Site Preparation

Site preparation for an oil and gas well, in most instances, looks like any other construction site. OSHA uses Safety and Health Regulations for safety compliance during this phase of the development of a drilling site.

Once the location for the site has been established, the area is prepared for drilling, with the following steps:

- Leveling Site
- Excavating and Trenching
- Rathole
- Mousehole

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The site is leveled (if necessary) with a bulldozer and/or a grader.

- Potential Hazards:
  - Damaging buried pipelines and cables.
  - Unpredictable weather changes can create unexpected hazards.
  - Uneven ground may cause bulldozers to roll over.

- Possible Solutions:
  - Perform a site line location survey.
  - Plan for hazards due to unpredictable changing weather.
  - After weather changes, conduct inspections for new hazards.
  - Provide rollover guards on all equipment used in site clearing operations.
  - Provide overhead and rear canopy guards on rider-operated equipment.

Excavating & Trenching

- The scale and duration of excavating and trenching are very minor and site-specific. On some drilling sites, a below-ground-level cellar may be excavated. This is where the main borehole is to be drilled. A reserve pit and settling pits may be excavated and are used for water or drilling fluid (mud) discharges.

Pre-Drilling Preparation

Prior to commencing the rig-up process, the conductor, rathole and mousehole are completed.

Special companies may be hired to begin drilling these three holes.

- Conductor Hole & Conductor Pipe
- Rathole
- Mousehole
Conductor Hole & Conductor Pipe

This is a large diameter hole, lined with pipe, also called a starter hole, varies in depth down of tens of feet to a few hundred feet depending on the local geology.

Some sites do not require a conductor hole.

Rathole

A rathole is a hole in the rig floor, 30 to 35 feet deep, lined with casing that projects above the floor, into which the kelly is placed when hoisting operations are in progress.

This is either done by the portable rig that drills the conductor hole or can be done by the primary rig after rigging-up.

Mousehole

A mousehole is a shallow borehole under the rig floor, usually lined with pipe, in which joints of drill pipe are temporarily placed.

This is either done by the portable rig that drills the conductor hole or can be done by the drilling rig after rigging-up.
Depending on the location of the well, access to the site may require preparation of a road bed. A site, and its access road, must accommodate a large number of temporary and semi-permanent structures and tanks, all brought in by truck.

Transporting Equipment by Truck

Equipment is loaded on trucks at the previous drill site or storage yard, secured and transported to the new drill location.

Unload at Drill Site

Equipment is unloaded and placed approximately where it will be rigged up.
Rigging Up
Rigging up is placing and assembling the various parts of equipment that make up the rig, and preparing the rig for drilling.

Setting Up the Substructure
Equipment is unloaded and positioned at or near the exact location that it will occupy during operations.

The substructure is assembled, pinned together, leveled, and made ready for other rig components on the floor.

Equipment outfitting begins but can be done throughout the rigging up process.
Once the substructure is set in place, the process of setting up the rig floor begins. Begin by installing stairways and guardrails to allow access to the rig floor. Then, the drawworks is set in place and secured to the substructure. On mechanical rigs, the engines are set in place and the compound and associated equipment connected to the drawworks. On electric rigs, the electric cables (lines) are strung to the drawworks.

The bottom of the mast is raised to the rig floor and pinned in place.

The crown section is then raised into place on the derrick stand.
Rigging up the Mast

- The "A-legs" are raised and pinned into place.
- The monkeyboard is pinned in place on the mat and all lines and cables are laid out to prevent tangling when the mast is raised.

Raising the Mast

The mast is now ready to be raised. The engines are started and the drilling line is spooled onto the drawworks drum. Once the mast has been raised and pinned, the remaining floor equipment can be set into place. If the rig has safety guylines, they must be attached to the anchors and properly tensioned prior to continuing the rigging up process. A derrick emergency escape device is installed on the mast.

Installing Handrails, Guardrails, Stairs, Walkways, and Ladders

Handrails, guardrails, stairways, walkways, and ladders are installed where they are needed for safety and access.
Installing the Power System

Installing the power system is usually done simultaneously with setting up the rig floor, because power is needed to operate the equipment. Today there are generally two types of rigs being used on land. A mechanical rig is powered by engines and compound. An electric rig is powered by engines and generators. This type supplies power to electric motors, which drive the machinery.

Installing the Power System

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Rigging Up the Circulating System

• While one crew finishes preparing the rig floor, another crew might be rigging up the circulating system.
• The mud tanks and mud pumps are set into the predetermined location.
• The mud lines are then connected and electric cords are strung.

Rigging Up the Circulating System

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Installing the Auxiliary Equipment

• All remaining drilling and auxiliary equipment must be set into place and installed where needed.
• The catwalk and pipe racks are positioned and the pipe and drill collars are set on the racks.

Installing the Auxiliary Equipment

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Installing the Auxiliary Equipment
Inspecting the Rig

Perform a complete inspection of the rig before operating. The driller and/or rig superintendent/toolpusher/manager should walk around the entire rig and inspect for missing or loose pins and bolts, equipment guards, adequate guard railings, proper line and cable placement, and unclear walkways.

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Rigging Down

After production casing is run and cemented, the rig is taken down and moved to another site. The rigging down process is basically the reverse of rigging up.

The hazards and solutions are similar to those for rigging up.