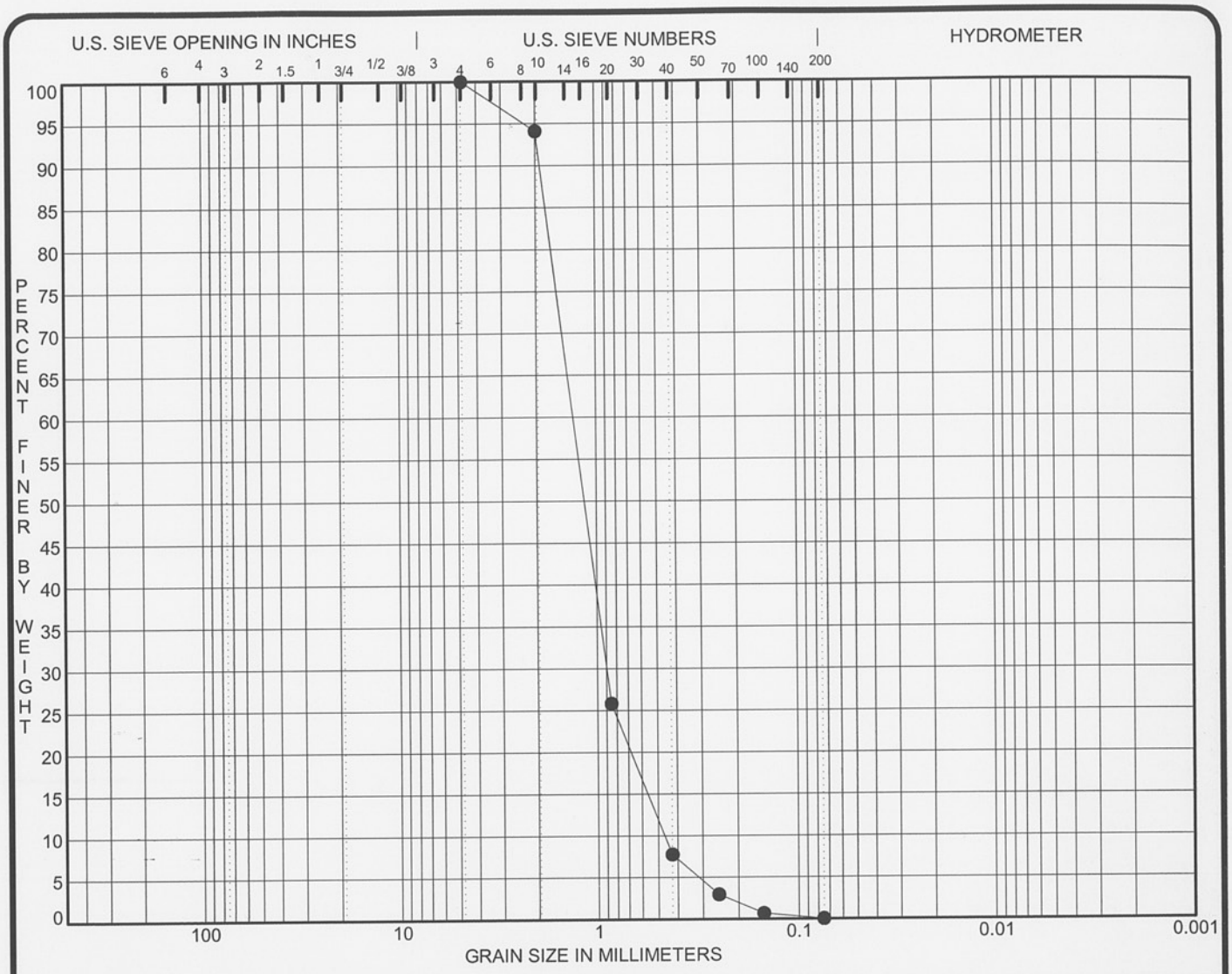
LOCATION SAMPLED: Nutrient Baffle Box Test

