ATTACHMENT 1 - DESCRIPTION OF CHANGES

BASE BID FOR PARISH PROJECT NO. P980701: WILLOWDALE DRAINAGE PUMP STATION

Item No.	Description	Unit	Unit Price	Original Contract		Change Order No. 1		Total to Date		Increases	Decreases	Deletions	Additions
				Quantity	Cost	Quantity	Cost	Quantity	Cost				
1	Mobilization	LS	$75,000 00	1 00	$75,000 00								
2	Temporary Signs and Barricades	LS	$1,400 00	1 00	$1,400 00								
3	Project Sign	EA	$400.00	1 00	$400 00								
4	Pre-Engineered Metal Building	LS	$14,000 00	1.00	$14,000.00								
5	Pump Station Structure	LS	$280,000 00	1.00	$280,000.00								
6	Drainage Pump and Gear Reducer Assembly	EA	$350,000.00	3 00	$1,050,000 00								
7	Diesel Engines	EA	$31,000 00	3 00	$93,000 00								
8	Discharge Piping	EA	$18,000 00	3.00	$54,000 00								
9	Intake Basin	LS	$660,000 00	1 00	$660,000 00								
10	Discharge Basin	LS	$100,000 00	1 00	$100,000 00								
11	Bar Screen	LS	$15,000 00	1 00	$15,000 00								
12	Walkways, Stairs, Handrails and Gratings	LS	$19,000 00	1 00	$19,000 00								
13	Overhead Crane	LS	$5,500 00	1 00	$5,500 00								
14	Electrical and Motor Control Center	LS	$120,000 00	1 00	$120,000 00								
15	Fuel Oil Storage Tank and Day Tank	LS	$35,000 00	1 00	$35,000 00								
16	Emergency Generator	EA	$12,000 00	1 00	$12,000 00								
17	Seal Water System	LS	$3,100 00	1 00	$3,100 00								
18	Test Pile	EA	$22,000 00	2 00	$44,000 00								
19	Fencing and Gates	LS	$3,500 00	1 00	$3,500 00								
20	General Excavation and Grading	LS	$250,000 00	1 00	$250,000 00								
21	Crushed Limestone Parking Area and Limestone Roadway (Truck Measured)	CY	$33 00	370 00	$12,210 00								
22	Class "D" Geotextile	SY	$1 00	6000 00	$6,000 00								
23	Crushed Stone for Base Course and Shoulder Roadway (Truck Measured)	CY	$44 00	1240 00	$54,560 00								
24	Hot Mix Asphalt Wearing Course (1-1/2" Thick)	SY	$3 00	3700 00	$11,100 00								
25	Hot Mix Asphalt Wearing Course (3-1/2" Thick)	SY	$10 00	3700 00	$37,000 00								
26	Rip Rap (Truck Measure)	CY	$100 00	300 00	$30,000 00								
27	Drop Inlets	EA	$3,500 00	3 00	$10,500.00								
28	12" Diameter PVC Drainline	LF	$125 00	70 00	$8,750.00								
29	15" Diameter PVC Drainline	LF	$150 00	50 00	$7,500 00								
30	18" Diameter PVC Drainline	LF	$160 00	35 00	$5,600.00								
31	8" PVC Water Main Including Fittings	LF	$10.00	2330 00	$23,300.00								
32	Water Line Tie-In at Willowdale Blvd	LS	$3,500 00	1 00	$3,500 00								
33	8" D.I Water Main Aerial Crossing	LS	$4,500 00	1 00	$4,500.00								
34	8" Water Valve and Box	EA	$1,800.00	1 00	$1,800 00								
35	4" Water Valve and Box	EA	$350 00	1 00	$350 00								
36	2" PVC Waterline Including Fittings	LF	$12 00	70 00	$840 00								
37	Fire Hydrants	EA	$1,600 00	5 00	$8,000 00								
38	2" Water Meter	EA	$1 00	1 00	$1 00								
39	2" Water Backflow Preventer	EA	$1,200.00	1.00	$1,200 00								
40	Relocation of Infrastructure Items	LS	$30,000 00	1 00	$30,000 00								
X-1	Increase in Engine Cost	LS	$26,421 00			1 00	$26,421 00			$26,421 00			
X 2	Change From 48" to 54" Pumps	LS	$224,123 00			1 00	$224,123 00			$224,123 00			
X 3	Sump Modifications	LS	$31,672.00			1.00	$31,672 00			$31,672 00			
X 4	Change Discharge Pipe From 48" to 54"	LS	$41,275 00			1.00	$41,275 00			$41,275 00			

ATTACHMENT 2

CORRESPONDENCE

CHANGE ORDER

No. 1

DATE OF ISSUANCE 16-Sep-02 EFFECTIVE DATE 18-Sep-02

OWNER St. Charles Parish (SCP) Department of Public Works and Wastewater
CONTRACTOR D & O Contractors, Inc
Contract: Willowdale Drainage Pump Station
Project: Willowdale Drainage Pump Station
OWNER's Contract No. P980701 ENGINEER's Contract No N/A
ENGINEER N-Y Associates, Inc.

You are directed to make the following changes in the Contract Documents:
Description: See Attachment 1 - Description of Changes

Reason for Change Order: To increase the size of the new triplex station from 360 CFS to 525 CFS, in order to handle the entire Master Plan flow of 524 CFS with new pumps

Attachments: (List documents supporting change) Attachment 2 - Backup Material from Contractor.

CHANGE IN CONTRACT PRICE

Original Contract Price

$3,091 611.00

Net increase (decrease) from previous Change Orders No 0 to No 0

$0 00

Contract Price prior to this Change Order.

$3 091 611 00

Net increase (decrease) of this Change Order.

$473 714 00

Contract price with all approved Change Orders

$3 565 325 00

CHANGE IN CONTRACT TIMES

Original Contract Times:
Substantial Completion: August 2, 2003
Ready for final payment September 16, 2003
(days or dates)

Net change from previous Change Orders No 0 to No. 0
Substantial Completion Zero
Ready for final payment Zero
(days)

Contract Times prior to this Change Order
Substantial Completion August 2, 2003
Ready for final payment September 16, 2003
(days or dates)

Net increase (decrease) this Change Order
Substantial Completion Zero
Ready for final payment Zero
(days)

Contract Times with all approved Change Orders
Substantial Completion. August 2, 2003
Ready for final payment September 16, 2003
(days or dates)

RECOMMENDED: By: [signature] ENGINEER (Authorized Signature) Date: 9/23/02

APPROVED: By: Albert D. Laque OWNER (Authorized Signature) Date: 10/8/2002

ACCEPTED: By: [signature] CONTRACTOR (Authorized Signature) Date 9-23-02

EJCDC 1910-8-B (1998 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specifications Institute

2002-0401
INTRODUCED BY: ALBERT D. LAQUE, PARISH PRESIDENT (DEPARTMENT OF PUBLIC WORKS)
ORDINANCE NO. 02-10-7

An ordinance approving and authorizing the execution of Change Order No. One (1) for Parish Project No P980701 Willowdale Drainage Pump Station to increase the size of the new triplex station from 360 CFS to 525 CFS, and increase the amount of the contract by $473,714.00 in order to handle the entire West Bank Master Drainage Plan flow of 524 CFS with new pumps.

WHEREAS, Ordinance No. 02-6-1 adopted June 3, 2002 by the St. Charles Parish Council, approved and authorized the execution of a contract with D & O Contractors, Inc. for the construction of Willowdale Drainage Pump Station in the amount of $3,091,611.00, and,

WHEREAS, the pumps originally planed for use in this pump station did not meet the West Bank Master Drainage Plan's flow requirements; and,

WHEREAS, the purchase of larger pumps is required to meet the West Bank Master Drainage Plan flow requirements and an increase in the contract amount by $473,714.00 is required.

THE ST. CHARLES PARISH COUNCIL HEREBY ORDAINS:

SECTION I. That Change Order No. One (1) to the contract for the Willowdale Drainage Pump Station to change the size of the new triplex station and to increase the contract amount to $3,565,325.00 is hereby approved.

SECTION II. That the Parish President is hereby authorized to execute said Change Order.

The foregoing ordinance having been submitted to a vote, the vote thereon was as follows:

YEAS: RAMCHANDRAN, FAUCHEUX, HILAIRE, FABRE, ABADIE, BLACK, MARINO, MINNICH
NAYS: NONE
ABSENT: AUTHEMENT

X-5	Additional Mechanical Work	LS	$9,431 00			1 00	$9,431.00			$9,431 00			
X-6	Additional Electrical Work	LS	$5,600 00			1 00	$5,600 00			$5,600 00			
X-7	Demolition of Existing Pump Station	LS	$12,721 00			1 00	$12,721 00			$12,721 00			
X 8	10' x 6' Box Culvert at Willowdale	LF	$950 00			80 00	$76,000.00			$76,000 00			
X-9	10' x 10' Box Culvert for Pump Station Access	LF	$975 00			45.00	$43,875 00			$43,875 00			
X 10	Credit for Waterline Crossing	LS	-$6,700 00			1 00	-$6,700.00				$6,700 00		
X-11	Removal of Existing 96" Dia CMP	LS	$3,140 00			1 00	$3,140 00			$3,140 00			
X-12	Extra for Traffic Control & Detour at Willowdale Blvd	LS	$6,156 00			1.00	$6,156 00			$6,156 00			
			TOTALS	$3,091,611 00			$473,714 00		$0.00	$480,414 00	$6,700 00	$0.00	$0 00
			RESULTING INCREASE TO BASE BID							$473,714 00			

98022
Sig. Fill
CC FN
MFN
CFN
REB
AM

D&O CONTRACTORS, INC.

FAX SHEET

TO: Amritendu Maji	*FROM:* Dan Wagner
COMPANY: N-Y Associates	*DATE:* September 19, 2002
PHONE #: (504) 885-0500	*# OF PAGES INC. COVER:* 5
FAX #: (504) 885-0595	*OUR PONE & FAX #:* (504) 466-1257 & (504) 461-5971

RE: Willowdale

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE COMPLY

Please see attached.

RECEIVED
SEP 19 2002
NY ASSOCIATES, INC
NY ARCHITECTS, LTD

Thank You

2207 GREENWOOD STREET
KENNER, LA 70062

D&O CONTRACTORS, INC.

EST. 1975

September 19, 2002

N-Y Associates, Inc.
2750 Lake Villa Drive
Metairie, LA 70002
Attn: Amritendu Maji, P.E.

RE: Willowdale Pump Station

Dear Mr. Maji:

We propose to furnish labor, material and equipment to install three (3) each fifty-four (54) inch Verti-Line pumps for the additional sum of $473,714.00. This proposal includes all items to increase pumps, engines, discharge pipe, along with sump modifications as outlined in Pentair's letter (copy attached). It also includes demolition and removal of existing stations and construction of one (1) 10'x8' box culvert at Willowdale Blvd. Along with one (1) 10'x8' box culvert at the pump station site. Our cost is compiled as follows:

Increased Engine Cost Quote No. 02EPS102-03	$26,421.00
Increased Pump Cost	$224,123.00
Sump Modifications	$31,672.00
Increases Discharge Pipe Cost	$41,275.00
Additional Mechanical Cost	$9,431.00
Additional Electrical Cost	$5,600.00
Demo Ext. Stations	$12,721.00
Box Culvert at Willowdale Blvd.	$82,156.00
Box Culvert at Station	$47,015.00
Credit for Waterxing	$-6,700.00

Sincerely,

Dan Wagner
Project Manager

2207 GREENWOOD STREET • KENNER, LOUISIANA • 70062
PHONE: (504) 466-1257 • FAX: (504) 461-5971
LOUISIANA LICENSE NO. 9998

Layne/Verti-Line

September 10, 2002

Parson & Sanderson, Inc.
405 Commerce Point
Haralson, LA 70123

Subject: Willowdale Drainage Pump Station

Dear Mr. Leedy:

Per your conversation with Arnie Sdano, Director of Engineering, you discussed three options to reduce sub-surface vortices. Attached with this letter is the option you settled on, as shown in drawing T-063330. The dimensions in the drawing are based on the anticipated bell diameter size of 85.5".

We confirm that the measures you are undertaking via the addition of fillets and splitters will reduce the probability of vortices to the point where Layne/Verti-Line will guarantee the performance of the pumps in the modified sump when operating at the rated flow and speed while at the "pump off" intake elevation of –6.0 feet. We also confirm that the pumps can be operated at a reduced pump speed of 293 RPM down to an intake elevation of –7.5 feet in order to draw down the suction canal in advance of an approaching storm. These guarantees are based on the pump station drawing (G-3) supplied to Layne/Verti-Line showing the vent/vacuum breaker, which we assume, is always open and that the siphon is never established.

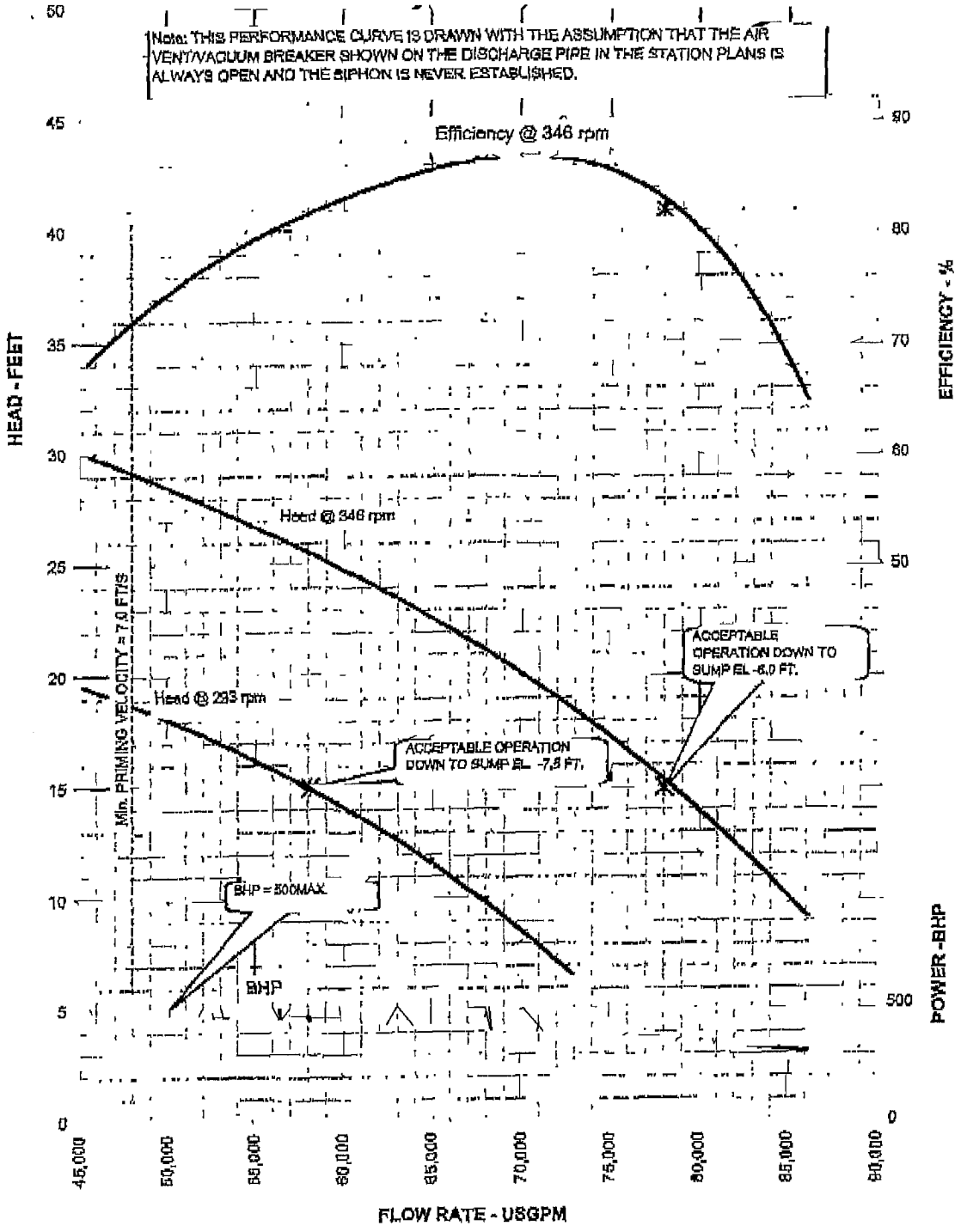
Brenette Wilder
Product Engineer

Arnie R. Sdano – P.E.
Director of Engineering

cc: Mike Wiley, Director of Marketing
Manjit Sagoo, Sr. Staff Engineer

Layne/Vertiline

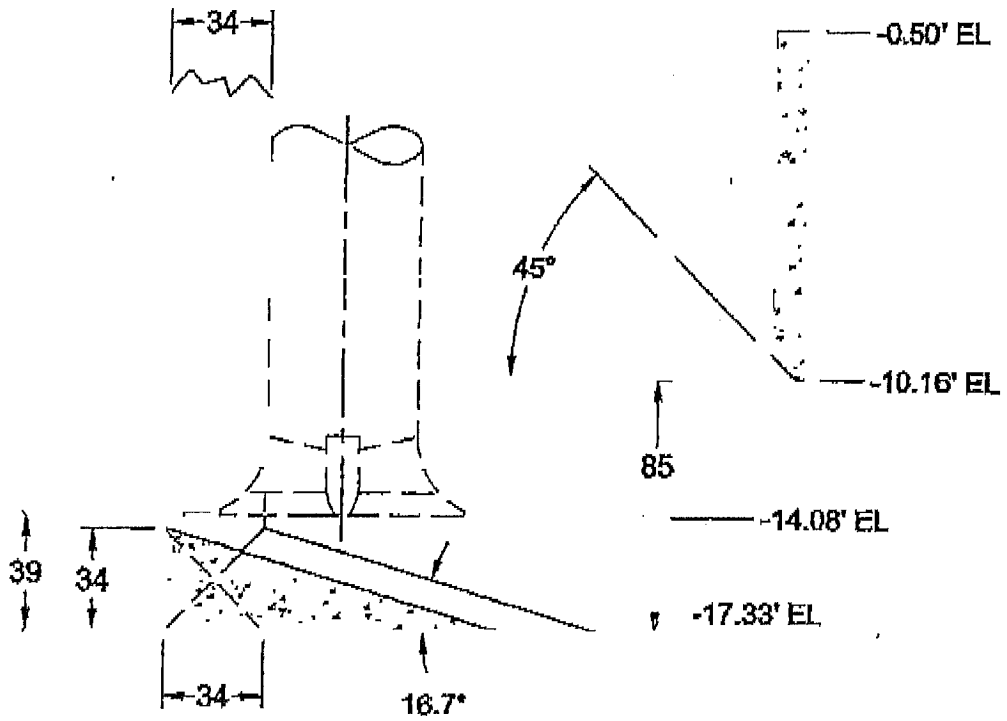
Pump Performance Curve
Pump Size: 54"6310 Willowdale
74000 GPM @ 15.0 Feet Head @ 346 rpm, IMP 47.0

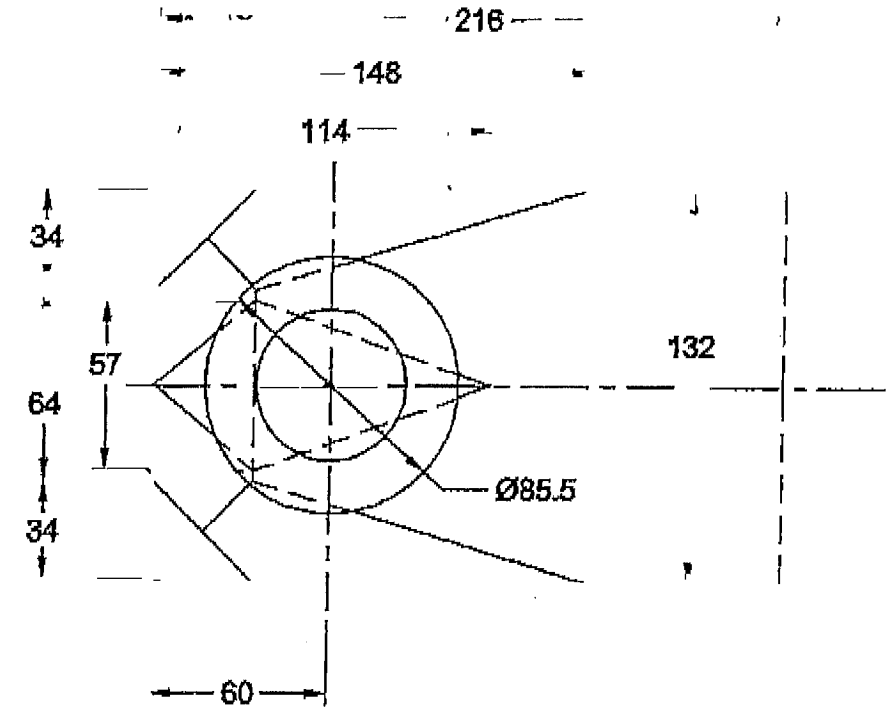


M. Sagoo

Prop_4.53-A_47.0_max.xls, Printed 9/10/2002

B. WILDER 9/02 A. SDANO 9/10 B. WILDER 9/10 54" 5310





ALL DIMENSIONS IN INCHES

WILLOWDALE DRAINAGE P.S.
SUMP DESIGN

Cayuga Precast Limited

DWG NO T-063330 REV NO 0

98025
Pkg Fil
CC FN
MFN
CFN
AM
REL

Louisiana Machinery Power Systems

2011 Engineers Road
Belle Chasse, LA 70037
Phone 504-393-5050 FAX 504-391-0107

Fax Transmittal

To:	Amritendu Maji	Fax:	885-0595
	Jeff Leedy		736-9348
From:	Gary P Sarrat Jr	Date:	9/12/02
Re:	Willowdale	Pages:	6

Maji,

I was able to get the 525Hp rating out of the same 3406 that was selected and quoted earlier. The rating as we discussed earlier is not continuous per se. This 'E' rating is for standby centrifugal pumps. The engine is capable of running the duration of the pumping emergency continuously; then idle for days or weeks. The typical duty cycle would be 500-800hrs per year, which will fall under this application. The good news is that all our installation sizes remain the same since we are using the same engine model. The bad news is that there is an increase in pricing for the added HP. I have sent Dan the quote detailing the use of this engine, and also included the pricing for the pump package control panels (one per pkg) that was not priced out at bid time. I have also included in the fax a cut sheet on the engine we will be using the E rating, which will get 514HP at 1800rpm Let me know if you have any questions.

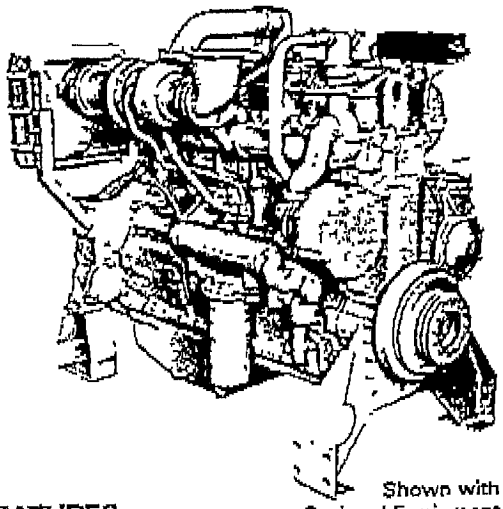
Thanks,

Gary Sarrat Jr
Industrial Engine Sales

CATERPILLAR

Industrial Engine 3406C

322-525 bhp/240-392 bkW
1800-2100 rpm



Shown with Optional Equipment

CATERPILLAR® ENGINE SPECIFICATIONS

In-Line, 6 Cylinder, 4-Stroke-Cycle Diesel
Bore — in (mm) 5.4 (137)
Stroke — in (mm) 6.5 (165)
Displacement — cu in (L) 893 (14.6)
Low Idle (rpm) 600
Rotation (from flywheel end) .. Counterclockwise
Capacity for Liquids — U.S. Gal (L)
  Cooling System (engine only) 9.0 (34.1)
  Lube Oil System (refill) 9.0 (34.1)
Weight, Net Dry (approx) — lb (kg)
  Including Flywheel 2990 (1356)

FEATURES

- **FUEL ECONOMY**
  Consistent performance, variable-timed fuel injection, broad rpm turbocharger match, excellent fuel economy over entire operating range.
- **RELIABILITY AND DIESEL DURABILITY**
  Diesel tough components, precise balance, and conservative speed for smooth operation and long engine life.
- **FLEXIBLE APPLICATION RANGE**
  High torque rise, big displacement, convenient installation, more performance for your money.
- **WORLDWIDE PRODUCT SUPPORT AND PARTS AVAILABILITY**

STANDARD EQUIPMENT

Air Intake
  single-stage, dry air cleaner
Cooling
  thermostats and housing, centrifugal gear-driven jacket water
Exhaust
  6-inch dry elbow
Fuel
  filter, priming and transfer pumps
Flywheel and flywheel housing, SAE No. 1
Instruments and gauges
  instrument panel, fuel pressure, lube oil pressure and water temperature gauge, service meter
Lube
  filter, oil cooler
Supports

OPTIONAL EQUIPMENT

Air Compressor
Air Intake
  heavy-duty air cleaner, muffler, precleaner
Alternators
Cooling
  expansion tank, heat exchanger, radiator, fans, fan drives, auxiliary water pump, dry charge coolant conditioner
Exhaust
  flexible fittings, mufflers, watercooled manifolds and turbos, flanges
Instruments and gauges
  premium panel 8-gauge, tachometers, tach drives
Power Takeoffs
  auxiliary drives, enclosed clutches, hydraulic pumps, stub shaft
Protection Devices
  alarm switches, oil and water shutoffs, electric and mechanical
Starting
  air, electric

CATERPILLAR

3406C INDUSTRIAL ENGINE

PERFORMANCE DATA

Turbocharged-Aftercooled PA5188

Rating Level	E			D			C			B			A		
Rated rpm	2100			2100			2100			2000			1800		
Engine Power @ rpm	525 bhp (392 bkW)			515 bhp (384 bkW)			460 bhp (343 bkW)			440 bhp (328 bkW)			420 bhp (313 bkW)		
rpm	2100	1800	1500	2100	1800	1500	2100	1800	1500	2000	1800	1500	1800	1700	1500
bhp	525	501	456	515	499	451	460	446	403	440	429	391	420	431	415
lb/bhp-hr	.367	.355	.352	.339	.332	.334	.339	.330	.330	.335	.330	.330	.337	.332	.333
gal/hr	27.4	25.4	22.8	24.9	23.6	21.5	22.3	21.0	19.1	21.0	20.2	18.4	19.8	20.3	19.7
bkW	392	374	340	384	372	337	343	332	301	328	320	291	313	321	309
g/bkW-hr	223	216	214	206	202	203	206	201	201	204	201	201	201	202	203
L/hr	103.9	96.0	86.4	94.4	89.4	81.3	84.3	79.5	72.2	79.5	76.6	69.8	75.1	77.0	74.5

PERFORMANCE DATA

Turbocharged-Aftercooled PA2373

Rating Level	E			D			C			B			A		
Rated rpm	2100			2100			2100			2000			1800		
Engine Power @ rpm	500 bhp (373 bkW)			480 bhp (358 bkW)			400 bhp (298 bkW)			370 bhp (276 bkW)			325 bhp (242 bkW)		
rpm	2100	1800	1500	2100	1800	1500	2100	1800	1500	2000	1800	1500	1800	1700	1500
bhp	500	483	437	480	464	419	400	377	341	370	356	324	325	327	310
lb/bhp-hr	.339	.332	.332	.339	.330	.332	.339	.329	.330	.334	.329	.332	329	.329	.332
gal/hr	24.2	22.9	20.7	23.2	21.9	19.9	19.4	17.6	16.1	17.7	16.7	15.3	15.3	15.3	14.7
bkW	373	360	326	358	346	313	298	282	254	276	266	241	242	244	232
g/bkW-hr	206	202	202	206	201	202	206	200	201	203	200	202	200	200	202
L/hr	91.7	86.5	78.4	87.9	82.9	75.2	73.4	67.2	60.9	66.9	63.4	58.0	57.8	58.0	55.7

PERFORMANCE DATA

Turbocharged-Aftercooled PA2376

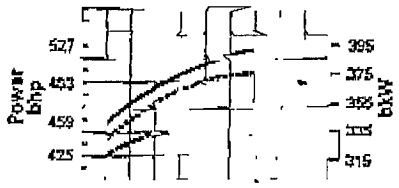
Rating Level	E			D			C			B			A		
Rated rpm	2100			2100			2100			2000			1800		
Engine Power @ rpm	450 bhp (336 bkW)			420 bhp (313 bkW)			360 bhp (269 bkW)			325 bhp (242 bkW)			322 bhp (240 bkW)		
rpm	2100	1800	1500	2100	1800	1500	2100	1800	1500	2000	1800	1500	1800	1700	1500
bhp	450	426	386	420	398	360	360	339	306	325	312	293	322	318	296
lb/bhp-hr	.339	.330	.330	.339	.329	.330	.340	.329	.332	.337	.330	.334	.333	.332	.334
gal/hr	21.8	20.1	18.2	20.3	18.7	17.0	17.5	15.9	14.5	15.6	14.3	13.4	15.3	15.0	14.1
bkW	336	318	288	313	297	268	269	253	229	242	233	211	240	237	221
g/bkW-hr	206	201	201	206	200	201	207	200	202	205	201	203	203	202	203
L/hr	82.4	76.0	68.9	77.0	70.8	64.3	66.3	60.3	54.8	59.2	55.7	50.9	58.0	56.9	53.5

3406C INDUSTRIAL ENGINE

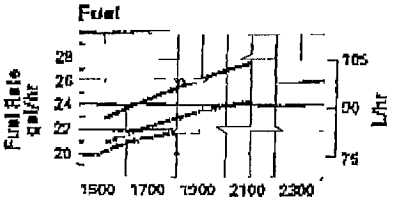
CATERPILLAR

PERFORMANCE CURVES

E Rating



Fuel



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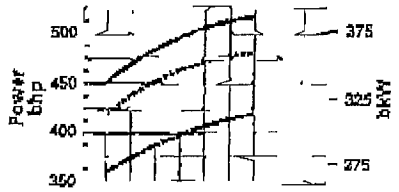

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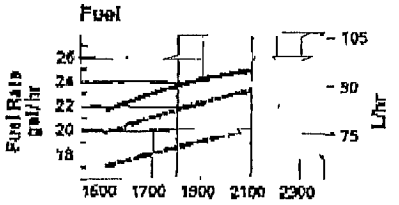
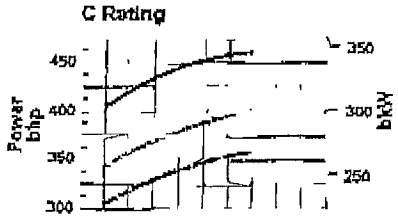


DITA, PA 5188
DITA, PA 2373
DITA, PA 2376

C Rating



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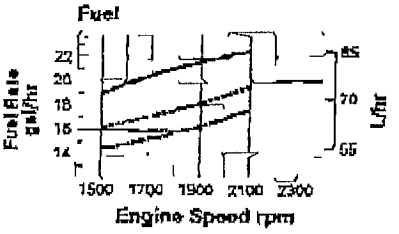

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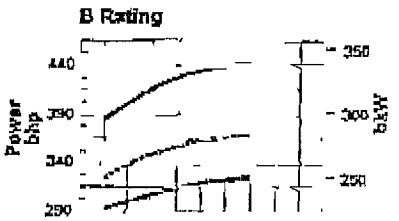
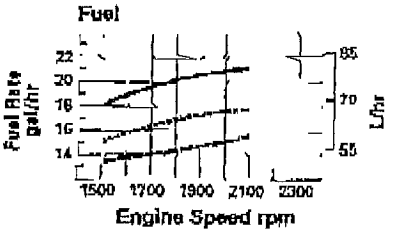
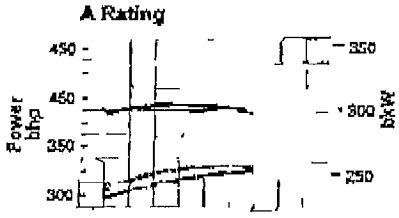


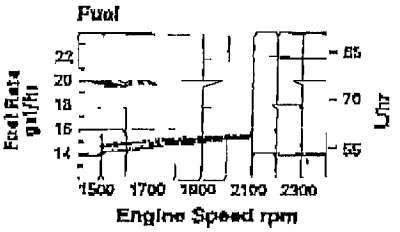
Fuel



A Rating



Fuel



3406C INDUSTRIAL ENGINE

CATERPILLAR

INDUSTRIAL RATINGS

IND-E

IND-E ratings are for service where power is required for a short time for initial starting or sudden overload. For emergency service where standard power is unavailable. The maximum horsepower and speed capability of the engine can be utilized for a maximum of 15 uninterrupted minutes followed by one hour at intermittent or duration of the emergency. Operating limits are:

1. Time at full load not to exceed 5% of the duty cycle or 15 minutes max.
2. Load factor limited to 35%.
3. The maximum horsepower and speed capability of the engine can be utilized for a maximum of 15 minutes followed by one hour at intermittent or duration of the emergency.
4. Typical operating hours per year is 500.

Examples of an IND-E industrial application are:

1. Standby centrifugal water pumps
2. Oil field well servicing
3. Crash trucks
4. Gas turbine starters

IND-D

IND-D ratings are for service where rated power is required for period overloads. The maximum horsepower and speed capability of the engine can be utilized for a maximum of 30 uninterrupted minutes followed by one hour at intermittent. Operating limits are:

1. Time at full load not to exceed 10% of the duty cycle or 30 min max.
2. Load factor limited to 50%.
3. Full load operation to a maximum of 30 minutes followed by one hour at intermittent.
4. Typical operating hours per year is 1500.

Examples of an IND-D industrial application are:

1. Offshore cranes
2. Runway snowblowers
3. Water well drills
4. Portable air compressors
5. Fire pump certification power (advertised power)

IND-C (INTERMITTENT)

IND-C ratings are for service where power and/or speed are cyclic. The horsepower and speed of the engine which can be utilized for one uninterrupted hour followed by one hour of operation at or below the continuous rating.

Operating limits are:

1. Time at full load not to exceed 50% of the duty cycle or one hour max.
2. Load factor limited to 70%.
3. Full load operation limited to one uninterrupted hour followed by one hour of operation at or below the continuous rating
4. Typical operating hours per year is 3000 hours.

Examples of an IND-C industrial application are:

1. Agricultural tractors, harvesters, and combines
2. Truck – off highway
3. Fire pump application power (90% of certified power)
4. Blast hole drills
5. Rock crushers and wood chippers with high torque rise
6. Oil field hoisting

IND-B

IND-B ratings are for moderate-duty service where power and/or speed are cyclic. Operating limits are:

1. Time at full load not to exceed 80% of the duty cycle.
2. Load factor limited to 85%.
3. Typical operating hours per year is 4000 hours.

Examples of an IND-B industrial application are:

1. Irrigation where normal pump demand is 85% of engine rating
2. Oil field mechanical pumping/drilling
3. Stationary/plant air compressors

IND-A (CONTINUOUS)

IND-A continuous ratings are for heavy-duty service when the engine is operated at rated load and speed up to 100% of the time without interruption or load cycling. Operating limits are:

1. No hour or load factor limitation.
2. Continuous operation at full load.
3. Average load factor to approach 100%.
4. Typical operating hours per year is over 4000 hrs.

