SHINCCI-USA

Sunstate Environmental Services, Inc.

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
COLLEGE OF ENGINEERING
Biosystems Engineering

Liquid-Solids Separation Systems

Low Energy Treatment Technology

Pathogen Free and Odor Free Reusable Organic Final Product

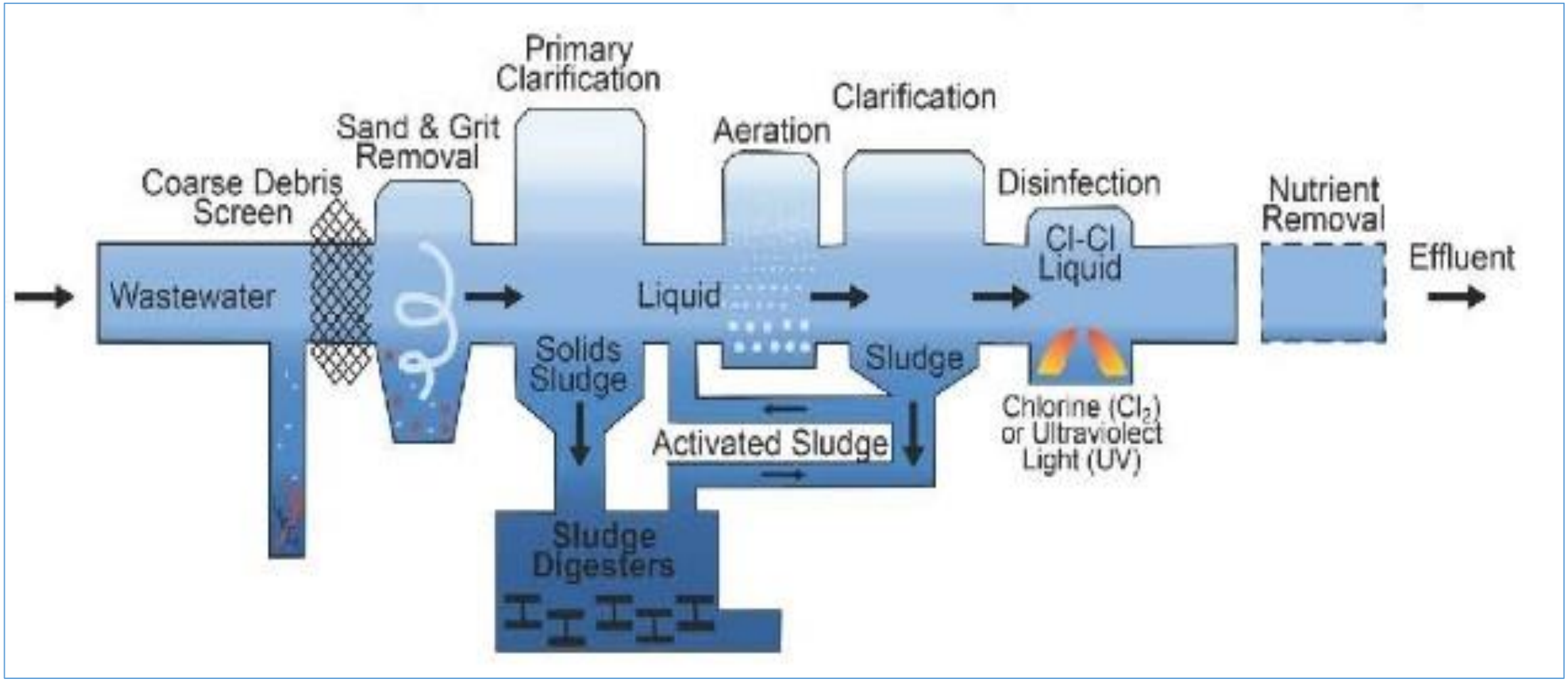
Akrum H. Tamimi, PhD

Department of Biosystems Engineering

The University of Arizona, Tucson, AZ

akrumt@email.Arizona.edu

Background


Primary Clarification
Clarification
Sand & Grit Removal
Aeration
Coarse Debris Screen
Disinfection
Nutrient Removal
Cl-Cl Liquid
Wastewater
Liquid
Effluent
Solids Sludge
Sludge
Activated Sludge
Chlorine (Cl_2) or Ultraviolect Light (UV)
Sludge Digesters

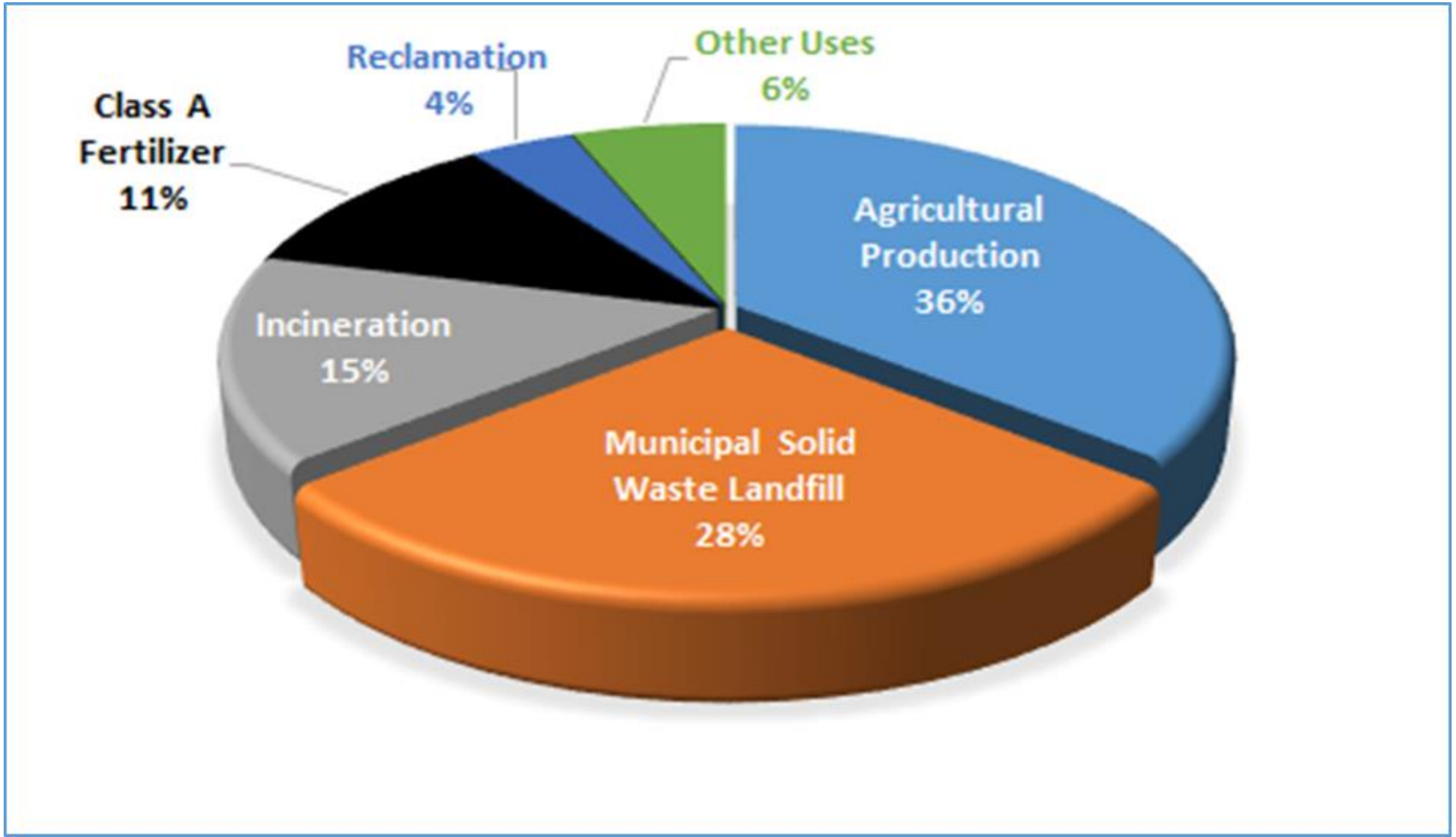
Sludge / Biosolids Terminology

- Class B: $\leq 2 \times 10^6$ Fecal Coliform per gram of solids
- Class A: Pathogen Free
- Vector Attraction Reduction – No Odor
- U.S. EPA Rule 503

Quantities of Wastewater Sludge and Septage

- The Equivalent of 7.1 Million dry tons of wastewater sludge and septage are generated each year
- Liquid Sludge and Septage are despised of at an average total solids of 10%
- Yields 64.5 Million m^3 of Liquid Sludge per year
  - Equivalent to 17,063,492,064 Gallons per year

Sludge Fate


Reclamation
4%
Other Uses
6%
Class A
Fertilizer
11%
Agricultural
Production
36%
Incineration
15%
Municipal Solid
Waste Landfill
28%

Sludge / Biosolids / Organic Residuals

Drying Beds

Green House Drying

Biosolids Aging in Lagoons

Solarization

The MagnaGro Process™

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
CINCINNATI, OH 45268

Pathogen Equivalency Committee
U.S. EPA

OFFICE OF
RESEARCH AND DEVELOPMENT

Akrum H. Tamimi, PhD
Department of Soil, Water,
and Environmental Science
1117 E. Lowell St.
Bldg. 90, Room 406B
The University of Arizona
Tucson, AZ 85721

Dear Dr. Tamimi,

Re: Request for Site Specific Process to Further Reduce Pathogens (PFRP)
Equivalency of the MagnaGro Process ™ for the treatment of Dewatered Sludge /
Biosolids at the Green Valley Wastewater Treatment Facility, Green Valley, AZ

Thank you for letter of April 2013, and subsequent materials in August 2013. These documents were submitted to Laura Boczek., of EPA's Pathogenic Equivalency Committee (PEC) for consideration. The PEC has reviewed the documentation, data, and appendixes.

Magna Flow Environmental

February 14, 2014

Arizona Department of Environmental Quality
Attention, Director Henry R. Darwin
1110 West Washington Street
Phoenix, Arizona 85007

Via email: Hart.Monica@AZDEQ.gov

Dear Director Darwin,

Please consider this letter as a formal request to approve the MagnaGro Process™ equivalent to a Process to Further Reduce Pathogens as per the attached EPA Pathogen Equivalency Committee (PEC) recommendation. The EPA PEC recommendation is a site specific equivalency at Green Valley Wastewater Recycling Facility, Green Valley, Pima County, AZ.

Please let us know if you require further information.

Sincerely,

Jerry McCurtain,
Vice President

P.O. Box 60709 * Houston, Texas 77205-0709 * (281) 448-8585 * Fax: (281) 397-7195

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Janice K. Brewer
Governor

Henry R. Darwin
Director

March 28, 2014

Akrum H. Tamimi, PhD
Department of Soil, Water & Environmental Science
1117 East Lowell Street
Building 90, Room # 4068
The University of Arizona
Tucson, Arizona 85721

Re: Approval of the Site Specific request to use the MagnaGro Process™ at the Green Valley Wastewater Treatment Facility, Green Valley, Arizona.

Dear Dr. Tamimi,

On February 20, 2014, the Arizona Department of Environmental Quality (ADEQ) received your request for the site specific approval of the MagnaGro Process™ equivalent to a Process to Further Reduce Pathogens at the Green Valley Wastewater Treatment Facility, Green Valley, Arizona.

In accordance with Arizona Administrative Code (A.A.C.) R18-9-1006(D)(12), the Director shall approve another process if the process is equivalent to a Process to Further Reduce Pathogens specified in subsections (D)(5) through (D)(11), as determined by the EPA Pathogen Equivalency Committee.

Based upon a review of the MagnaGro Process™ by ADEQ personnel, as well as a review of the EPA Pathogen Equivalency Committee's recommendation, ADEQ approves the site specific MagnaGro Process™ when it is operated under the conditions outlined in the EPA Pathogen Equivalency Committee's approval letter (Attachment #1).

If you have specific questions with respect to this recommendation, please contact Robert Phalen, ADEQ Biosolids Coordinator, at 602-771-7674; or Daniel Czecholinski, ADEQ Field Service Unit #1 Manager, at 602-771-4612

Sincerely,

Michael Fulton, Director
Water Quality Division

Cc: Jerry McCurtain, Vice President
Magna Flow Environmental, P.O. Box #: 60709, Houston, Texas 77205-0709

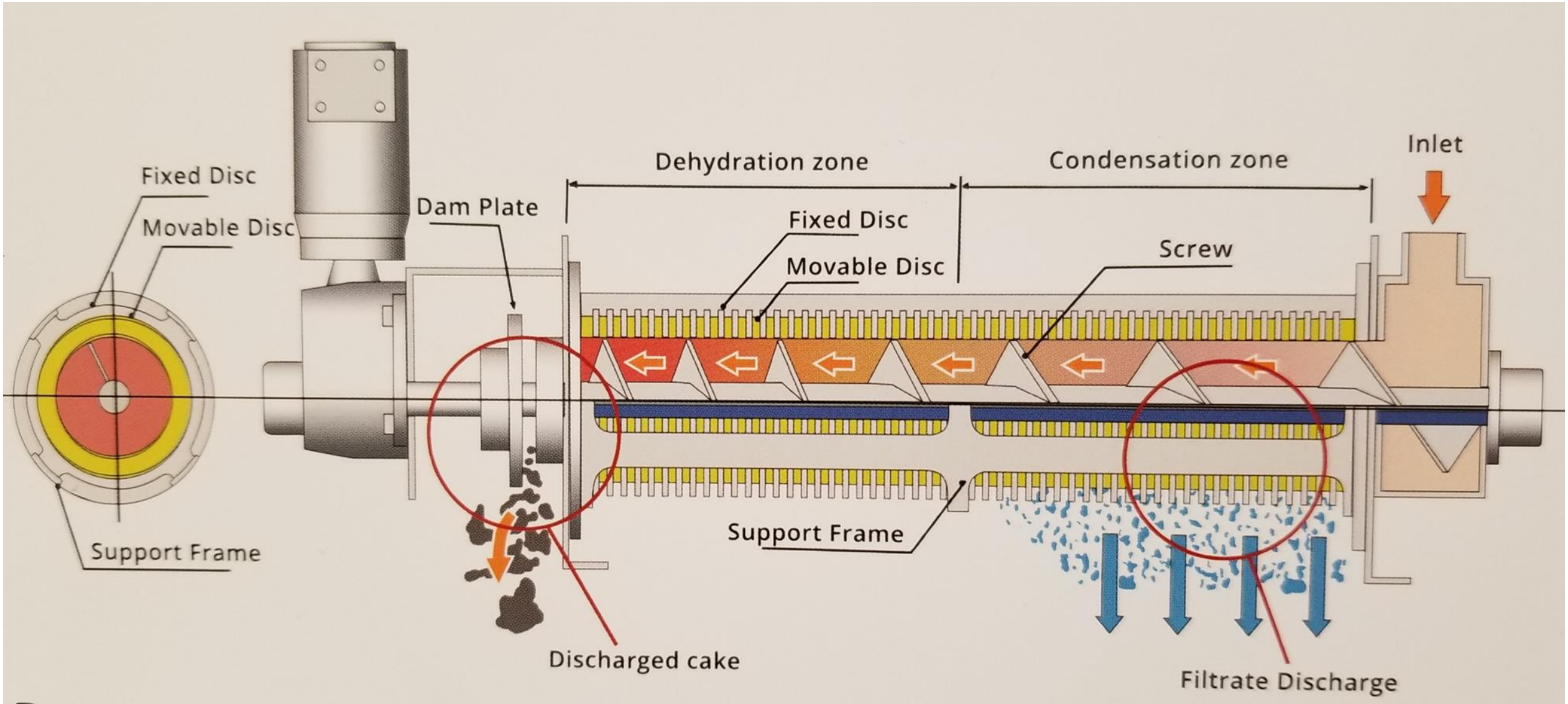
Houssam B. Eljerdi, Technical Services Manager
Treatment Division, Pima County Wastewater Reclamation Department
7101 North Casa Grande Highway, Tucson, Arizona 85743

REF #: WQUFSU #1 14-0722

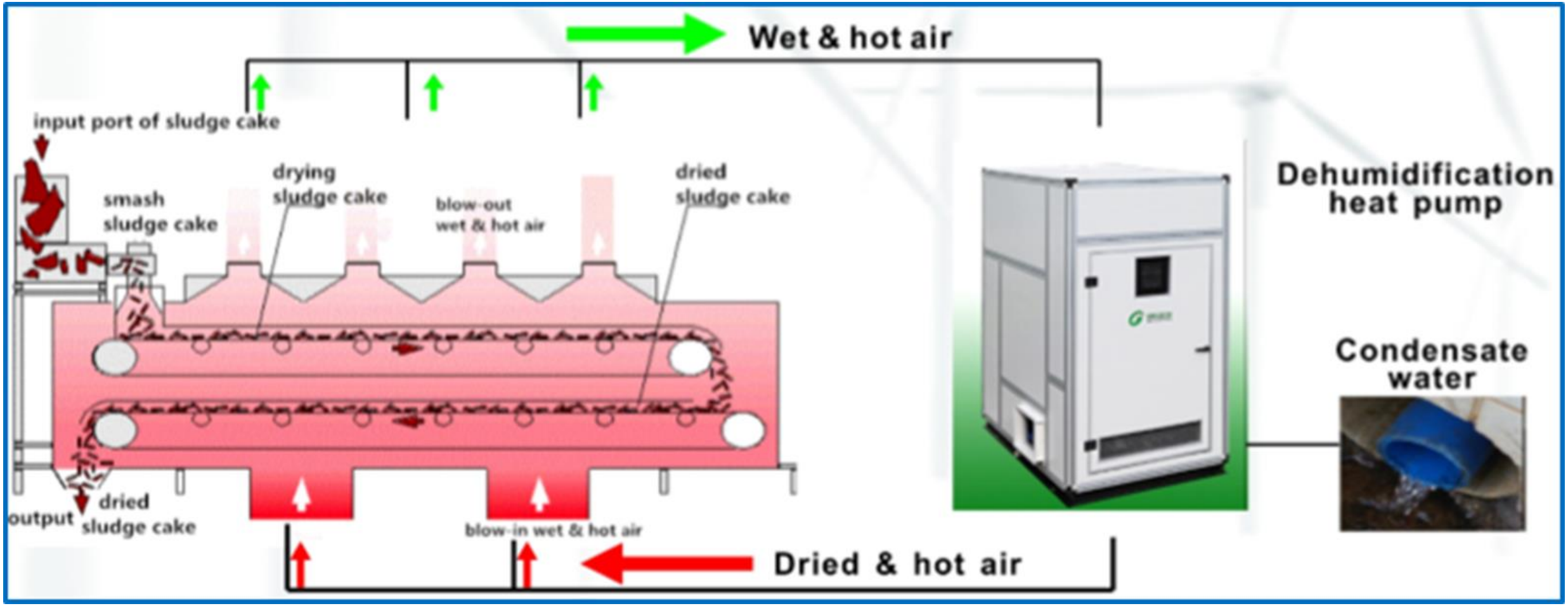
Southern Regional Office
400 West Congress Street • Suite 433 • Tucson, AZ 85701
(520) 628-6733

