

• MAINTENANCE •



**OPERATIONS
CHALLENGE™**



OPERATIONS CHALLENGE 2026

Vaughan Chopper Maintenance Event 2026 Version

General Notes

The pump servicing table shall be able to hold 400 lbs at a minimum (pump weighs approx. 325 lbs)

All locations (practice and competition) must be structurally sound and have the capability to withstand a pumping station that holds 266 gallons of water. In addition, the wheels (4) must also be able to withstand at minimum 554 lbs per wheel).

If you are utilizing the Vaughan provided pump and pump station, the water level must be at a minimum level of 2.8 ft. or 34 inches. This is imperative to ensure the pump does not cavitate and damage the pump. Should you opt to build your own tank, be certain that the minimum water level is 2.8 ft or 34 inches. This is a recycling process, so the level will maintain while the pump is operating. Please note: Remove the pump after practice or competitions to avoid rusting and water discoloration. It is also recommended to take a proactive approach to keeping the pump in good condition by keeping the pump clean and lubricated.

This event requires a 230 -volt 3-phase power source, otherwise, there will be damage to the Vaughan Chopper Control Panel and Vaughan Chopper pump.

At minimum, you must have a 230-volt, 20 amp service power source and there is no 115 volt unit available. At competitions which cannot provide 230v power, they can run the event, but the pump and voltage test station will not operable.

It is recommended to keep spare power plugs/cords due to wear and tear at the connections while practicing and competing.

Excessive cussing/unsportsmanlike conduct will be assessed as a penalty.

Do not put any items in your mouth if done this will be considered a serious health and safety violation/penalty.

Hard hat, steel toes shoes, safety glasses required. 5-second rule will apply if dropped.

PLEASE NOTE: The work table that will be used at WEFTEC will be the ULINE, H-2484 (96" x 30"), the pump lay down area (20" x 20") will be centered on that table. If you have been using the table Vaughan sent with the kit (ULINE, H-3078), the center of the table is 12" closer to the cradle because the table is only 72" long. The legs on the H-2448 table can be adjusted up to the correct height (34").



OPERATIONS CHALLENGE 2026

Vaughan Chopper Maintenance Event

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Event Introduction:

The purpose of this event is to test the skills of a maintenance team in response to issues at a sanitary pumping station.

Premise

This pumping station is in a district that has many restaurants and businesses. While the city has an ordinance dis-allowing industrial waste discharges, its restaurant grease trap program has been sub-par at best. This district service area has been very problematic over the years with many SSO's that were not rain related but countless ragging/debris issues creating pump clogs and line blockages. The high cost of station cleaning and line maintenance has prompted city management to act. Recently, the city had initiated a new CMOM Capital Improvement Project. A portion of the CIP is to develop a program to reduce or eliminate "rags" that are problematic to the pumping and collection system. As a result of the CMOM study, it was determined by the asset class engineer to install Vaughan Chopper conditioning pumps to help eliminate SSO's and future blockages. However, as with any wastewater application, there are many variables to operating an efficient collection system that must be addressed including but not limited to FOG (Fats, Oils and Grease), wet wipes and other various debris. The new management has just recently created a grease trap program to address these issues, however, these programs take time due to budget schedules, implementation, and training.

Scenario

A pump station team has received high level alarms via telemetry in the problematic service district. The high-level alarms have been cleared and acknowledged several times. The SCADA trends show that the pumps are cycling as programmed but continue to hit the high-level set-point alarm (level sensor activated). It is also confirmed that the station has yet to receive the high, high level back-up float so visual and audible alarms were not activated. The early morning plan was to not only mitigate the alarming issue but perform a full service of the station and its control panel. All the results from the service would then be documented in CMMS.

Upon arrival to the pumping station, it was determined that there was an abnormal amount of build-up just below the level sensor in the neutral corner of the wet well. The wet well pumps and conditioning pump appeared to be operating well but adjustment/direction of the conditioning pump was going to be required. Since a full service was going to be performed anyway as a preventive measure, the impeller, corroded hardware, and pump nozzle were to be replaced along with the pump re-positioning.



