SEDIMENT MANAGEMENT HANDBOOK

A GUIDE TO NEW STORMWATER MANAGEMENT REQUIREMENTS FOR THE CONSTRUCTION INDUSTRY IN QUEENSLAND

UNDERSTANDING STATE PLANNING POLICY CHANGES EFFECTED 3 JULY 2017 STEPS TO ACHIEVING COMPLIANCE TURBID WATER SOLUTIONS – HASSLE-FREE



turbid water solutions

Noun

(of a liquid) transforming cloudy, opaque or muddy into clean and clear

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UNDERSTANDING THE STATE PLANNING POLICY CHANGES

MANAGE OR WORK ON A CONSTRUCTION SITE? HERE'S WHAT YOU NEED TO KNOW.

On 3 July 2017, the Queensland Government released the new State Planning Policy.

The policy addresses a vast number of planning and development issues.

It has wide-ranging impacts on the construction industry including, new requirements for sediment basins.

One of the key policy changes relates to how water quality is managed on construction sites and includes a more stringent performance standard for sediment basins.

THE BOTTOM LINE IS ...

The policy effectively encourages the use of High Efficiency Sediment (HES) basins¹ on most construction sites throughout Queensland.

As of 3 July 2017, the changes need to be incorporated in planning for all proposed works and new development applications.

Please go to the Appendix on page 13 for details of required outcomes and minimum requirements for managing stormwater.

¹High Efficiency Sediment basins are also known as Type A and Type B basins (IECA 2016, Draft Appendix B).



"Sediment is a major issue affecting water quality and the health of our waterways, wetlands and bays."

Graeme "Butch" Uechtritz (BApp. Sc (EnvMgt & Mar Biol)



WHY ARE THE CHANGES NECESSARY?

"Water quality is one of 17 state interests outlined in the State Planning Policy. The state's expectation is that water quality be maintained or even improved during construction and development projects," says Graeme "Butch" Uechtritz, Managing Director of Turbid Water Solutions.

"Our climate in Queensland is different to the southern states. We have a distinct wet season with frequent thunderstorms and widespread monsoonal rainfall. Our climate generates a lot of runoff which can be too much for traditional sediment basin designs," says Butch.

"In fact, recent studies conducted for the Queensland Government have shown traditional sediment basin designs typically only capture and treat turbidity for 11% to 37% of Queensland's annual average runoff volume.

"That's a lot of dirty water being discharged untreated into our waterways!" says Butch.

"The Queensland Government has identified that this standard is grossly inadequate to protect waterways from the impact of construction-phase turbidity and fine sediment. "The State Planning Policy now requires sediment basins to treat at least 80% of the annual average runoff volume. That's a massive jump in requirement standards," says Butch.

"With these new requirements, it will be almost impossible for the construction industry to comply, without changing technology and processes.

"But there is good news for the construction industry in relation to these changes."

WHAT'S THE GOOD NEWS?

"The good news is the technology, systems and processes are already available to easily achieve compliance with the new standards AND reduce labour requirements.

"Not only that, Turbid's High Efficiency Sediment basins* cost less and take less land than a traditional sediment basin designed and operated to the old standard. That's a real saving to the industry and an improved environmental outcome. What's not to like about that!

"The secret is using systems that automate the management and monitoring process," says Butch.

*More on High Efficiency Sediment basins in the step-by-step guide on the following pages.



STEP BY STEP: GUIDE TO ACHIEVING COMPLIANCE

- 1. UNDERSTAND THE WHY.
- 2. UNDERSTAND THE HOW.
- 3. GET TO KNOW HIGH EFFICIENCY SEDIMENT (HES) BASINS.
- 4. SET YOUR SEDIMENT CONTROL TO AUTO-PILOT.
- 5. ACHIEVE HASSLE-FREE COMPLIANCE!

1. UNDERSTAND THE WHY

Understanding the new standards is important so you can educate your clients and workforce.