MATERIAL DESCRIPTION: Sample 1–input sand-4854, sample 2-output sand-5016

DATE SAMPLED: 2/7/05, 3/11/05 SAMPLED BY: Client

TEST RESULTS			
Sieve Designation	Sieve Opening Size (mm)	Percent Passing	
		Sample 1	Sample 2
#4	4.75	100.0	100.0
#10	2.00	94.1	97.5
#40	0.425	7.8	36.2
#60	0.250	3.0	18.5
#100	0.150	0.7	9.4
#200	0.075	0.00	1.7

2cc: client



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	P1	25% FINE/ 75% COURSE- DELIVERED 2/7/05. (INPUT SAND)					1.33	2.8
	0							

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P1	4.75	1.30	0.895	0.4630	0.0	100.0	0.0	

3/4"	3/8"	NO. 4	NO. 10	NO. 40	NO. 60	NO. 100	NO. 200
		100.0	94.1	7.8	3.0	0.7	0.0

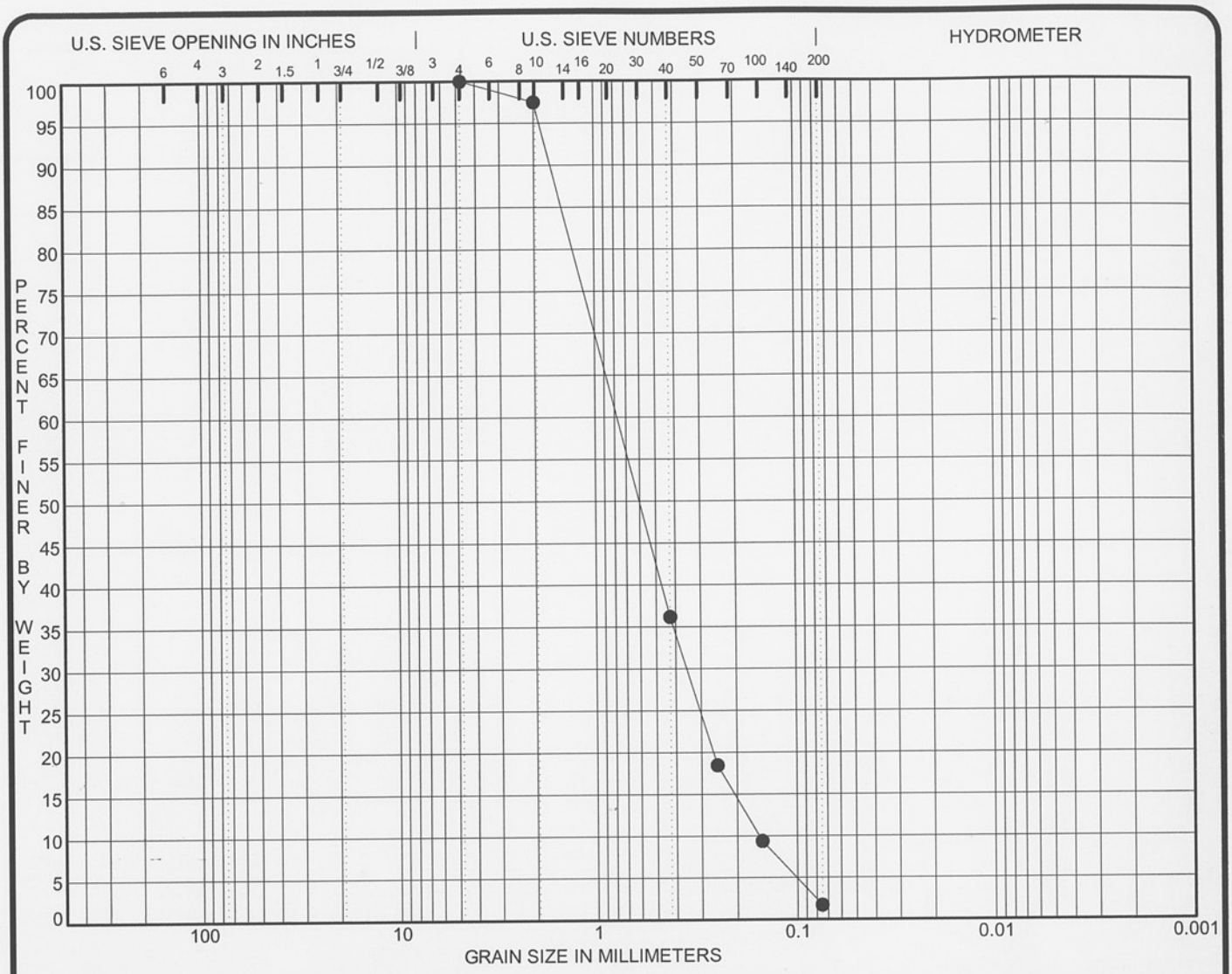
Client: SUNTREE TECHNOLOGIES
798 CLEARLAKE ROAD
COCOA FLORIDA 32922

