

NRCS	PUMPING PLANT DESIGN AND CHECKOUT WORKSHEET	WVEng EDCD 533C
Field Office _____		Date ___ / ___ / ___
Land Owner _____	County _____	
Planned by _____	Checked by _____	Approved by _____

The following items must be in the design folder for the Pumping Plant Facility.
Check items that pertain to the pumping plant, fill in the blank or circle word as appropriate.

Survey Record

- ___ Identify benchmark, bar scale, north arrow and latitude and longitude at point of discharge
- ___ Location of water source; centerline elevation of pump and/or discharge point; static water level.
- ___ Profile along the proposed centerline(s) of pipelines.
- ___ Random shots necessary for the plan view map and design purposes (elevation highs and lows).
- ___ Location of summits and lows.
- ___ Location of structures, rock outcroppings, sink holes, etc.
- ___ Location of above or below ground utilities, utility markings, etc.

Design Record –Check, circle or fill in the blank as appropriate.

1. The purpose of the pumping plant is to provide water for ___ livestock, ___ poultry, ___ dairy, ___ microirrigation, ___ sprinkler irrigation, ___ greenhouses, ___ other.
2. Water quality for the above purpose has been determined adequate or will be treated?
3. Note associated Conservation Practices such as Well (614), Irrigation Water Conveyance (430), Irrigation-Microirrigation (441), Irrigation Sprinkler (442), Pipeline (516), Watering Facility (642) Pumping Plant
4. Determine System Daily Water Requirements (Gal/day); Reference _____ WV ENG WS 642-B or
 - a. ___ Livestock; _____ Type, _____ #AU's ___ gallons/day for ___ hours/day.
 - b. ___ Livestock; _____ Type, _____ #AU's ___ gallons/day for ___ hours/day.
 - c. ___ Poultry, _____ Type, _____ #AU's ___ gallons/day for ___ hours/day.
 - d. ___ Poultry, _____ Type, _____ #AU's ___ gallons/day for ___ hours/day.
 - e. ___ Micro- Irrigation _____ GPM for ___ Hours/Day or _____ Gallons/Day.
 - f. ___ Sprinkler Irrigation _____ GPM for ___ Hours/day.
 - g. ___ Nursery, High Tunnel or Greenhouse _____ GPM for ___ Hours/day.
 - h. ___ Aquaculture Ponds _____ GPM for ___ Hours/Day or _____ Gallons/Day.
 - i. ___ Dairy Barn Use _____ GPM for ___ Hours/day or _____ Gallons/Day.
 - j. ___ Supplemental Water _____ GPM for _____ Hours/day or _____ Gallons/Day.
 - k. ___ Other water ___ at _____ GPM for _____ Hours/day or _____ Gallons/Day.
5. ___ Estimate the System Maximum Daily Water Use (from above information) is ___ GPM for _____ hrs/day (intermittent) _____ continuous (hrs/day) or a total of _____ Gallons/Day. Irrigation pumping plant shall provide a minimum of 125% of daily rate.
 - a. Required Irrigation Pumping Plant Production Rate _____ GPM
6. ___ Document the Total Dynamic Head (TDH) is the sum of the Total Dynamic Suction Head (TDSH) and the Total Dynamic Discharge Head (TDDH) for the pumping plant.
7. ___ Complete WVENG WS 533B information and pumping plant schematic.
8. ___ The pump's energy is supplied by ___ diesel , ___ electric (single or three phase), ___ solar, ___ wind ___ other source.
9. ___ Well Certification Documentation, ___ WV Dept. of Human and Health Resources (place pump in well) _____ , Certified Electrician or permitted installer, Local Health Dept. ___ County, ___ State, ___ Federal, ___ Other

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10. ___ Topographic Map (Plan View) locating of all existing and planned practices, components, pipelines, watering facilities, barns, watering application areas (troughs), apparent property lines, irrigation fields, and existing water courses/bodies.

- a. ___ Pump curve attached and pump selected within range of greatest efficiency.
- b. ___ Concrete pad or foundation ___ ft. x ___ ft. x ___ in. thick = ___ yd³s
(3,000 or 4,000 PSI strength, Welded wire mesh or rebar reinforcement)
- c. Other Structures _____ psi _____ re-bar/ ww mesh
- d. Other Structures _____ psi _____ re-bar/ ww mesh
- e. ___ Pumping Plant Outlet Discharge Protection; ___ NA, ___ Rock type, ___ Size, ___ Gradation.
- f. ___ Building material requirements, _____.
- g. ___ Quantity computations and cost estimates.

