

# ***Ldn Consulting, Inc.***

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**Subject: Noise Assessment for the Water Mill Development Lift Station in the City of San Marcos (TSM21-0004)**

Ldn Consulting (Ldn) has analyzed the noise levels from the lift station at the proposed Water Mill Development. The purpose of this analysis is to identify the anticipated noise levels at all property lines adjacent to and near the Project's proposed lift station and compare them with the City of San Marcos Noise Standards.

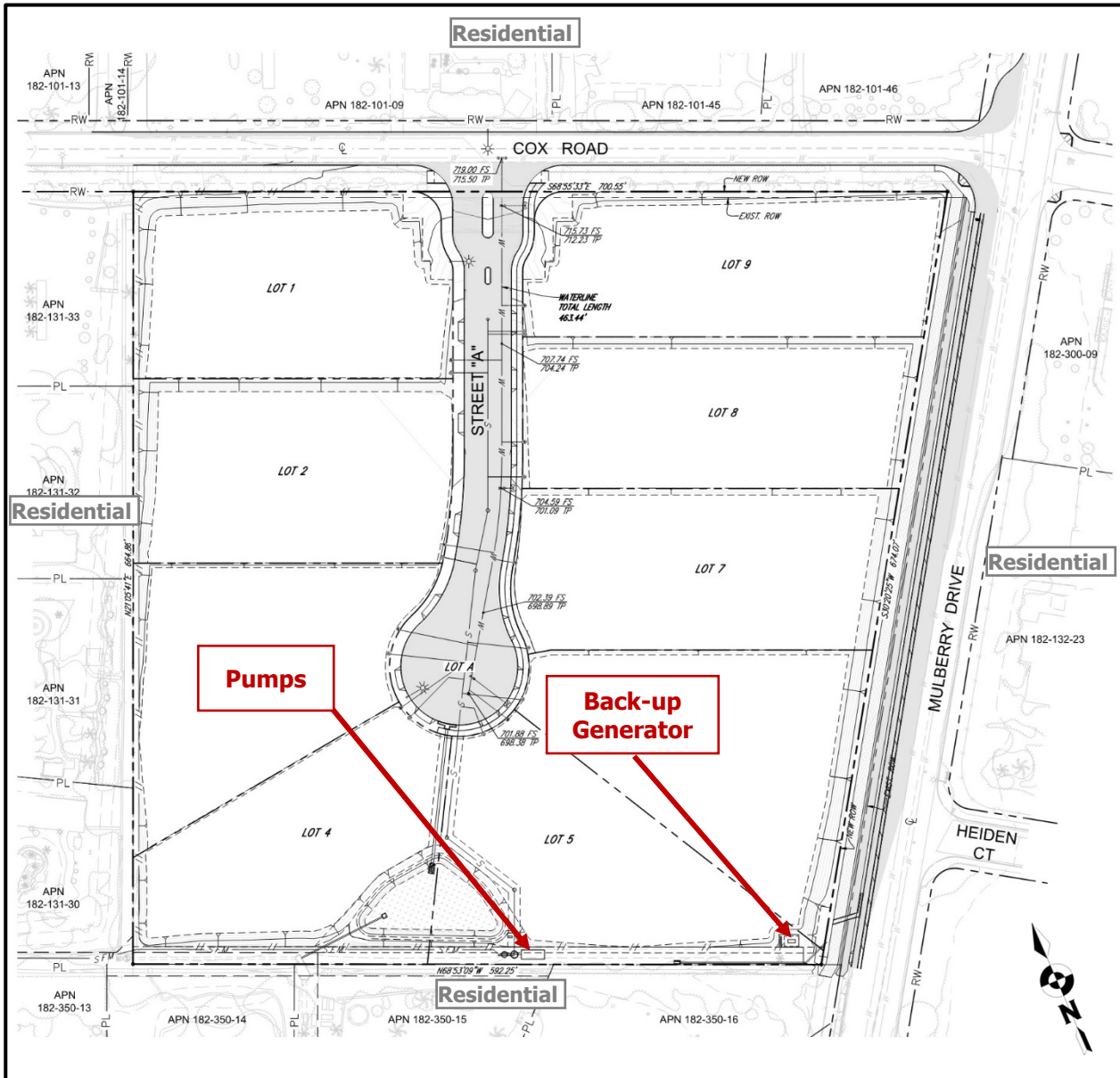
## **Project Location/Description**

The lift station is to be located along the southern property line of the Water Mill residential development, in the City of San Marcos, CA. The Water Mill residential development is generally located north of State Route 78 (SR-78) and east of Twin Oaks Valley Road at the southwest corner of Cox Road and Mulberry Drive. The focus of this letter is the proposed lift station operational noise levels.

According to the project site plan, the lift station will be submersible and contain two pumps. Pump stations typically contain transformers and emergency generators, which could generate potential noise levels that exceed the property line standards and therefore shielding or mitigation may be required. The lift station configuration is provided in Figure 1.

The proposed sewer pump/lift station includes a lift station wet well for influent sewage and two submersible pumping units. A number of pump station elements would be located below grade including the pump station wet well. Above-grade facilities would include an emergency generator which would be located at the southeast corner of the project site adjacent to Mulberry Drive. The site has existing single-family residential uses to the north across Cox Road, to the east across Mulberry Drive, and adjacent to the site to the west and south.

