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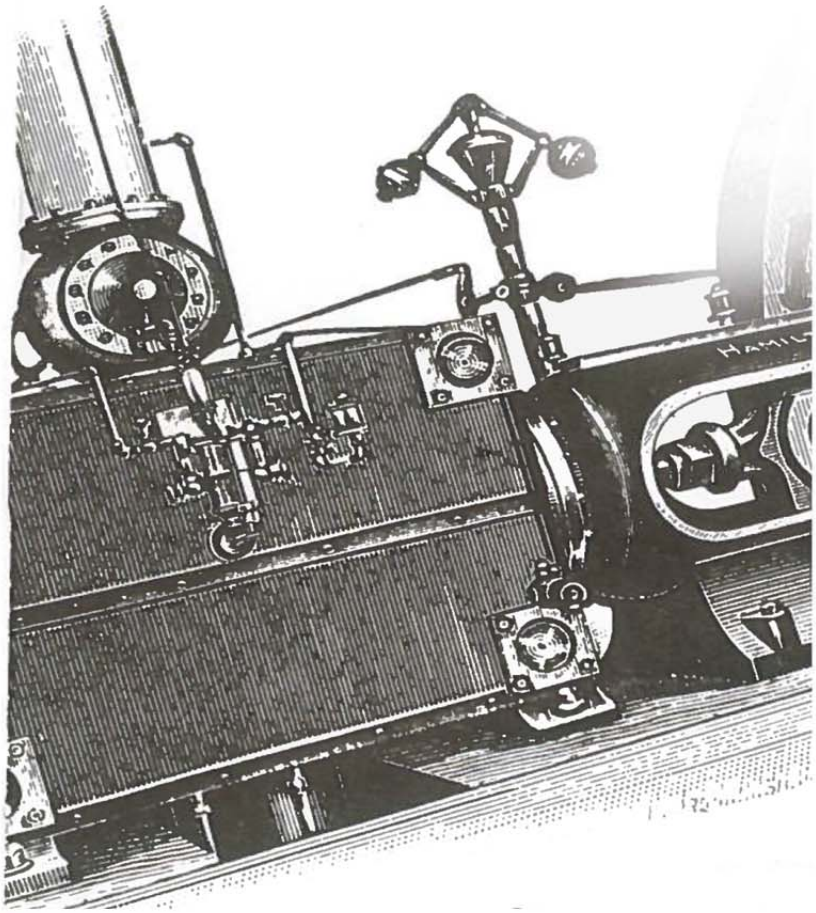
Self-Guided Pumphouse Tour

SELF-GUIDED TOUR



CITY OF HIDALGO TEXAS

OLD HIDALGO PUMPHOUSE MUSEUM
& WORLD BIRDING CENTER

WORLD BIRDING
CENTER

Self-Guided
Pumphouse Tour
Welcome to the Old Hidalgo Pumphouse.

We hope that this brochure will make your visit more enjoyable and meaningful, and that it will help explain how the Pumphouse worked, and why it was important. We'll be happy to answer any questions you may have.

As you came in from the parking area you were greeted by a sign **1** explaining the Pumphouse discharge basin and the discharge gates which regulated the water flow to the canal system as it made its way to the fields to the north. We also hope you noticed the distinctive Pumphouse façade **2** and read the historical marker **3** to the left of the entrance.

Before any water was pumped to the fields, an order was needed. Orders came in to the order desk **4** over the telephone seen on the wall to the left **5**. (Before the telephone was installed, orders arrived on horseback.) The orders were recorded and kept on file. Daily records were kept of water pumped out to the farms and cities, and were written on slips like the one displayed on the cabinet door.

The most prominent structures in this area are the three large boilers **6 7 8** which turned water into high pressure steam to drive the steam engines which, in turn, drove the pumps. To make steam, the boilers needed water and heat. Some of the boiler water came from spent steam returning from the engines which was then condensed and stored in the cistern **9** below the concrete circle in the floor.

Condensers may be seen just outside the building in the discharge channels, along with a huge flap valve which opened when the pumps were running, and prevented the water from returning to the discharge pipes. The balance of the water needed for the boilers was drawn from water pumped from the river. It was filtered, softened and pumped into a feedwater tank. The filters **10** are just outside this wall. The filtration material was excelsior, wood shredded to look like shredded wheat.

The water softener **11** and the 2000-gallon feedwater tank **12** are seen here in this alcove. Originally softening was done with chemicals in an open tank, but in more recent times softening was all done in pressurized tanks, to remove minerals from the water and prevent scale (mineral deposits) from building up in the boiler tubes.

The treated water was then forced into the high pressure boilers by the feedwater pumps **13** seen in front of the first boiler and the smoke stack. Sight gauges monitored the water level.

Fire in the boilers was originally fueled by mesquite wood which was surplus as the area land was being cleared for farming. When the wood was depleted, crude oil was shipped in by rail, stored in redwood tanks, and then piped to the burners. By 1920, the first contracts were let for purchase of natural gas, which was used to fire the boilers from then until the pumphouse closed in 1983.

The boilers have water-filled tubes above the flames which connect through headers to the steam domes **14** above. The live steam is piped from the top of the dome to a 12 inch manifold, behind the boilers, which distributes steam power to the engines we'll see down in the engine room. Again, please note the fire doors **15** where wood was stoked on the No. 1 boiler and the gas valves **16** which fired the No. 3 boiler.

Here against the wall is a smithy and machine shop display, **17** added not only to demonstrate some of the machines used in the Pumphouse machine shop at the San Juan headquarters, but also to recall the dependence farmers had on machine shops to forge and shape parts which needed repair.

Stop in at the visitors' center **18** straight ahead and on your left, and take the time to visit the displays. Then go through the second set of double glass doors to the pump rooms.

Go through the doorway **19** to your right, which is in the original 1909 corrugated steel wall between the boilers and the engine room. Here in this room **20** stood the first engine and pump in 1909. The beams overhead are also original. (The original engines and pumps were removed in the 1950's.)

The sign **21** on the wall indicates the pride taken in the early engines, which were state of the art at the beginning of the 20th century. Painted in bright colors, "they were pretty engines," says a former Pumphouse worker. Remember, the people of that time were accustomed to pumping water with a hand pump. The two original pumps were similar to the ones which you will see in the next room, although smaller. A Twin City steam engine stood here. A wall to the right was taken out and an Allis Chalmers steam engine was placed in a newly built room.

In 1954, the wall of that room was removed and an Ingersoll-Rand internal combustion engine **22** was placed in yet another new space.

As we move on to the remaining steam engines, please look out over the channel **23** where the water was taken from the Rio Grande. The river once flowed directly in front of the Pumphouse, but in 1933 a hurricane caused the river to change its course ½ mile south, requiring a new channel to be dug, dredged and maintained. You can see the wildlife refuge on the left, Reynosa and cars on the bridge over the Rio Grande from this view.

Installed in 1911 to 1912, the engines **24** you see below in the pump pits were the ultimate in reciprocating steam engines in their day. They are double-action, double-expansion engines, having a high pressure side **25** and a low pressure side **26** to obtain the greatest efficiency from the steam. There is a piston on both sides of the pump, each with its connecting rod, cross head bearing and pitman. Two intake and tow exhaust valves for each piston allow for a power stroke in each direction (double-action) to increase engine power – similar to how steam locomotives function.

The valves are operated from eccentrics **27** through actuating rods **28** which open and close the four valves for each piston. The pistons on each engine are connected to a common shaft by the piston rods, cross head bearings and pitmans **29**.

The shaft itself, weighing over 4,000 lbs., drives the impeller in the centrifugal pump **30**. The pump is 20 feet tall, with two 36 inch intake pipes **31** and a 60 inch discharge pipe **32**. There were other pumps built this large, but none any longer.

Starting the boilers and engines from a cold start took from 16 to 24 hours, depending on outside temperature and the river level. The boilers had to be heated slowly, the engines purged of any leftover water, and the pumps primed used steam jets.

Engine speed was controlled with the governors **33** which you can see. They are connected to the valve mechanism on each piston box Steam powered vacuum pumps **34** helped circulate the spent exhaust steam through the outdoor condensers mentioned earlier.

Constant oiling and supervision was needed in the engines' operation. Capacity for each of these two pumps was 72,000 gallons per minute, under ideal conditions.

Moving into the Worthington room we see the first departure from steam at the Pumphouse. This engine, **35** a straight eight, 800 horsepower internal combustion engine, was installed in 1948, and drove a centrifugal pump **36**. It was later supplemented with the V12 Ingersoll-Rand engine seen at the other end of the

building. They, in turn, were supplemented by four electric powered pumps mounted in the channel in 1980, each of which pumped 37,000 gallons per minute. The Worthington pumped 63,000 gallons per minute according to the records. Total capacity was 408,000 gallons per minute.

For the sake of illustration, at that rate an Olympic-sized swimming pool could be filled in about 20 seconds!

Moving back into the boiler area, we see a cutout in the brick boiler wall **37** showing how the tubes were located. The illustration shows how the fire heated the water and made steam. The 12 inch diameter pipe **38** on the wall behind the boilers collected the steam from the boiler steam domes and transmitted it to the steam engines.

The 125 ft. tall smoke stack **39** has an exterior diameter of 10ft. A large flue **40** connects it to all the boilers, with dampers at each boiler to control the draft.

As we move on we see one gas burner **41** displayed. Note that there are eight burners on one gas intake. There were four intakes on this boiler. You may note the draft adjustment where the gas pipes enter the burner area, as well as the flue as it joins each boiler.

One of the rear boiler doors **42** has been removed to expose there are where the tube caps are placed in the steam headers.

Operations at this pumphouse were abandoned in 1983, when ten of the more efficient electric pumps were mounted in the channel about ½ mile to the southeast. They are now in operation doing the vital work of irrigating farms and supplying municipal water systems, a function this Pumphouse performed for close to eighty years.

Leave the building where you entered, then follow the pathways outside to see the bundled pipe condensers **43** and flap valve **44** in the discharge channels.