Shincci – USA
Dewatering Spiral Filter Press
&
Low Temperature
Dehumidification Module

Spiral Filter Press or Any Dewatering System

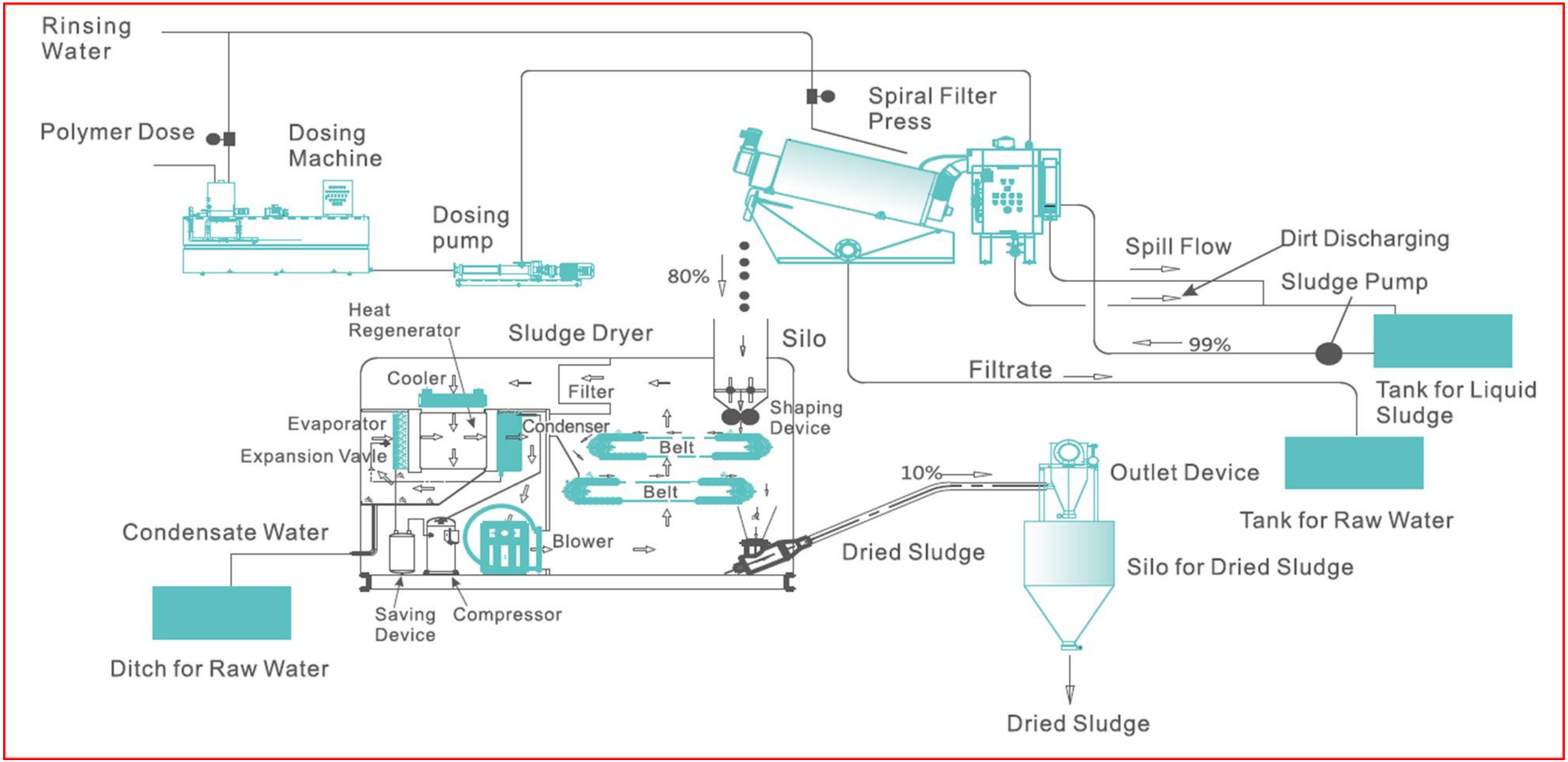


Low Temperature Dehumidification Heat Pump



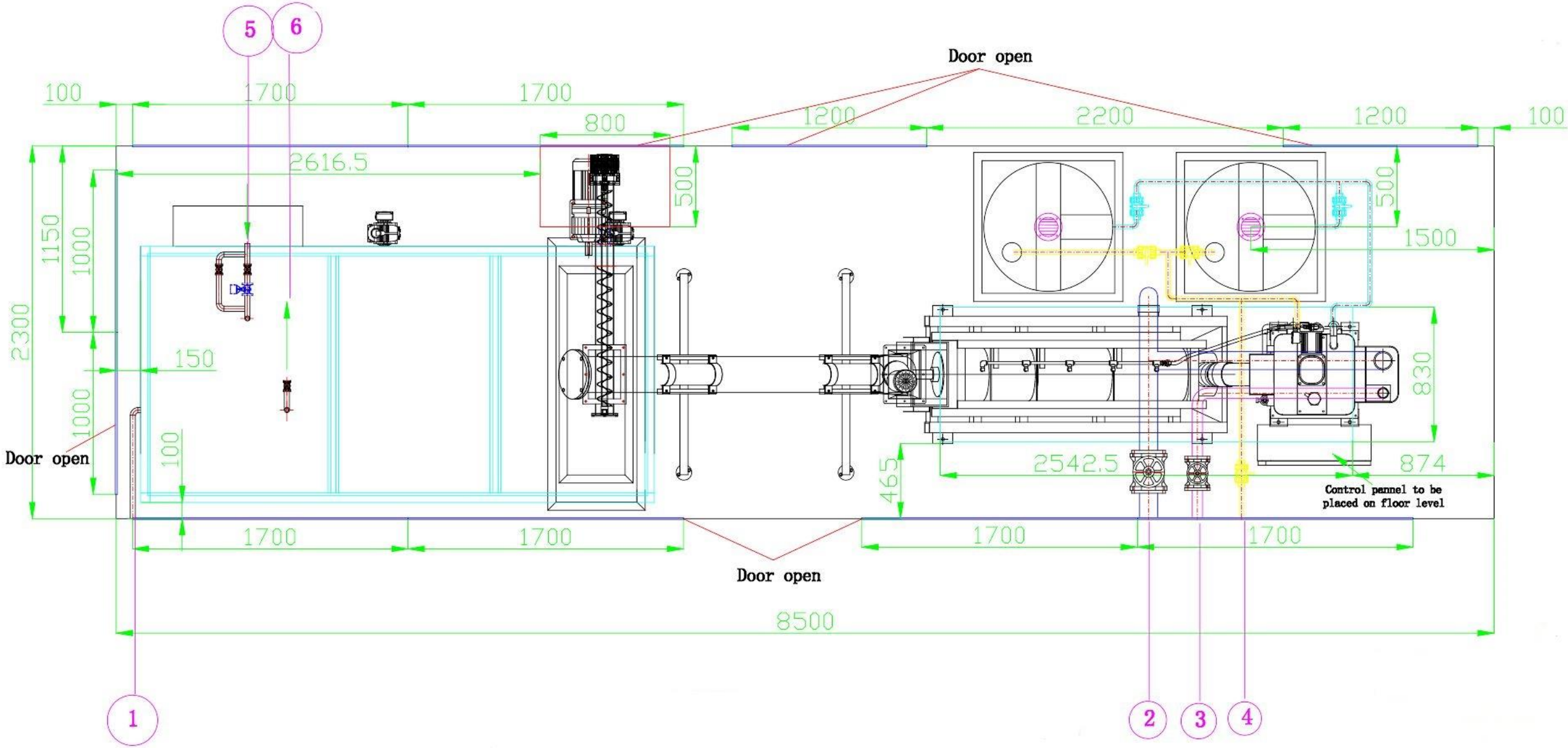
Mesh Belt Drying

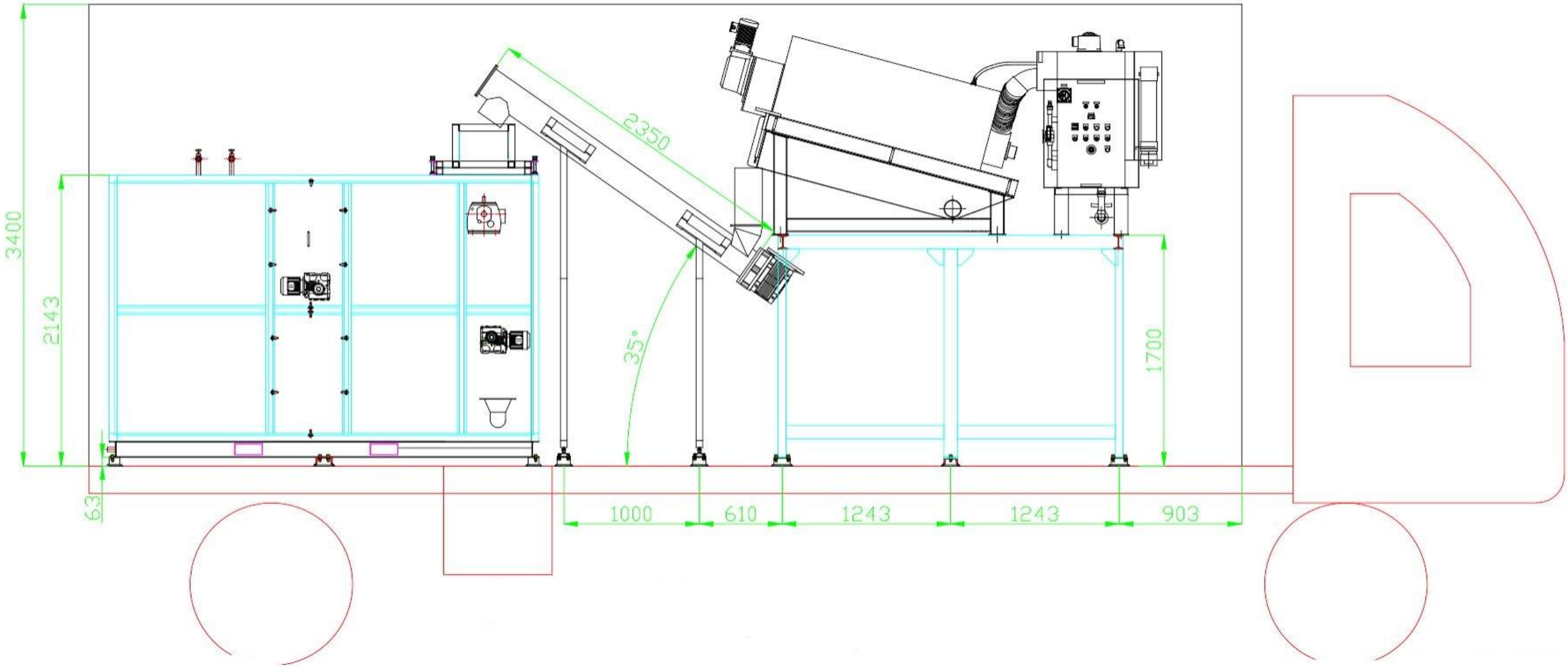
System Layout



Electric Powered Dryer

Combined Dewatering and Drying System


5
6
Door open
100
1700
1700
800
1200
2200
1200
100
2616.5
500
500
1150
1000
1500
2300
150
1000
830
Door open
100
2542.5
874
465
Control pannel to be placed on floor level
1700
1700
1700
1700
Door open
8500
1
2
3
4