Event Procedure

3 Minute Walk-through

1. Each team will be given a 4-minute walk-through to look over the tools and supplied materials in order to service the pump and prepare for the event. All tools that begin in the tool box can be strategically re-positioned but must remain in the box until the event starts. The same applies to the tools provided on the set-up table. Those items can't be placed in the tool box until after the event starts. The tools/materials supplied on the set-up table may be moved from their original position set-up by the event judges. The tool box and other supplied tool/materials can be re-located but must start and end on the set-up table. The set-up table may not be moved! The tool box must be latched but a lock will not be used. The multi meter must be turned off before the event starts. **Check zip-lock bags for damage.**
2. Any member that touches the cutter bar or impeller at any time (during set-up and event) must wear leather gloves.
3. The hoist, trolley, and gantry must start and finish in the designated marked areas. Exact positioning within the designated marked area is required after the event, the wheels must be facing opposite of the set-up table.
4. All gantry pins, wheels and wheel locks must be in their original position before and after the event.
5. No work may be performed on the set-up table.
6. Hoist chain adjustment is allowed during the 4-minute set-up.
7. The tank and work table may not be moved prior to and during the event.
8. During the 4-minute set-up, the ½ inch drive torque wrench must be set to 50 ft/lbs and 3/8 inch drive set to 20 ft/lbs. Both shall be confirmed by the designated judge. If the settings are not correct, the team member will be allowed to re-set the torque settings. If the settings are still not correct, the judge will set it to the correct settings and penalties will be assessed.
9. Prior to the 4-minute walk-through, please communicate to the head judge who the team captain, safety supervisor and electrician are.
10. The following can be completed on the electrical check sheet. TEAM NAME, DATE (MM/DD/YY) AND ELECTRICIANS NAME. These items must be legible.



Failure to comply with each of these steps will result in penalty assessment.

During the event (General):

1. Only the team captain can stop the event if needed and they must communicate that to the head judge only. The head judge will stop his stop watch and all other stopwatches will continue to run. Depending on the issue/situation will dictate which stopwatch will be used moving forward in the event.
2. No running will be allowed. Two feet off the ground at the same time is considered running.
3. Always practice the code of conduct.
4. Never argue with any judge at any time.
5. General safety: Due to the size of the gantry, no part of the gantry shall cross the event border line (in the air or ground level). This will be considered a safety infraction, and a penalty will be assessed.
6. When moving the gantry you must use two team members, one on each end
7. Anytime while lifting the pump, the gantry wheels must be locked. When the gantry is moving, the wheels must be unlocked. Each time the wheels are locked or unlocked, the team member performing this must verbalize ("locked" or unlocked"). A penalty will be assessed for EACH time it is not verbalized.
8. Three team members are required anytime the pump is being moved with the Gantry. One member on each end of the gantry and one member holding the pump to eliminate excessive swinging of the pump.
9. During movement of the Gantry, the chain, hook, or pump may not swing more than 12" at any time.



10. Gantry Red Strap: For gantry safety precaution only. Once erected, no team member can stand on or use to strap to hold wheels down onto floor surface.
11. If a task is required to be performed prior to the next task, it will be specifically expressed in the event description.
12. Please note: Replacement bolts, impeller and nozzle will be an opposite color to ensure replacement.
13. Voltage Test Station: The meter probe must be fully inserted into the test ports during all voltage checks. Proper finger positioning will be behind the guards on the test probes will be required.
14. Do not run over the motor electrical cords with the gantry wheels. If a cord makes incidental wheel contact while the gantry wheels are locked, there will be no penalty assessment.
15. The gantry can be lifted over the power/control cables if there is no load on the gantry (i.e. pump connected).
16. Should the gantry wheels leave the surface while lifting, lowering or moving, a safety penalty and misuse of equipment/tools penalty will be assessed.
17. Once the pump is removed from the pump station, the gantry be relocated and must be positioned directly over the 20" x 20" designated box with the wheels locked prior to lowering pump onto the work table. Any swinging of the pump will result in a misuse of equipment penalty.
18. Once the pump is lifted to the horizontal position, the gantry must be relocated directly over the pump cradle with the wheels locked before lowering onto the cradle. Any swinging of the pump will result in a misuse of equipment penalty.