**Figure 1: Proposed Sewer Pump/Lift Station Site Plan**



Source: Excel Engineering, 2024

**Operational Noise Standards**

The City noise regulations that apply to the Project are found in Chapter 20.300 Site Planning and General Development Standards of the City Municipal Code. These regulations aim to prohibit unnecessary, excessive, and annoying noises from all sources, as certain noise levels are detrimental to the health and welfare of individuals. The standards of this section and of Chapter 10.24 Noise of the Municipal Code apply to all land uses in all Zones unless otherwise specified. No person shall create or allow the creation of exterior noise that causes the noise level to exceed the noise standards established by Table 20.300-4 (provided below in Table 1).

**Table 1: Sound Level Limits**

Zone	Allowable Noise Level (dBA Leq) Measured from the Property Line
Single-Family Residential (A, R-1, R-2) <sup>1,2</sup>	
7 a.m. to 10 p.m. (daytime)	60
10 p.m. to 7 a.m. (overnight)	50
Multifamily Residential (R-3) <sup>1,2</sup>	
7 a.m. to 10 p.m. (daytime)	65
10 p.m. to 7 a.m. (overnight)	55
Commercial (C, O-P, SR) <sup>3</sup>	
7 a.m. to 10 p.m. (daytime)	65
10 p.m. to 7 a.m. (overnight)	55
Industrial	
7 a.m. to 10 p.m. (daytime)	65
10 p.m. to 7 a.m. (overnight)	60
1. For single-family detached dwelling units, the "exterior noise level" is defined as the noise level measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum net lot area: (i) for lots less than 4,000 square feet in area, the exterior area shall include 400 square feet, (ii) for lots between 4,000 square feet to 10 acres in area, the exterior area shall include 10 percent of the lot area; (iii) for lots over 10 acres in area, the exterior area shall include 1 acre. 2. For all other residential land uses, "exterior noise level" is defined as noise measured at exterior areas which are provided for private or group usable open space purposes. "Private Usable Open Space" is defined as usable open space intended for use of occupants of one dwelling unit, normally including yards, decks, and balconies. When the noise limit for Private Usable Open Space cannot be met, then a Group Usable Open Space that meets the exterior noise level standard shall be provided. "Group Usable Open Space" is defined as usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways. 3. For non-residential noise sensitive land uses, exterior noise level is defined as noise measured at the exterior area provided for public use.	

The City Ordinance limits noise generation in single-family zones to 60 dB Leq (one-hour average) between the hours of 7 a.m. and 10 p.m. and 50 dB Leq between the hours of 10 p.m. and 7 a.m. as measured at the project property line as shown above in Table 1. Per the City of San Marcos General Plan Noise Element (GPNE), noise standards for commercial, multi-family, and mixed-use land uses are the same, and are higher than single-family residential areas because they reflect a more urban environment (GPNE, pg. 7-10). Higher thresholds are permitted due to the integrated mix of residential and commercial activity and their usual location near major arterials (GPNE, pg. 7-9). The surrounding land uses are designated single-family, therefore a 60 dBA hourly noise standard during the daytime hours between 7 a.m. and 10 p.m., a 50 dBA standard during the overnight hours between 10 p.m. and 7 a.m. would apply. The pump station is expected to run through all hours of the day, therefore, the 50 dBA hourly noise level standard would apply.

### **Operational Noise Levels**

Sound from a localized source (a point-source) radiates uniformly outward as it travels away from the source. The sound level attenuates or drops-off at a rate of 6 dBA for each doubling of distance. A drop-off rate of 6 dBA per doubling of distance was used for the proposed equipment to the property lines using a point-source noise modeling program. The equipment noise levels were modeled to the nearest existing residences to the south and east and to the nearest proposed residences to the north and west. The existing residences to the north and west are located further away and will be shielded by the existing homes and perimeter fencing. The following equipment consist of the potential noise sources at the proposed sewer lift station:

- Pumps – The pumps will have 7.5 HP motors, but they are submerged and 19 feet below grade in a vault.
- Generator – The generator will be a 25 kilowatt (kW) unit fitting within a sound reducing enclosure.

#### Pumps

It was determined that the pumps needed for the sewer pump/lift station operations are to be submerged below ground in a wet well. Based on a similar underground pump station, the pumps would generate a noise level of 45 dBA at a distance of 15 feet from the access hatch with the hatch open (Harmony Grove Village – Pacific Noise Control, dated 7/24/06). With the hatch closed, noise levels would be reduced a minimum of 10 dBA. At a minimum distance of 20 feet to the nearest residential property line to the west (future Lot 5), the pump noise levels would be reduced to below 35 dBA.

### Generator

The project will contain an emergency generator fitted in a sound reducing enclosure, which would be located at the southeast corner of the project site. The generator could generate unshielded noise levels that exceed the property line standards during normal maintenance and therefore shielding or mitigation may be required. The 25 kW generator is needed to power the pumps if the main power supply is lost at the pump station. To assess the generator noise levels, tested outdoor sound levels were provided by the manufacturer/supplier. The noise ratings provided indicate the generator will produce noise levels of 60 dBA during weekly engine exercise and during normal operation when measured at a distance of 23 feet in all directions when equipped with the Level 1 Acoustic Enclosure. The manufacturer specifications are provided in **Attachment A** to this report. At a distance of 14 feet from the nearest property line to the north (future Lots 5 and 6), the generator noise levels would be increased from 60 dBA to approximately 64 dBA.

### Cumulative Noise Levels

The noise levels for each of the sources were combined to determine the cumulative noise levels at the surrounding residential property lines. The projection includes the pumps and generator operating at the same time. Additionally, the pumps and generator will be separated by over 200 feet and noise levels would not add cumulatively. As indicated above, distance alone would not be adequate to reduce noise levels from the emergency generator to below the City's nighttime threshold of 50 dBA.

