**PUMP STATION CHECKLIST**

|  |  |  |  |
| --- | --- | --- | --- |
| Project Name: |  | | |
| Reviewed By: |  | Date: |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pump Number, Flowrate and Pressure** | | | | |
| Pump No. | 1 | 2 | 3 | 4 |
| Mfg & Model |  |  |  |  |
| Type |  |  |  |  |
| Rating (flowrate @ TDH) |  |  |  |  |
| Net Positive Suction Head(req’d) |  |  |  |  |
| Motor Size (HP) |  |  |  |  |
| Variable or constant speed drive |  |  |  |  |
| On-Off Settings (describe - psi, tank levels, etc.) |  |  |  |  |

|  |  |
| --- | --- |
| **Design Basis and Design Capacity (12VAC5-590-1050 B)** |  |
| Pump station design capacity gpm/MGD @ ft TDH |  |
| Basis for design capacity (describe): |  |
| At least two (2) pumping units provided?  (For small noncommunity systems, the reserve capacity requirements may be reduced in accordance with the type and size of system served)? | Yes  No  N/A |
| Are pumps capable of delivering the peak hour demand, with the largest pump out of service, taking into account storage contributions? | Yes  No  N/A |
| When booster pumps are used to transfer water from atmospheric storage tanks to hydropneumatic storage tanks located upstream of an entry point, the combined capacity shall equal or exceed the peak hour demand.  If fire flow is provided, a pump or pumps separate from the transfer pumps shall be provided to deliver the required fire flow. | Yes  No  N/A  Yes  No  N/A |
| Are adequate calculations provided to verify design? | Yes  No  N/A |
| Is minimum distribution pressure at peak/total flow ≥ 20 psig?  Design shall be based on the most restrictive conditions, defaulting to the greater of peak hour demand or maximum daily water demand plus applicable fire flows | Yes  No  N/A |
| An automatic pressure cutoff or a pressure regulating valve is provided to prevent suction line pressure from dropping below 10 psi? | Yes  No  N/A |

|  |  |
| --- | --- |
| **Pumps (12VAC5-590-1050)** |  |
| Pumps, their motors, and all accessories are controlled in a manner that they will operate at their rated capacity (full range of the operating conditions)? | Yes  No  N/A |
| Where two or more pumps are installed, provision is made for proper alternation of pumps? Alternation may be automatic or manual. | Yes  No  N/A |
| In case a check valve fails, is provision made to prevent operation of the pump in the event of a backspin cycle? | Yes  No  N/A |
| Pumps are lubricated with water of equal or better quality than the water being pumped or with food grade oil? | Yes  No  N/A |

|  |  |
| --- | --- |
| Where pumps are sealed with potable water and are pumping water of lesser sanitary quality, the seal is protected with:   * An air gap of at least two inches or two pipe diameters, whichever is greater, where a break-tank is provided; or * An approved RPZ assembly is provided | Yes  No  N/A |
| Where automatic pre-lubrication of pump bearings is necessary and an auxiliary power supply is provided, the pre-lubrication line is provided with a valved bypass around the automatic control? | Yes  No  N/A |
| A suitable outlet for drainage from pump glands is provided without discharging onto the floor? | Yes  No  N/A |

|  |  |
| --- | --- |
| **Booster Pumps (12VAC5-590-1050 B)** |  |
| The following two items apply to all booster pumps, except those connected to supply mains not containing service connections and except those taking suction directly from storage facilities: |  |
| 1. Will not produce negative gauge pressure in their suction line? | Yes  No  N/A |
| 1. The intake pressure is at least 20 psi under normal operation? | Yes  No  N/A |

|  |  |  |
| --- | --- | --- |
| **Controls (12VAC5-590-1050 A)** | |  |
| Describe (local/remote SCADA, automatic controls, etc): | |  |
| Type of pump alternation provided: Manual / Automatic / None  Satisfactory? | | Yes  No  N/A |
| Are HOA switches provided for each pump? (recommended) | | Yes  No  N/A |
| Describe operation monitoring (SCADA, etc.) | |  |
| Is operation monitoring satisfactory? | | Yes  No |
| If pump withdraws directly from atmospheric storage, is low tank water level (withdrawal) shut off & auto reset provided? | | Yes  No  N/A |
| Controls will prevent excessive cycling of the pumps, by means of   * Sufficient range between start and cutoff pressure, or * Another mechanism | | Yes  No  N/A |
| Control equipment has overload protection for high equipment/air temperature? | | Yes  No  N/A |
| Electrical controls are protected to the 100-year flood elevation? | | Yes  No  N/A |
| Electrical controls are above grade? (recommended) | | Yes  No  N/A |
| **Piping & Valves (12VAC5-590-1065)** | |  |
| Piping is adequately sized to minimize pressure losses? | Yes  No | |
| Piping is not subject to contamination? | Yes  No | |
| Piping is properly anchored to prevent movement? | Yes  No | |
| Are there potential cross-connection?  How are potential cross-connections protected?  Complies with 12VAC5-590-610? | | Yes  No  N/A  Yes  No  N/A |
| Positive-acting check valve (or suitable control features) provided on discharge for each pump, located between the pump and the shutoff valve? | | Yes  No  N/A |
| Shutoff valves provided on both suction and discharge lines for each pump? | | Yes  No  N/A |
| Discharge control valves and appurtenances located above the pump floor when an above-ground discharge is provided? | | Yes  No  N/A |
| Surge relief valves or slow acting check valves designed to minimize hydraulic pressure transients?  Describe protection from surge and water hammer.  Satisfactory? | | Yes  No  N/A  Yes  No  N/A |
| All exposed piping, valves and appurtenances protected against physical damage and freezing? | | Yes  No  N/A |
| Piping has proper labels to identify contents of the pipes? (if appropriate) | | Yes  No  N/A |
| Each pump has an individual suction line or the lines are manifolded to ensure similar hydraulic and operational conditions? | | Yes  No  N/A |
| Foot valves, if necessary, have a net valve area of at least 2-1/2 times the area of the suction pipe and are screened? | | Yes  No  N/A |
| **Suction Wells (12VAC5-590-1040 B)** | | Yes  No |
| Are watertight? | | Yes  No |
| Floors sloped to allow water and solids to drain? | | Yes  No |
| Covered or otherwise protected against contamination, including by pump lubricants? | | Yes  No |
| Have multiple pumping compartments or other means to allow the suction well to be taken out of service for inspection, maintenance, or repair? | | Yes  No |