Client No: 34184-001-01
Report No: 4854
Date: 3/24/05

Project: NUTRIENTS SEPARATING BAFFLE BOX TEST
VOLUSIA COUNTY
, FLORIDA

SOIL GRADATION CURVES

Universal Engineering Sciences, Inc.
ROCKLEDGE, FLORIDA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	P1	WHITE COURSE & FINE SAND - DELIVERED 03/11/05. (OUTPUT SAND)					1.03	5.0
	0							

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P1	4.75	0.78	0.353	0.1553	0.0	98.3	1.7	

3/4"	3/8"	NO. 4	NO. 10	NO. 40	NO. 60	NO. 100	NO. 200
		100.0	97.5	36.2	18.5	9.4	1.7

Client: SUNTREE TECHNOLOGIES
798 CLEARLAKE ROAD
COCOA FLORIDA 32922

Client No: 34184-001-01
Report No: 5016
Date: 3/24/05

Project: NUTRIENTS SEPARATING BAFFLE BOX TEST
VOLUSIA COUNTY
, FLORIDA

SOIL GRADATION CURVES

Universal Engineering Sciences, Inc.
ROCKLEDGE, FLORIDA

SEDIMENT FIELD TEST FOR SUNTREE NUTRIENT SEPARATING BAFFLE BOX

1 ST PALLET		*2 ND PALLET*		*LAST PALLET*	
BUCKET #1	57 *LBS*	BUCKET #1	57 *LBS*	BUCKET #1	61 *LBS*
BUCKET #2	59 *LBS*	BUCKET #2	60 *LBS*	BUCKET #2	59 *LBS*
BUCKET #3	55 *LBS*	BUCKET #3	60 *LBS*	BUCKET #3	62 *LBS*
BUCKET #4	52 *LBS*	BUCKET #4	57 *LBS*	BUCKET #4	56 *LBS*
BUCKET #5	57 *LBS*	BUCKET #5	61 *LBS*	BUCKET #5	56 *LBS*
BUCKET #6	57 *LBS*	BUCKET #6	59 *LBS*	BUCKET #6	54 *LBS*
BUCKET #7	60 *LBS*	BUCKET #7	57 *LBS*	BUCKET #7	59 *LBS*
BUCKET #8	57 *LBS*	BUCKET #8	58 *LBS*	BUCKET #8	59 *LBS*
BUCKET #9	55 *LBS*	BUCKET #9	58 *LBS*	BUCKET #9	58 *LBS*
BUCKET #10	59 *LBS*	BUCKET #10	61 *LBS*	BUCKET #10	57 *LBS*
BUCKET #11	57 *LBS*	BUCKET #11	52 *LBS*	BUCKET #11	64 *LBS*
BUCKET #12	56 *LBS*	BUCKET #12	58 *LBS*	BUCKET #12	55 *LBS*
