



**Australian Government**  
**National Capital Authority**

# **Works Approval**

for

**The Scrivener Dam  
Dissipator Strengthening Project (DSP)  
Permanent Works**

**Project no: P22/908**

## Works Approval Application

<b>1.</b>	<b>Purpose of this document .....</b>	<b>2</b>
<b>2.</b>	<b>Works Approval application documentation.....</b>	<b>3</b>
2.1	Planning Report .....	3
2.2	Schedule of proposed works .....	3
2.3	Detailed Site Plan.....	3
2.4	Architectural Drawings .....	3
2.5	Landscape Plans.....	3
2.6	Civil & Excavation Plans .....	4
2.7	Drawing Schedule .....	4
2.8	A 3D Design Model .....	4
2.9	Traffic and Parking Assessment Report .....	5
2.10	ACT Government Agency Clearances.....	5
2.11	A Consultation Report.....	5
2.12	A Site Establishment and Construction Management Report .....	6
<b>3.</b>	<b>About the NCA .....</b>	<b>7</b>
3.1	Background to the NCA .....	7
3.2	The NCA and the Dam.....	7
<b>4.</b>	<b>Purpose of the Project .....</b>	<b>8</b>
<b>5.</b>	<b>Project background.....</b>	<b>9</b>
5.1	About the Dam.....	9
5.2	Location of the Dam .....	9
5.3	Dam structure and operation .....	10
5.4	The Dissipator .....	11
5.5	Need for the Works .....	14
5.6	Project Objectives.....	14
5.7	Designer and Design Works .....	15
5.8	PWC approvals.....	15
5.9	Head Contractor Procurement .....	15
<b>6.</b>	<b>Reference documents .....</b>	<b>16</b>
6.1	Overview.....	16
6.2	Principal's Design Documentation .....	16
6.3	Design related reports .....	17
6.4	Investigations and study reports .....	17
<b>7.</b>	<b>The Head Contractor's Activities and the Works .....</b>	<b>18</b>
7.1	Overview.....	18
7.2	Head Contractor involvement .....	18
7.3	Temporary Works summary .....	18
7.4	Permanent Works summary .....	18
<b>8.</b>	<b>The Permanent Works .....</b>	<b>20</b>
8.1	General .....	20
8.2	Staging the Works.....	20
8.3	Baffle block demolition .....	20
8.4	Anchoring.....	20
8.5	Slab construction .....	20
8.6	New baffle block construction.....	20
8.7	Abutment erosion protection .....	21

# 1. Purpose of this document

- (a) This purpose of this document is to provide an overview of the Scrivener Dam Dissipator Strengthening Project (DSP); and, to provide required details for the NCA Works Approval application.
- (b) Please note: there will be two Works Approvals for this project, as follow:
  - (i) Permanent Works Approval; and
  - (ii) Temporary Works Approval (for the Construction stage).
- (c) This application is for the Permanent Works Approval
- (d) A subsequent application will be provided for the Temporary Works / Construction Activities Works Approval. The Temporary Works Approval application will address items relating to earthworks, site establishment and construction management.
- (e) It should be noted that the Permanent Works will not substantially change the visual appearance of Scrivener Dam or the dissipator. There will only be minor visual changes following the completion of the Permanent Works – including a few minor details and the colour of the new concrete. Further detail on this item can be found in the Heritage Impact Study Report.
- (f) Clause 2 details what documents have been provided as part of the Works Approval application.
- (g) Clause 6 details Reference Documents prepared and aggregated for the project.
- (h) This document, and the application, is not intended to provide all information required to fully understand the Project in detail.
- (i) Should more information be required, we will be happy to provide it.

## 2. Works Approval application documentation

The following information has been requested by the Works Approval application instructions (on the Major Works Approval Application Information Checklist).

Accompanying the details of what was requested, are details of what the project has provided as part of this Permanent Works Works Approval application.

### 2.1 Planning Report

- (a) As per the NCA Major Works Approval Application Information Checklist, the Planning Report should address the relevant design and planning matters in accordance with the provisions of the National Capital Plan. It should also contain advice in relation to how obligations have been met under other legislation including the *Environment Protection and Biodiversity Conservation Act 1999*, *Copyright Amendment (Moral Rights) Act 2000* or relevant Territory legislation.
- (b) The Scrivener Dam DSP Project submits the following documents in support of this requirement (these documents are attached to the application):
  - (i) Scrivener Dam DSP - 100% Design Report;
  - (ii) Scrivener Dam DSP - Heritage Impact Assessment;
  - (iii) Scrivener Dam DSP – Cultural Heritage Impact Assessment; and
  - (iv) Scrivener Dam DSP - Environmental Impact Assessment.