Fresnel Barrier Reduction Calculations were used to determine the noise level reductions from barriers based on distance, source height, receiver elevation and the top of barrier. The calculations are provided in **Attachment B** to this report. It was determined that a minimum 6-foot noise barrier would be required around the generator to reduce noise levels below the City's nighttime threshold of 50 dBA. The cumulative noise levels are listed in Table 1 for the northern property line, Table 2 for the western property line, Table 3 for the southern property line, and Table 4 for the eastern property line. Figure 2 shows the location of the required 6-foot noise barrier and the resultant noise contours. The barrier can consist of a solid gate if access is required. Although, due to the distance from the homes to the east across Mulberry Drive, no barrier is required, it is recommended that a 6-foot barrier be installed to help the overall noise reductions to the southern and northern property lines. The project design includes construction of a 6-foot barrier around the generator, which meets these recommendations.

**Table 1: Property Line Noise Levels (Northern Property Line)**

Source	Distance from Source to Measurement Location (Feet)	Measured Noise Level (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Noise Reduction from barrier (dBA)	Resultant Noise Level @ Property Line (dBA)
Pumps	15	35	20	-2.5	-	33
Generator	23	60	14	+4	-14	50
<b>Cumulative Noise Level @ Property Line (dBA)</b>						<b>50</b>

**Table 2: Property Line Noise Levels (Western Property Line)**

Source	Distance from Source to Measurement Location (Feet)	Measured Noise Level (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Noise Reduction from barrier (dBA)	Resultant Noise Level @ Property Line (dBA)
Pumps	15	35	16	-1	-	34
Generator	23	60	20	+1.2	-14	47
<b>Cumulative Noise Level @ Property Line (dBA)</b>						<b>47</b>

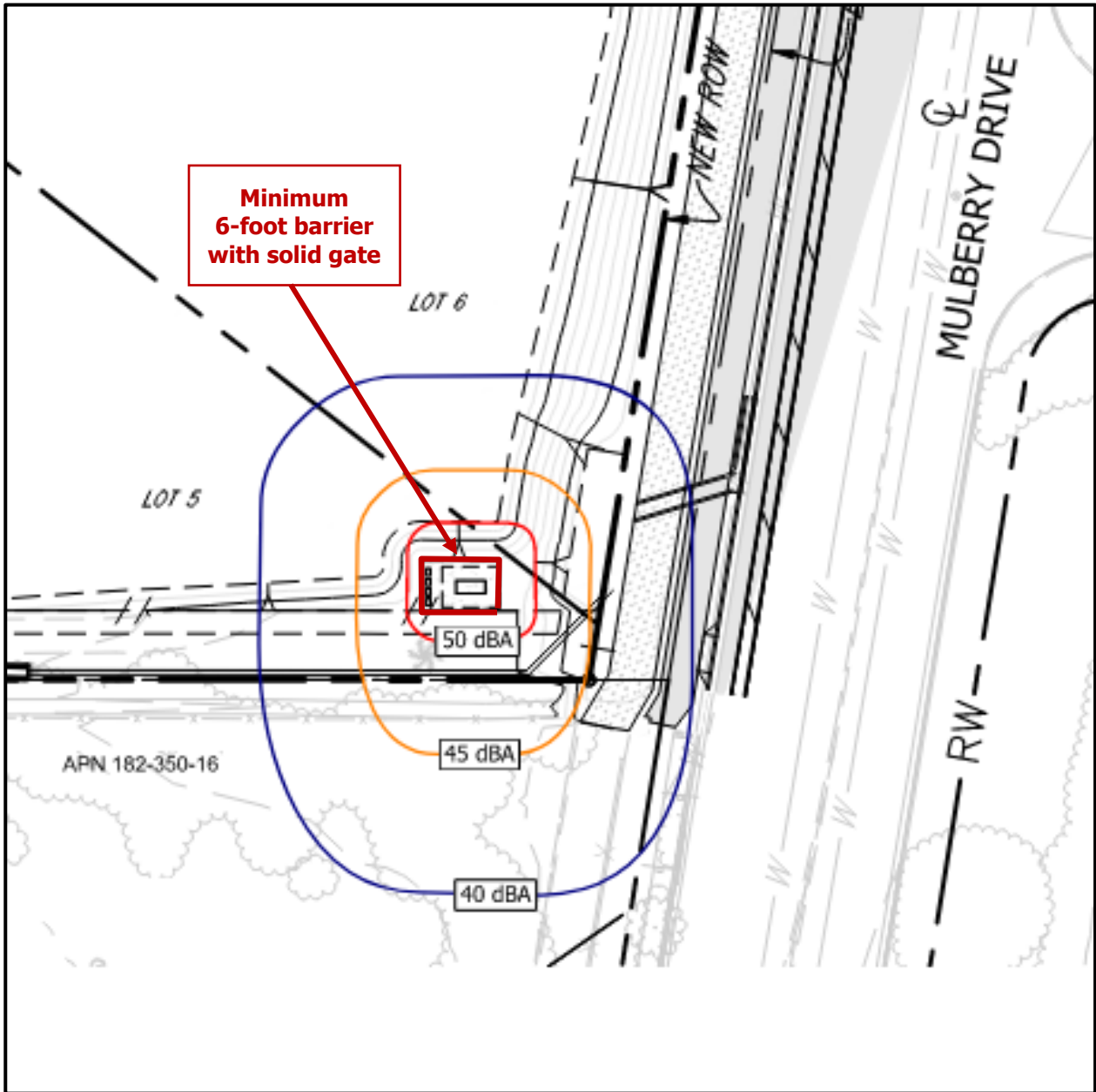
**Table 3: Property Line Noise Levels (Southern Property Line)**

Source	Distance from Source to Measurement Location (Feet)	Measured Noise Level (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Noise Reduction from barrier (dBA)	Resultant Noise Level @ Property Line (dBA)
Pumps	15	35	42	-9	-	26
Generator	23	60	24	-0	-11	49
<b>Cumulative Noise Level @ Property Line (dBA)</b>						<b>49</b>

**Table 4: Property Line Noise Levels (Eastern Property Line)**

Source	Distance from Source to Measurement Location (Feet)	Measured Noise Level (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Noise Reduction from barrier (dBA)	Resultant Noise Level @ Property Line (dBA)
Pumps	15	35	350	-27	-	8
Generator	23	60	114	-14	-14	32
<b>Cumulative Noise Level @ Property Line (dBA)</b>						<b>32</b>

**Figure 2: Noise Barrier Locations and Contours**



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## **Conclusions**

It should be noted, the emergency generator would only be operational during the evening hours during an emergency. The standby generator would only be tested during daytime hours (7:00 a.m. to 10:00 p.m.).

Based on the findings, the proposed lift station operations are anticipated to comply with the City's noise requirements with a minimum 6-foot barrier surrounding the emergency generator on all sides and the generator being equipped with the manufacturer's Level 1 Acoustic Enclosure . If you have any questions, please contact me directly at (760) 473-1253.

Sincerely, Ldn Consulting

Jeremy Loudon, Principal

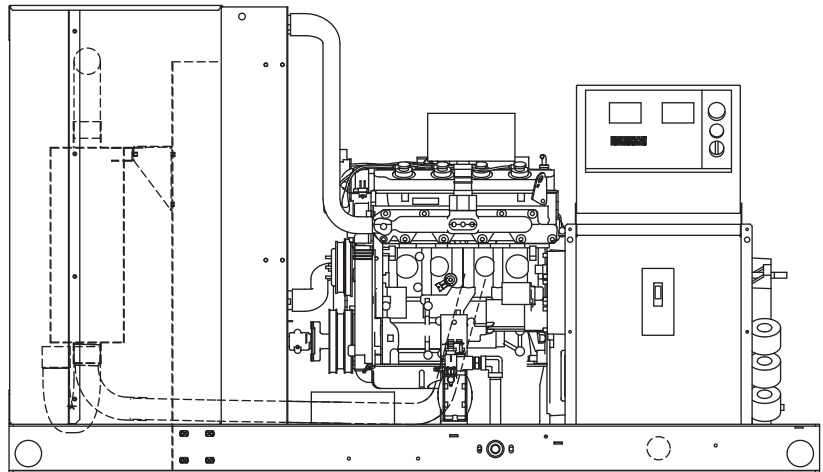
***Attachment:***        **A:** Generator Specifications  
                              **B:** Fresnel Barrier Calculations

# QT025A

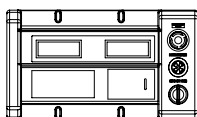
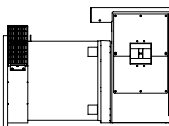
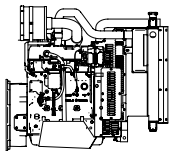
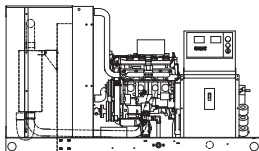
## Industrial Gaseous Generator Set

EPA Certified Stationary Emergency

Standby Power Rating  
**31kVA 25kW 60Hz**



Generator image used for illustration purposes only



### features

#### Generator Set

- PROTOTYPE & TORSIONALLY TESTED
- UL2200 TESTED
- RHINOCOAT PAINT SYSTEM

#### Engine

- EPA COMPLIANT
- INDUSTRIAL TESTED, GENERAC APPROVED
- POWER-MATCHED OUTPUT
- INDUSTRIAL GRADE

#### Alternator

- TWO-THIRDS PITCH
- LAYER WOUND ROTOR & STATOR
- CLASS H MATERIALS
- DIGITAL 3-PHASE VOLTAGE CONTROL

#### Controls

- ENCAPSULATED BOARD W/ SEALED HARNESS
- 4-20mA VOLTAGE-TO-CURRENT SENSORS
- SURFACE-MOUNT TECHNOLOGY
- ADVANCED DIAGNOSTICS & COMMUNICATIONS

### benefits

- ▶ PROVIDES A PROVEN UNIT
- ▶ ENSURES A QUALITY PRODUCT
- ▶ IMPROVES RESISTANCE TO ELEMENTS
- ▶ ENVIRONMENTALLY FRIENDLY
- ▶ ENSURES INDUSTRIAL STANDARDS
- ▶ ENGINEERED FOR PERFORMANCE
- ▶ IMPROVES LONGEVITY AND RELIABILITY

- ▶ ELIMINATES HARMFUL 3RD HARMONIC
- ▶ IMPROVES COOLING
- ▶ HEAT TOLERANT DESIGN
- ▶ FAST AND ACCURATE RESPONSE

- ▶ EASY, AFFORDABLE REPLACEMENT
- ▶ NOISE RESISTANT 24/7 MONITORING
- ▶ PROVIDES VIBRATION RESISTANCE
- ▶ HARDENED RELIABILITY

### primary codes and standards



**QT025A**

**application and engineering data**

**ENGINE SPECIFICATIONS**

**General**

Make	Generac
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Engine Reference	See Emissions Data Sheet
Cylinder #	4
Type	In-line
Displacement - L	2.4
Bore - mm (in.)	86.61 (3.41)
Stroke - mm (in.)	100.08 (3.94)
Compression Ratio	9.5:1
Intake Air Method	Naturally Aspirated
Number of Main Bearings	5
Connecting Rods	Forged
Cylinder Head	Aluminum
Cylinder Liners	No
Ignition	High Energy
Pistons	Aluminum Alloy
Crankshaft	Cast
Lifter Type	Overhead Cam
Intake Valve Material	Steel Alloy
Exhaust Valve Material	Hardened Steel
Hardened Valve Seats	Yes

**Lubrication System**

Oil Pump Type	Gear
Oil Filter Type	Full-flow spin-on cartridge
Crankcase Capacity - L (qts)	3.8 (4)

**Cooling System**

Cooling System Type	Pressurized Closed
Water Pump Flow	11 gal/min
Fan Type	Pusher
Fan Speed (rpm)	2150
Fan Diameter mm (in.)	457 (18)
Coolant Heater Wattage	1500
Coolant Heater Standard Voltage	120VAC

**Fuel System**

Fuel Type	Natural Gas, Propane Vapor
Carburetor	Down Draft
Secondary Fuel Regulator	Standard
Fuel Shut Off Solenoid	Standard
Operating Fuel Pressure	5" - 14" H2O*

\*Fuel pressure must remain within specified range and not drop more than 1 in. w.c. from static (no-load) to full load.

**Engine Electrical System**

System Voltage	12VDC
Battery Charging Alternator (Amps)	30
Battery Size (at 0°C)	525CCA
Battery Group	26
Battery Voltage	12VDC
Ground Polarity	Negative

**ALTERNATOR SPECIFICATIONS**

Standard Model	390mm
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	<50
Standard Excitation	Brush Type
Bearings	Sealed Ball
Coupling	Flexible Disc
Load Capacity - Standby	100%
Prototype Short Circuit Test	Yes

Voltage Regulator Type	Full Digital
Number of Sensed Phases	3
Regulation Accuracy (Steady State)	+/- 0.25%

**Engine Governing**

Governor	Electronic
Frequency Regulation (Steady State)	+/- 0.25%

**CODES AND STANDARDS COMPLIANCE (WHERE APPLICABLE)**

NFPA 99	BS5514
NFPA 110	SAE J1349
ISO 8528-5	DIN6271
ISO 1708A.5	IEEE C62.41 TESTING
ISO 3046	NEMA ICS 1
	UL2200

Rating Definitions:

Standby – Applicable for a varying emergency load for the duration of a utility power outage with no overload capability. (Max. load factor = 70%)

# QT025A

# operating data (60Hz)

## POWER RATINGS (kW)

	Natural Gas		Propane Vapor	
Single-Phase 120/240VAC @1.0pf	25	Amps: 104	25	Amps: 104
Three-Phase 120/208VAC @0.8pf	25	Amps: 87	25	Amps: 87
Three-Phase 120/240VAC @0.8pf	25	Amps: 75	25	Amps: 75
Three-Phase 277/480VAC @0.8pf	25	Amps: 38	25	Amps: 38

## STARTING CAPABILITIES (sKVA)

		sKVA vs. Voltage Dip											
		480VAC						208/240VAC					
Alternator	kW	10%	15%	20%	25%	30%	35%	10%	15%	20%	25%	30%	35%
Standard	25	16	25	33	41	49	57	12	19	25	31	37	43

## FUEL

### Fuel Consumption Rates\*

Natural Gas			Propane Vapor		
Percent Load	ft <sup>3</sup> /hr	m <sup>3</sup> /hr	Percent Load	ft <sup>3</sup> /hr	m <sup>3</sup> /hr
25%	140	3.9	25%	56	1.6
50%	220	6.2	50%	87	2.5
75%	300	8.5	75%	119	3.4
100%	380	10.8	100%	151	4.3

\* Refer to "Emissions Data Sheet" for maximum fuel flow for EPA and SCAQMD permitting purposes.

## COOLING

		STANDBY
Air Flow (inlet air combustion and radiator)	ft <sup>3</sup> /min (m <sup>3</sup> /min)	1500 (42.48)
System Coolant Capacity	Gal (Liters)	2.5 (9.46)
Heat Rejection to Coolant	BTU/hr	95,000
Max. Operating Air Temp on Radiator	°F (°C)	122 (50)
Max. Ambient Temperature	°F (°C)	104 (40)
Maximum Radiator Backpressure	in H <sub>2</sub> O	1.5

## COMBUSTION AIR REQUIREMENTS

	STANDBY
Flow at Rated Power	cfm <input type="text" value="70"/>

## ENGINE

		STANDBY
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	40
Piston Speed	ft/min	1182
BMEP	psi	120

\*\* Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

## EXHAUST

		STANDBY
Exhaust Flow (Rated Output)	cfm (m <sup>3</sup> /min)	220 (6.2)
Maximum Recommended Back Pressure	inHg	1.5
Exhaust Temp (Rated Output)	°F (°C)	975 (524)
Exhaust Outlet Size	in	2.5

# QT025A

# standard features and options

## GENERATOR SET

- Genset Vibration Isolation Std
- Extended warranty Opt
- Gen-Link™ Communications Software Opt
- Steel Enclosure Opt
- Aluminum Enclosure Opt

## ENGINE SYSTEM

### General

- Oil Drain Extension Std
- Critical Exhaust Silencer Std
- Air cleaner Std
- Fan guard Std
- Radiator duct adapter Std

### Fuel System

- Fuel lockoff solenoid Std
- Secondary Fuel Regulator Std
- Flexible fuel lines Std

### Cooling System

- 120VAC Coolant Heater Std
- Closed Coolant Recovery System Std
- UV/Ozone resistant hoses Std
- Factory-Installed Radiator Std
- Radiator Drain Extension Std

### Engine Electrical System

- Battery charging alternator Std
- Battery cables Std
- Battery tray Std
- Solenoid activated starter motor Std
- 10A UL float/equalize battery charger Std
- Rubber-booted engine electrical connections Std

## ALTERNATOR SYSTEM

- UL2200 GENprotect™ Std
- Main Line Circuit Breaker Std

## CONTROL SYSTEM

### Control Panel

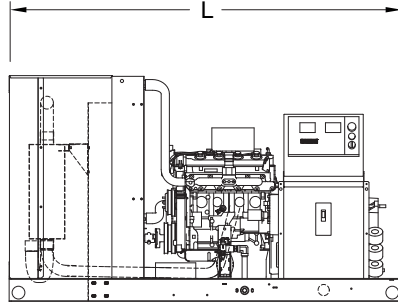
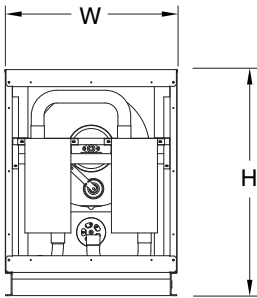
- Digital H Control Panel - Dual 4x20 Display Std
- Programmable Crank Limiter Std
- 21-Light Remote Annunciator Opt
- Remote Relay Panel (8 or 16) Opt
- 7-Day Programmable Exerciser Std
- Special Applications Programmable PLC Std
- RS-232 Communications Std
- RS-485 Communications Std
- All-Phase Sensing DVR Std
- Full System Status Std
- Utility Monitoring (Req. H-Transfer Switch) Std
- 2-Wire Start Compatible Std
- Power Output (kW) Std
- Power Factor Std
- Reactive Power Std
- All phase AC Voltage Std
- All phase Currents Std
- Oil Pressure Std
- Coolant Temperature Std
- Coolant Level Std
- Fuel Pressure Std
- Engine Speed Std
- Battery Voltage Std
- Frequency Std
- Isochronous Governor Control Std
- -40deg C - 70deg C Operation Std
- Waterproof Plug-In Connectors Std
- Audible Alarms and Shutdowns Std
- Not in Auto (Flashing Light) Std
- Auto/Off/Manual Switch Std
- E-Stop (Red Mushroom-Type) Std
- NFPA 110 Level I and II (Programmable) Std
- Remote Communication - RS232 Std

### Alarms (Programmable Tolerances, Pre-Alarms and Shutdowns)

- Low Fuel Pressure Std
- Oil Pressure (Pre-programmed Low Pressure Shutdown) Std
- Coolant Temperature (Pre-programmed High Temp Shutdown) Std
- Coolant Level (Pre-programmed Low Level Shutdown) Std
- Engine Speed (Pre-programmed Overspeed Shutdown) Std
- Voltage (Pre-programmed Overvoltage Shutdown) Std
- Battery Voltage Std

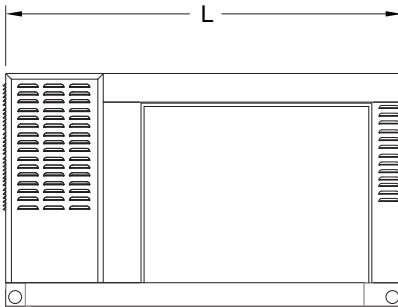
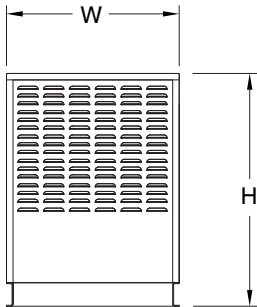
**QT025A**

**dimensions, weights and sound levels**



**OPEN SET**

L	W	H	WT	dBA*
77	34	43	1163	83



**LEVEL 1 ACOUSTIC ENCLOSURE**

L	W	H	WT	dBA*
77	34	46	1414	60

\*All measurements are approximate and \*All measurements are approximate and for estimation purposes only. Sound levels measured at 23ft (7m) under normal operation and do not account for ambient site conditions. estimation purposes only. Sound levels measured at 23ft (7m) and does not account for ambient site conditions.

<b>YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER</b>

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

## H-100 Control Panel

## Controls



## DESCRIPTION

- Digital controls for all safety shutdowns
- Isochronous governor control
- Digital 3 $\phi$  sensing voltage regulator
- Sealed Digital Circuit Board
- 2 Amp static battery charger
- Mates with HTS transfer switch and any 2-wire start ATS
- Alarm and event logging
- Built-in diagnostics
- Internal PLC
- Optional modem with dialout

## STANDARD FEATURES

The Quiet-Test™ H-100 Control Panel is a digital microprocessor electronic controller that integrates all engine and transfer switch functions into a single control system.

- Two 4 line x 20 displays
- Full system status
- 3 phase sensing digital voltage regulator
- Remote ports
  - RS232
  - RS485
  - Canbus
- Water proof connections
- All engine sensors are 4-20 ma for minimal interference
- Built in PLC

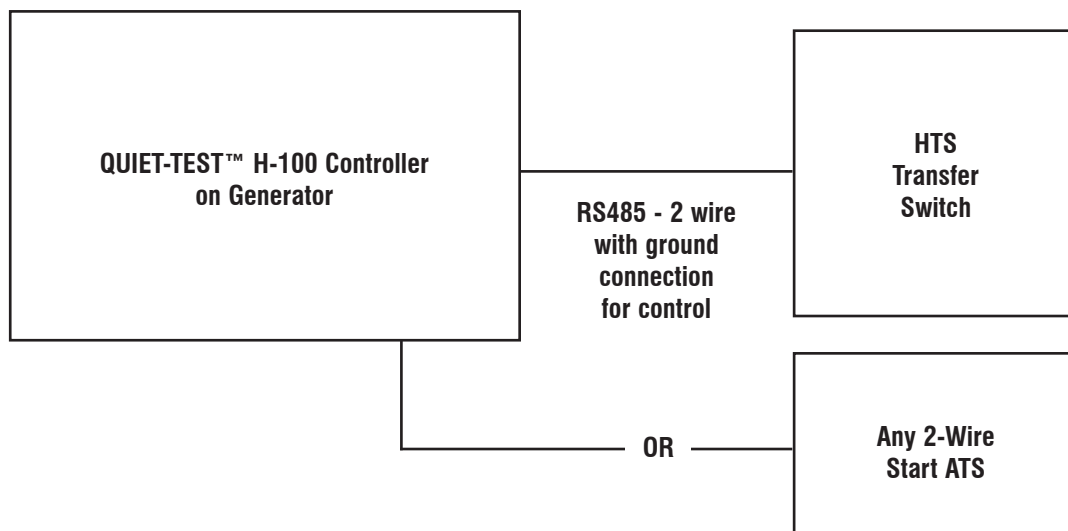
In addition, the generator set parameters can be manipulated and monitored without standing in front of the control panel with GenLink® software. The Generac H-100 control also monitors and controls transfer switch functions when used with the HTS Transfer Switch.

- Monitors utility voltage
- Monitors generator voltage
- Timer for line interrupt delay
- Timer for engine warmup
- Timer for minimum engine run time
- Timer for return to utility position
- Timer for engine cooldown
- Built in exerciser timer (7 day)
- Additional 2 wire start controls for any 2 wire transfer switch.

## H-100 Control Panel

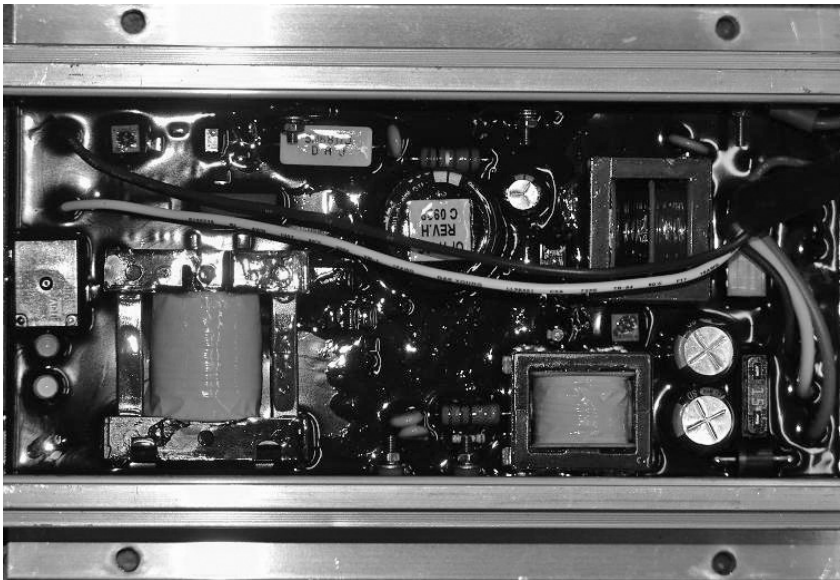
- Full range stand-by operation
- Full system status
  - 3 phase AC volts
  - 3 phase amps
  - kW
  - Power factor
  - Reactive power
  - Oil pressure
  - Water temperature
  - Water level
  - Oil temperature (optional)
  - Fuel pressure
  - Engine speed
  - Battery voltage
  - Alternator frequency
  - Time
  - Date
  - Transfer switch status
  - Run hours
  - Service reminders
  - Trending
  - Fault history (alarm log)
  - I<sup>2</sup>t function for full generator protection
  - Built in PLC for special applications
- Shutdowns
  - Overvoltage
  - Overspeed
  - Low oil pressure
  - High coolant temperature
  - Low coolant level
- Remote communication
  - RS232
  - Optional modem
  - Canbus
- Configurable to NFPA 110, level 1 or 2
- Programmable auto crank
- Emergency Stop
- On Off Manual Switch
- Not in Auto flashing light
- Audible alarm for fault condition
- Transfer switch logic communicates with HTS transfer switch
- Weekly exerciser (programmable)
- Selectable Low speed exercise
- Digital voltage regulator with 3 phase sensing (3 phase units)
- Isochronous governor
- Waterproof electrical connectors
- Temperature Range -40° to 70° C

## TYPICAL CONTROL CONNECTION



**2.5A & 10A Battery Chargers H-Panel & PM-DCP Panels**

**Accessories**



Battery Charger shown from inside of Control Panel Enclosure. Connections are made via an attached harness.

The Generac 2.5A 12 volt and 10A 12/24 volt battery chargers are designed to work with the H and PM-DCP control panels to provide the ultimate in automatic battery voltage maintenance.

The 2.5 amp charger is self-regulating and produces instantaneous output current adjustments to keep the battery charged to an optimum level. Battery voltage is read on the control panel digital display.