Construction Specifications

- ___ North arrow, scale, general location map
- ___ Plan view and x-sections (where appropriate)
- ___ Documented compliance with nationwide 811 and MISS UTILITY 1-800- 245-4838 Utility Check Sheet WV-Eng 6
- ___ Permits
- ___ Vegetation Plan.
- ___ Construction and Material Specifications
- ___ O&M Plan (reviewed by landowner).

Check Data Record

- ___ Extent of completed work (As-built drawings verified and marked).
- ___ Location and dimensions of appurtenances (check valve, pressure relief valve, filter, flow meter, drains, control valves, air vacuum release valve, tanks, etc.).
- ___ Minimum cover and grade-lines for underground pipelines and thrust blocks from the pumping plant.
- ___ Pumping Plant _____ Make, _____ Model, _____ GPM, _____ @ discharge PSI, _____ Type (diesel, electric, solar, PTO, other), _____ Horsepower, _____ performance curve , data for all pumps, and other related appurtenances.
- ___ Filter (_____ mesh, _____ screen size)
- ___ Check Valves
- ___ Diameter, schedule of above and below ground pipe
- ___ Building material requirements.
- ___ Quantity computations and cost estimates.

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Total Dynamic Head (TDH) is the sum of the Total Dynamic Suction Head (TDSH) and the Total Dynamic Discharge Head (TDDH) for the pumping plant.

Data required for Deep/Shallow Well Turbine Pump Selection:

- 1) The TDDH is the sum of the following @ discharge capacity of _____ GPM
 - a) _____ (ft.) static water level below natural ground or to CL of pump
 - b) _____ (ft.); elevation change; from i. to the highest _____ elevation (summit) in the system
 - c) _____ (ft.); pipeline friction losses of longest conveyance pipeline(s), main, submain and/or header
 - d) _____ (ft.); friction losses from tees, valves, and other associated appurtenances (generally 1%-2%.of total losses). Normally calculated in PSI therefore convert to ft. (multiply by 2.31).
 - e) _____ (ft); pressure required for pressure tank or float valves
 - f) _____ (ft.); friction losses in irrigation disc and or sand filters or screens (typically 11.6 ft or 5 psi for sand filters; 5 ft. or 2.3 psi for disc filters).
 - g) _____ (ft.); pressure required at most distance and/or highest point of application for micro, sprinkler, traveling gun, pressure tank, float valve, etc.

_____ (ft); Total Dynamic Discharge Head (sum the above) TDDH Required _____ ft. @ Discharge Capacity of Pump _____ GPM

- 2) The TDSH is the sum of the following
 - a) _____ (ft) Suction Head from lowest water source to CL of pump
 - b) _____ (ft) Estimated friction loss in suction pipe or pump column
 - c) _____ (ft) Pressure Tank requirement (convert from psi to ft. (multiply by 2.31)
 - d) _____ (ft) Miscellaneous friction loss
 - e) _____ (ft); Total Dynamic Head (sum the total above losses) @ _____ GPM

- 3) Planned Total Dynamic Head (sum of TDDH and TDSH)
 - a) _____ ft TDH; _____ ft. (TDDH) + _____ ft.(TDSH) @ _____ GPM

- 4) _____ Pump Curve attached and pump selected within range of greatest efficiency.

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Data required for Horizontal Centrifugal Pump Selection:

Discharge Conditions:

Source of water supply _____

a. Vertical suction lift _____ ft. (<20')

b. Length of Suction Pipe _____ ft.

c. Number and kind of bends required _____ = _____ ft.

d. Foot Valve and Strainer _____

Sum Static Discharge Lift _____ ft.

a. Discharge Head Required _____ ft. @ Discharge Capacity of Pump _____ GPM

b. Pump Location: _____ Portable _____ Permanent

c. Type of Driver: _____ electric _____ voltage _____ phase _____ cycle _____ diesel _____ gasoline
 _____ power take off _____ natural or LP gas

d. Power Unit: _____ Separate from pump _____ Attached with pump

e. _____ Pump Curve Attached and pump selected within range of greatest efficiency.