19. Upon completion of the pump rebuild, the gantry must be relocated and positioned directly over the pump prior to lifting. Once the pump is lifted in the horizontal position, the gantry must be relocated directly over the 20"x 20" designated box prior to lowering into the vertical position. Any swinging of the pump will result in a misuse of equipment penalty.
20. The pump must be lifted only by chain hoist anytime during the event.
21. The pump may never be placed on the electrical cords at any time during the event.
22. All torquing must be done in a controlled manner, using proper torque wrench technique (one hand on the handle grip and the other on the ratchet head). Any snapping of torque wrench will be considered over torquing and will be penalized. Must verbalize "torque" after tightening each bolt that requires torquing.
23. Using ratchet wrenches for the pump re-assembly is strictly prohibited. However, ratchet wrenches must be used for the nozzle flange bolt/nuts.
24. Boundaries or Tape Lines: This includes the Safety Area! The plane of all equipment tape marks extends infinitely upward like a wall, please treat it as such. Any equipment/feet that touches the tape mark or crosses the plane of the tape mark will be penalized.
25. Complete the electrical check sheet using the sheets and clip board provided. Any team member can record the results performed by the electrician with the exception of Event Procedure Item I.5.
26. All electrical checks that require use of the multimeter must be done by the electrician.
27. Test Station: Anytime the Electrician steps on the boundary tape or outside the "Safety Area" at the control panel, the test port cover must be closed and latched. Both feet must be inside the "safety area". The meter probes may remain inserted into test ports in while inside the "safety area". Each reading a member takes while he is outside or on the line of the safety area is a penalty. Example, if you are on the line for three (3) voltage checks, that will result in three (3) penalties. During the event, any other team member may cross the safety area boundary as this only applies to the Electrician.
28. Should the safety tag fall off the hoist chain, a penalty will be assessed.
29. No team member can hold onto the D-ring within 1' of the chain hoist.
30. If anything falls into the pump station, a penalty will be assessed.



31. The Electrician shall not touch the pump station water at any time during the event. Failure to comply with this requirement will result in a safety penalty assessment.
32. Eye Bolts: The eye bolts shall not be repositioned at any time.
33. A penalty will be assessed for each wrong answer on the Electrical Check Sheet. Voltage reading must be within +/- 2 volts of pre-checked voltage.



A. LOTO of Control Panel

1. Record power supply voltage to control panel. There will be a sticker on the supply cord plug indicating power supply voltage. Please see the bottom side picture of the panel below.



2. Turn the pump off at the control panel. Verbalize “pump is off”
3. Isolate the power to the control panel using the main disconnect. Verbalize “Power is off”
4. The electrician must write their initials and date on the tag with the permanent marker provided. It must be legible. It must be written on the white label not directly on the tag itself. The date must be in the following format MM/DD/YY for example 01/10/19. The date written on the tag shall be the actual date you are performing the event. This must be complete prior to proceeding to step A-5 7.
5. Perform lock and tag out procedure on the main breaker. Verbalize “Main disconnect locked out”. Using a gang hasp on the main disconnect, all team members must lock out using the provided individual color-coded locks (the LOTO tag must be hooked through the zip-tie as opposed to the tag eyelet). The Electrician must use the red lock. The Safety Supervisor must use the yellow lock. The other team members can use any other color lock. All members must install their own lock and keep the lock out key on their person at all times while locked out. Once the Electrician and Safety Supervisor are locked out, the Electrician must verbalize “Lock out verified”.
6. Once main disconnect is locked out, the electrician can then use the provided multi-meter to check for power at the test port.
 - a. Turn the multi meter to AC voltage V~