BUCKET #13	52 *LBS*	BUCKET #13	60 *LBS*	BUCKET #13	53 *LBS*
BUCKET #14	56 *LBS*	BUCKET #14	55 *LBS*	BUCKET #14	64 *LBS*
BUCKET #15	55 *LBS*	BUCKET #15	55 *LBS*	BUCKET #15	63 *LBS*
BUCKET #16	58 *LBS*	BUCKET #16	59 *LBS*	BUCKET #16	66 *LBS*
BUCKET #17	54 *LBS*	BUCKET #17	59 *LBS*	BUCKET #17	56 *LBS*
BUCKET #18	53 *LBS*	BUCKET #18	50 *LBS*	BUCKET #18	59 *LBS*
TOTAL WEIGHT	***1009 LBS***	***TOTAL WEIGHT***	***1036 LBS***	BUCKET #19	65 *LBS*
				BUCKET #20	61 *LBS*
				BUCKET #21	56 *LBS*
1ST PALLET	1009	LBS		BUCKET #22	54 *LBS*
2ND PALLET	1036	LBS		BUCKET #23	65 *LBS*
LAST PALLET	1591	*LBS*		BUCKET #24	62 *LBS*
TOTAL WEIGHT RETURNED	3,636	*LBS*		BUCKET #25	58 *LBS*
MINUS 3LB PER BUCKET	-189	*LBS*		BUCKET #26	48 *LBS*
NET WEIGHT	**3447**	*LBS*		BUCKET #27	61 *LBS*
				TOTAL WEIGHT	***1591 LBS***

EQUALS A NET RETURN OF 95.75%

THE ORIGINAL INPUT WITHOUT BUCKETS WAS 3600 LBS. WHICH GIVES A RETURN OF 95.75%

SUNTREE TECHNOLOGIES MODEL NO. NSBB 6-12-84

FLOW, TREATMENT, & BYPASS SPECIFICATIONS FOR THE BIOMASS SEPARATING BASKET

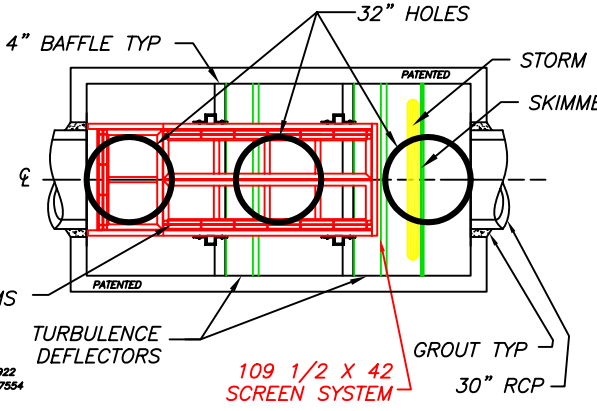
1. Inflow Pipe Area	7.0 SQ.FT.
2. Open Orifice Area in Biomass Separating Basket	34.5 SQ.FT.
3. Treatable Flow Area With No Blockage	34.5 SQ.FT.
4. Treatable Flow Area With 50% Blockage	17.2 SQ.FT.
5. Treatable Flow Area With 75% Blockage	8.6 SQ.FT.
6. Minimum Bypass Available (With Basket 100% Full)	7.7 SQ.FT.

BASKET STORAGE = 58 CU. FT. (2.1 YDS.)

SEDIMENT STORAGE

Lower Front Chamber	72 CU. FT.
Lower Middle Chamber	66 CU. FT.
Lower Rear Chamber	66 CU. FT.
TOTAL	204 CU. FT. (7.5 YDS.)

