



Construct turf playing surfaces

AHCTRF301

By the end of this topic, you should be able to:

- Plan for construction activities
- Survey and lay out the construction site
- Prepare for construction work
- Set out site for construction
- Excavate the construction site
- Install drainage system
- Install soil profile

- Playing surfaces for high performance sports and recreation include:
 - Golfing greens
 - Cricket pitches
 - Purpose built sporting facilities
 - Football ovals
 - Horse racing tracks
- These surfaces will each have different requirements and thus, have different grass requirements.
- For example:
 - Couch or Bentgrass are suitable for golf fairways
 - Kikuya Kenda is suitable for sports fields

- To prepare for turf construction activities, you should familiarise yourself with the following:
 - Task requirements
 - Refer to site and construction plans
 - Identify construction site
 - Identify the intended use of the land, including the requirements for:
 - Drainage and irrigation
 - Profile layers
 - Finished heights
 - Identify construction method
 - Refer to enterprise requirements

- To prepare for turf construction activities, you should familiarise yourself with the following:
 - Work area
 - Site details
 - Site aspect, which may affect soil profile requirements
 - For example, a golf course next to the beach may have increased salt in the soil
 - Soil type needs to be identified to determine if amendments are required
 - Site features (e.g. nearby plants)

Preparing for turf construction

- To prepare for turf construction activities, you should familiarise yourself with the following:
 - Work area
 - Consider and account for WHS hazards/risks, considering site history
 - Underground services, which should be avoided during excavation (e.g. gas, phone, power, water, sewerage)
 - Refer to Dial Before You Dig for details
 - Existing irrigation and drainage systems
 - Weather patterns for the area and known run-off from adjacent sites, which may require drainage to be installed

Report hazards to your supervisor within a timely fashion – especially emergency situations

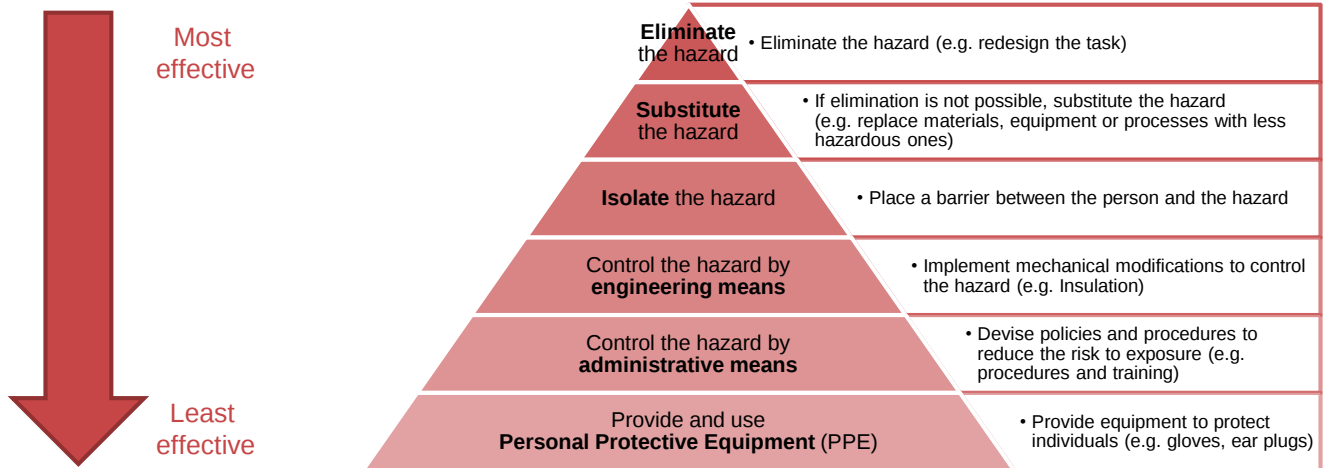
Preparing for turf construction

- To prepare for turf construction activities, you should familiarise yourself with the following:
 - Work area
 - Consider and account for the environmental impacts from:
 - Construction and excavation activity (e.g. its effects on existing site features, such as buildings/plants)
 - Newly installed drainage and irrigations systems (e.g. water run-off, waterlogging, soil salination, ecological damage)
 - Soil amendments (e.g. nutrient leaching)
 - Waste disposal procedures (e.g. harmful effects on the environment)

Report hazards to your supervisor within a timely fashion – especially emergency situations

Workplace risk control

- The hierarchy of control gives priority to the order in which hazard and risk controls should be implemented.



- To prepare for turf construction activities, you should familiarise yourself with the following:
 - Available PPE, machinery, tools and equipment
 - PPE may include: Long sleeved shirt and pants, dust mask, ear protection, gloves, safety glasses/goggles, waders, wide brimmed hat, work boots
 - Machinery may include: Trenching machines, skid steer loader, front end loader
 - Tools and equipment may include:
 - Soil testing instruments (e.g. soil auger, soil core sampler, shovel, trowel)
 - Surveying equipment (e.g. level, tripod, staff, plumb bob, marking paint, compass, GPS, pegs, hammer, measuring tape, gamma wheel, recording books)
 - Turf establishment (e.g. hose, mower, rake, shovel, fertiliser spreader)
 - Machinery, tools and equipment to construct drainage, irrigation and soil profiles
 - Ensure they are appropriately selected, prepared, calibrated and used for the task, following manufacturer recommendations

- To prepare for turf construction activities, you should familiarise yourself with the following:
 - **Materials required for the task**
 - You will be required to estimate, cost and order materials for the task
 - Materials to be ordered may include: Soil amendments
 - Common calculations may include:
 - **Area (m^2)**
 - Rectangular: Length (L) x Width (W)
 - Circular: π (3.14) x radius (R)²
 - **Volume (m^3)**
 - Rectangular: Length (L) x Width (W) x Depth (D)

Preparing for turf construction

- To prepare for turf construction activities, you should collaborate with others, as necessary:
 - **Your supervisor:** Ask questions and seek clarification, applying active listening
 - **Experts (e.g. design consultants, environmental consultant):** Seek guidance when establishing work requirements
 - **Your work team (e.g. surveying assistant):** Notify them of work requirements and completion requirements
 - **Contractors (e.g. soil testing facilities, mobile plant operators) and product suppliers:** Coordinate activities to complete activities in a sequential, timely and cost effective manner

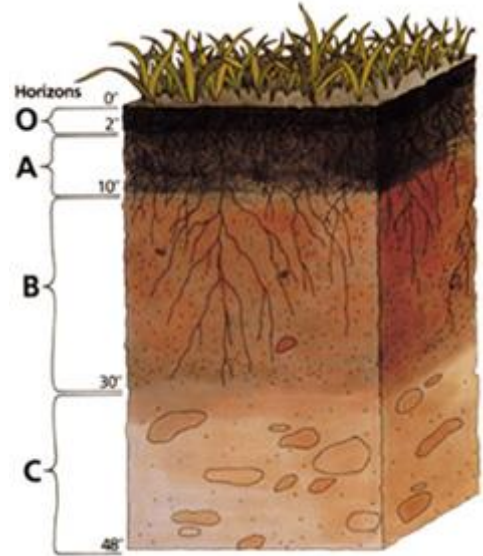
Ensure that your communications are clear – being mindful of people's varying backgrounds and abilities

- It is necessary to take soil samples in preparation for the installation of the soil profile
 - You can determine whether soil amendments are required and arrange these accordingly
- When taking soil samples:
 - Use representative samples across the area
 - Refer to the instructions for the testing instrument
 - Follow enterprise work procedures

You can test soil pH yourself with an over-the-counter kit or meter. For a comprehensive analysis, send your soil off to a testing facility.