- b. Check voltage between L1-Ground, verbalize “L1- ground no voltage”
 - c. Check voltage between L2-Ground, verbalize “L2- ground no voltage”
 - d. Check voltage between L3-Ground, verbalize “L3- ground no voltage”
 - e. Once complete, verbalize “no voltage to ground present”
 - f. Check voltage between L1 – L2, verbalize “L1 – L2 no voltage”
 - g. Check voltage between L2 – L3, verbalize “L2 – L3 no voltage”
 - h. Check voltage between L1 – L3, verbalize “L1 – L3 no voltage”
 - i. Once complete, verbalize “no voltage present”
7. The electrician will now check to see if the pump is isolated by turning the pump on by turning the on switch to HAND. If the pump does not turn on the electrician will turn the switch back to the off position and state “Pump Isolated”. This must be complete prior to task A.8. 10.
8. The Safety Supervisor will also check the pump to verify the pump has been isolated by turning the on switch to HAND. If the pump does not turn on the Safety Supervisor will turn the switch back to the off position and state “Pump Isolated, Safe to Remove Pump”. No member can touch the pump or station until it is declared “Safe to Remove Pump” by the Safety Supervisor. The pump can now be removed. At this time, you can now unplug the power cable for resistance check.
9. The pump can be removed from the pump station, placed on the work table, and placed on the pump cradle by any member. However, no member can begin the pump rebuild unless they are locked out.



B. Gantry Assembly

1. The Reid gantry will be fully erected with the wheels in their designated locations.
2. Install trolley on gantry. Trolley must be installed in one of the three center holes of the gantry unit.
3. Install chain hoist on the trolley.
4. The gantry height will need to be extended high enough so that two holes are showing on the bottom to safely remove the pump from the tank. Ensure all bolts are fully inserted with the nuts started on each end of the gantry before moving. It does not matter which two of the three holes are used for the bolts when assembling the gantry. However, the bolts must be back in their original locations and orientation at the end of the event.

C. Pump Removal

1. While moving the gantry over the pump station, be very careful not to allow the chain/hook to touch the water. This will be a safety infraction. However, if the Electrician and Safety Supervisor deem the pump safe to be removed. No penalty will be assessed.
2. Using the chain hoist, lower chain hook and attach to the lift bale and raise the pump to the desired level to safely clear the tank wall. When removing the pump, be careful not to hit the wall, causing the wet well to move. If the wet well moves a penalty will be assessed and you must return the wet well to the original location.
3. Proceed to move the pump to the work table.
4. With the gantry positioned directly over the 20" x 20" marked box, place the pump on the designated area on the work table.
5. Lower pump on work table in the vertical position in the marked box (20" x 20"). This must be performed prior to step C.5.



6. Slightly lower the chain hoist and remove from the pump lift bale.
7. Using the provided lifting sling, choke sling securely around the motor at the bottom bracket. Do not trap the electrical cord in sling. See picture below.



8. If the lifting sling is installed incorrectly, the judge will notify the team member to properly secure the sling in the designated location. Choking the sling tight is of the utmost importance.
9. Lower the chain hoist hook and attach to the lifting sling.
10. Using two team members (one steadying the pump and the other operating the chain hoist), raise pump to a horizontal position. Any lifting without the chain hoist will be assessed a penalty.
11. Raise the pump high enough to clear the fixed pump cradle on the service table in the horizontal position.



12. Position the gantry and pump directly over the pump cradle. **Pump must be positioned with pump stand side towards the pump station.**
13. Lower the pump onto the pump cradle.
14. A team member's entire hand must be on the motor/pump, to control the movement of the motor while installing the ratchet tie down strap and must remain until the ratchet tie down strap is secured.
15. Using the provided ratchet strap, firmly wrap the pump onto the work table and ratchet tight (can't be twisted). No member is allowed to begin work on the pump until the ratchet strap is safely secured or when the pump is being lowered or raised. The ratchet strap hooks **MUST** be inserted in the eye bolts.

D. Pump Rebuild

1. Team members must be locked out to begin the pump rebuild.
2. Using two team members, remove the pump stand using the 9/16" ratchet wrenches. PLEASE NOTE: Two hands (any one or two team members) must be holding the stand at all times while removing the bolts. If the pump stand drops or falls or is not gently placed on the work table, a safety penalty will be assessed.
3. The pump stand must be gently placed on the work table.
4. Using the provided aluminum bar as a jam, place it between the impeller and cutter bar fingers to loosen the cutter nut by using the 1/2 inch drive breaker bar and the 1 11/16" inch socket. This step must be done prior to loosening the suction plate bolts and proceeding to step D.4.
5. Remove two bolts holding the suction plate to the casing for suction plate and cutter bar removal. Note the location of these two bolts, you will need to re-install two replacement bolts in the same holes.
6. Rotate shaft such that the impeller keyway is in the 12:00 o'clock position. Remove impeller and key. PLEASE NOTE: The team member handling the impeller must wear leather gloves.
7. Wipe shaft using shop rag three times, verbalize each wipe.
8. Using air nozzle blow out shaft keyway and threads for a five second count, verbalize one-one thousand, two-one thousand, etc.



9. Install new impeller key. Note: The impeller key is 1" L x 3/8" W x 5/16" H. Improper installation of the impeller key will not allow the impeller to slide into the proper position.
10. Install new impeller. The event judge will intervene if the impeller is not correctly installed. **DO NOT FORCE IMPELLER ONTO SHAFT.**
11. Using air nozzle blow out the six exposed threaded casing holes for a one second count, verbalize one-one thousand for each hole. **All threaded holes do not need to be blown out, just the six where the bolts were removed.**
12. Re-install cutter nut hand tight.
13. Install cutter bar with one of the cutter bar fingers pointing at discharge flange. See below. Should the cutter bar be installed incorrectly, the judge will intervene, stating "cutter bar is in the in-correct position", Corrections must be made prior to the next step.



14. Install the two 3/8" NC alignment pins, verbalizing three half turn rotations for each pin. This must be complete before task D-14.
15. Install suction plate with new fasteners hand tight at 3:00 o'clock and 9:00 o'clock in reference to discharge flange at 12:00 o'clock position.
16. Using the 3/8-inch drive torque wrench, soft torque the suction plate fasteners to 20 ft/lbs and verbalize. You must use the torque wrench as a ratchet for this task. This must be complete before task D-16 and D-17.
17. Install the aluminum bar between the impeller and cutter bar as a jamb. Using the 1/2 drive torque wrench, soft torque the cutter nut to 50 ft/lbs and verbalize. You must use the torque wrench as a ratchet for this task.
18. Re-install pump stand using two team members. Using at least two hands from either member holding the pump stand in place, install two (2) bolts hand tight.



The alignment pins can be removed and the requirement to use two hands is then not required. Should the alignment pins not back out by hand, the provided 5/16" open end wrench can be used to loosen the pins. This is not a requirement and is considered optional. Install remaining two bolts. Using the 3/8-inch drive torque wrench, soft torque the pump stand fasteners to 20 ft/lbs in a torque/cross pattern and verbalize. You must use the torque wrench as a ratchet for this task. This must be complete before step D-18.

19. Using leather gloves, rotate impeller by hand to ensure it rotates smooth and free from any interference. Verbalize "pump rotates smooth and free."

20. Place fasteners that were removed back in the appropriate bags, and seal.

E. Change Bolts and install new Flanged Nozzle

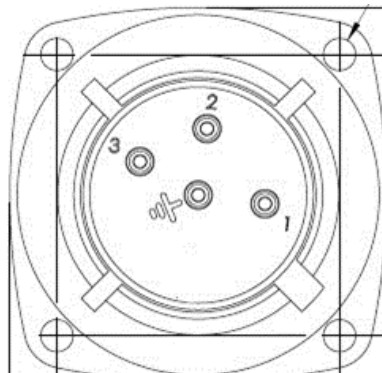
1. Remove the flange bolts that connect the flanged nozzle to the discharge flange.
2. Remove old, flanged nozzle and gasket from the discharge flange.
3. Install new flanged nozzle and gasket using new flange bolts. **NEW:** The bolts must be installed with the bolt head and flat washer toward the volute and lock washers/nuts end toward the nozzle. If one bolt is being installed backwards, the judge will intervene. The error must be corrected before proceeding. Tighten and verbalize "tight" on each bolt using 15/16" ratchet wrenches such that they are snug and can't be turned by hand.
4. Ensure proper torque/cross pattern is used.
5. Install old flat washer, lock washer and nut back onto the bolt (in that order) and place back in the appropriate bag and seal. Nuts must be at least flush or more from the end of the bolt.