3400
2143
63
2350
35°
1700
1000
610
1243
1243
903


SHINCCI 晟启

Organic Fertilizer

LAB NO: 23335 DATE: 10/25/2017

ORGANIC FERTILIZER REPORT

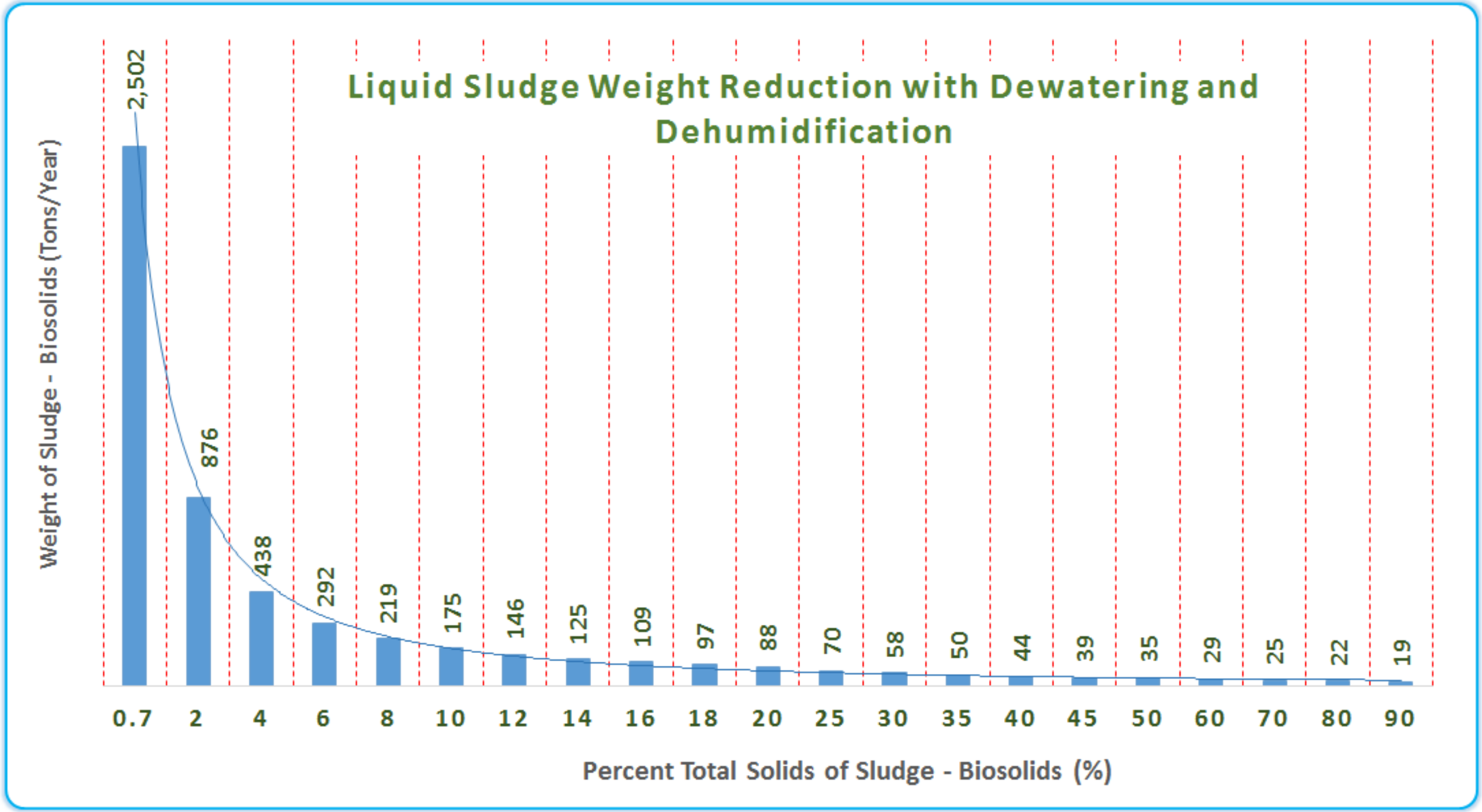
PAGE: 1

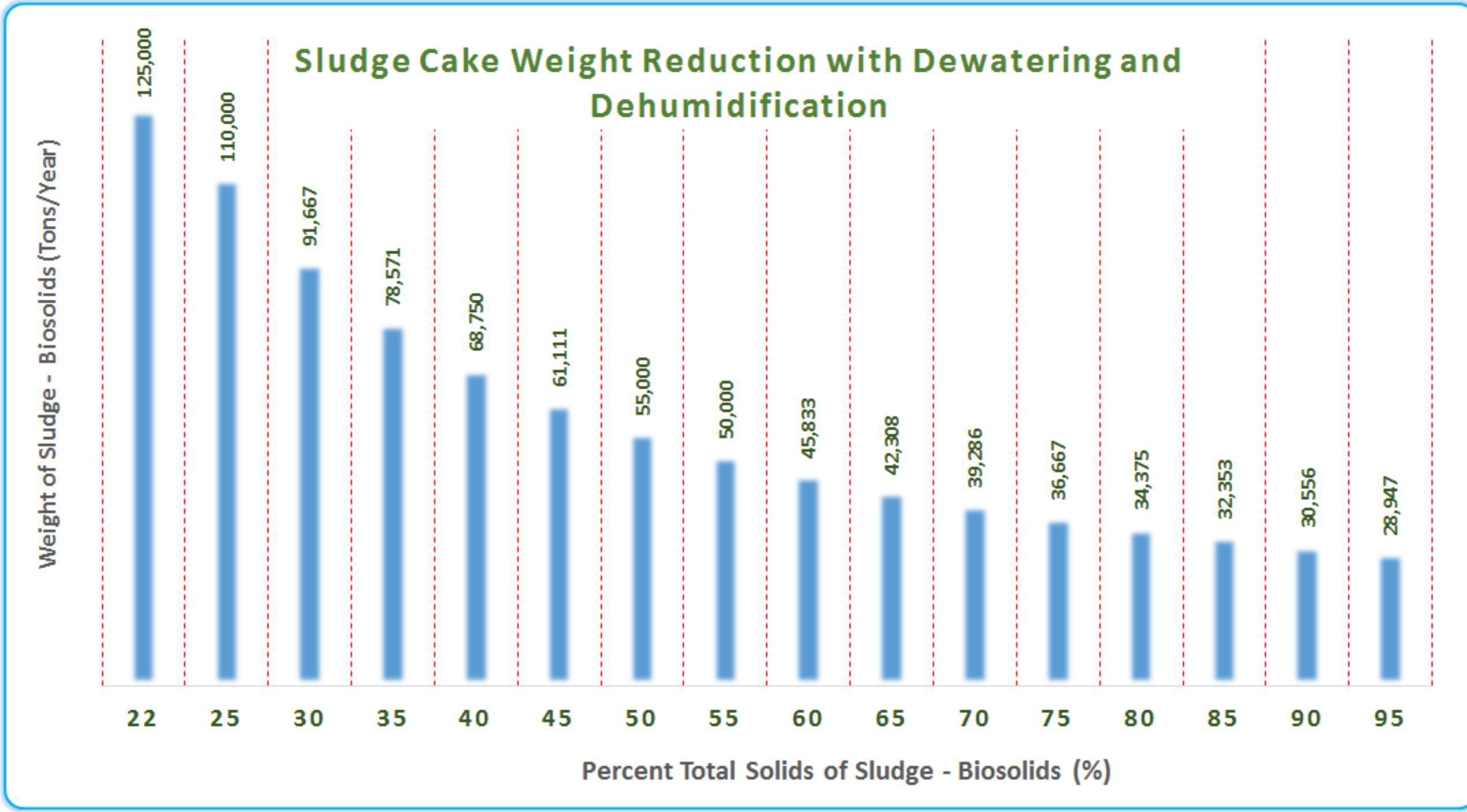
SAMPLE ID	REPORT OF ANALYSIS IN PERCENT									REPORT OF ANALYSIS IN PARTS PER MILLION						
	Nitrogen N	Phosphorus P	Phosphate P_2O_5	Potassium K	Potash K_2O	Sulfur S	Magnesium Mg	Calcium Ca	Sodium Na	Iron Fe	Aluminum Al	Manganese Mn	Copper Cu	Zinc Zn	B	
QCR	6.26	1.37	3.14	0.370	0.446	1.380	0.370	2.920	0.360	12140	2914	318	1043	1114	130.0	

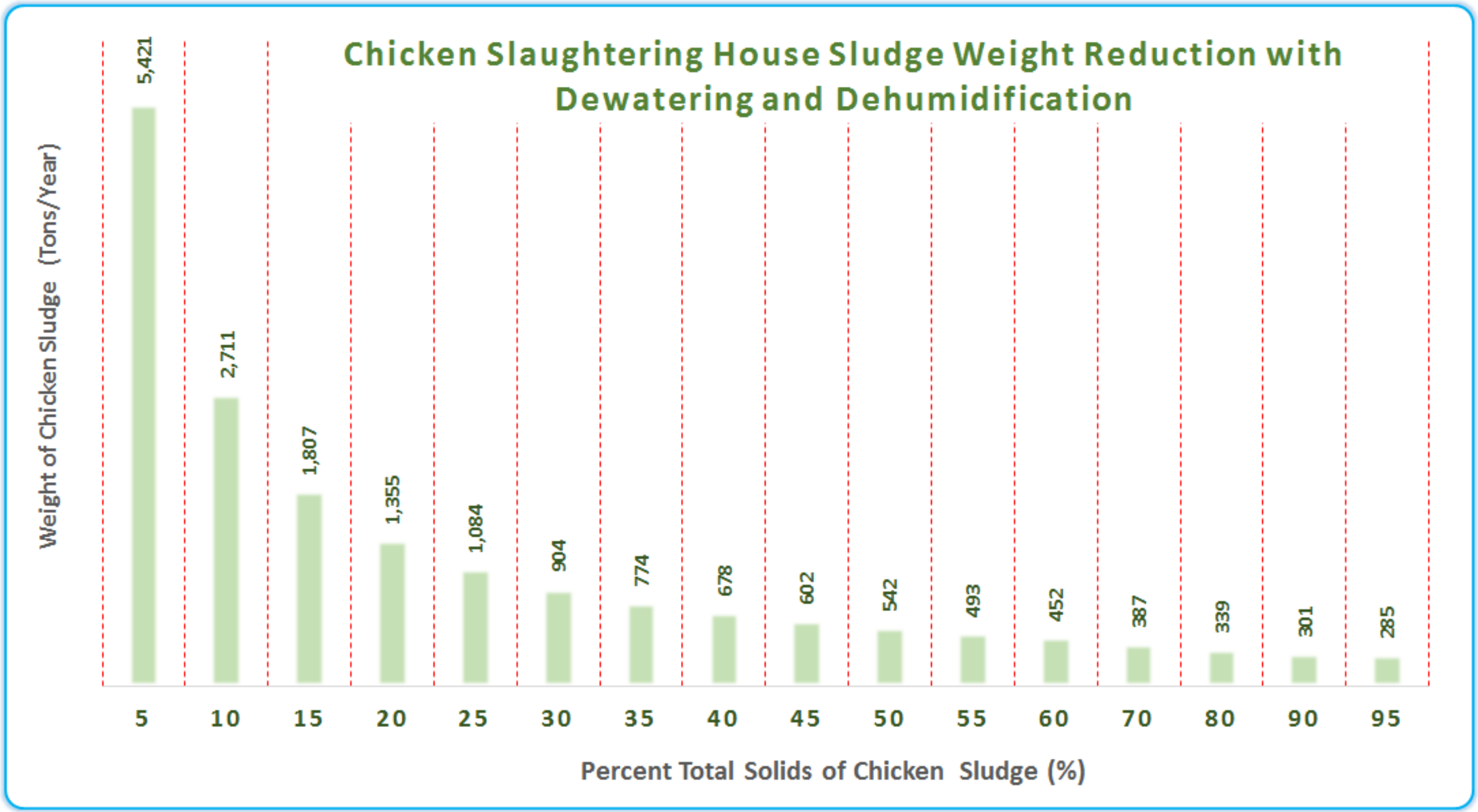
SAMPLE ID	POUNDS OF NUTRIENTS / TON															
	Nitrogen N	Phosphorus P	Phosphate P_2O_5	Potassium K	Potash K_2O	Sulfur S	Magnesium Mg	Calcium Ca	Sodium Na	Iron Fe	Aluminum Al	Manganese Mn	Copper Cu	Zinc Zn	B	
QCR	125.2	27.4	62.8	7.4	8.9	27.6	7.4	58.4	7.2	24.3	5.8	0.6	2.1	2.2	0.3	

How Shincci – USA Technology Meets U.S. EPA Rule 503 Requirements

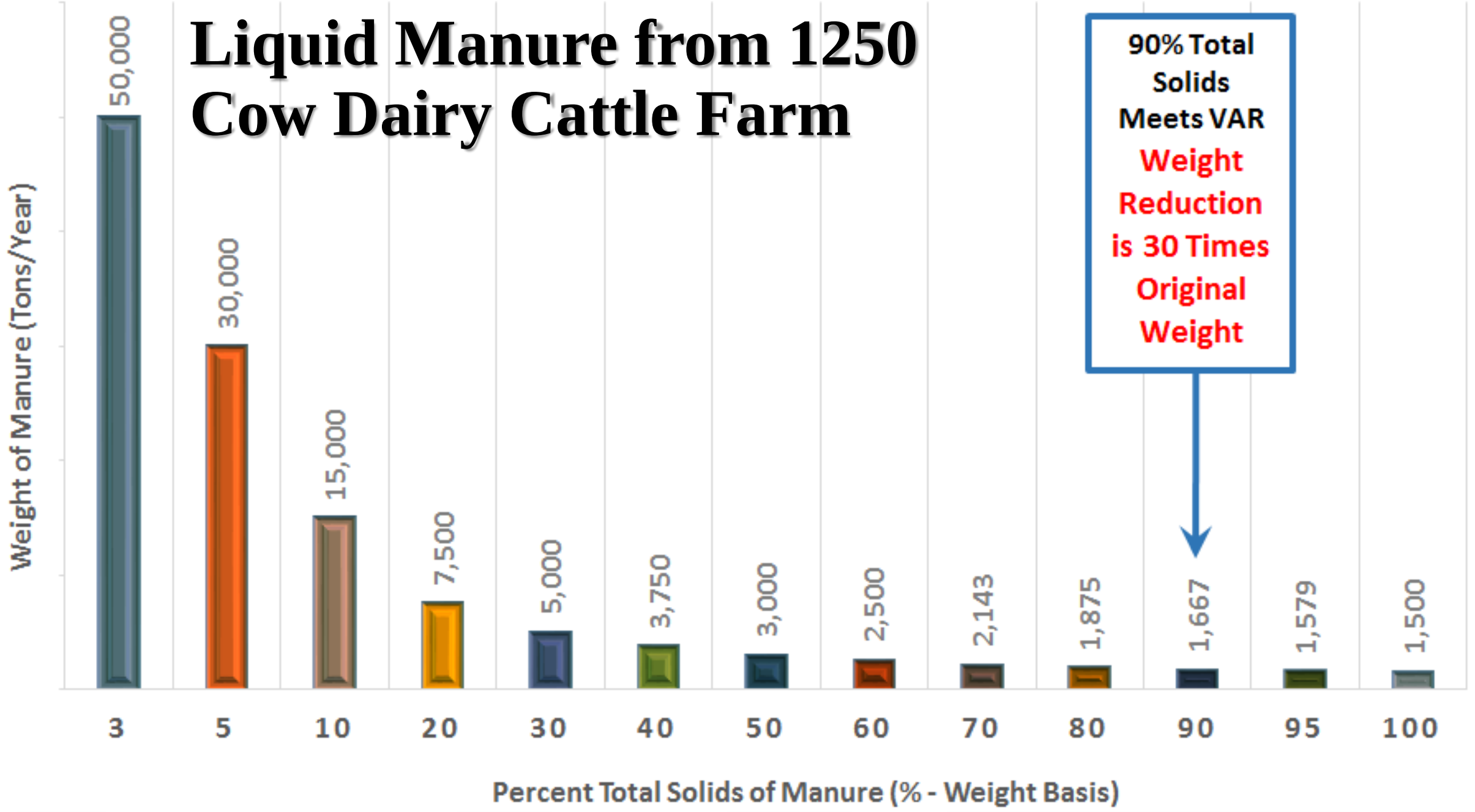
- Class A Biosolids
  - Heat Drying
  - Pasteurization
- Vector Attraction Reduction
- Exceptional Quality – EQ Biosolids

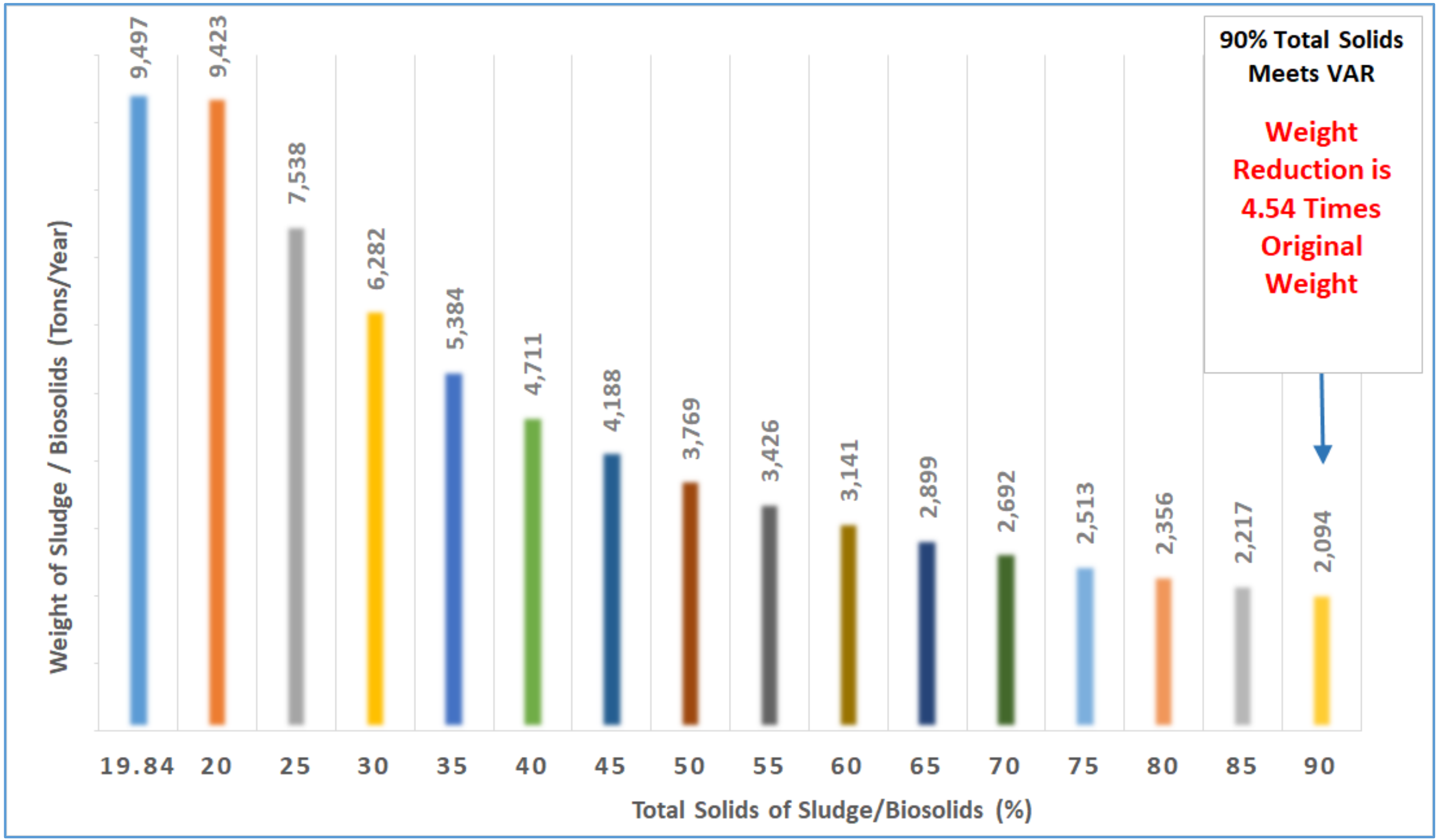

Liquid Sludge Weight Reduction with Dewatering and Dehumidification
Weight of Sludge - Biosolids (Tons/Year)
2,502
876
438
292
219
175
146
125
109
97
88
70
58
50
44
39
35
29
25
22
19
0.7
2
4
6
8
10
12
14
16
18
20
25
30
35
40
45
50
60
70
80
90
Percent Total Solids of Sludge - Biosolids (%)

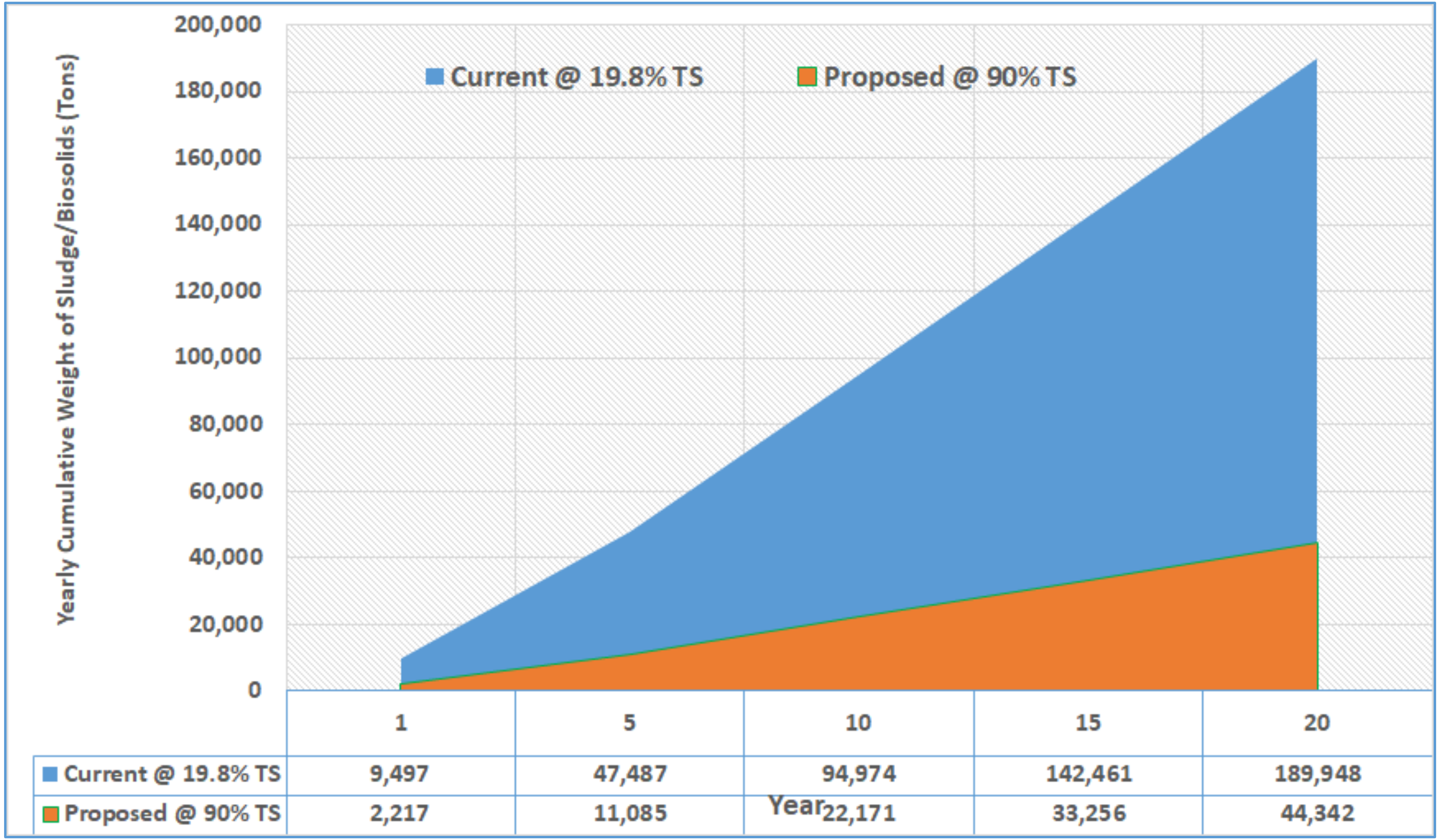

Sludge Cake Weight Reduction with Dewatering and Dehumidification
Weight of Sludge - Biosolids (Tons/Year)
125,000
110,000
91,667
78,571
68,750
61,111
55,000
50,000
45,833
42,308
39,286
36,667
34,375
32,353
30,556
28,947
22
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
Percent Total Solids of Sludge - Biosolids (%)