RECOMMENDED PIPE SIZES: 18" to 36"



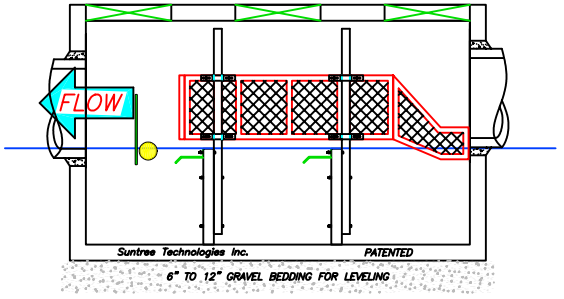
PLAN VIEW

PATENTED

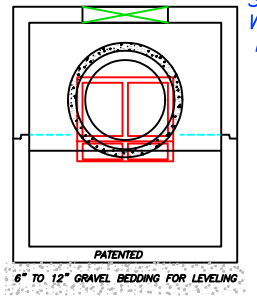
AND PATENTS PENDING

THE STRUCTURE IN THIS DRAWING IS PRIMARILY INTENDED TO BE INSTALLED IN OFF ROAD LOCATIONS WITH LESS THAN 5' OF COVER. STRUCTURES ARE READILY AVAILABLE FOR ALL OTHER CONDITIONS. CONSULT SUNTREE TECHNOLOGIES' REPRESENTATIVE FOR DETAILS.

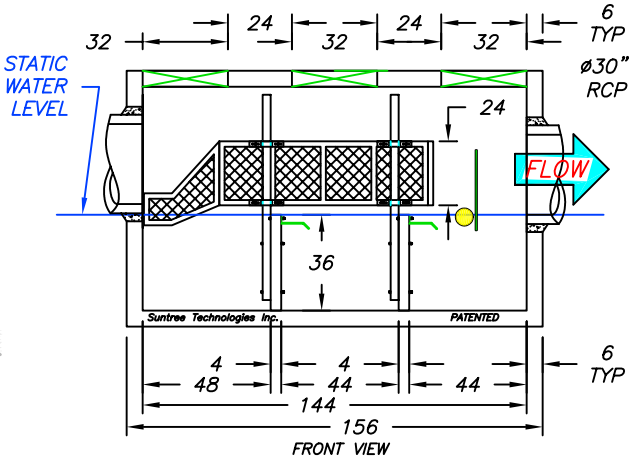
Suntree Technologies Inc.
798 Clearlake Road, Cocoa, Florida 32922
PH: 321-637-7552 Fax: 321-637-7554



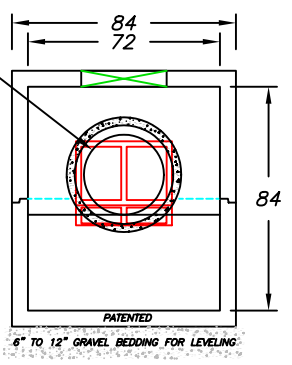
REAR VIEW



LEFT END VIEW



FRONT VIEW



RIGHT END VIEW

NOTES:

1. CONCRETE 28 DAY COMPRESSIVE STRENGTH fc=5,000 PSI.
2. REINFORCING: ASTM A-615, GRADE 60.
3. SUPPORTS AN H20 LOADING AS INDICATED BY AASHTO.
4. JOINT SEALANT: BUTYL RUBBER SS-S-00210
5. ALL WALLS, TOP + BOTTOM ARE 6" THICK.

PEAK DESIGN FLOW

46.2 C.F.S.

(BASED ON 6 FT. PER SEC. FLOW MULTIPLIED BY THE MIN. BYPASS AVAILABLE.)

SUNTREE TECHNOLOGIES, INC. 798 CLEARLAKE RD. SUITE #2 COCOA, FL. 32922		PROJECT: SUNTREE TECHNOLOGIES SPEC.
NUTRIENT SEPARATING BAFFLE BOX MODEL NO.NSBB 6-12-84		REVISIONS: BASKET SYSTEM — DATE: 01/06/04
DATE: 03/15/05	SCALE:SF = 72	REVISIONS: — DATE:
DRAFTER: N.R.B.	UNITS =INCHES	REVISIONS: — DATE:
		REVISIONS: — DATE: