2.2.2 PLANT SITE ARRANGEMENT

Figure 2-4 shows a plant site plan and general arrangement. The plant site consists of 44.5 acres. The project equipment and buildings, electrical substation, stormwater pond, and miscellaneous facilities would be contained within a fenced 12-acre area. Approximately 10 acres of the remaining area would be utilized for a wastewater storage pond. The remaining 22.5 acres would be used for other uses such as temporary construction laydown and parking. Upon completion of construction, the land would be landscaped with native vegetation. Alternatively, Plymouth Farm may be granted permission to use the land for agricultural purposes. A buffer zone between the project equipment and site boundary would be maintained. The entire plant site would be fenced.

Generated power would be delivered to either the proposed BPA McNary-John Day 500-kV transmission line or the existing BPA McNary-Big Eddy 230-kV transmission line, both of which are located approximately 0.6 mile north of the plant site. When the PGF power plant is not generating, maintenance and standby power would be provided by the Benton Rural Electric Association (REA). A Benton REA 69-kV substation serves the Williams Co. compressor station and a Columbia River water pumping station west of the site. All transformers, switching, and other electrical equipment would be installed inside a fenced substation.

The PGF would be controlled from a central control room located in the turbine building. The administration building would also house the maintenance shops and warehouse. The water treatment system would provide high purity process water to the HRSG, and would be housed in a separate building.

Two 2-million-gallon tanks on the plant site would store raw water. One tank would provide raw water to the plant, and the other would be maintained as a fire water source. Smaller tanks on the site would store demineralized water and chemicals.

The site would be graded to direct stormwater runoff from the plant site to a stormwater retention pond.

Wastewater (blowdown) from the cooling tower would flow to a wastewater storage pond, where it would be stored during non-irrigation months. Wastewater stored during the winter would be mixed with fresh water and used to irrigate the Plymouth Farm orchard during the irrigation season.

2.2.3 POWER PLANT CONFIGURATION

The PGF power plant would include a combustion gas turbine (CT) driving an electrical generator (CTG), an HRSG, and a steam turbine (ST) driving a second electrical generator (STG). It would also include both an air-cooled condenser (ACC) and mechanical draft evaporative cooling tower (wet tower) for plant cooling.

Hot exhaust gasses from the combustion gas turbine would flow to the HRSG to produce steam. Fuel would also be burned in a duct burner to produce additional high pressure steam, which

would then flow to the steam turbine. Steam exhausted by the steam turbine would flow to a condensing system. The condensate stream would then be returned to the HRSG to continue the process.