Chicken Slaughtering House Sludge Weight Reduction with Dewatering and Dehumidification
Weight of Chicken Sludge (Tons/Year)
5,421
2,711
1,807
1,355
1,084
904
774
678
602
542
493
452
387
339
301
285
5
10
15
20
25
30
35
40
45
50
55
60
70
80
90
95
Percent Total Solids of Chicken Sludge (%)

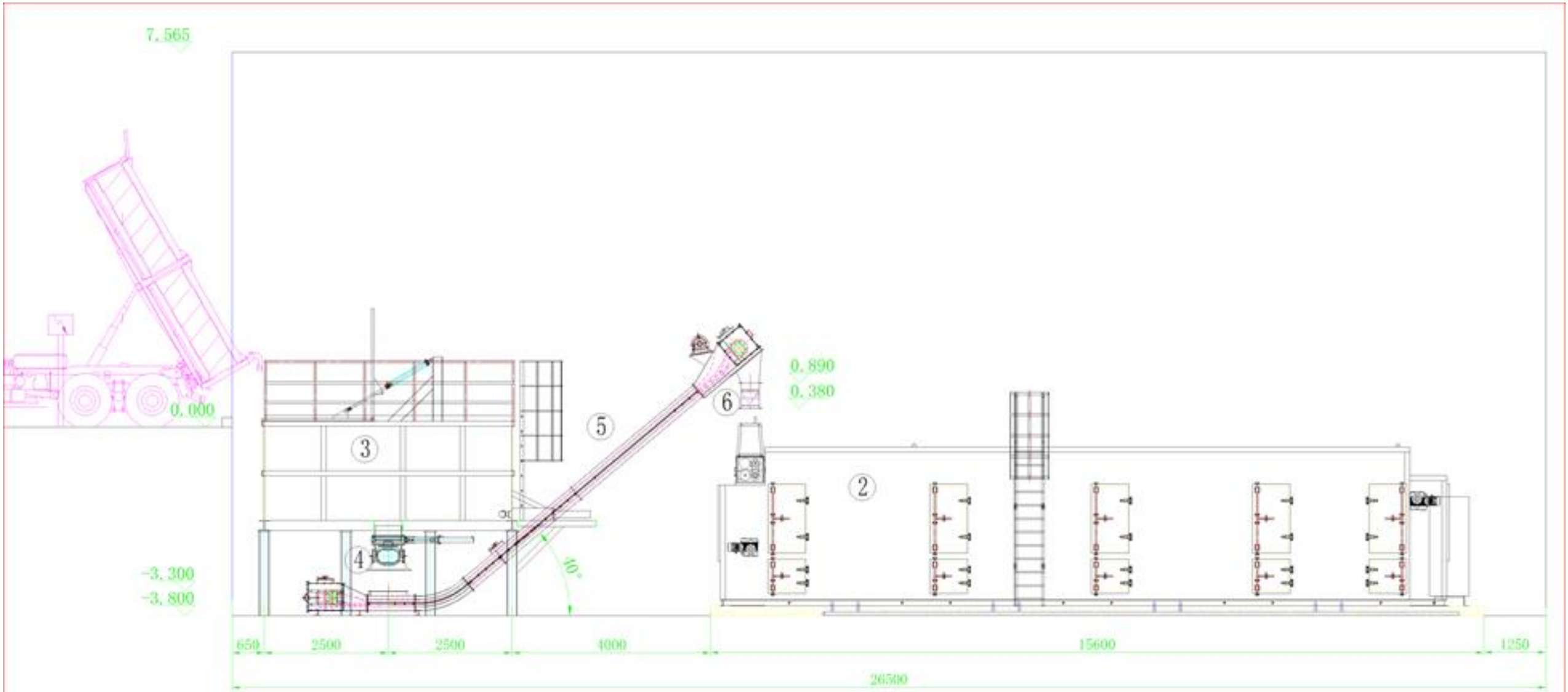
Liquid Manure from 1250 Cow Dairy Cattle Farm

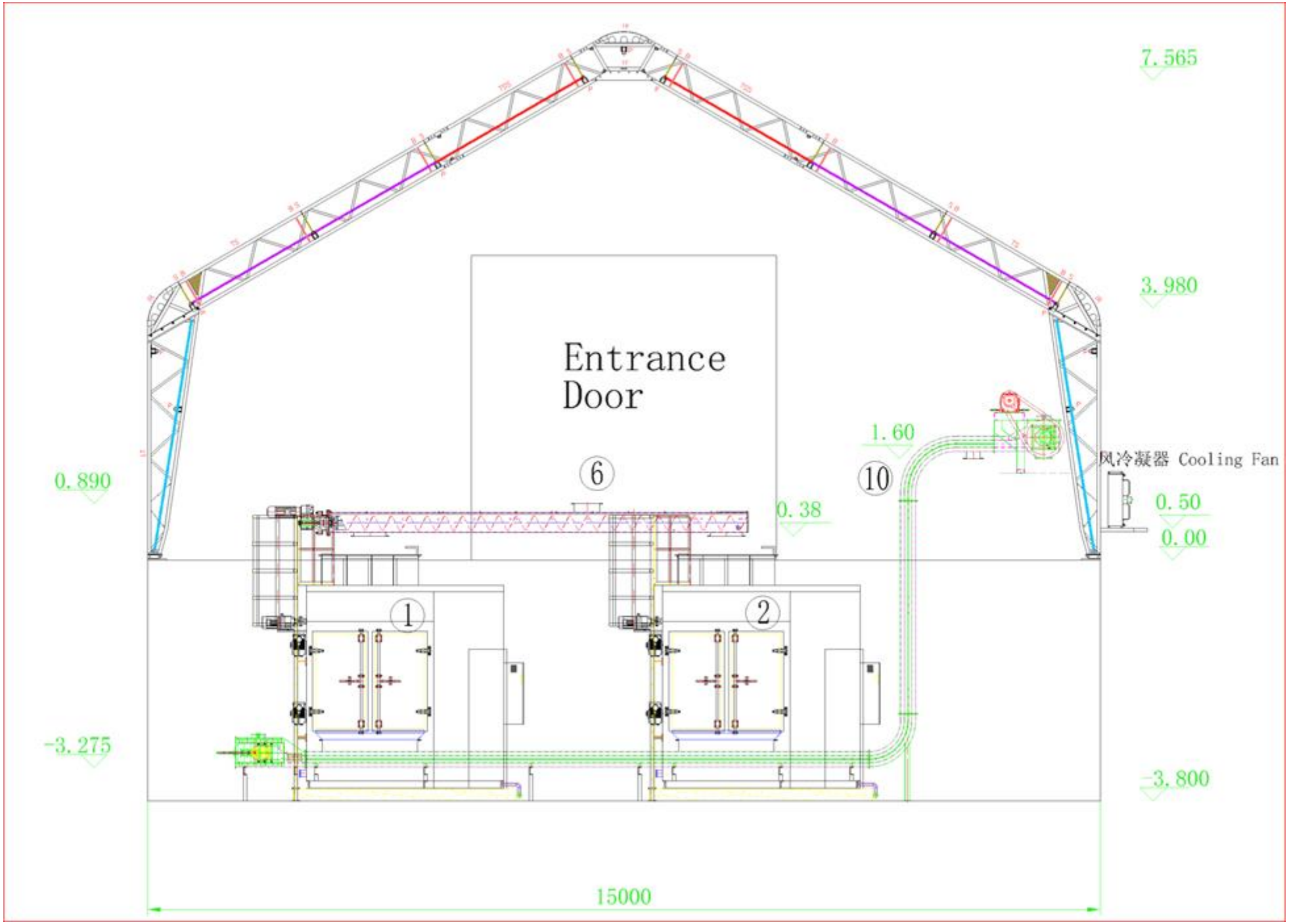


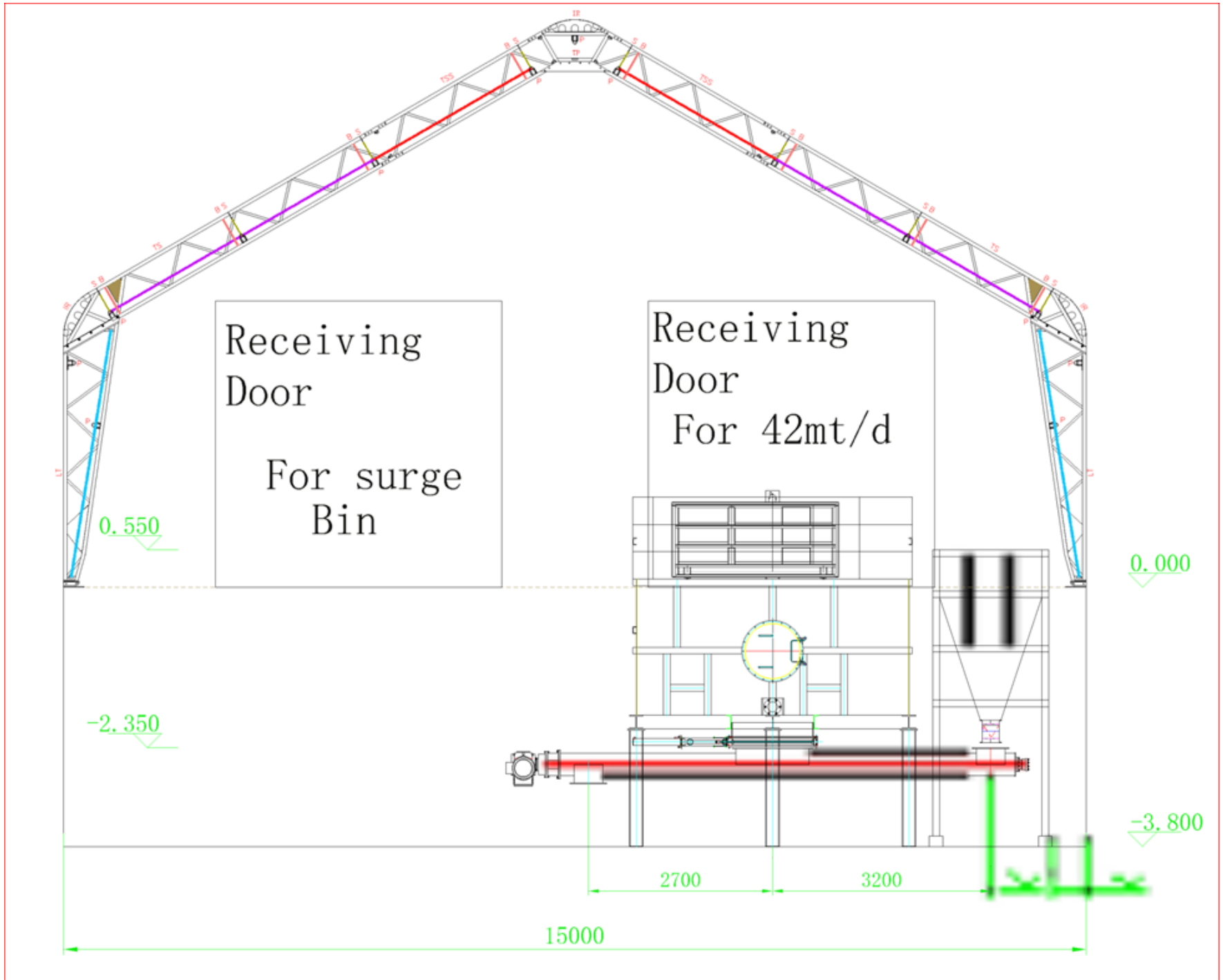

90% Total Solids
Meets VAR
Weight
Reduction is
4.54 Times
Original
Weight
Weight of Sludge / Biosolids (Tons/Year)
9,497
9,423
7,538
6,282
5,384
4,711
4,188
3,769
3,426
3,141
2,899
2,692
2,513
2,356
2,217
2,094
19.84
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
Total Solids of Sludge/Biosolids (%)

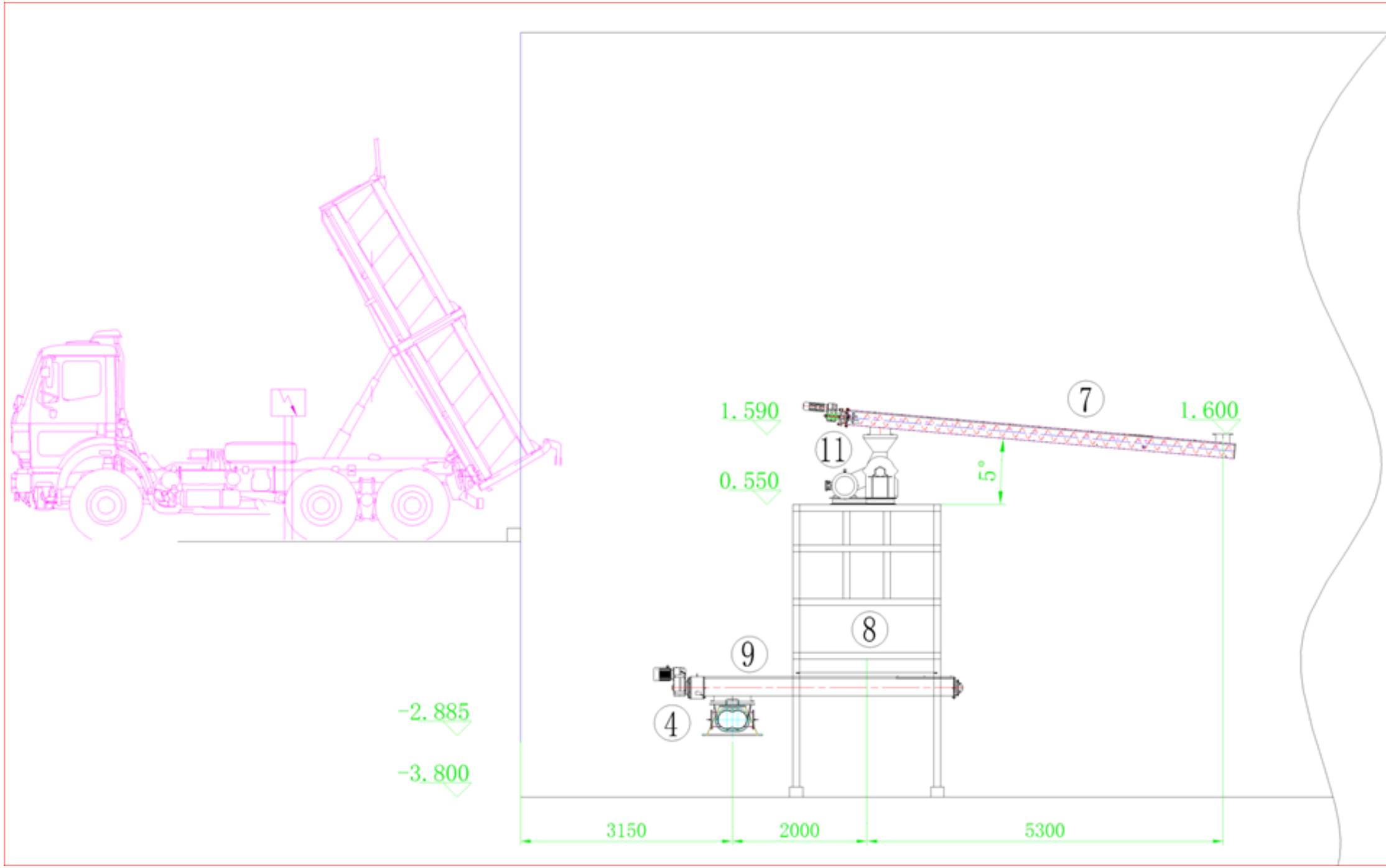


	1	5	10	15	20
Current @ 19.8% TS	9,497	47,487	94,974	142,461	189,948
Proposed @ 90% TS	2,217	11,085	22,171	33,256	44,342