HOWEVER, the new State Planning Policy (July 2017) is 88 pages long!

The team at Turbid has pored over the policy document and pulled out important pages for you to read and understand.

You will find them in the Appendix of this ebook.

The full State Planning Policy July 2017 is available online at <u>www.dilgp.qld.gov.au</u>



2. UNDERSTAND THE HOW

Turbid can design, build and operate (or any combination of) various sediment control solutions, taking into account the site's:

- 1. variability in rainfall and the use of stored water as a resource,
- 2. site specific constraints,
- 3. site specific assets, and
- 4. operational ability to achieve water quality targets.

Working with developers and contractors, Turbid will design the most effective solution prior to any groundworks occurring. Any temporary designs need to anticipate the final stormwater management strategy for the site to ensure a seamless transition between the construction and operational phases of the development.

TURBID HAS CREATED THE TURBID STORMWATER PROCESS WHICH EXPLAINS HOW THE CONSTRUCTION INDUSTRY CAN COMPLY.



3. GET TO KNOW HIGH EFFICIENCY SEDIMENT BASINS (HES)

"You have probably already heard of High Efficiency Sediment (HES) basins," says Butch.

"You will hear more about them now planning policy changes are in effect. Using an HES basin will be a key way to comply with the new standards."

Turbid is leading the industry with the use of High Efficiency Sediment basins. HES basins can improve productivity and ease of compliance.

- Significantly reduce the footprint (up to one fifth) of sediment controls for both temporary and longer termed construction activities.
- Improve environmental performance.
- Significantly reduce the frequency of turbid discharges off-site resulting in less complaints and less risk of enforcement from regulators.
- Provides a source of construction water (as Type-B HES basins do not need to be emptied).
- Reduce manual handling requirements resulting in lower costs for flocculation of basins and improved WH&S.
- When considered early as part of an integrated stormwater management approach it can minimise land take for stormwater controls.
- Manage construction phase sediment loading risks to WSUD assets, thereby allowing WSUD assets to be brought on earlier, potentially saving time and money for developers.

HES basin



4. SET YOUR SEDIMENT CONTROL TO AUTO-PILOT

Turbid's Stormwater Process means you can set your on-site sediment control to auto-pilot and easily achieve compliance to the new State Planning Policy 2017.

THE OLD WAY OF DOING THINGS

- Hand mixing coagulant
- Applying to basin
- Mixing
- Manual monitoring
- Risk of non-compliance at every stage

5. ACHIEVE HASSLE-FREE COMPLIANCE!

Turbid® Water Solutions provides the complete solution with innovative designs, treatment and monitoring processes to ensure only clean water is leaving your site without hassle or restraints to your operations.

THE NEW WAY

- 24/7 auto dosing
- 24/7 pH and turbidity monitoring
- Real-time data collection & operator alerts

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- Access sampling results remotely
- Remote site control & automation



COMPLETE SEDIMENT CONTROL SOLUTIONS

TURBID WATER SOLUTIONS – HASSLE FREE SYSTEMS

AUTOMATIC DOSING UNITS

Turbid's range of automatic dosing systems provide fully automated accurate dosing of chemicals to treat water on site. Unlike manual methods, which require staff on site on holidays, weekends and potentially during rainfall events, Turbid's systems work when you don't want to.

ifod™ (intelligent flocculating operational device)

Turbid's range of ifods[™] provide accurate dosing of highly effective products to treat water on construction sites. The ifod[™] is a "box on post" design for light weight transportability and minimal storage and can be easily fixed to substrate and attached to an external chemical storage tank. It is ideal for sites without easy access to power as the ifod[™] is equipped with a low voltage solar charged battery for operation. It is also relocatable, so can be transferred to a different section of a site as required. The system has been designed to operate most effectively with our environmentally sensitive water treatment products.

