Session 2

Site Assessment and ESC Planning

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What sort of Plan do I require?

- Plans may comprise:
  - Drawing(s) to show layout of works
  - Commentary as annotated sketches, or as
  - separate Technical report/s
- Rules-of-Thumb
  - Disturbed area <250m^2: measures as appropriate
  - Disturbed area >250m^2 and <1,500m^2: ESCP required
  - Disturbed area >1,500m^2: certified ESCP, along with Construction Drainage Plan (CDP) and Monitoring and Maintenance Plan
  - Inspection and Test Plans (ITP) may also be required for larger (>1ha) sites

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Examples

- Disturbed area <250m^2: house extension, garage, small driveway
- Disturbed area 250-1,500m^2: most houses, commercial developments, medium/high density housing, small civil works
- Disturbed area >1,500m^2: large subdivisions, large medium/high density housing, large civil works

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ESCP Standard?

- Basic ESCP may comprise:
  - Annotated Site Plan to show recommended best-practice (drainage, erosion and sediment) ESC measures
  - Standard Drawings from Book 6 (IECA)
  - Monitoring, Maintenance and Stabilisation notes
- In addition, advanced ESCP may also include:
  - Cut/fill plan, Layout and Staging Plan
  - Construction Drainage Plan
  - Specification and Construction details for ESC measures
  - Supporting calculations for sediment basins and structures
  - Inspection and Test Plan
  - Site revegetation and rehabilitation requirements
  - Certification by qualified person

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What are we trying to avoid?

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Common ESC measures

Basic ESCP measures include:

- Clean water diversion
- Site access controls (barrier fence)
- Stabilised (Site) access
- Sediment fence
- Designated stockpile locations
- Waste disposal facilities/storage

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Clean water diversion

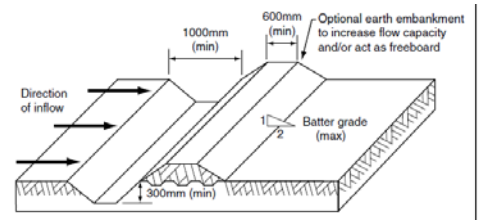


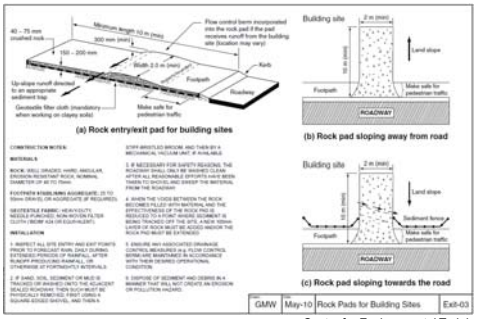
Figure 1 - Typical profile of diversion channel with bank

Drawn:	Date:		
GMW	Dec-09	Diversion Channels	DC-01

Clean water diversion

Access controls/barrier fence

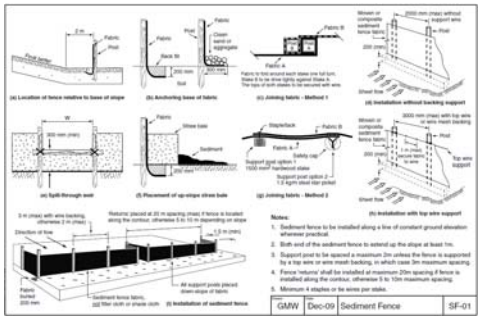
Stabilised access



GMW	May-10	Rock Pads for Building Sites	Exit-03

Stabilised access

Sediment fence



GMW	Dec-09	Sediment Fence	SF-01

Sediment fence

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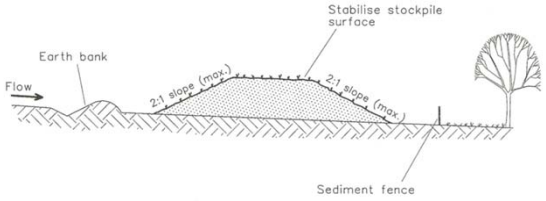
Stockpiles



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Stockpiles

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Waste storage and disposal

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Advanced ESCP

- Applies same principles as Basic ESCP
- For larger projects with:
  - Greater areas of disturbance / construction complexity
  - Difficult climate/soil conditions
  - Higher pollution risk
  - Environmental sensitivity