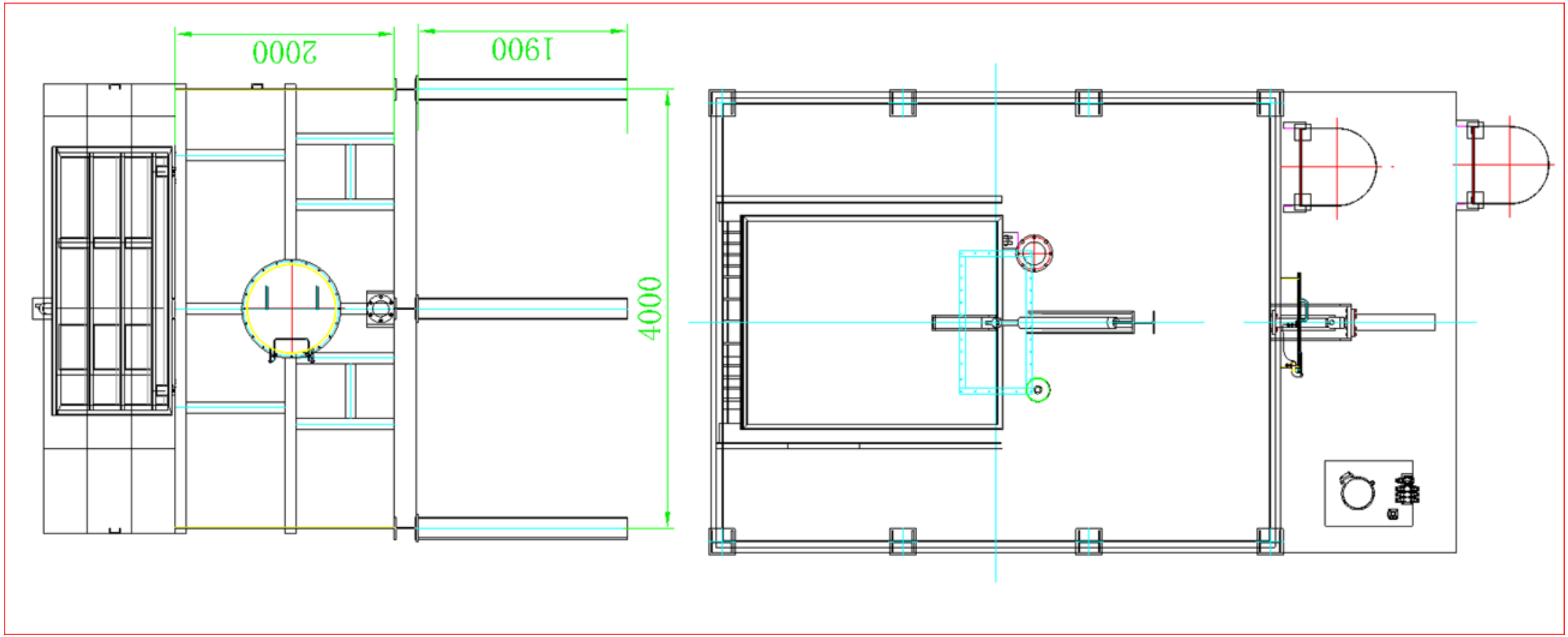

7.565
0.000
-3.300
-3.800
0.890
0.380
40°
650
2500
2500
4000
15600
1250
26500
2
3
4
5
6


7.565
3.980
Entrance
Door
1.60
风冷凝器 Cooling Fan
0.890
6
10
0.38
0.50
0.00
1
2
-3.275
-3.800
15000

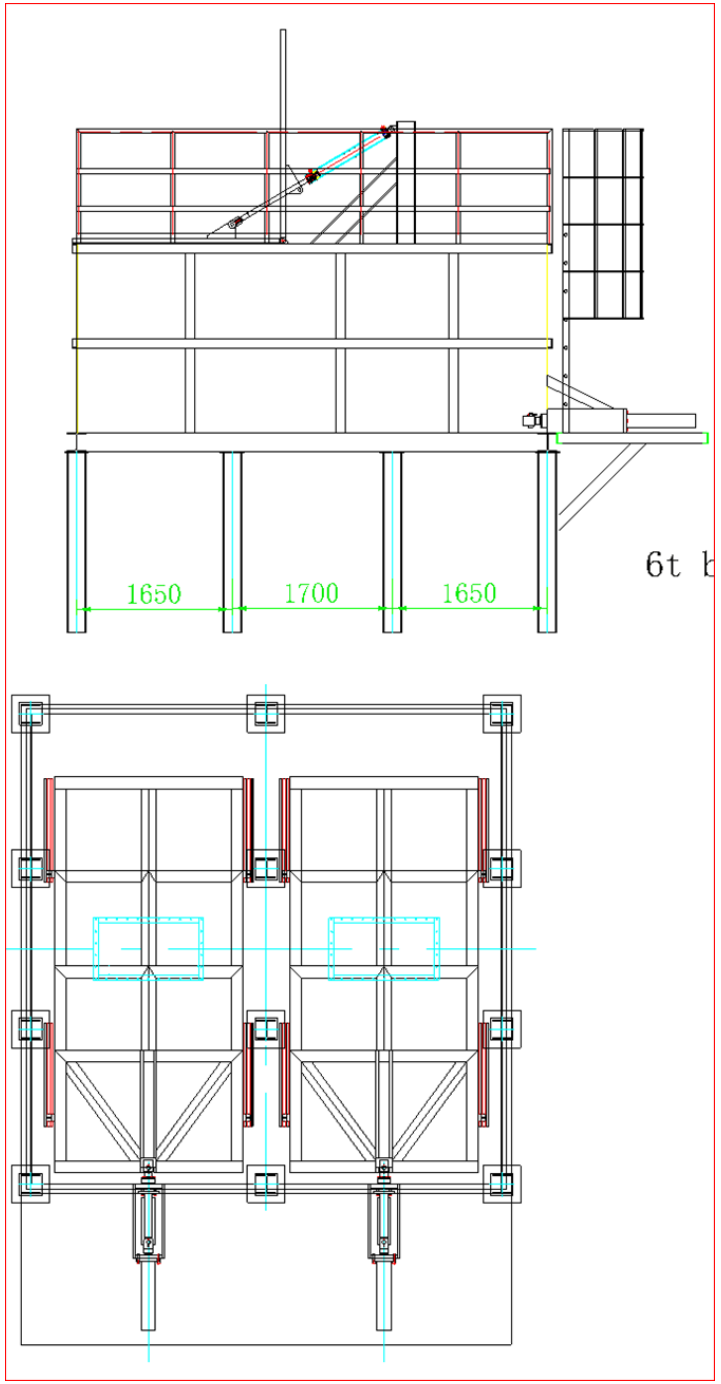

Receiving
Door
For surge
Bin
Receiving
Door
For 42mt/d
0.550
0.000
-2.350
-3.800
2700
3200
15000


1.590
7
1.600
11
0.550
5°
8
9
4
-2.885
-3.800
3150
2000
5300

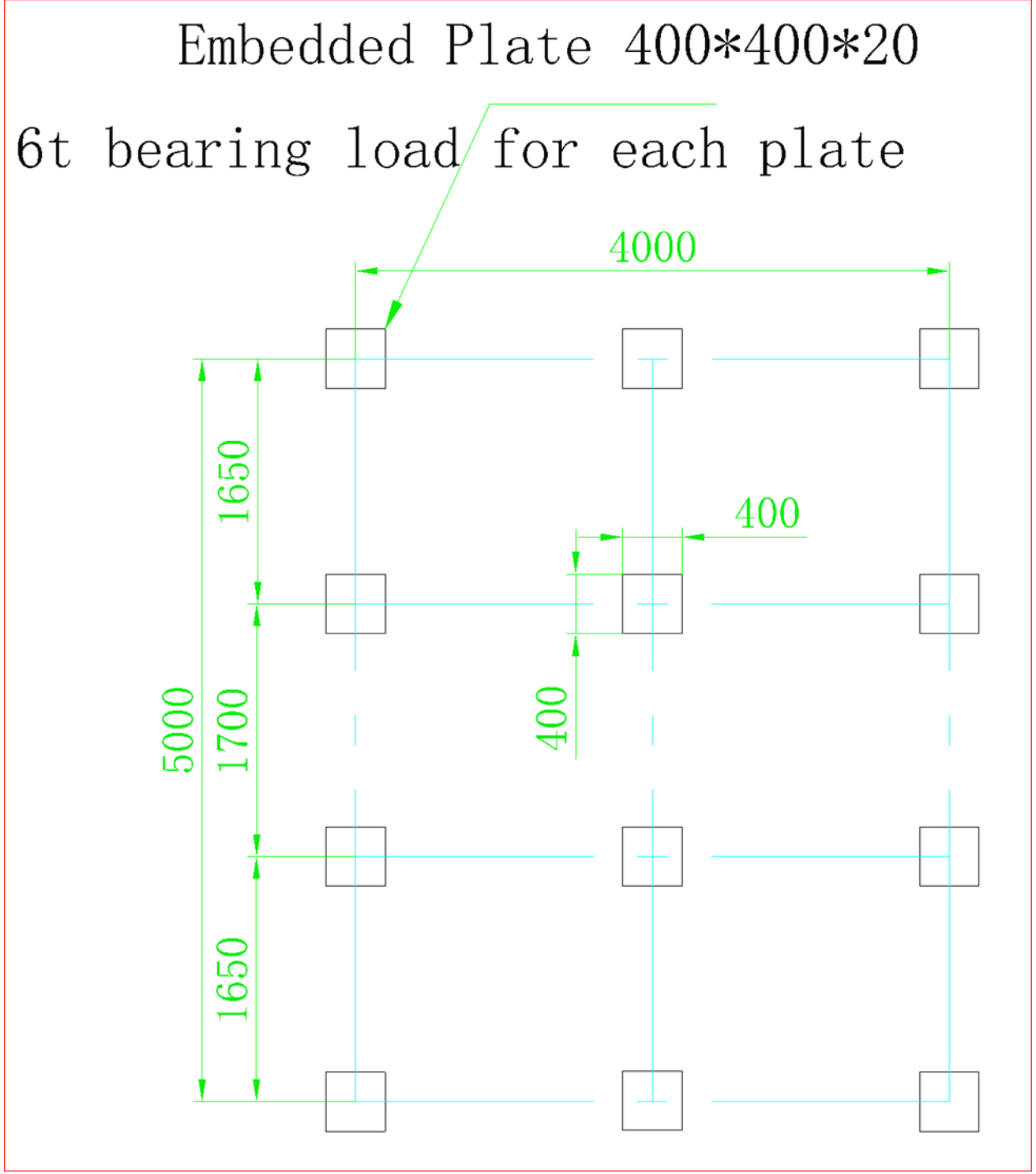
Slide-bottom Sludge Silo for Inlet Wet Sludge Cake: Plan and Side Views

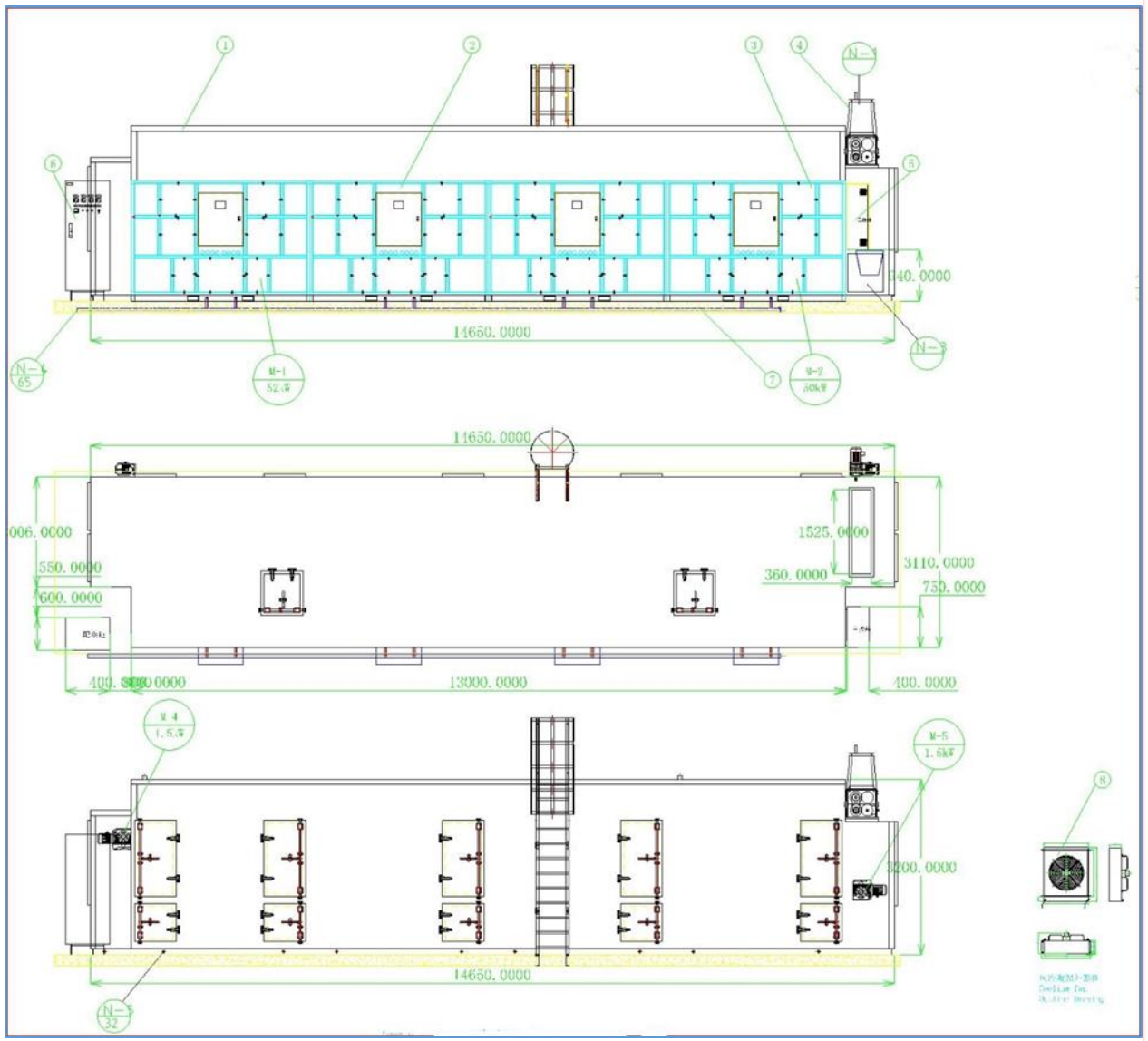


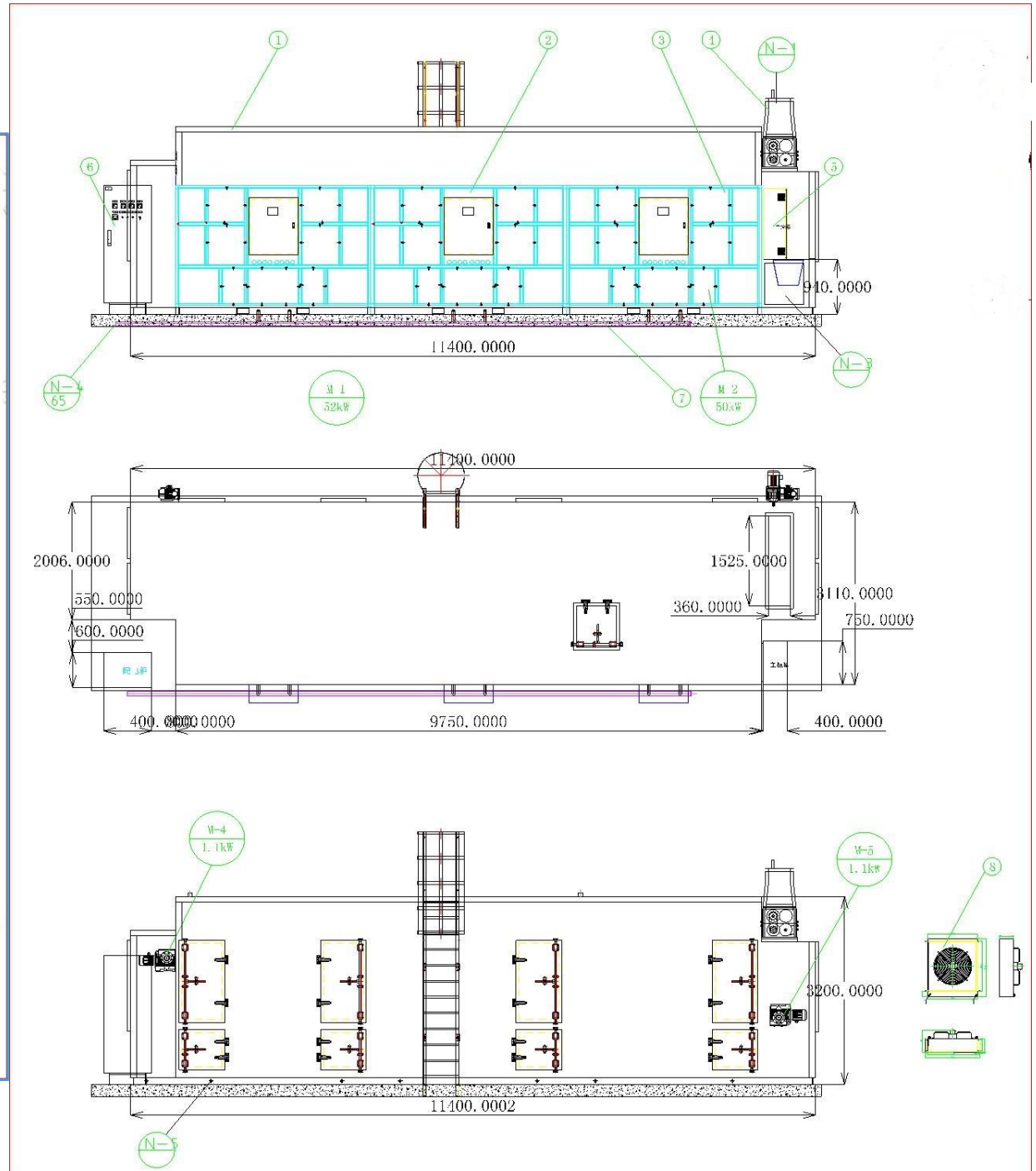
Slide-bottom Sludge Silo for Inlet Wet Sludge Cake: Plan and Side Views

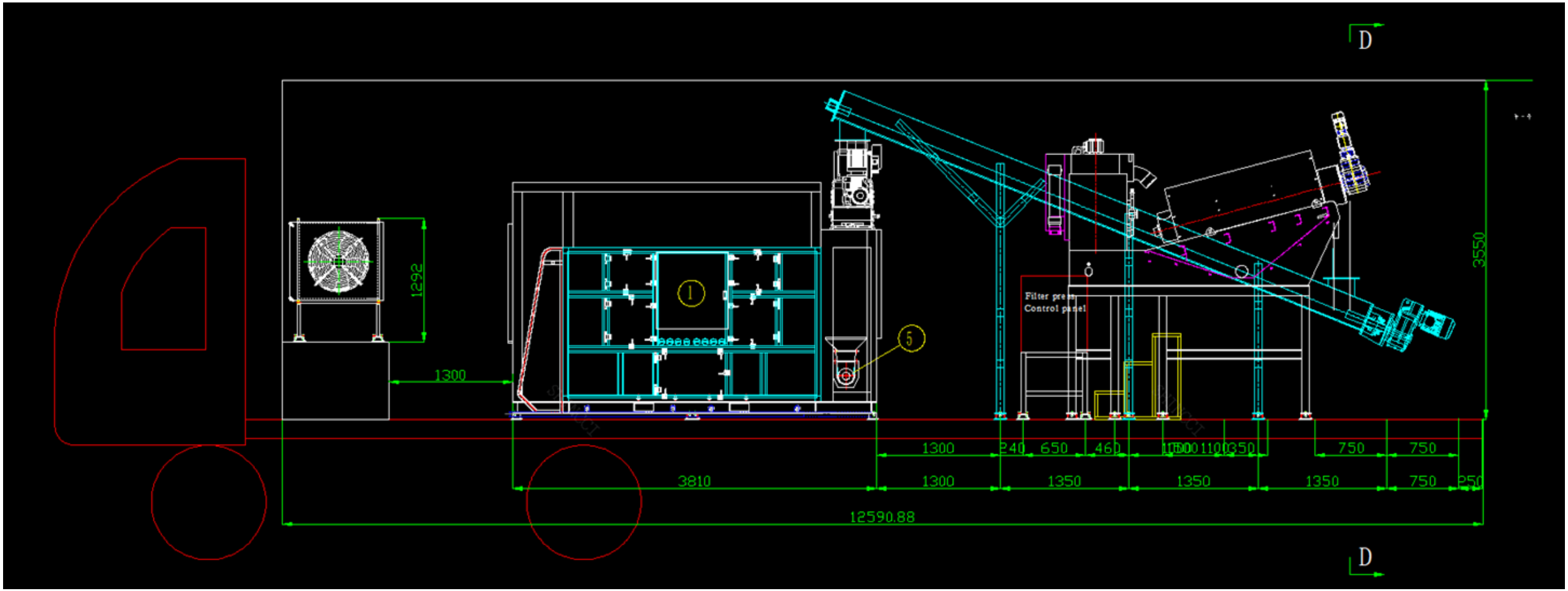


Slide-bottom Sludge Silo for Inlet Wet Sludge Cake: Plate Size, Spacing and Bearing Capacity

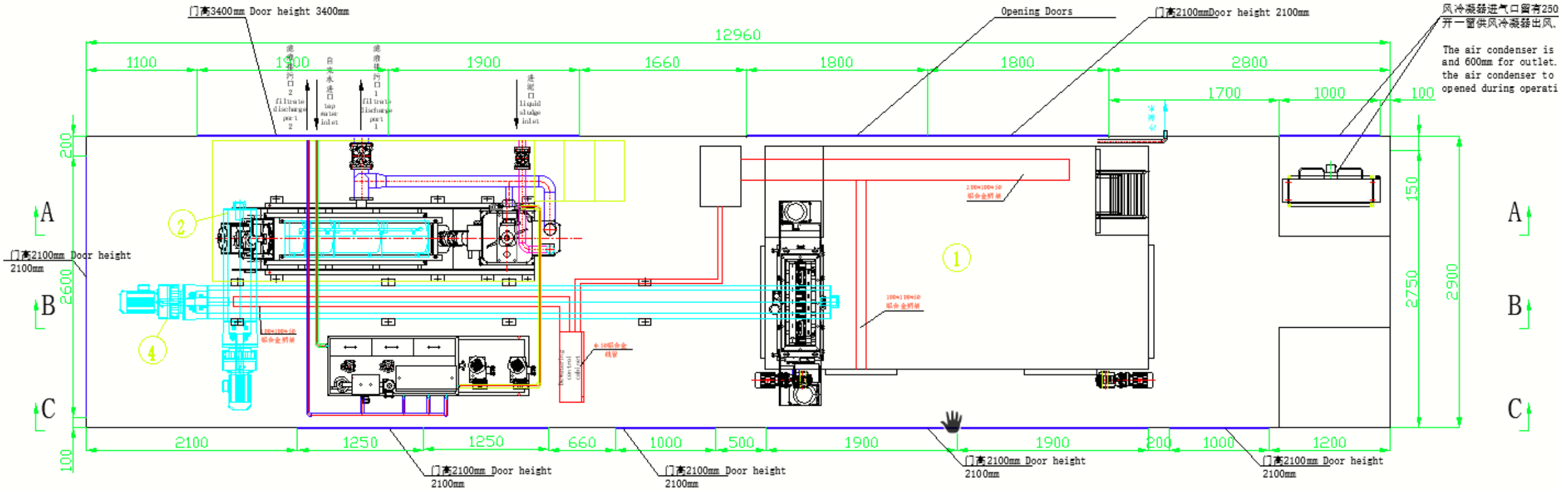



14650.0000
940.0000
M-1
52kW
M-2
50kW
N-1
65
N-2
N-3
2006.0000
550.0000
600.0000
1525.0000
360.0000
3110.0000
750.0000
400.0000
13000.0000
M-4
1.5kW
M-5
1.5kW
3200.0000
N-5
32

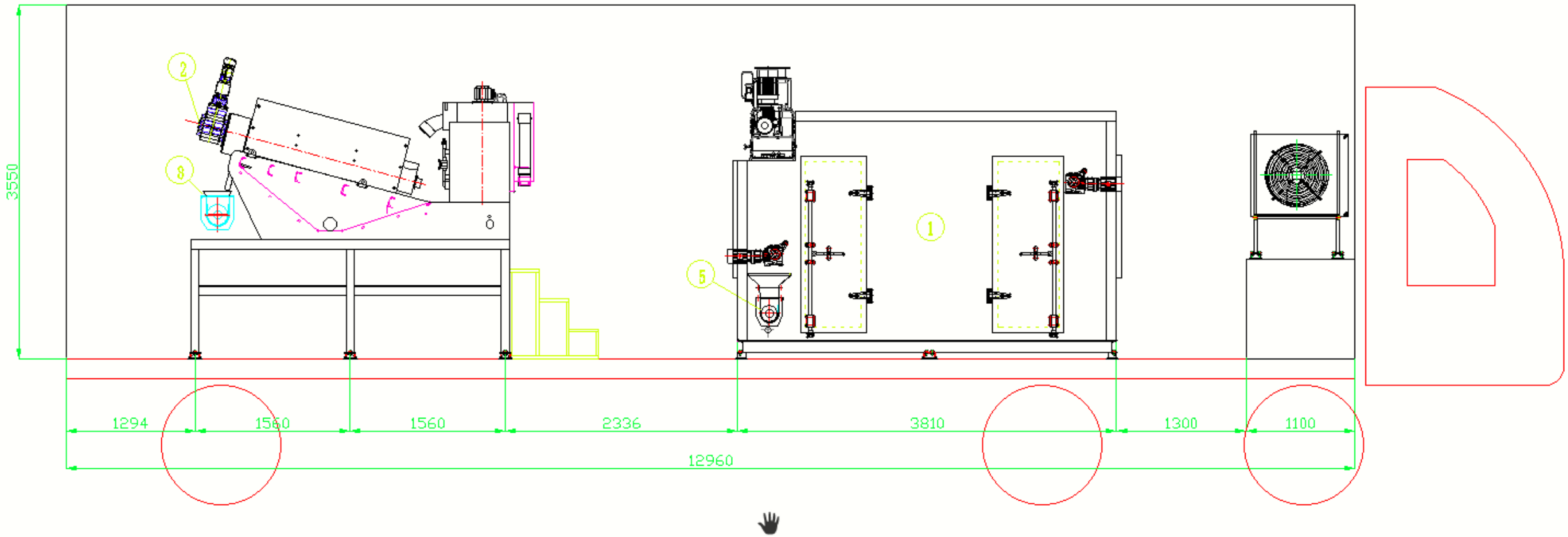

11400.0000
940.0000
M-1
52kW
M-2
50kW
N-1
65
N-2
N-3
2006.0000
550.0000
600.0000
1525.0000
360.0000
3110.0000
750.0000
9750.0000
400.0000
M-4
1.1kW
M-5
1.1kW
3200.0000
11400.0002
N-5


D
D
1292
1300
3810
1300
240
650
460
1300
1350
1350
1350
750
750
250
12590.88
3550
Filter press
Control panel
1
5

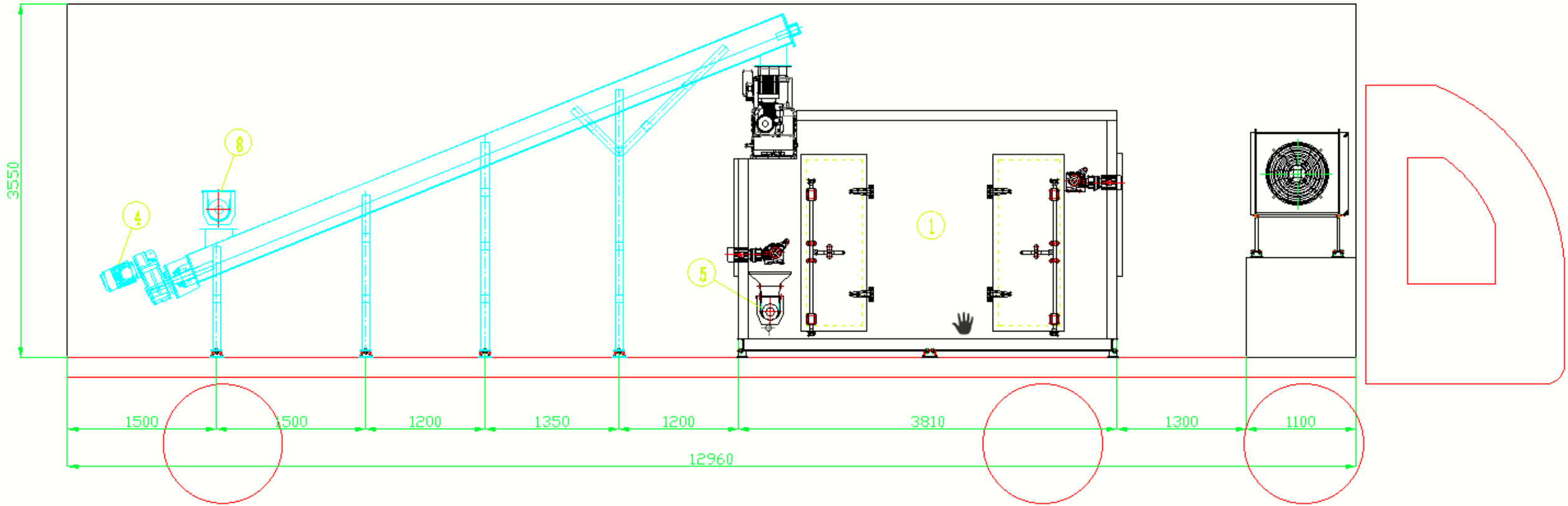
General Layout on the Trailer: Top View



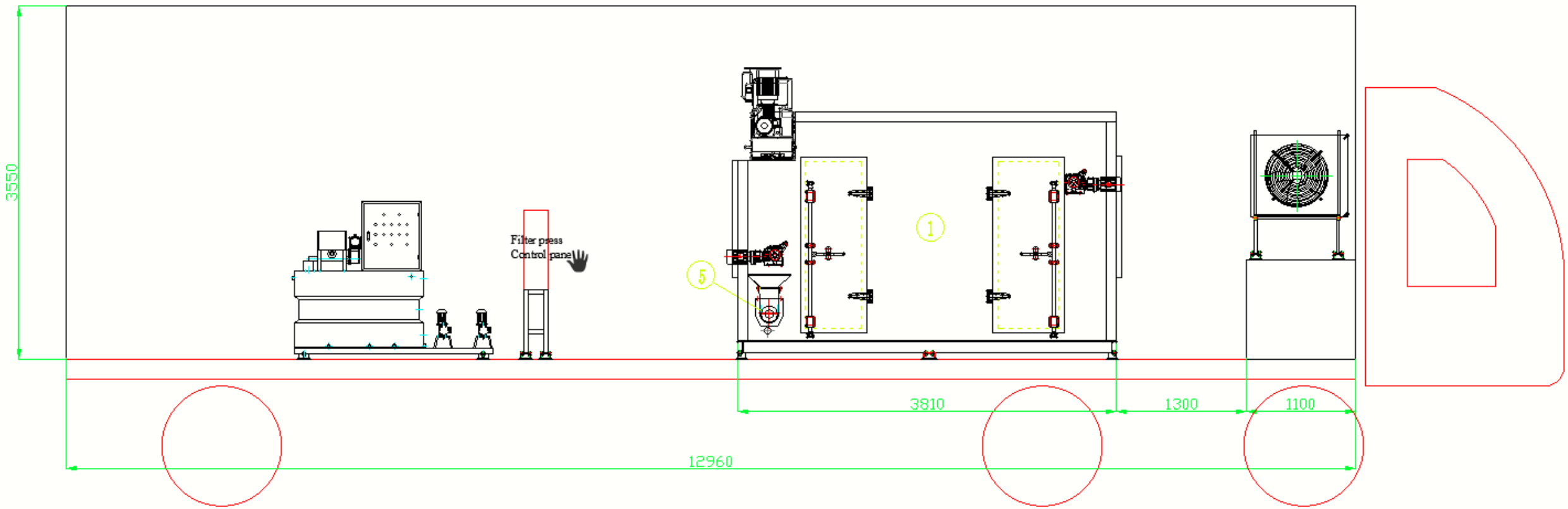
Section A-A

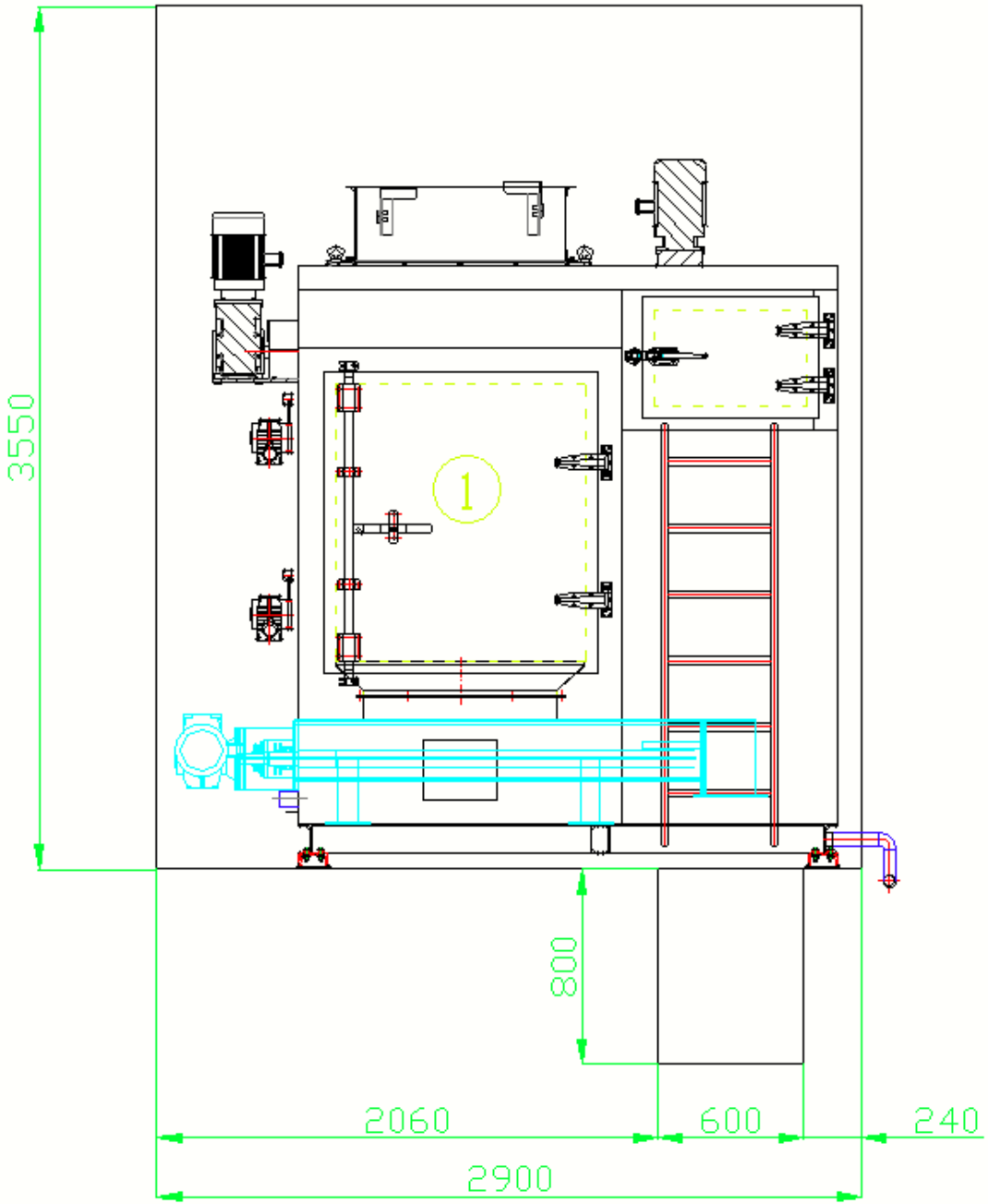


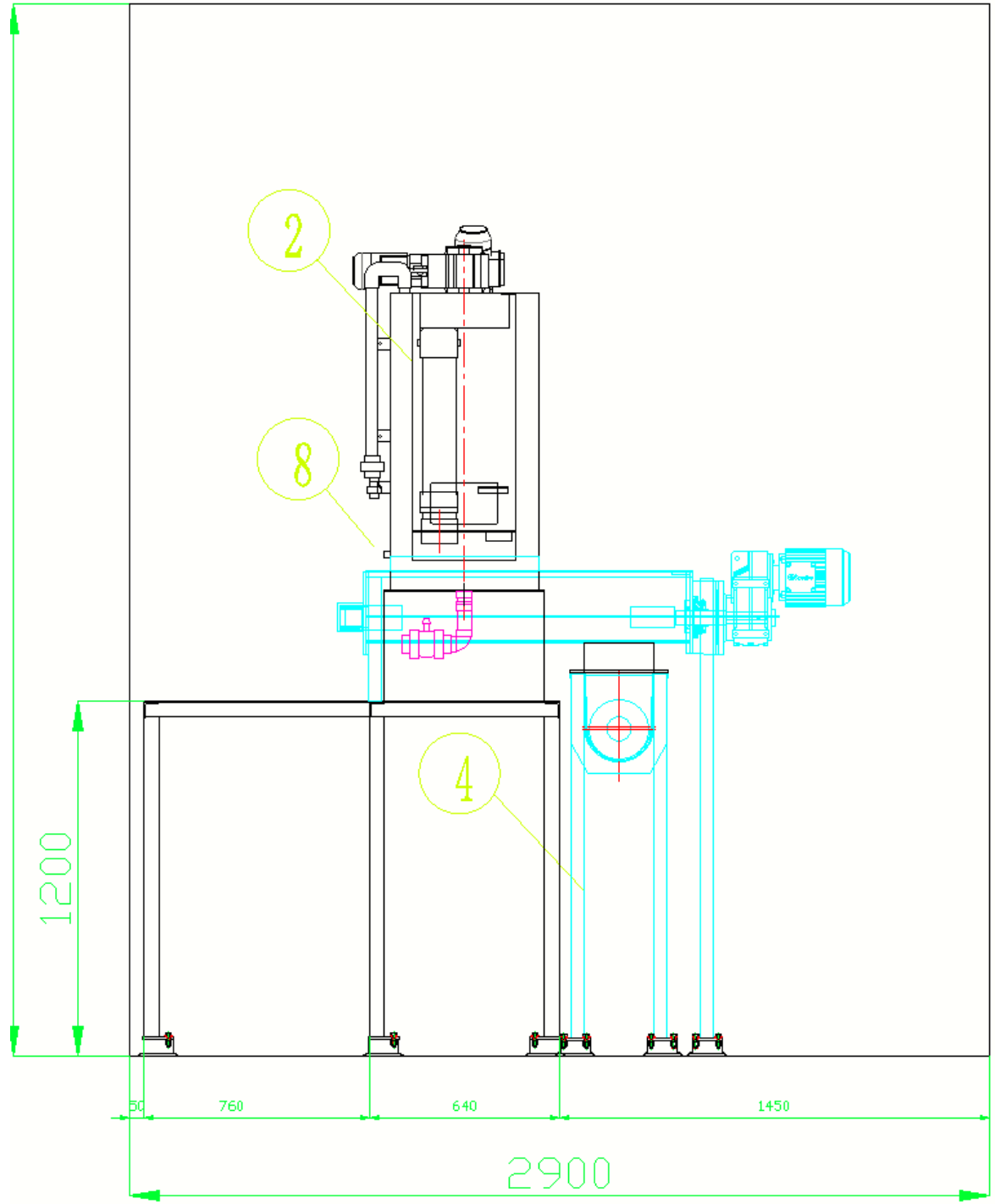
Section B-B



Section C-C




3550
1
800
2060
600
240
2900


2
8
4
1200
50
760
640
1450
2900


SUS 304
SUS 304
SUS 304
SUS 304


TOYOTA


SUPPLY AIR
SUS 304
Please tear down the protective film in three months of leave the factory

City of Auburn Sludge – Slitter Box

No.	Project / Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
1	Foshan Gaoming WTTP	SBDD16000SL	Municipal	20%	20.0	70%	1-Jan-15
2	Hunan province,Xiangyin WWTP	SBDD4800FL	Municipal	20%	8.0	60%	1-Apr-16
3	Meizhou city Sludge Treatment Center	SBDD9600FL	Municipal	20%	12.0	80%	1-May-16
4	Shenzhen LuoFang WWTP	SBDD38400SL*2	Municipal	40%	200.0	60%	1-May-16
5	Beijing Jinyuan Baite Water Processing Equipment Co.,Ltd.	SBDD1200SL	Municipal	20%	1.5	70%	1-Jun-16
6	Sighisora,Romania Municipal WTTP	SBDD7200FL*2	Municipal	20%	20.0	90%	1-Jun-16
7	Hunan province, Xiangtan Second WWTP	SBDD16200FSL*2	Municipal	20%	50.0	60%	1-Oct-16
8	Hebei Province,Langfang WWTP	SBDD4800FL	Municipal	20%	6.0	70%	1-Aug-16
9	Shenzhen Shekou WTTP	SBDD1200SL	Municipal	35%	2.0	70%	1-Sep-16
10	Zhejiang Jiande WWTP	SBDD14400SL	Municipal	35%	20.0	80%	1-Nov-16
11	Shandong Yantai Refuse Disposal	SBDD2400FL	Municipal	18%	3.0	70%	1-Nov-16
12	Everbright Water Affairs	SBDD4800FL	Municipal	20%	12.0	80%	1-Nov-16
13	Dali Fengyi Industry Park WWTP	SBDD9600FL	Municipal	20%	14.0	60%	1-Dec-16
14	Guangzhou Sino-Singapore-town WWTP	SBDD4800FL*2	Municipal	30%	15.0	65%	1-Jan-17
15	Guanghan Sanxingdui WWTP	SBDD21000F3SL*1	Municipal	20%	30.0	70%	1-Feb-17
16	Zhengzhou Ziying WWTP	SBDD9600FL	Municipal	30%	15.0	70%	1-Mar-17
17	Yuma,Arizona WWTP	SBDD1200SL	Municipal	0.70%	2.0	90%	1-May-17
18	Shaoyang Sludge Treatment Center -BOT	SBDD32400FSL	Municipal	35%	60.0	70%	1-May-17
19	SHENZHEN SHENSHUI ECOLOGICAL & ENVIRONMENTAL TECHNOLOGY CO., LTD.	SBDD48000SL SBDD48000SL-II	Municipal	20%	100.0	65%	1-May-17
20	Hunan Province,Yuanling WTTP	SBDD4800FL	Municipal	20%	6 T/D	50%	1-Jul-17
21	Zhengzhou City Second WWTP	SBDD9600FL	Municipal	35%	15 T/D	70%	1-Aug-17
22	Yantai Runda Group	SBDD38400SL	Municipal	30%	50.0	60%	1-Aug-17
23	Shenzhen, Futian WWTP	SBDD28800F2SL4 SBDD28800F2SL4-B SBDD33600F2SL5 SBDD33600F2SL5-B	Municipal	30%	250.0	60%	1-Oct-17
24	Changde Huirui WWTP	SBDD7200FL*2	Municipal	20%	19.0	80%	1-Oct-17
25	Dongyang Hengdian WWTP	SBDD14400SL	Municipal	30%	20.0	80%	1-Oct-17
26	Lvliang Second WWTP	SBDD21600FSL	Municipal	15%	28.0	70%	1-Oct-17
27	Gansu subei WWTP	SBDD2400FL	Municipal	20%	3.0	80%	1-Nov-07
28	Hubei Province, Julu First WWTP	SBDD7200FL	Municipal	20%	12.0	50%	1-Nov-07
29	Hunan Province,Xiangyin WWTP(Phase 2)	SBDD9600FL	Municipal	20%	15.0	70%	1-Nov-07
30	Shenzhen city Binhe WWTP	SBDD27000FSL*6	Municipal	30%	400.0	70%	1-Dec-17
31	Sinopec (Xi'an)	SBDD9600FL	Municipal	23%	12.0	80%	1-Dec-17
32	Beijing Foton Engine	SBDD600SL	Municipal	18%	0.6	80%	1-Feb-18
33	Xichang water supply and drainage - Jiongjiu Project	SBDD7200FL	Municipal	18%	10.0	70%	1-Feb-18
34	Xichang water supply and drainage - Qionghai Project	SBDD7200FL	Municipal	18%	10.0	70%	1-Feb-18
35	Xichang water supply and drainage - Xiaomiao Project	SBDD21600FSL*1 SBDD27000FSL*1	Municipal	18%	70.0	70%	1-Feb-18
36	Hongjiang Shuangxi WWTP	SBDD2400FL	Municipal	20%	2.1	50%	1-Mar-18
37	Yaan First Sewage Treatment Plant	SBDD14400SL	Municipal	18%	20.0	70%	1-Apr-18
38	NINGBO Municipal Sewerage North	SBDD24000SL	Municipal	40%	50.0	70%	1-May-18
39	Shangjie WWTP	SBDD10800FSL*2	Municipal	25%	15.0	70%	1-Jul-18
40	Xining Delhi Sludge Disposal Center	SBDD9600FL SBDD14400FL	Municipal	20%	36.0	70%	4-Aug-18
41	Gansu Dunhuang Qinghai Oilfield	SBDD9600FL*2	Municipal	20%	15.0	50%	5-Aug-18
42	Sichuan Everbright Energy Conservation and Environmental Protection	SBDD36000SL*2	Municipal	20%	100.0	70%	5-Sep-18
43	Shanghai Fengting Water purification plant	SBDD4800FL	Municipal	30%	16.0	70%	8-Sep-18
44	Guangzhou Zhuliao WWTP	SBDD14401FL	Municipal	25%	14.0	100%	1-Oct-18
45	Jincheng Zhengyuan Water	SBDD32400FSL	Municipal	20%	100.0	45%	2-Oct-18
46	Guangzhou Licheng WWTP	SHS4000FSL	Municipal	20%	60.0	60%	3-Oct-18
47	Luzhou Waste Disposal Demonstration Project	SBWHD15000*4	Municipal	28%	60.0	60%	4-Oct-18
48	Guangzhou Qianfeng WWTP	SBDD28800SL*3	Municipal	30%	135.0	70%	1-Nov-18
49	Italy Naples Scalea WWTP	SBDD2400FL	Municipal	25%	3.0	70%	2-Nov-18
50	Bayan Nur Urad Houqi WWTP	SBDD4800FL	Municipal	20%	7.5	70%	3-Nov-18
51	Luofang WWTP (2nd phase)	SBDD28800FL*6	Municipal	100%			
52	Qifu First WWTP	SBDD4800FL	Municipal	18%	5.0	70%	1-Dec-18
53	Qifu Second WWTP	SBDD7200FL	Municipal	18%	10.0	70%	2-Dec-18
54	Ganzhou Huichang WWTP	SBDD4800FL	Municipal	2%	5.0	50%	3-Dec-18
55	Shenzhen Pingshan WWTP	SBDD2400FL	Municipal	18%	3.0	80%	6-Dec-18
56	Guangzhou Zhongxin WWTP	SBDD16200FSL	Municipal	20%	37.5	60%	7-Dec-18
57	Guangzhou Mingzhu WWTP	SBDD10800FSL	Municipal	20%	15.0	60%	8-Dec-18
58	Guangzhou Taiping Town WWTP	SBDD10801FSL	Municipal	20%	15.0	60%	9-Dec-18
59	Guangzhou Liangkou Town WWTP	SBDD7200FL	Municipal	20%	7.4	60%	10-Dec-18
60	Guangzhou Wenquan Town WWTP	SBDD4800FL	Municipal	20%	6.0	60%	11-Dec-18
61	Guangzhou Conghua Water Purification	SBDD7200FL	Municipal	20%	9.6	60%	12-Dec-18
62	Linfen 3rd WWTP	SBDD33600SL*2	Municipal	17%	90.0	60%	2-Mar-19
63	Kaihua Tianhui Environment	SBWHD15000	Municipal	32%	24.0	60%	3-Mar-19
64	Hanmee Entec CO,ltd	SBDD600FL	Municipal	20%	0.7	90%	4-Mar-19
65	Changshanwan WWTP	SBDD43200FSL*4\SBDD38400SL	Municipal	20%	300.0	50%	5-Mar-19
66	Changsha wangcheng No.2 WWTP	SBDD2400FL	Municipal	18%	2.5	70%	6-Mar-19
67	Xi'an WWTP	SBDD54000FSL*5	Municipal	25%	500.0	65%	7-Apr-19
68	Guilin Beichong WWTP	SBDD10800FSL	Municipal	18%	14.0	70%	1-Jun-19
69	Shougang Machinery&Electric	SBDD28800SL	Municipal	20%	34.0	85%	1-Jun-19
70	Shishou Chengdong WWTP	SBDD14400FL	Municipal	17%	20.0	40%	1-Jun-19

No.	User Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
1	Taiwan Ping Ho Environment Technology	SBDD4000FL	Plating	28%	6	70%	1-Jan-15
2	Taiwan Shang Xin Industry	SBDD2000FL	Plating	20%	2.5	75%	1-Jan-15
3	Taiwan Yiqin Industry	SBDD6000FL	Plating	20%	8	70%	1-Mar-15
4	Taiwan Shangxin Industry	SBDD2000FL	Plating	20%	2	70%	1-Mar-15
5	Taiwan Yiqin Industry	SCODD200FL	Plating	20%	0.23	70%	1-Mar-15
6	Shanghai Tianma Microelectronics	SBDD1000SL	Plating	25%	1.2	85%	1-May-15
7	Shanghai INESA Dispaly materials Co.	SBDD1000SL	Plating	25%	1	85%	1-May-15
8	Taiwan Pingho Environment Technology	SBDD16000SL*2	Plating	25%	50	70%	1-Jun-15
9	Taiwan Pingho Environment Technology	SC0DD200FL	Plating	20%	0.2	70%	1-Jul-15
10	Taiwan Yiqin Industry	SCODD800FL*3	Plating	20%	1.5	70%	1-Nov-15
11	Jiangsu Skyray-Instrument	SCODD800FL	Plating	25%	1	70%	1-Sep-16
12	Qingdao Shuiqingmuhua Environment	SBDD1200SL	Plating	25%	1	70%	1-Dec-16
13	Bekaert China	SBDD2400FL	Plating	35%	4	70%	1-Dec-16
14	Hitachi Elevator China	SBDD1200SL	Plating	30%	3	70%	1-Apr-17
15	Taiwan HannsTouch Solution	SBDD4800FL	Plating	20%	6	70%	1-May-17
16	Jiangsu Skyray Instrument	SBDD2400FL	Plating	30%	5	80%	1-May-17
17	Pingdong Zhupiter	LTDD560	Plating	20%	3	70%	1-Jul-17
18	OTAX Electronics (ShenZhen)	SBDD2400FL	Plating	26%	3	75%	1-Aug-17
19	Huiyang Yuangao Electronics (ceiling fan)	SCODD800FL	Plating	30%	1.2	65%	1-Sep-17
20	Huiyang Yuyuan Industry (ceiling fan)	SCODD800FL	Plating	30%	1.2	65%	1-Sep-17
21	Haojue Motorcycle	SBDD2400FL	Plating	27%	3	85%	1-Oct-17
22	Career PCB (Kunshan)	SBDD2400FL	Plating	30%	3	70%	1-Nov-07
23	Texas Instruments (China)	SCODD800FL	Plating	25%	1	60%	1-Dec-17
24	SPRING PROFIT PLATING WORK CO.	SCODD1600SL	Plating	22%	2.4	60%	1-Mar-18
25	Qingdao Shuiqingmuhua Environment	SBDD2400FL*2	Plating	20%	6	70%	1-Apr-18
26	Tianjin Kinport Plating	SBDD7200FL	Plating	35%	14	70%	1-May-18
27	Tianjin Bingang Plating Management	SBDD7200FL	Plating	35%	14	70%	1-May-18
28	Wei'er Gao Electronic Co.,Ltd.	SCODD800FL	Plating	35%	1	75%	1-Jun-18
29	Pinghe Environment Protecttion	SCODD3200SL	Plating	25%	40	60%	1-Jul-18
30	Tangshan Kaiyuan Metal Surface Processing	SCODD800FL	Plating	25%	1.2	75%	6-Aug-18
31	Beijing Kohler Ltd.	SBDD1200FL	Plating	18%	1.2	80%	3-Sep-18
32	KOBE SPECIAL STEEL WIRE(PINGHU)	SCODD803FL	Plating	22%	4	70%	4-Nov-18
33	Anping County Haotian World Expo Industry Product	SBDD4800FL	Plating	17%	6	70%	1-Jan-19
34	Tianjin Faw Toyota Engine Co.,Ltd.	SBDD1200FL	Plating	28%	2	70%	2-Mar-19
35	Cansemi	SBDD2400FL	Plating	18%	3	70%	3-Mar-19
36	Honda（Guangzhou Auto Huangpu）	SBDD2400FL*2	Plating	17%	6	70%	5-Mar-19
37	Liang Dar Tech(Taiwan)	SBDD600SL	Plating	17%	0.5	70%	6-Mar-19
38	Johnson Health Tech(Taiwan)	SCODD400FL	Plating	30%	0.3	80%	7-Apr-19