Examples of an IND-A industrial application are:

1. Pipeline pumping
2. Ventilation
3. Customer specs

3406C INDUSTRIAL ENGINE

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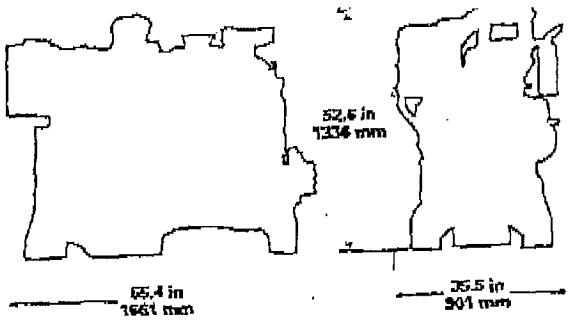
DIMENSIONS



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FAX

Date: Friday, September 20, 2002

Pages including cover sheet: 3

To: Amritendu Maji

Phone

Fax Phone *(504)885-0595*

From: GARY SARRAT JR
LOUISIANA MACHINERY P
2011 ENGINEERS RD
BELLE CHASSE
LA 70037

Phone

Fax Phone *+1(504)391-0107*

NOTE:

Maji,
Here is a little advance on the meeting at 10. See you then.
Thanks,
Gary Sarrat

RECEIVED
SEP 2 0 2002
NY ASSOCIATES, INC
NY ARCHITECTS, LTD

Louisiana Machinery Power Systems

2011 Engineers Road
Belle Chasse, LA 70037
Phone 504-393-5050 FAX 504-391-0107

NY & Associates
D&O Construction
Handlin & Martin Consulting Engineers

9-19-02

Re: Willowdale Pumping Station

In reference to the possible change in design conditions for the Willowdale Pumping Station, Louisiana Machinery Power Systems offers the following options and explanation.

When the question of design conditions was brought up by NY & Associates, they sought a solution that would offer 508HP in the same package dimensions and design. The 3406 originally quoted is rated at 345HP @ 1800rpm in a continuous duty application, as is generally accepted in this market. When the engines are to run they will be expected to operate continuously with a near constant load with little cycling. Caterpillar defines a "Continuous Duty" or "A Rating" as:

> For heavy-duty service when an engine is operated at rated load and speed up to 100% of the time without interruption or load cycling. Time at full load is 100%. Typical application examples include pipeline pumping and ventilation.

This description clearly defines the accepted definition given the continuous pumping application, and is the specification offered in most cases. In order to meet this specification, 508 HP requires a change in engine model and design. The only way to maintain the designed dimensions of the 3406 is to change to the C-16 model. The C-16 is a 964 cubic inch compared to the 893 cubic inch 3406. The footprint and engine dimensions are similar, and no major changes would have to be made to the station design, with respect to the engine dimensions, save one. As an electronically controlled engine, the radiator would slightly increase in size to accommodate the separate charge air cooler in the dual core design. Of course, the only major design change would be the integration of a fully electronic engine into the original design of a mechanical engine's place. With respect to the engine only, there is an $8-10,000 price increase.

Another option may include more clearly defining the actual duty cycle of the proposed units. This pumping station is designed to remove the excess rainwater from the Willowdale subdivision. The units will be run under full load for the duration of the flooding conditions. When removing minimal amounts of water, the engines will be under a lighter load, and run for a shorter period of time. The units will also be exercised under no load much of the time in between storms when the units will be called upon to pump large amounts of water. Caterpillar defines its "Standby" or "Intermittent E Rating" as such.

> For service where rated power is required for a short time for initial starting or sudden overload. For emergency service where standard power is unavailable. Horsepower and speed capability of the engine can be utilized for a maximum of 15 uninterrupted minutes, followed by one hour at the Intermittent C rating, or for the duration of the emergency. Application examples include standby centrifugal water pumps, oil field well servicing, and gas turbine starters.

The typical duty cycle of these drainage pumps is more similar to the Standby rating defined above The pumps will be used in emergency situations when normal drainage canals are not sufficient to move the water out of the area The engine will run for the duration of the emergency at full load, until the water has been removed and conditions are normal With expected exercising periods of 10-20 hours a month, and an estimated four weeks of 24-hour operation during flood periods, the resulting duty cycle totals under 900 hours a year usage 200 hours of which is at high idle during monthly exercising This duty cycle is more clearly defined by the "Standby - E Rating" defined above

All of these duty ratings have been defined to more clearly estimate overhaul periods. The 3406 engine that operates in a truly continuous duty rating and application (15.5 gph) will reach its overhaul interval of 200,000 gallons of fuel consumed at 12,000 hours, or 16 months of around the clock running. These units, of course, will not be operated for 12,000 continuous hours around the clock. At the estimated 900 hours a year usage, the same 3406 at the "E Rating" (25gph) will reach its 200,000 gallons overhaul interval at 8,000 hours, or 9 years of usage in this application.

This same situation has arisen before on a job to build the Belle Chasse II station behind Bayou Barriere Golf Course The design conditions changed and more horsepower was required. Now the station had been originally designed for a 3516 model which had a continuous rating of 1355 HP @ 1200RPM. After changing the gearing in the Philadelphia Right Angle Gear, the 1665 HP @ 1300RPM Intermittent rating was used because a switch to the 1600+ HP continuous duty rating would result in the use of a 3606 model (a 2500 extra cubic inches and over $100K difference) It was decided that this application is more clearly defined by the Intermittent rating, and the change was made The units have now been in operation for 9 years, and as of July have around 800 hours runtime. This usage schedules the engines for overhaul in 2012, or 20 years after installation It is with respect to this type duty cycle that we feel the use of the "Intermittent E" or "Standby Rating" more clearly defines the actual duty cycle of these units, and should have no problems running at 525HP @ 2100RPM

Should you have any questions or require any further information, please feel free to contact us.

Gary Sarrat Jr
Industrial Engine Sales
Louisiana Machinery Power Systems