The ifod[™] will be installed and calibrated to your site by qualified personnel, eliminating the risk of overdosing your basin by site staff. In conjunction with effective treatment products and an HES basin, the ifod[™] range offers a completely automated stormwater treatment system for your construction site either temporarily or for the longer term.

ifod-RAIN

The ifod-RAIN enables accurate dosing of treatment products during rainfall events. Dosing during rainfall ensures effective mixing avoiding the difficulty of treating a large full basin after rain. This ifod[™] is based on an internal chipset interpreting rainfall from a tipping bucket rain gauge to monitor rainfall in real time and triggering dosing from a low voltage metering pump based on pre-set customised rules.

ifod-FLOW

The ifod-FLOW provides accurate dosing of treatment products utilising flow metres inside or above pipes, open drains or weirs. It will measure water flow, either generated from rain events or pumping on site, and accurately dose via a low voltage metering pump according to the run off volume entering the basin. This ifod[™] can also be connected to water quality sensors for monitoring and control purposes and linked to our cloud based data platform for complete interoperability with our other systems.



ifod-PUMP

The ifod-PUMP is a timer based dosing system that is ideal for dewatering on site. This ifod[™] relies on a set flow rate flowing from either a pumpset or fixed flow pipework, for example into a sediment basin for treatment. It can be set up to be triggered either manually via a switch or automatically via sensors and uses a low voltage metering pump to accurately dose according to the set flow rate.

FLOC BOX

Turbid's Floc Box is a low cost, award-winning coagulant dispensing unit for treating sediment laden water on a construction site. Weighing in at just 45kg prior to the addition of coagulant, Turbid's Floc Box is easy to position and move around your site as and when required. The Floc Box uses rainfall captured on a catchment tray located on the top of the unit to control the displacement of a treatment product from the unit into the runoff stream entering the HES basin.

The simplicity of the Floc Box is its greatest feature requiring minimal human operation and involving no electronic or mechanical moving parts. With the catchment tray and header tank sitting below 1.2m high, maintenance, routine checks and alterations become the simplest of tasks.



Above: Calibrating the ifod™

Below: The Floc Box on-site



TREATMENT PRODUCTS

Turbid can provide a full suite of treatment products that can be used to remove sediment, metals, nutrients and pesticides from the water on site, prior to any discharges occuring. Our two key products include:

TURBICLEARTM

Turbiclear is a high quality, environmentally friendly, rapid acting coagulant for application to HES basins. Some key advantages are:

- Two to three times more effective than other coagulant agents. Lower dosing required.
- Easy to apply liquid no dust like gypsum.
- Can be automatically dosed using the Turbid ifod[™] and Floc Box, reducing the risk of overdosing.
- Excellent treated water clarity.

TURBIFLOC™

Turbifloc is a high quality, environmentally friendly, rapid acting flocculant for application to HES basins and other water treatment systems. Some key advantages are:

- Biodegradable natural bio-polymer technology (Chitosan based).
- Easy to apply liquid.
- Forms large stable particles able to handle higher velocity environments.
- Can be automatically dosed with Turbid systems.

WATER QUALITY MONITORING + SAFETY CUT-OFF SYSTEM

For high risk sites or sites upstream of highly sensitive receiving environments, Turbid can install and maintain water quality monitoring systems for your construction activities. This provides real time readings, alerts and notifications remotely accessible at any time.

iqad™ (intelligent quality assurance device)

The iqad[™] is a safety cut-off and monitoring system which utilises an internal microprocessor and logger to measure water quality parameters such as pH,

turbidity, electrical conductivity and dissolved oxygen. The iqad[™] is a "box on post" design for light weight transportability and minimal storage and can be easily fixed to substrate. It is ideal for sites without easy access to power as the iqad[™] is equipped with a low voltage solar charged battery for operation. It is also relocatable, so can be transferred to a different section of a site as required.