F. Electrical Motor Checks

1. All team members must be locked out prior to removing the power cable for resistance checks.
2. Unplug the motor power cable from the control panel. It is located on the bottom right side of the control panel. See below.

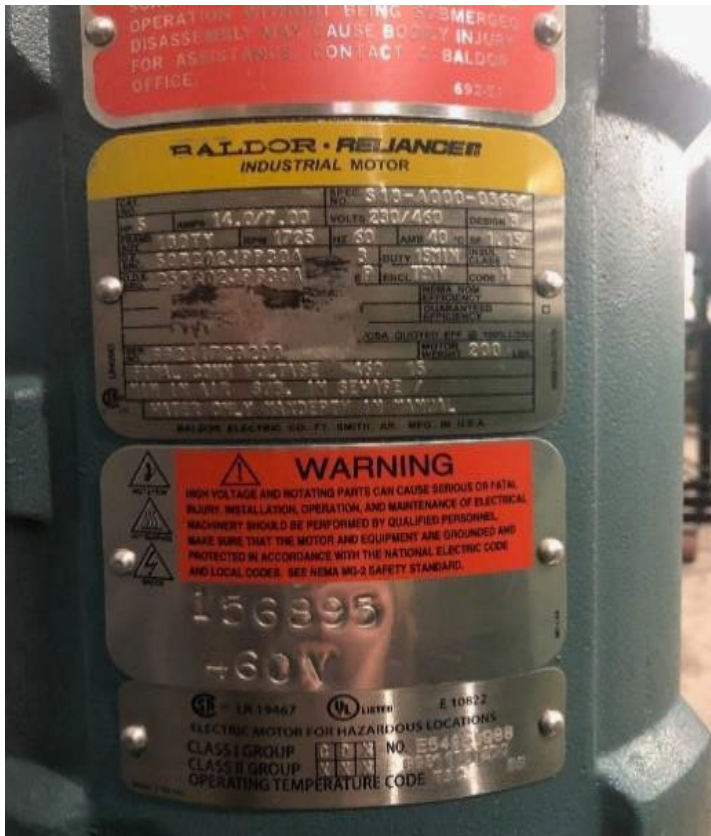


3. Using the provided multi-meter, turn the selector to resistance Ω . Perform and record the following resistance checks on the motor power cable. When recording “infinite”, you must use the ∞ symbol (sideways 8).
- a. T1 – Ground (should be infinite)
 - b. T2 – Ground (should be infinite)
 - c. T3 – Ground (should be infinite)
 - d. T1 to T2
 - e. T2 to T3
 - f. T3 to T1





- Motor Voltage Note: the motor final voltage will be hand stamped on the tag just below the motor information tag.
- Motor Amperage. Record Amps for the correct motor voltage.



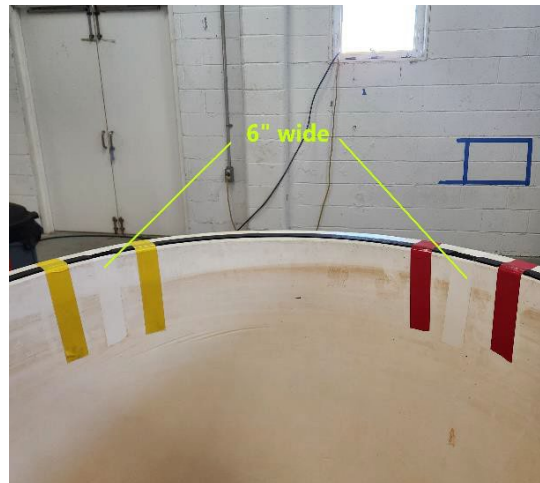


G. Removing pump from work table/cradle

1. Reposition the gantry directly over the pump laying in the horizontal position.
2. The chain hook must be re-attached to the lifting sling to moved back onto the 20"x 20" marked area. Adjust the chain to apply tension to the sling (no slack). Any slack in the chain will result in a penalty assessment. The tension must be sufficient enough to support the motor should it slip out of the cradle. Should the pump catch onto the motor/pump bolts and the work table legs lift above two inches, a misuse of equipment/tool penalty will be assessed.
3. A team member's entire hand must be on the motor, to control the movement of the motor while removing the ratchet tie down strap and must remain until the ratchet tie down strap is released.
4. Release and remove the ratchet tie down strap.
5. Lift the pump up high enough to safely clear cradle.
6. Proceed to move the gantry and pump directly over the 20" x 20" marked area on the work table.
7. Lower the pump onto the designated area on the work table in the marked area in a vertical position. Detach from the lifting sling. Remove the lifting sling. Attach the chain hook onto the lift bale.
8. Lift pump up into the vertical position high enough to safely clear the tank wall.
9. Proceed to move the pump to the tank.