The 10 amp charger has automatic float and equalize control. It precisely monitors the battery's voltage and automatically activates the correct charging mode. The charge rate is limited and controlled to efficiently and safely maintain ideal battery levels under varying conditions.

The equalize system uses a control circuit to limit charging current to 10 amps. When battery voltage drops below a preset level, charging current increases to 5 amps and then to the 10 amp charge rate if needed. When the battery reaches maximum charge, the charger switches to float mode to supply just enough current to maintain the battery at or above 13/26 volts. Battery voltage and charging current are read at the control panel digital display.

<b>Specifications</b>	<b>2.5 Amp</b>	<b>10 Amp</b>
Nominal Input	120 VAC	120 VAC
Operating AC Line Voltage Range	108 to 132 Volts AC	108 to 132 Volts AC
Input AC Line Frequency	50/60 Hz	50/60 Hz
Battery Fuse	N/A	15 Amps
Nominal Charge Rate	2.5 Amps	10 Amps
Equalize Voltage		13.8/27.6 Volts
Float Voltage	13.4	13.0/26.0
Current @ Equalize to Float Transition		5 Amps
Battery Under-voltage shutdown	N/A	11/22 Volts
LED Indicators		
AC Line Voltage	N/A	Green LED
Battery Connected and Charging	N/A	Yellow LED
Battery Current Drain	30 milliamp	30 milliamp
AC Line Connection	Connector Plug	Connector Plug
Battery Connection	Connector Plug	Connector Plug
Control Connection		AC Power Fail Relay Form C 2 Amp Rating
CUL Recognized	Yes	Yes
NFPA110 Compliant	No	Yes



Generator Northern PL

Source to Receiver Horizontal Distance (ft) = 14.00  
Source to Barrier Horizontal Distance (ft) = 6.00  
Barrier to Receiver Horizontal Distance (ft) = 8.00  
Source Height (ft) = 711.00  
Receiver Height (ft) = 708.00  
Barrier Height (ft) = 713.00  
Distance Source to Receptor (ft) d = 14.32  
Distance Source to Barrier top (ft) d1 = 6.32  
Distance Barrier top to Receiver (ft) d2 = 9.43

Frequency (Hz) = 8000	Attenuation (db) = 20.0	Fresnel N = 20.454
Frequency (Hz) = 4000	Attenuation (db) = 20.0	Fresnel N = 10.227
Frequency (Hz) = 2000	Attenuation (db) = 20.0	Fresnel N = 5.113
Frequency (Hz) = 1000	Attenuation (db) = 17.0	Fresnel N = 2.557
Frequency (Hz) = 500	Attenuation (db) = 14.2	Fresnel N = 1.278
Frequency (Hz) = 250	Attenuation (db) = 11.9	Fresnel N = 0.639
Frequency (Hz) = 125	Attenuation (db) = 10.0	Fresnel N = 0.320
Frequency (Hz) = 63	Attenuation (db) = 8.5	Fresnel N = 0.160

Generator Western PL

Source to Receiver Horizontal Distance (ft) = 20.00  
Source to Barrier Horizontal Distance (ft) = 12.00  
Barrier to Receiver Horizontal Distance (ft) = 8.00  
Source Height (ft) = 711.00  
Receiver Height (ft) = 708.00  
Barrier Height (ft) = 713.00  
Distance Source to Receptor (ft) d = 20.22  
Distance Source to Barrier top (ft) d1 = 12.17  
Distance Barrier top to Receiver (ft) d2 = 9.43

Frequency (Hz) = 8000	Attenuation (db) = 20.0	Fresnel N = 19.532
Frequency (Hz) = 4000	Attenuation (db) = 20.0	Fresnel N = 9.766
Frequency (Hz) = 2000	Attenuation (db) = 19.8	Fresnel N = 4.883
Frequency (Hz) = 1000	Attenuation (db) = 16.8	Fresnel N = 2.441
Frequency (Hz) = 500	Attenuation (db) = 14.1	Fresnel N = 1.221
Frequency (Hz) = 250	Attenuation (db) = 11.7	Fresnel N = 0.610
Frequency (Hz) = 125	Attenuation (db) = 9.9	Fresnel N = 0.305
Frequency (Hz) = 63	Attenuation (db) = 8.4	Fresnel N = 0.153

Generator Southern PL

Source to Receiver Horizontal Distance (ft) = 24.00  
Source to Barrier Horizontal Distance (ft) = 5.00  
Barrier to Receiver Horizontal Distance (ft) = 19.00  
Source Height (ft) = 711.00  
Receiver Height (ft) = 711.00  
Barrier Height (ft) = 713.00  
Distance Source to Receptor (ft) d = 24.00  
Distance Source to Barrier top (ft) d1 = 5.39  
Distance Barrier top to Receiver (ft) d2 = 19.10

Frequency (Hz) = 8000	Attenuation (db) = 20.0	Fresnel N = 6.958
Frequency (Hz) = 4000	Attenuation (db) = 18.3	Fresnel N = 3.479
Frequency (Hz) = 2000	Attenuation (db) = 15.4	Fresnel N = 1.740
Frequency (Hz) = 1000	Attenuation (db) = 12.9	Fresnel N = 0.870
Frequency (Hz) = 500	Attenuation (db) = 10.8	Fresnel N = 0.435
Frequency (Hz) = 250	Attenuation (db) = 9.1	Fresnel N = 0.217
Frequency (Hz) = 125	Attenuation (db) = 7.8	Fresnel N = 0.109
Frequency (Hz) = 63	Attenuation (db) = 6.7	Fresnel N = 0.054