### 2.2 Schedule of proposed works

- (a) A schedule of proposed works should be provided.
- (b) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) Clause 9 of this document provides a summary of the proposed Permanent Works; and
  - (ii) A full drawing set for the Permanent Works.

### 2.3 Detailed Site Plan

- (a) A detailed site plan which identifies site boundaries and key characteristics of the site should be provided.
- (b) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) Scrivener Dam DSP – Site Plan.

### 2.4 Architectural Drawings

- (a) Architectural drawings, that assist to fully explain the proposal, should be included.
- (b) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) A full drawing set for the Permanent Works.

### 2.5 Landscape Plans

- (a) Landscape drawings, that assist to fully explain the proposal, should be included.
- (b) The permanent works component of the project does not require any tree removal, earthworks or landscaping works. As such, this item is not applicable.

- (c) However, as part of the project, the left abutment (looking downstream) requires additional erosion protection – this will require stripping of soil, installation of armouring material and revegetation of the slope.
- (d) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) Drawings 12591211-C010, 12591211-C020 and 12591211-C025, of the full drawing set for the Permanent Works, shows the abutment erosion protection as part of the permanent works.
- (e) The Works Approval application for the Temporary Works will address these items at a later date.

## **2.6 Civil & Excavation Plans**

- (a) Civil and Excavation plans, that assist to fully explain the proposal, should be included.
- (b) The Permanent Works component of the project does not require any civil or excavation work. As such, this item is not applicable.
- (c) However, as part of the project, ground anchors will need to be installed and excavation of the existing concrete will need to be undertaken.
- (d) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) Drawings S111, S121, S131, S132, S133, S143, S151, S152, included in the full drawing set for the Permanent Works, shows the required anchoring works.
  - (ii) Drawings S121, S142, S162, S214, included in the full drawing set for the Permanent Works, shows the required concrete demolition work.
- (e) The Works Approval application for the Temporary Works will address other Civil and Excavation items at a later date.

## **2.7 Drawing Schedule**

- (a) A drawing schedule provided in an editable format such as .doc, .docx or similar should be provided (not .pdf).
- (b) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) A drawing schedule for the Permanent Works is located at Clause 6.2 below.

## **2.8 A 3D Design Model**

- (a) A 3D design model should be provided.
- (b) The Permanent Works, once complete, will be visually very similar to the existing dissipator, with several minor changes, as follows:
  - (i) The physical height of the dissipator will be 500mm higher (however, this will be barely noticeable);
  - (ii) A small drainage channel will be located in the toe of the dissipator;
  - (iii) The chute blocks will look slightly shorter; and
  - (iv) The initial fresh concrete colour will be different to the aged concrete.
- (c) Due to the very minor nature of the changes, and noting that most people will likely not discern the differences, it was deemed not necessary to produce a 3D model. And, as such, one has not been provided as part of this application.
- (d) However, a virtual model was created to model flood water flows through the dissipator. This can be made available, should the NCA Works Approval team required it.

## **2.9 Traffic and Parking Assessment Report**

- (a) A Traffic and Parking Assessment Report which considers the potential impact on the area, vehicle access and egress, parking arrangement and road capacity should be provided.
- (b) The NCA, commissioned a Traffic Investigation Report as part of the Environmental Impact Statement.
- (c) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) The Environmental Impact Assessment which contains the Traffic Assessment.

## **2.10 ACT Government Agency Clearances**

- (a) Works Approval applications requires that ACT Government clearances be provided.
- (b) The permanent works will not fundamentally change the dissipator; and, the permanent works are wholly within NCA controlled land. As such, such clearances are not required for the permanent works approval.
- (c) As such no ACT Government agency clearances have been provided as part of this application.
- (d) However, as part of the Environmental Impact Assessment, GHD contacted several agencies and have included the details of such interactions in the Environmental Impact Assessment Report.
- (e) The Scrivener Dam DSP Project submits the following in support of this requirement:
  - (i) The Environmental Impact Assessment which contains the discussions and outcomes with ACT Government agencies.
- (f) The Works Approval application for the Temporary Works will require such government agency clearances and as such will be provided at a later date.