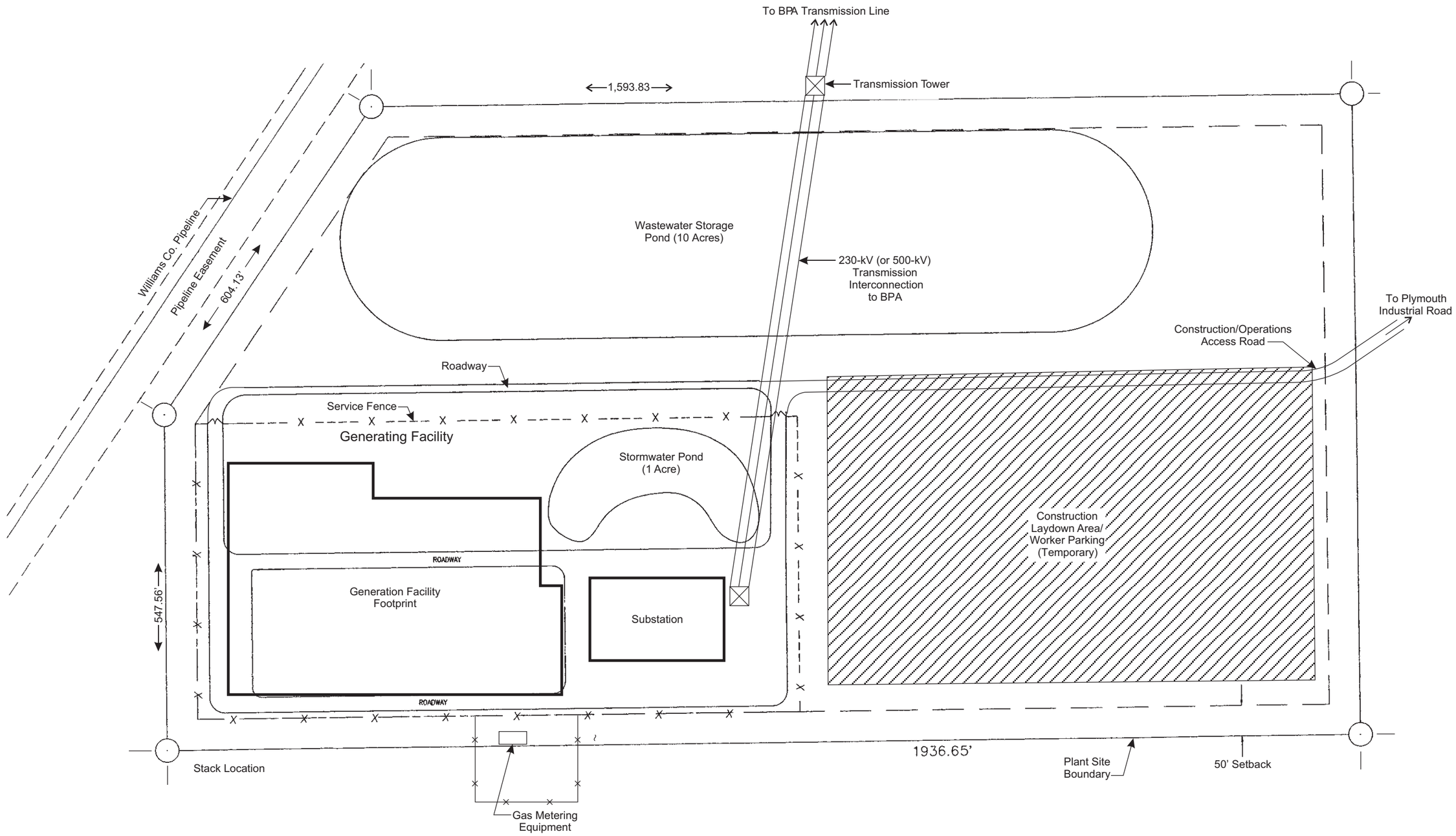
A portion of the exhaust steam would be condensed by the air-cooled condenser. The remainder would be cooled by a conventional water-cooled condenser; this condenser would be cooled by circulating water, which in turn would be cooled by the mechanical draft cooling tower. The proportion of exhaust steam condensed by the air or wet condenser would be determined by ambient air temperatures. Air-cooled condenser load would increase and water condenser load would decrease as ambient air temperatures decrease, to the point where water use is not required.

The total net nominal electrical generating capacity of the entire PGF at the annual average ambient temperature of 54° Fahrenheit (F) would be 307 megawatts (MW). The total gross capacity would be 317 MW. The PGF would produce a net output of 265 MW if operated as a combined cycle plant without duct firing.

The PGF would include the following primary component subsystems:

- 1 gas-fired combustion turbine
- 1 steam turbine
- 1 heat recovery steam generator
- 2 electric generators, each driven by one of the turbines
- 1 steam condensing system including:
    - 1 air-cooled condenser
    - 1 water-cooled condenser
    - 1 mechanical draft cooling tower
    - circulating water system
- steam system
- closed cooling water system with auxiliary cooling tower
- raw water makeup system
- demineralized water system
- condensate and feedwater system
- wastewater disposal system
- fuel gas system
- instrument air/service air system
- fire protection system
- unit control system
- electrical substation

Each of these key subsystems is described in more detail in the following sections.



Source: Wieland Lindgren Engineers

Figure 2-4
Plymouth Generating Facility
Site Plan

Figure 2-4 (continued)