The iqad[™] attaches to the discharge point of the basin and allows for the recording of the basin's discharges when occurring. The iqad[™] can also control a power actuated butterfly valve installed on the discharge pipe to stop any water discharging that is not within parameters set in the site's license conditions. All information can be logged or exported from the controllers via telemetry to our cloud based data platform.

Below: The iqad™ on-site



CLOUD BASED DATA PLATFORM AND ANALYTICS

eagle.io

Turbid uses eagle.io's revolutionary cloud based data management, visualisation and remote-control platform. This forms an integral and enabling component of the monitoring stage of the Turbid stormwater solution.

eagle.io technology allows for a reliable, user friendly data and control platform to interrogate and manage turbid systems, which can save a lot of time and expense when treating water on site.

Turbid won the international Ovum on the Radar award in 2014 for Cloud and Infrastructure Transformation for use of eagle.io type technology in its stormwater treatment systems.



Above: Safety cut-off system

Below: Monitoring the HES basin



APPENDIX

State interest – water quality

The environmental values and quality of Queensland waters are protected and enhanced.

All of the following state interest policies must be appropriately integrated in planning and development outcomes, where relevant.

- (1) Development facilitates the protection or enhancement of environmental values and the achievement of water quality objectives for Queensland waters.
- (2) Land zoned for urban purposes is located in areas that avoid or minimise the disturbance to:
 - (a) high risk soils
 - (b) high ecological value aquatic ecosystems
 - (c) groundwater dependent ecosystems
 - (d) natural drainage lines and landform features.

- (3) Development is located, designed, constructed and operated to avoid or minimise adverse impacts on environmental values of receiving waters arising from:
 - (a) altered stormwater quality and hydrology
 - (b) waste water (other than contaminated stormwater and sewage)
 - (c) the creation or expansion of non-tidal artificial waterways
 - (d) the release and mobilisation of nutrients and sediments.
- (4) At the construction phase, development achieves the applicable stormwater management design objectives in table A (appendix 2).

(5) At the post-construction phase, development:

Part E

State interest policies and assessment benchmarks

- (a) achieves the applicable stormwater management design objectives on-site, as identified in table B (appendix 2); or
- (b) achieves an alternative locally appropriate solution off-site that achieves an equivalent or improved water quality outcome to the relevant stormwater management design objectives in table B (appendix 2).
- (6) Development in water resource catchments and water supply buffer areas avoids potential adverse impacts on surface waters and groundwaters to protect drinking water supply environmental values.



State Planning Policy Document page 45 - section pertaining to stormwater treatment highlighted above

Full document available at https://dilgpprd.blob.core.windows.net/general/spp-july-2017.pdf

APPENDIX cont.

Appendix 2 – Stormwater management design objectives

Table A: Construction phase – stormwater management design objectives

Application:

• Applies to all climatic regions.

Part 1 Construction phase – stormwater management design objectives¹²

| Issue | Desired outcomes |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drainage control | 1. Manage stormwater flows around or through areas of exposed soil to avoid contamination |
| | 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. |
| | Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). |
| | Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3). |
| Erosion control | Stage clearing and construction works to minimise the area of exposed soil at any one time. |
| | 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. |
| | 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised ¹³ using methods which will achieve effective short-term stabilisation. |
| Sediment control | Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. |
| | 2. All exposed areas greater than 2500 metres ² must be provided with sediment control: which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5). |
| Litter, hydrocarbons and other contaminants | 1. Remove gross pollutants and litter. |
| | 2. Avoid the release of oil or visible sheen to released waters. |
| | 3. Dispose of waste containing contaminants at authorised facilities. |
| Waterway stability and flood flow management | Where measures are required to meet post-construction waterway stability objective: (specified in table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. |
| | 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP). |

¹⁹ Note: An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation water contamination.

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State Planning Policy Document page 80 - section pertaining to stormwater treatment highlighted above

Full document available at https://dilgpprd.blob.core.windows.net/general/spp-july-2017.pdf