## **2.11 A Consultation Report**

- (a) Works approval requires that a Consultation Report outlining any pre-consultation conducted by the proponent and how the matters raised during construction have been addressed be provided.
- (b) The NCA Scrivener Dam DSP has undertaken numerous stakeholder engagements and consultation events, included the following:
  - (i) Dissipator Strengthening Project user group sessions - The NCA held two formal Lake User Group consultation sessions to specifically discuss the project with interested stakeholders and to better understand the concerns of recreational and commercial lake users. Two meetings were held on 30 November 2022 and 8 December 2022. As part of the consultation, the NCA provided further details about the project and stakeholders were given the opportunity to provide comment. Following these user group sessions, the NCA sought to understand how the Project may impact entities and what possible mitigation strategies exist;
  - (ii) NCA Website - the NCA maintains a webpage on the NCA website which provides details about the project for interested individuals;
  - (iii) Noise and Vibration Investigations - the NCA engaged an acoustic consultant to undertake a noise and vibration study for the project. Consultation was undertaken with the National Zoo and Aquarium and Government House as part of this project;

- (iv) Environmental Investigations - the NCA engaged an environmental consultant to complete an Environmental Impact Assessment Investigations. The consultant contacted multiple government organisations to better understand the impact to them and to understand potentially what approvals are required for the project;
  - (v) Media releases and social media;
  - (vi) Monthly email updates to members of the community who wish to sign up the to the project newsletter; and
  - (vii) Informal consultation, including on-site visits with impacted stakeholders – completed as required and as questions are raised during the project.
- (c) The Scrivener Dam DSP Project submits the following in support of this requirement:
- (i) Details of the Lake User Group Meeting #1 can be found in Content Manager at 525306;
  - (ii) Details of the Lake User Group Meeting #2 can be found in Content Manager at 526787;
  - (iii) Details of the Lake User Groups who were invited to the Lake User Group Meetings can be found on the following NCA Website Page:  
<https://www.nca.gov.au/environment/lake-burley-griffin/activities-and-lake-user-groups#>
  - (iv) Details of Lake User Group Meetings can be found in Content Manager at 23/37/01; and
  - (v) The Environmental Impact Assessment which contains details on the consultations and discussions and outcomes of meetings with Pedal Power and ACT Government agencies.

## **2.12 A Site Establishment and Construction Management Report**

- (a) Works Approval requires that a Site Establishment and Construction Management Report be provided.
- (b) This item relates more to the Temporary Works Approval as part of this project.
- (c) As such no Site Establishment or Construction Management Report has been provided.
- (d) The Works Approval application for the Temporary Works will address this item at a later date.

## 3. About the NCA

### 3.1 Background to the NCA

- (a) The NCA manages the Australian Government's interest in the planning and development of Canberra as the capital city of Australia. The NCA does this by planning, promoting, maintaining and enhancing Canberra as the capital city of Australia.
- (b) As part of this remit, the NCA is responsible for the day-to-day operation and maintenance of Lake Burley Griffin and Scrivener Dam.
- (c) The functions of the NCA are as defined under section 6 of the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cth).

### 3.2 The NCA and the Dam

- (a) The NCA is responsible for the safe operation and maintenance of Scrivener Dam.
- (b) In order to assist day-to-day obligations at Scrivener Dam, the NCA has engaged the services of several organisations, as follows:
  - (i) **Dam safety engineers.** The NCA has contracted SMEC Australia to provide Dam Safety Engineer services for Scrivener Dam. These services include regular dam inspections, monitoring, reporting and assistance with technical issues.
  - (ii) **Operation and maintenance contractor.** The NCA has contracted Complex Co. Pty Ltd (**O&M Contractor**) to undertake the day-to-day operation and maintenance of Scrivener Dam. These services include day-to-day manning of the Dam, regular inspections, monitoring, day-to-day operation of the Dam, day-to-day maintenance and exercising of the Dam, flood watch and flood management, as well as minor maintenance projects. This contract does not extend to significant projects.
  - (iii) **Hydrometric services.** The NCA has contracted Aquamonix to provide flow telemetry data to better inform the management and operation of the Dam.