Preparing for turf construction

- It is important to understand what exists beneath the surface when taking soil samples.
 - The vertical section of soil from the ground surface downwards to where the soil meets the underlying rock is known as the **soil profile**
- The horizons (labelled) represent the following:
 - **O**: Litter (i.e. dead plants and animal parts)
 - **A**: Top soil or mineral horizon
 - **B**: Chemical products of weathering accumulated in the soil
 - **C**: Parent material from which soil has formed



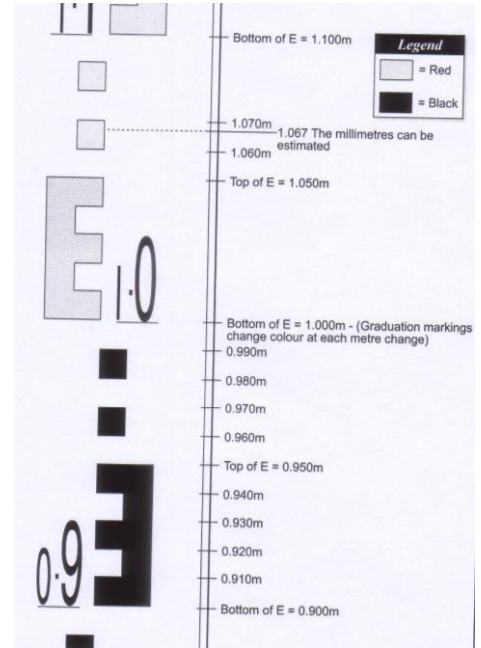
- Soil affects plants in a range of different ways:
 - If a soil has a hard B horizon, roots may have limited depth
 - Large changes in pH at a certain depth may restrict root growth
 - High salinity levels at depth will restrict root growth and/or performance
- The recorded results of soil tests may identify modifications that need to be made to the soil. For example:
 - Adding lime to reduce soil acidity (pH)
 - Changing drainage systems to reduce salinity
 - Adding organic matter (OM) to improve soil structure
 - Applying fertiliser to adjust nutrient levels (e.g. NPK levels and trace elements)

- During surveying, you use a levelling instrument to determine the difference in height between points from a horizontal plane or level line of sight.
 - The calculated vertical distance between survey points is known as the Reduced Level (RL)
- Once a surveying station is established, the relative height of the viewing plane needs to be determined
 - This is done by taking a measurement at a point which has a known level – the benchmark (BM)
 - The first reading back to the benchmark is known as the Backsight (BS)
 - Levels established from this BM assist levelling to new points on the site – known as Temporary Benchmarks (TBM)
 - A reading taken from the backsight to a new point is called Foresight (FS)

Surveying the construction site

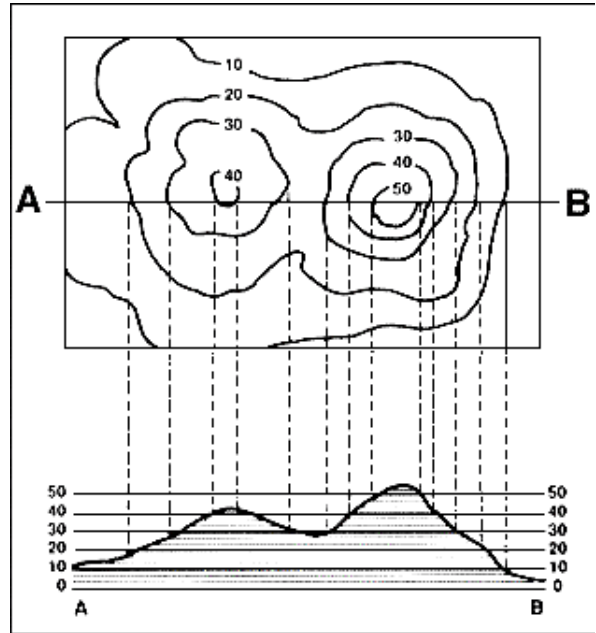
- Follow the example to correctly read a staff
- Be sure to record your findings accurately and legibly according to industry standards.