No.	Project / Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
1	Guangdong Titan Pharmaceutical	SBDD4000FL	Pharmaceutical	20%	5	90%	1-Oct-2015
2	Jiangsu Blue Ocean Environment	SBDD2400FL	Pharmaceutical	20%	3	60%	1-Mar-2016
3	Zhejiang Wansheng Pharmaceutical	SBDD9600FL	Pharmaceutical	20%	12	75%	1-Sep-2016
4	Shandong Qilu Pharmaceutical	SBDD7200FL	Pharmaceutical	20%	10	70%	1-Sep-2016
5	Jiaozuo Joincare	SBDD38400SL*2	Pharmaceutical	35%	120	70%	1-May-2017
6	Shandong Lukang Pharmaceutical	SBDD27000FSL*2	Pharmaceutical	25%	75	70%	1-Oct-2017
7	Shandong Xinlitai Pharmaceutical	SBDD7200FL	Pharmaceutical	15%	10	70%	1-Dec-2017
8	Zhejiang Chengyi Pharmaceutical	SBDD1200SL	Pharmaceutical	21%	1	80%	1-Jan-2018
9	Joincare Pharmaceutical Group Industry-BOT(Phase 3)	SBDD38400SL	Pharmaceutical	35%	60	70%	1-Apr-2018
10	Guangdong Titan Pharmaceutical	SBDD4800FL	Pharmaceutical	18%	6.9	80%	1-May-2018
11	Shenzhen Haibin Pharmaceutical	SBDD2400FL	Pharmaceutical	20%	1.2	70%	1-Aug-2018
12	Shandong Lukang Pharmaceutical	SBWHD20000	Pharmaceutical	18%	20	90%	1-Oct-2018
13	Livzon New North River Pharmaceutical	SBDD4800FL	Pharmaceutical	26%	6	80%	1-Nov-2018
14	Zhejiang AngLiKang Pharmaceutical	SBDD4800FL	Pharmaceutical	16%	6	60%	1-Nov-2018
15	Xi'an Remade Water Industry Tech	SBDD1200FL	Pharmaceutical	15%	0.8	80%	2-Nov-2018
16	Eli Lilly and Company	SBDD1200FL	Pharmaceutical	18%	1	70%	4-Dec-2018
17	Weihai Disu Pharmaceutical	SBWHD10000	Pharmaceutical	17%	10	70%	5-Dec-2018
18	Hebei Guang Xiang Pharmaceutical	SBDD4800FL	Pharmaceutical	37%	4.6	60%	6-Dec-2018
19	Shandong Pacific Environmental Protection Co.,ltd.	SBDD2400FL	Pharmaceutical	17%	3	70%	1-May-2019

No.	Project / Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
1	Henan Prosper Leather	SBWHD10000	Leather	30%	15	80%	1-Oct-2016
2	Guangzhou Midori automotive leather	SBDD7200FL	Leather	30%	10	80%	1-May-2017

No.	User Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
77	Honda Jiangling Engine	SBDD1200SL	Chemical	20%	0.8	70%	1-Jul-2018
78	Tianjin Fuji Protein Co.,Ltd.	SBDD2400FL	Chemical	18%	3	70%	1-Jul-2018
79	Bekaert China	SBDD2400FL	Chemical	25%	3	80%	1-Jul-2018
80	BEKAERT Shenyang	SBDD4800FL	Chemical	30%	6	80%	1-Jul-2018
81	Fengheng Garment Rinsing Co.,Ltd.	SBDD4800FL	Chemical	15%	5	70%	1-Jul-2018
82	Langfang FOXCONN	SBDD16200FSL	Chemical	22%	20	70%	1-Jul-2018
83	Lianyungang Zhonghua Chemicals Co.,Ltd.	SBDD4800FL	Chemical	26%	6.5	80%	1-Jul-2018
84	ZY POSCO(Qinghuangdao)	SBDD2400FL	Chemical	20%	2	80%	1-Jul-2018
85	RIZHAO Lvyuan Industrial WWTP	SBDD19200FL	Chemical	20%	50	70%	1-Jul-2018
86	Zhejiang Wynca Group	SBDD1200SL	Chemical	30%	1.68	80%	1-Jul-2018
87	Shenzhen China Star Optoelectronics Technology	SBDD43200FSL*1 SBDD37800FSL*1	Chemical	20%	95	70%	1-Aug-2018
88	Shandong Longda Biology Engineering Co.,Ltd.	SBDD28800FL	Chemical	40%	100	80%	1-Aug-2018
89	Zhejiang Xinyong Biochemical	SBDD2400FL	Chemical	17%	3	70%	1-Aug-2018
90	YONGNONG (YONON)	SBDD4800FL	Chemical	32%	6	80%	1-Aug-2018
91	Huizhou CEE (Sandong)	SBDD2400FL	Chemical	32%	2.6	70%	2-Aug-2018
92	Huizhou CEE (Chenjiang)	SBDD7200FL	Chemical	31%	10	70%	3-Aug-2018
93	Zhejiang Jinke Culture	SBDD1200SL	Chemical	18%	1.4	80%	7-Aug-2018
94	Jingjiang Xingang WWTP	SBDD4800FL	Chemical	18%	6	60%	1-Sep-2018
95	Shanghai ASMC	SBDD2400FL	Chemical	25%	3.5	70%	2-Sep-2018
96	Shanghai Ailu Package	SBDD2400FL	Chemical	18%	1.5	70%	4-Sep-2018
97	Zhejiang Dayang Biotech Technology Group	SBDD2400FL	Chemical	18%	3	80%	6-Sep-2018
98	Hebei Chinjoo art	SBDD7200FL	Chemical	19%	3	60%	7-Sep-2018
99	Suzhou Santuo Tech	SBDD7200FL	Chemical	17%	9	70%	1-Oct-2018
100	Hangzhou Bioking Biochemical Engineering	SBDD4800FL	Chemical	18%	5	80%	2-Oct-2018
101	China Petroleum & Chemical Corporation Jiujiang Company	SBDD14400SL\SBDD9600SL	Chemical	100%			3-Oct-2018
102	Pujiang Sanyang	SBDD7200FL	Chemical	37%	5	70%	1-Nov-2018
103	Yanzhou Coal Yulin energy	SBWHD15000	Chemical	20%	20	70%	2-Nov-2018
104	Yongfengyu Paper Industry （Shanghai） Limited Company	SCODD400FL	Chemical	30%	0.6	70%	3-Nov-2018
105	FOSHAN SANSHUI JIALIDA TEXTILE CO.,LTD.	SBHWHD50000	Chemical	20%	160	70%	4-Nov-2018
106	Zhejiang Junrong Hardware Industry	SCODD400FL	Chemical	30%	0.6	80%	5-Dec-2018
107	Anhui Zhongneng Chemical	SBWHD10000	Chemical	17%	11.3	60%	1-Jan-2019
108	SMC Corporation(China)	SCODD4800FL	Chemical	30%	0.6	75%	2-Jan-2019
109	KOYO AUYOMOTIVE PARTS (WUXI) CO., LTD.	SBDD2400FL	Chemical	40%	3	70%	3-Jan-2019
110	Invt Energy Management(Shenzhen)	SBDD2400FL	Chemical	27%	4	80%	4-Jan-2019
111	Yingtan WWTP	SBDD19200FL、SBDD14400FL	Chemical	30%	47	80%	6-Jan-2019
112	Jiangsu Huangqiao WWTP	SBDD7200FL	Chemical	18%	10	70%	7-Feb-2019
113	Changshan KERUN New Material	SBDD4800FL	Chemical	37%	7	80%	7-Mar-2019
114	Yingde Jifeng Dyeing&Weaving Co.,Ltd.	SBWHD15000	Chemical	33%	30	60%	9-Mar-2019
115	Shaoxing Weiyi recycled resources	SBDD4800FL	Chemical	37%	7	75%	10-Mar-2019
116	Jiangsu Zhenhua Environmental Protection	SBWHD10000	Chemical	28%	14	75%	11-Mar-2019
117	FAR EASTER DYEING & FINISHING CO.,LTD	SBWHD15000	Chemical	28%	20	70%	12-May-2019
118	Tianjin Bohai Chemical	SBDD14400SL、 SBDD32400FSL*2	Chemical	20%	118	80%	13-May-2019
119	Ningbo Dexin Dyeing	SBDD4800FL	Chemical	25%	7	80%	13-May-2019
120	Jiangsu Yangnong Chemical Group Co.,Ltd.	SBWHD5000	Chemical	20%	6	80%	1-Jun-2019
121	Luzhou North Chemical Industry Co.,Ltd.	SBDD2400FL	Chemical	20%	2	70%	1-Jun-2019

No.	User Entity	Model Specification	Sludge Type	Sludge Cake Total Solids (%)	Wet Sludge Scale (Metric Ton/Day)	Required Total Solids of Dried Sludge (%)	Operation Starting Date
1	Dongguan Chengyuen Tannery	SBDD4000	Chemical	30%	6	75%	1-Aug-2012
2	FoShan Xinlong WWTP	SBDD12000SL	Chemical	17%	15	70%	1-Oct-2014
3	Henkel (Dongguan factory)	SCODD200FL	Chemical	30%	0.3	80%	1-Jun-2015
4	Suzhou Hongda Enzyme-making Co	SBDD16000SL*2	Chemical	40%	75	70%	1-Sep-2015
5	Suzhou EMC Group	SCODD400FL	Chemical	40%	600	70%	1-Sep-2015
6	Yunnan Qingzhong Tech	SBDD28800SL	Chemical	45%	60	85%	1-Dec-2015
7	Chongqing Dajiang Yuqiang Plastic	SCODD800FL*2	Chemical	25%	1.5	80%	1-Dec-2015
8	Performance Fiber (Kaiping) Co.	SCODD800FL*2	Chemical	40%	4	70%	1-Mar-2016
9	Sembcorp WTTP in Jiangsu	SBDD9600FL	Chemical	20%	12	80%	1-Apr-2016
10	Shanghai Lubrizol	SBDD1200SL	Chemical	40%	1.5	70%	1-May-2016
11	Shanghai MinXin Environment	SCODD800FL	Chemical	30%	1	70%	1-May-2016
12	Nanjing Runbu WWTP	SBDD2400FL	Chemical	20%	3	80%	1-Jun-2016
13	Foshan Xinlong WWTP	SBDD43200F6SL3*6	Chemical	20%	300	70%	1-Jun-2016
14	Jiangsu Skyray Instrument	SBDD600SL	Chemical	25%	1	70%	1-Oct-2016
15	Zhejiang Lily Group	SBWHD10000	Chemical	30%	15	85%	1-Jun-2016
16	DYSTAR (Nanjing)	SBDD7200FL	Chemical	20%	9.6	80%	1-Jul-2016
17	Xiamen ReCulture Renewable Energy Co.	SBDD28800SL	Chemical	30%	50	70%	1-Jul-2016
18	Ningbo Zhengguang Resin	SBDD2400FL	Chemical	30%	3	70%	1-Aug-2016
19	Hubei Xianlong Chemical Engineering	SBDD7200FL	Chemical	25%	8	75%	1-Sep-2016
20	Chongzhou Jin Peng Environment Tech	SBDD14400SL	Chemical	30%	18	80%	1-Sep-2016
21	Siemens (Wuxi) Switch	SCODD400FL	Chemical	25%	0.4	80%	1-Sep-2016
22	Sierra PCB	SCODD800FL	Chemical	30%	0.48	90%	1-Oct-2016
23	International Flavors & Fragrances (Zhejiang)	SBDD600SL	Chemical	50%	1.5	80%	1-Dec-2016
24	Jiangsu Skyray Instrument	SCOD800FL	Chemical	35%	1	80%	1-May-2017
25	Shenzhen Weilvda Tech	SCODD400FL*2	Chemical	60%	2	80%	1-May-2017
26	Citic Envirotech, Changyi City WWTP	SBDD14400SL	Chemical	30%	25	70%	1-Jun-2017
27	Cosmax (China)	SBDD1200SL	Chemical	20%	1.5	70%	1-Jul-2017
28	Henkel (Shanghai Factory)	SCODD800FL	Chemical	25%	1.5	70%	1-Jul-2017
29	Shanghai Sanjiu Mechanical	SCODD800FL	Chemical	25%	0.3	70%	1-Jul-2017
30	Hangzhou Electrochemical Group	SBDD1200SL	Chemical	18%	1.5	85%	1-Aug-2017
31	Hebei Jiacheng Enviro Protect	SBDD1200SL	Chemical	20%	1.5	90%	1-Aug-2017
32	Fulong Fiberglass	SBDD1200SL	Chemical	20%	1	70%	1-Aug-2017
33	Zhejiang Dibang Chemical	SBWHD20000	Chemical	55%	40	80%	1-Aug-2017
34	Chongqing Earthope	SBWHD15000	Chemical	20%	20	80%	1-Aug-2017
35	Huiyang Yuangao Electronics	SCODD800FL	Chemical	30%	1.2	70%	1-Aug-2017
36	Kunshan Sino Silicon Products Inc.	SCODD800FL*2	Chemical	28%	3	75%	1-Aug-2017
37	Jiangyin Xinqiao Sewage Treatment	SBDD9600FL	Chemical	40%	18	60%	1-Sep-2017
38	Bicheng Glassfiber	SBDD2400FL	Chemical	25%	3.5	75%	1-Sep-2017
39	Shanghai Rongcheng Paper Industry	SCODD400FL	Chemical	25%	0.4	70%	1-Sep-2017
40	Toyo Pack (Changshu)	SBDD1200SL	Chemical	25%	1.5	90%	1-Sep-2017
41	Shanghai Amkor OSAT Technology	SBDD2400FL	Chemical	40%	3	70%	1-Sep-2017
42	Chongqing Yuanlv Environment	SBDD2400FL	Chemical	39%	3	75%	1-Sep-2017
43	VOSS (Hubei) Beverage	SBDD1200SL	Chemical	20%	1	80%	1-Sep-2017
44	Zhejiang Huangma Surfactant Manufacturer	SBDD1200SL	Chemical	20%	1.06	80%	1-Sep-2017
45	Zhangyuan Tungsten	SBDD7200FL	Chemical	22%	10	70%	1-Oct-2017
46	Zhenjiang Jiangnan Chemical	SBDD7200FL*2	Chemical	25%	7 12	70%	1-Oct-2017
47	Wuhan Baijie Tech	SBDD600SL	Chemical	20%	0.8	90%	1-Oct-2017
48	Jiangsu Minth Group	SCODD800FL	Chemical	25%	2.2	70%	1-Oct-2017
49	Luxi Group	SBWHD25000	Chemical	30%	40	70%	1-Oct-2017
50	Ningbo Longxin Fine Chemical Co.	SBDD2400FL	Chemical	45%	5	80%	1-Oct-2017
51	JAC Automobile （Phase 1）	SCODD800FL	Chemical	25%	10	70%	1-Oct-2017
52	Beijing BOE	SBDD2400FL	Chemical	20%	2	80%	1-Oct-2017
53	Suzhou L-Max Electronic	SCODD800FL	Chemical	21%	1	75%	1-Oct-2017
54	Yiyang New Material Industrial Park	SBDD7200FL	Chemical	20%	7.56	70%	1-Nov-2007
55	Tianjin Toyo Ink	SBDD600SL	Chemical	20%	0.7	80%	1-Jan-2018
56	Kuangchuan Pasture	SBDD1200SL	Chemical	20%	1.8	60%	1-Feb-2018
57	JAC Automobile （Phase 2）	SCODD800FL	Chemical	30%	1.4	70%	1-Feb-2018
58	JAC Automobile （Phase 3）	SCODD800FL	Chemical	30%	1.4	70%	1-Feb-2018
59	Jiangsu Youth Chemical Co.	SBWHD15000	Chemical	19%	21	70%	1-Feb-2018
60	Zhoushan Omat	SCODD800FL	Chemical	40%	1.5	80%	1-Mar-2018
61	Harbin Institute of Technology	SBDD1200FL	Chemical	18%	1.5	90%	1-Mar-2018
62	JAC（2 STATION）	SCODD800FL	Chemical	30%	1.4	70%	1-Mar-2018
63	JAC Auto	SCODD800FL	Chemical	30%	1.4	70%	1-Apr-2018
64	Jiangsu Jiannong ABA Agrochemical	SBDD2400FL	Chemical	20%	3	70%	1-Mar-2018
65	Nichicon Electronics(Suqian)Co.,Ltd	SCODD800FL	Chemical	19.5%	1	70%	1-Apr-2018
66	Shanghai Pharma	SCODD800FL	Chemical	30%	1	70%	1-Apr-2018
67	JAC Auto	SCODD800FL	Chemical	30%	1.4	70%	1-Apr-2018
68	Zhejiang Feng Tar Wool Technology Co.,Ltd.	SBDD19200FL	Chemical	35%	35	75%	1-Apr-2018
69	Jiangsu Funing Industrial WWTP	SBDD4800FL	Chemical	34%	5	80%	1-May-2018
70	Taiho Kogyo Corporation of Yanta	SCODD400FL	Chemical	25%	0.05	70%	1-May-2018
71	Slaughterhouse sewage treatment	SBDD4800FL	Chemical	20.0%	5.375	80%	1-May-2018
72	Shanghai Huofu Liyong Car Lockset	SBDD600SL	Chemical	20%	0.4	70%	1-May-2018
73	Qingdao Haiwan Specialty Chemicals	SBWHD20000	Chemical	35%	30	85%	1-Jun-2018
74	Jiangsu Beihua Environmental Tech	SBDD9600FL	Chemical	29%	14	80%	1-Jun-2018
75	Shanghai Automotive Brake Systems Co.,Ltd.	SBDD1200SL	Chemical	18%	1.2	70%	1-Jun-2018
76	Tianjin HiEntech	SBDD1200SL	Chemical	20%	1.4	80%	1-Jul-2018

On Going Research at Department of Biosystems Engineering

- Meat Lab Waste
  - 175 Tons at 10% Solids
  - Will reduce to ~20 Tons
- Gasification of Final Product
- Use for Seedlings at Controlled Environment Agriculture

Thank you

Questions?