10. Position the gantry and pump over the wet well.
11. Lower the pump to the required pump placement area inside the wet well making sure that the pump is targeted toward the appropriate color as determined by the nozzle color (red or yellow). When lowering the pump be careful not to hit the wall, causing the wet well to move. If the wet well moves a penalty will be assessed and you must return the wet well to the original location or another penalty will be assessed. Once the chain is un-hooked from the lifting bale. You are not allowed to touch or reposition the pump or a penalty will be assessed. However, if the pump set is determined by the team member to be inaccurate, you can then reattach the chain hook to the lifting bale, lift pump enough to re-position correctly. Of course, ensure the wheels are in the locked position. Team members must be locked out to touch the water for pump positioning. The Electrician is strictly prohibited to touch the water at any time during the event.



H. Dis-assemble Gantry

1. Lower the gantry risers to the starting position. Bolts shall be installed in the top and bottom holes leaving the middle one open. The black nuts shall be installed facing outward (outward as defined when the gantry is fully assembled) from the gantry with the bolt head facing inward.
2. Remove Chain hoist and trolley from the gantry beam.
3. Place caster wheels back within the marked areas. The wheels must be facing opposite the set-up table.
4. Reinstall all pins in the trolley. Pins shall be inserted on the same side as they are attached to the trolley.



5. Place the trolley and chain hoist within their respected marked areas. Touching the tape marks or over the tape marks is not acceptable.

I. Restore power to the control panel

1. Once the pump is set, team members may remove their locks (The electrician last, red lock).
2. Remove gang hasp, lockout/tags and turn main breaker to the “on” position.
3. Before turning the pump on, take voltage test readings from the voltage test station and record on the Electrical Check Sheet. Please note: The voltage readings must include one decimal. (Example: 208.4)
 - a. Turn the multi meter to AC voltage V~
 - b. Check voltage between L1-L2, verbalize “L1-L2 voltage present”, record voltage
 - c. Check voltage between L2-L3, verbalize “L2-L3 voltage present”, record voltage
 - d. Check voltage between L1-L3, verbalize “L1-L3 voltage present”, record voltage, close test port cover.
4. At this time, no team member can touch the pump station, water or pump. The Safety Supervisor must verbalize “Voltage verified ok, the pump is safe to turn on”. The electrician shall then turn on the pump on (pump selector switch in the “Hand” position).
5. Electrician must finish filling out the electrical check sheet and safety supervisor will need to sign it.
6. Once the pump is back in service and left running, the power and control cable for the pump must be laid out in the marked area. No portion of these cables shall touch the boundary/taped lines or a penalty will be assessed.





J. Clean-up

1. Prior to leaving the event area, all tools that started in the toolbox must be returned to the toolbox in no particular order. Any tools not returned to the toolbox will be assessed a penalty.
2. Prior to leaving the event area, all items that were placed on the set-up table must be returned to the set-up table in no particular order. Any items not placed on the set-up table or in the toolbox will be assessed a penalty.
3. The toolbox lid must be securely closed and latched. No lock will be used.
4. **All zip-lock bags must be re-sealed.**
5. Multi-meter must be off after completion of the event.
6. Leave the event area and the team captain must verbalize “stop”.