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ESCP preparation

- Review local issues, site constraints and approval conditions
- Review proposed development layout
- Prepare (conceptual) cut/fill plan
- Identify entry/exit points and access controls
- Locate Site buildings and stockpile/laydown areas
- Identify 'no disturbance' areas
- Locate internal (construction) access roads
- Identify waterfront/riparian or flood prone areas
- Catchment analysis and prepare Construction Drainage Plan/s
- Determine required sediment control standards

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ESCP preparation

- Determine major sediment control measures (basins) and locate appropriately
- Review and prepare works staging plan
- Locate 'clean water' / 'dirty water' runoff controls
- Manage flow velocities in drains
- Determine appropriate erosion control standards
- Control sediment runoff at property boundary
- Establish sediment controls (traps) as necessary
- Define 'final' disturbance limits
- Prepare Site revegetation/rehabilitation plans
- Prepare ESCP, Monitoring and Maintenance Plan, Inspection and Test Plan and supporting documents

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Site Assessment and Planning

- IECA White Blue Chapter 3, consideration given to:
- Minimising short and long-term environmental harm from both the construction and operational phases of a project
- Sufficient land area within and around the construction activities for the placement and operation of required ESC and drainage control measures
- Sufficient land area for the short-term stockpiling of construction materials, equipment and site facilities such that they do not impact on 'no disturbance' areas and are retained within the Site's sediment control zone

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Site Constraints

Need to Consider:

- Soils
- Topography
- Climate
- Water
- Vegetation
- Ecology
- Cultural heritage

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Soil Landscapes

Links soils to landscape by key features:

- Geology/rock type
- Soil type
- Position on slope
- Landform (topography)
- IECA White Book – Section 3.4

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Potential Limitations Soils

High variability in soils across QLD:

- Soils range from sands to clays, various levels of stoniness, varying depths
- Typically poor soil fertility and low pH
- Constraints such as waterlogging, shrink/swell cracking, sodicity and dispersibility common
- Often moderate to high erosion hazard, particularly subsoils

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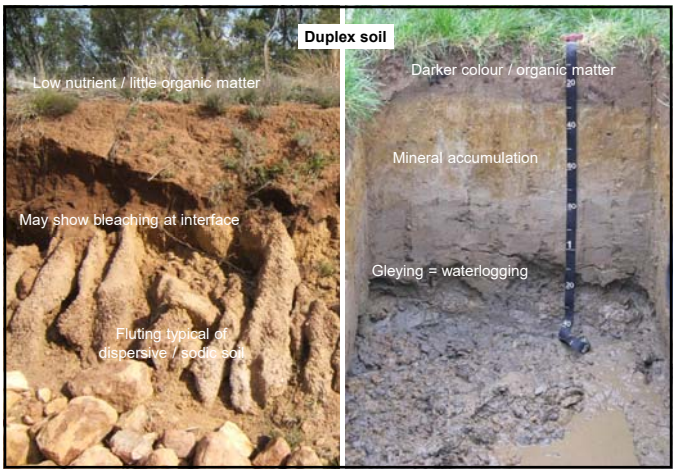


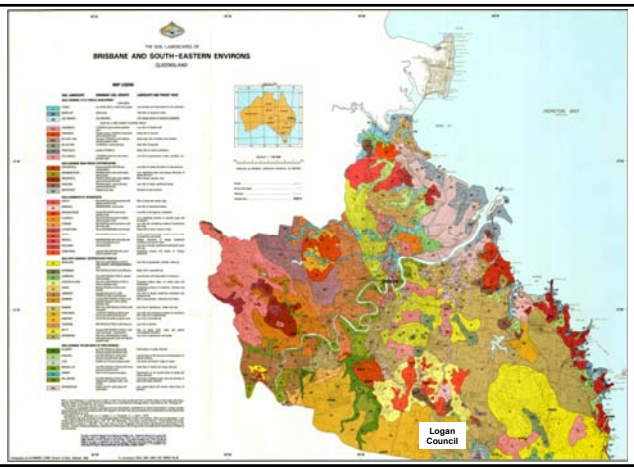
Soil Landscape Mapping

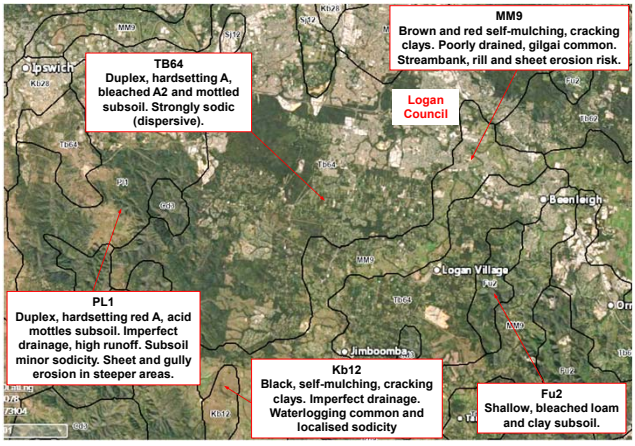
QLD Land Management Manuals (DPI)

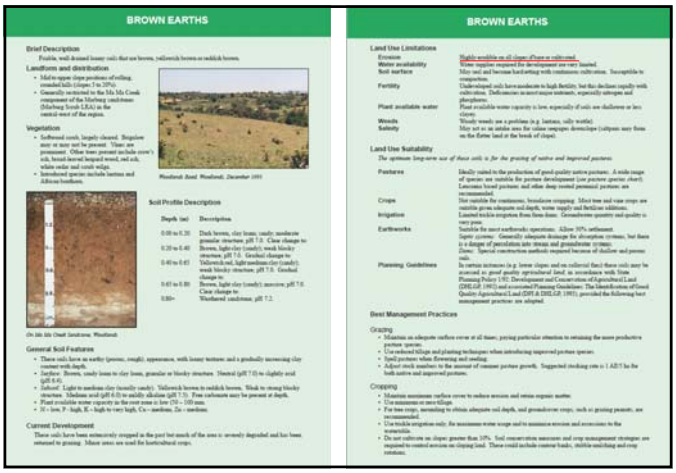
- 1:100,000 – 1:250,000 scale
- Detailed information in companion Resource Information book
- QLD Government Publications Portal

Digital Mapping at Queensland Globe

- Electronic spatial data, including borelogs
- https://qldglobe.information.qld.gov.au/







Management Options?

- Where identified, suitable revegetation topsoils must be separated and preserved for later use
- Minimise exposure of sodic subsoils
- If excavation necessary, segregate sodic soils from other materials and treat/store appropriately to manage dispersion
- Treat sodic soils with gypsum

Salinity

- How can salinity affect E&SC?
  - Implications for plant growth
  - Reduction in C-factor and consequent increase in erosion hazard
  - IECA White Book, Appendix C discusses appropriate management measures fro problem soil conditions

Acid sulfate soils

- How can acid sulfate soils affect E&SC?

- Acid Sulfate Soil Risk Mapping
- Common in coastal QLD
- Excavations in and near coast and estuaries
- Procedures for handling and pH stabilisation

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Topographic Limitations

- Coastal/inter-tidal areas – ASS, high GW
- Poor drainage areas – floodplains, alluvial banks etc.
- Flood-prone land – <2-year ARI flood level = high erosion hazard. Structures placed >5-year ARI flood level.
- Steep slopes – >5H:1V (20%), High risk. Effective drainage control priority. Batter and slope length limits should be considered

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Potential Limitations Regional Climate

Variability across SEQ:

- Predictable rainfall patterns over the long-term record (changing?)
- El Nino Southern Oscillation (e.g. La Nina 2020-22)
- Wet summers or wet winters
- High variability in evaporation rates (spatially and temporally) from open water and soil surfaces
- Soil cover and permeability commonly limiting to soakage = runoff

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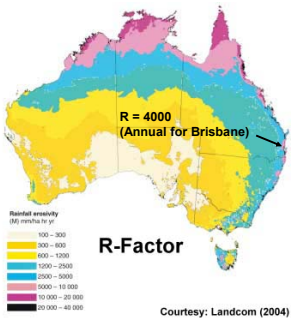
Rainfall Erosivity (R-factor)



- A measure of the ability of rainfall to cause erosion
- Related to the energy and intensity of rainfall
- Varies throughout Australia and throughout the year
- Range in QLD 600->30,000

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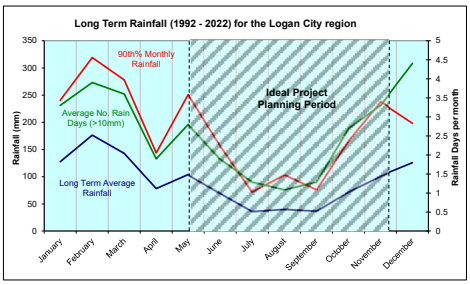
Potential Limitations Local Climate



Source: BOM Logan City WTP

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Riparian and flood prone land

- What are the E&SC implications for riparian and flood prone land?