To ensure surveying results are accurate, equipment must be calibrated



Surveying the construction site

- After surveying the construction site, you will develop and draw a contour map
 - A contour map displays joined lines which indicate the lay of the land
 - These joined lines indicate points which are at the same height
 - This contour map should include reduced levels and a cross section



- When setting out the site for construction, undertake the following:
 - Verify boundaries and features shown on the site and construction plans with the actual site and existing features
 - The construction plan will contain the following:
 - Title block – Outlining the plan name and its revision
 - Legend – Explaining symbols and abbreviations used on the plan
 - Aspect – Showing the North direction
 - Scale – The ratio between the distance on the plans and the actual distance (e.g. 1:100)
 - Notes – Supportive information to help explain the plan requirements

- When setting out the site for construction, undertake the following:
 - Ensure nominated levels are workable, checking:
 - Finishing levels
 - Provision for drainage and irrigation
 - Drainage head of the site to ensure nominated levels are workable
 - Check measurements and peg out construction area
 - Notify supervisor of any variances between plan and actual site

- Undertake the following tasks when excavating the construction site:
 - Remove excess soil and place in a designated area
 - This can be done by hand; however, mobile plant (e.g. skid steer loader or front end loader) is more efficient for large areas
 - Refer to the base design plan to determine the level and slope for grading
 - Aim for uniform compaction over the entire site
 - Compaction reduces soil movement
 - High traffic areas should be compaction resistant
 - Compaction allows contours to be built
 - Ensure you follow the plan to determine the compaction requirements for each profile layer, as over-compaction can be problematic
 - For example: It can cause more water to be held in the soil and less air, which affects plant nutrient uptake

Installing an irrigation system

- When installing an irrigation system, undertake the following steps:
 - Mark and excavate trenches to the depth specified in the plans
 - Ensure excavation occurs at the specified depth to avoid damage to services and facilities
 - Avoid damage to features and established plants
 - Place pipes into the trenches and cut to required lengths
 - Trenches must be sufficiently compacted to avoid divots
 - Glue fittings to the pipes
 - Avoid using too much solvent cement, as it can eat through pipe walls and cause joint weakening
 - Flush and check the system before filling in the trenches

Ensure that you keep a clean workspace throughout the installation

Installing a drainage system

- When installing an irrigation system, undertake the following steps:
 - Mark and excavate trenches to the depth specified in the plans
 - Install drainage material on trench base
 - Lay and install pipes according to plan designs
- Drainage systems include –
 - **Collector drains:** Collects water at a central point, useful for sloped areas
 - **Slit drainage:** A network of trenches using perforated pipes and sand to drain away excess water from the surface and sub-surface

- When installing a soil profile, undertake the following steps:
 - Calculate and measure required materials to be spread over the designated area
 - Calibrate equipment to manufacturer's guidelines to distribute the required amount of material over the designated area
 - Refer to the manufacturer's guidelines
 - Ensure each profile layer is compacted to reflect the final contour
 - The interface between profile layers should be uniform and unbroken, according to plans
 - Prepare, mix and evenly apply soil amendments
 - Give the finishing soil a final levelling and consolidation, ready for planting

- When installing a soil profile, you should assess the following features:
 - Depth
 - Optimum soil depth for turf root development is 200-300mm
 - OM level
 - pH level
 - Tilth
 - Evenly rake out surface to achieve consistent texture
 - Uniformly level to defined contour requirements
 - Ensure there are adequate fertiliser reserves, measuring and adding as required

Installing the soil profile

- The soil profile will differ according to the intended use of the playing surface.
- For example, the top profile layers of the following playing surfaces:

Golfing green with natural grass

- Should have sand-filled aerification holes to have good air porosity
- Must hold nutrients/moisture, which stimulates biological life

Cricket pitch with synthetic grass

- Top layer of clay to support synthetic grass
- Nutrients for synthetic grass are not a focus, which can damage soil structure, microbes and soil life

- As part of finalisation processes, you should:
 - Shut down, maintain, clean and store machinery, tools and equipment according to manufacturer's specifications
 - Report identified hazards and faults
 - Stockpile excess soil in a designated area
 - Dispose of materials that cannot be reused or recycled
 - Ensure you implement environmentally safe practices
 - Follow Safety Data Sheet (SDS) requirements