2026 Vaughan Maintenance Event

Tools (Tool List)	Quantity	Make/Model/Manufacturer
Wetwell	1	48x40 BSNPKG, 4' Dia x 34" D x 46" H
Vaughan Submersible Pump	1	SE3F1 180 TY
Pump Nozzle	1	3" x 2", V115-146-OPS
Tool Box	1	Kobalt Portable 20.6 in Black Steel Lockable Tool Box (Model # HS20MHB-13)
Set-up Table	1	8 ft Standard
Work Table	1	72" x 30" H-3078-ULINE or 96" x 30" H-2484-Steel ULINE (Table to be used at WEFTEC)
Multimeter	1	Milwaukee Digital Multimeter – True RMS, Model # - 2216-20
Gang Hasp	1	3 Panduit PSL-1013 1"
Lockout Kit	1	OPS-Lockout/Tagout Kit – 4-lock kits with wrist Elastic Key Wrist Bands (Match colors of locks Red, Yellow, Green, Blue)
Ratchet Strap	1	P/N PCC 1050-15VS 15'
Lifting Sling	1	Green Round Sling, OL2 x 4'
½" Drive Torque Wrench	1	P/N: KTA-G3462-2EG1
3/8" Drive Torque Wrench	1	P/N: KTA-G3362-2EG1
½" drive breaker bar	1	
½" x ¾" adapter	1	
1 11/16" socket (3/4" drive)	1	
9/16" ratchet wrench	2	
15/16" ratchet wrenches	2	
5/16" open-end wrench	1	
Aluminum Bar	1	PN V122-759, 5" x 3/8" x ¾" square stock
Vaughan Pump Cradle	1	P/N: V120-482
Vaughan Pump Impeller	1	P/N: V114-723-050-OPS, 3F-5.0", Twisted
Keyway	1	1" L x 3/8" W x 5/16" H



Tools (Tool List)	Quantity	Make/Model/Manufacturer
Flange Bolts	4	5/8" NC x 2 3/4" L Lock & flat washers
3" Flange Gasket	1	150# - Rubber
Suction Plate bolts w/flat and lock washers	6	Two (2) – 3/8" NC x 3/4" L Four (4) – 3/8" NC x 1 1/4" L Lock and flat washers
Shop Rag	1	
Sharpie	1	Black
Computer/Laptop	1	Standard
Air Nozzle	1	Garage Ready Air Blow Gun Professional Series with Variable Air Flow Trigger Heavy Duty 4 inch nozzle and 1/4" Industrial Type D Air Compressor Quick Connect.
Cutter Bar Alignment Pins	2	3/8" NC , V3500-101-OPS Enclosure: NEMA 3R, 4.12 rated enclosure, 230V P/N WCS4C-021A-VCP-OPS
Control panel	1	Issued in Vaughan Kit -V122-622
One Quart Zip Lock Bags	3	Parts Packaging
Reid Gantry Crane	1	P/N: WLL 250KG/US-PGRS20J
Reid Crane Trolley	1	PGTXR00500
Reid Chain Hoist	1	P/N: WLL 0.5t/Code: CX005/Chain Load: V- 4.3 x 12.0 mm
Absorbent Pad, 35"x23"	1	Amazon, Gorilla Grip Ultra Absorbent Moisture Guard Doormat



Team Member PPE

Leather
Gloves
Steel Toe
Boots Hard
Hat Safety
Glasses



2026 CDN. VAUGHAN MAINTENANCE EVENT REV 2

Electrical Check Sheet

Team name: _____

Date: _____

Electrician name: _____

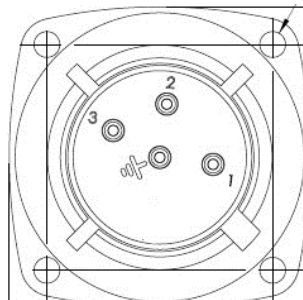
Power Supply Voltage: _____

Motor Final Voltage

Motor: ID Tag Operating Amperage: _____

Power Cable

T1 to Ground	_____ List ohms
T2 to Ground	_____ List ohms
T3 to Ground	_____ List ohms
T1 to T2	_____ List ohms
T2 to T3	_____ List ohms
T1 to T3	_____ List ohms





The condition of the power cable? Good _____ Bad _____
The condition of the control cable? Good _____ Bad _____

Final Voltage Check

L1 – L2 _____ L1 – L3 _____ L2
– L3 _____

Have all electrical Checks been complete and recorded? Yes _____ No _____

Safety Supervisor

Signature



OPERATIONS CHALLENGE™

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