|  |  |
| --- | --- |
| **Appurtenances (12VAC5-590-1065)** |  |
| Each pumps is equipped with air release/vacuum relief valve located upstream of the check valve with exhaust/relief piping terminating at least 18 inches above the floor in a down-turned position and covered with a corrosion resistant screen? | Yes  No  N/A |
| Standard pressure gauge or compound gauge, as appropriate, provided at the suction for each pump? | Yes  No  N/A |
| A pressure gauge provided at discharge for each pump? | Yes  No  N/A |
| Pressure gauges capable of displaying the maximum expected pressure? | Yes  No  N/A |
| Snubber, dampener or isolation valve provided to protect gauges? (recommended) | Yes  No  N/A |
| A sample tap is provided, recommend non-threaded and downward facing? | Yes  No  N/A |
| Flow rate indicating and totalizing meter with recording capabilities is provided for booster pump stations located in the distribution system? (recommended) | Yes  No  N/A |
| By-pass piping provided (for repairs)? (recommended) | Yes  No  N/A |
| **Alternate Power (12VAC5-590-730)** |  |
| Was alternate power considered in order to maintain a minimum level of service during an electrical power outage? | Yes  No  N/A |
| Describe alternate power provisions:  Satisfactory? | Yes  No  N/A |
| If standby power is provided by onsite generators or engines, provisions for filling the fuel storage tank, the fuel tank itself, and the fuel line are designed to protect the water supply from contamination? | Yes  No  N/A |
| **Pump Station Location (12VAC5-590-1020)** |  |
| Station minimum of one foot above 100-year flood elevation or protected to that height? | Yes  No |
| Accessible at all times? | Yes  No |
| Graded around station to provide drainage away from station? | Yes  No |
| Protected to prevent vandalism and entrance by animals or unauthorized persons? | Yes  No |
| **Pump Station Enclosure/Building (12VAC5-590-1040 and 1010)** |  |
| Structure is of durable construction; fire and weather resistant? | Yes  No |
| Maintains sanitary quality of pumped water? | Yes  No |
| Enclosure is waterproofed (if underground)? | Yes  No |
| All pumps are accessible for servicing and repair and adequate room for servicing all equipment? | Yes  No |
| Space provided for installation of additional pumps if needed? | Yes  No |
| Outward-opening doors, lockable? | Yes  No |
| Finished floor elevation should be at least six inches above the finished grade | Yes  No |
| Concrete floor with adequate reinforcement and a minimum thickness of 6 inches? | Yes  No |
| Floor slopes of at least 1/8 inch per foot toward a screened 4-inch diameter drain to atmosphere or other provisions for gravity drainage? | Yes  No |
| Heat is provided for safe operation of equipment? | Yes  No |
| Dehumidification provided in areas where excess moisture could cause hazards to safety or damage to equipment? | Yes  No |
| Adequate lighting throughout? | Yes  No |
| Forced draft ventilation of at least six changes of air per hour is provided for all rooms, compartments, pits and enclosures below grade, and any area where unsafe atmosphere may develop or excessive heat may build up? | Yes  No |
| Openings in floors, roofs, or elsewhere for removal of heavy or bulky equipment is provided? | Yes  No |
| Craneways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors, or other heavy equipment is provided? | Yes  No |

**Calculations:**

[[1]](#footnote-1)Building volume V = \_\_\_\_\_\_\_cf

Fan capacity Q = \_\_\_\_\_\_ cfm

Air changes per hour = Q\*60/V = \_\_\_\_\_ , > 6?

1. Required for all rooms below grade, where unsafe atmosphere may develop and/or excessive heat may build up. [↑](#footnote-ref-1)