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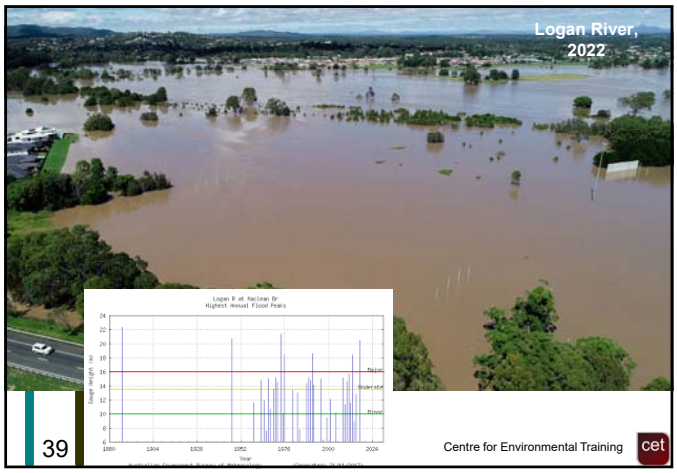
Groundwater

- How can groundwater affect E&SC?
  - Flow into bores, wells and open excavations
  - Collapse of excavations
  - Site access
  - Perched watertables
  - Moisture fluctuations
  - Seasonal and permanent watertables
  - Implications for plant growth and stabilisation

Potential Limitations Site Hydrology

- Urban stormwater systems
- Flood dynamics variable (spatially and temporally)
- Runoff close to 100% on impervious surfaces (urban); low time of concentration
- Drainage on and around your construction site – where will the water go?



Other Potential Conflicts

- **Physical Assets**
  - Access tracks, local roads, rail corridors, utilities, bridges etc.
- **Natural Assets**
  - Surface waters, catchment areas, groundwater, wetlands, cultural heritage areas, sensitive species and habitats

Potential Conflicts

Water and Sewer Assets

- Water storages / reservoirs
- Water treatment plants
- Wastewater treatment plants
- Sewer mains
- Pump stations
- stormwater pipe, culverts and detention / treatment facilities

Other Potential Conflicts

Infrastructure Assets

- Main and local roads
- Paths and cycle ways
- Kerb and gutter
- Bridges and culverts

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Environmental Sensitivity SEQ

Threatened Animal Species

- 26 mammals, 54 birds, 23 reptiles, 14 amphibians, 11 fish, 5 insects and 5 crustaceans

Threatened Plant Species (localised)

- 300 plants and ecological communities

Heritage

- Cultural sites

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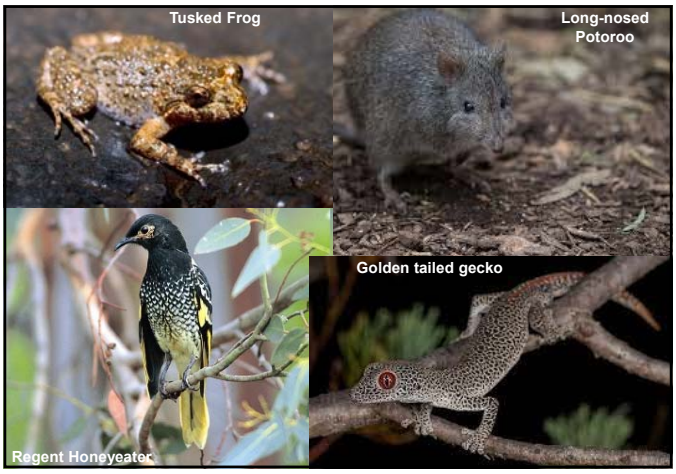

Management Options?

- Program critical works during times of 'low probability' for extreme rainfall conditions
- Store problematic materials (dispersive/sodic soils) well away from potential areas of inundation
- Maintain maximum surface cover (natural or installed) of exposed areas
- Minimise the use of temporary stream crossings (greenfield sites)

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