Thanks for stopping by the Old Hidalgo Pumphouse, and plan to return again real soon, y'hear?

Old Hidalgo Pumphouse
is a project of the City of Hidalgo
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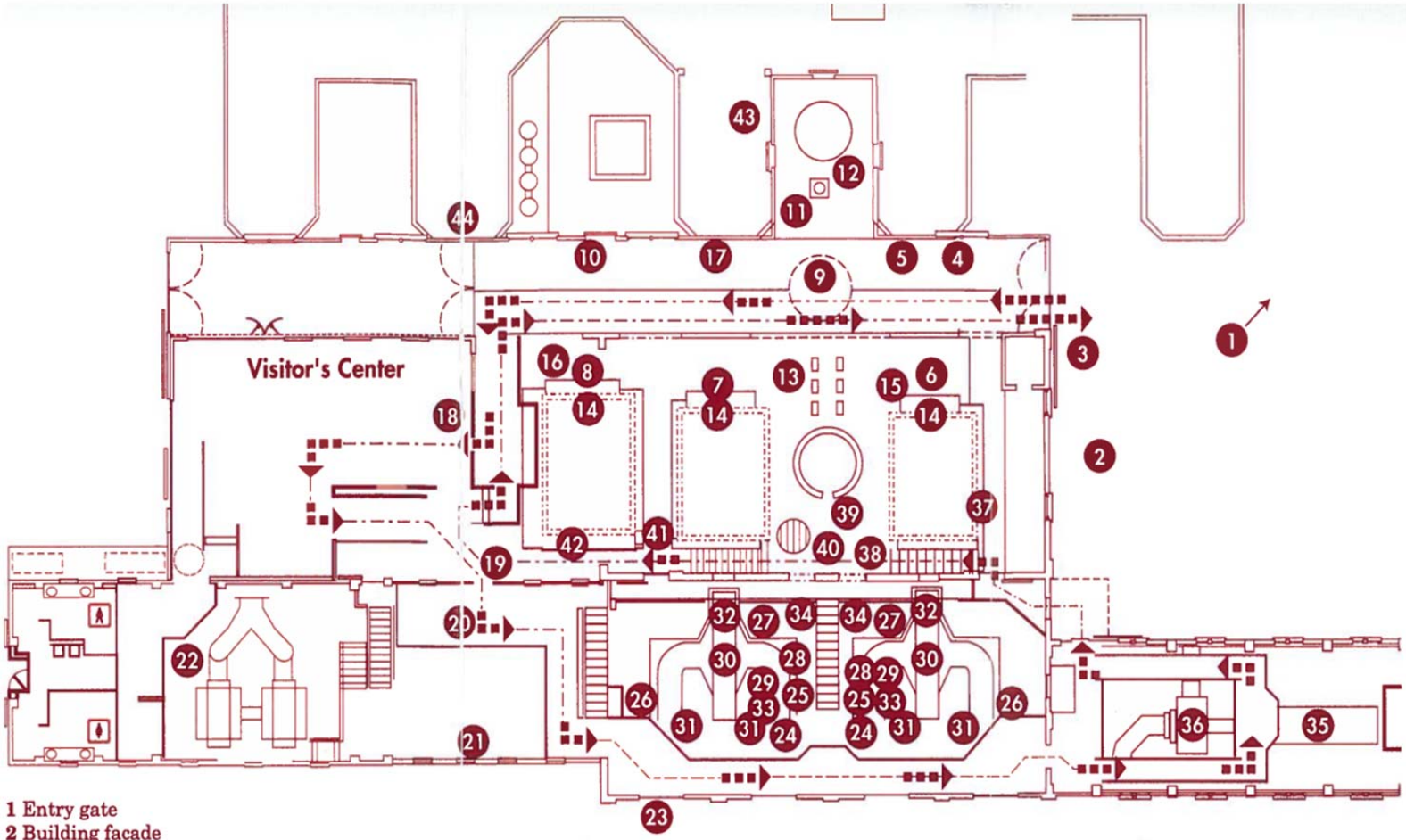

1 Entry gate
2 Building facade
3 Historical marker
4 Order desk
5 Old telephone
6 Boiler # 1
7 Boiler # 2
8 Boiler # 3
9 Cistern
10 Filters
11 Water Softener
12 Feedwater tank
13 Feedwater pumps
14 Steam domes
15 Fire doors
16 Gas Valves

17 Machine shop
18 Visitors center
19 Entry door to pumps
20 Original pumproom
21 Wall sign
22 Ingersoll Rand engine
23 Intake channel
24 Hamilton Corliss engines
25 High pressure cylinders
26 Low pressure cylinders
27 Eccentrics
28 Actuating rods
29 Crosshead bearings
30 Worthington centrifugal pumps

31 Intake pipes
32 Discharge pipes
33 Governors
34 Vacuum pumps
35 Worthington engine
36 Centrifugal pump
37 Water tubes in boiler
38 Steam collector pipe
39 Smoke stack
40 Boiler flue
41 Gas burner jet
42 Boiler tube caps
43 Outdoor steam condensers
44 Outdoor flap valve