## 4. Purpose of the Project

- (a) Scrivener Dam (**Dam**) is located on the Molonglo River, in Canberra, and forms Lake Burley Griffin (**Lake**). The Dam has been assessed as being an asset of national importance.
- (b) Several issues have been identified with the current state of the Dam's dissipator (**Dissipator**), including the following:
  - (i) **Anchors.** The current ground anchors are not substantial enough and may be significantly corroded.
  - (ii) **Slab joints.** The existing Dissipator slabs do not have water stops which may allow transient pressures to pass through the slab joints.
  - (iii) **Significant hydraulic forces.** During flood events, the dissipator could experience hydraulic forces which may not be able to resisted due to the issues with the anchors and slab joints. In turn, this could compromise the safety and function of the dam.
- (c) In light of the identified issues, the Scrivener Dam Dissipator Strengthening Project (**Project**) was commenced in 2021 to remedy the issues.
- (d) The NCA is now seeking to engage a suitably qualified Head Contractor to perform the Contractor's Activities and deliver and complete the work relating to this project (**Works**) in accordance with the Head Contract.

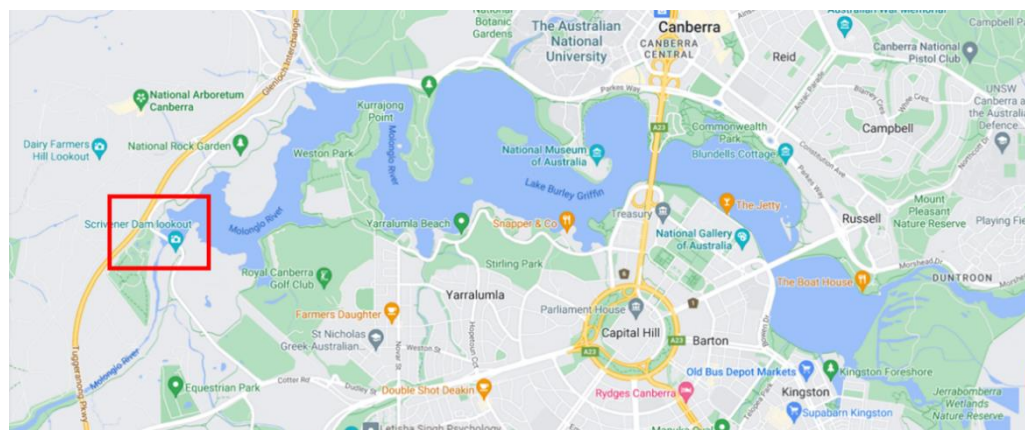
## 5. Project background

### 5.1 About the Dam

- (a) The Dam is situated on the Molonglo River and the detention of water creates Lake Burley Griffin – an ornamental and recreational body of water which forms the architectural centrepiece of Walter Burley Griffin and Marion Mahony Griffin's vision for Canberra.
- (b) The Dam was designed in the late 1950's for the National Capital Development Commission by the Commonwealth Department of Works, Major Development Division. The construction of the Dam commenced in 1960 and was completed in 1963.
- (c) It is a concrete gravity dam constructed from roughly 55,000m<sup>3</sup> of concrete. The Dam is 25m high with a crest length of 235m.
- (d) The Lake was included on the Commonwealth Heritage list in 2022. The listing also extends to adjacent lands including the Dam.
- (e) The Dam is classified as a 'Large' dam in accordance with standards published by the International Commission on Large Dams . This classification has been determined based on the height of the Dam and the volume of water stored in the reservoir behind the Dam.
- (f) The Dam has been assessed as a 'High C' hazard category dam in accordance with the guidelines issued by the Australian National Committee on Large Dams. The hazard category assessment for a dam is determined primarily based on the population at risk and potential loss of life resulting from a failure of the dam.
- (g) The Dam was specifically designed to maintain the level of the Lake at a constant level of 555.93m above sea level (+/- 150mm). This is a very unique feature of the Dam and largely determines the way it's operated.

### 5.2 Location of the Dam

- (a) The Dam is located on the Molonglo River corridor in the suburb of Yarralumla, Canberra. The Dam is bridged by Lady Denman Drive and is located adjacent to Government House and the National Zoo and Aquarium.



### 5.3 Dam structure and operation

- (a) A pictorial overview of Scrivener Dam is shown as follows:



- (b) The Dam is operated to maintain the level of the Lake within a narrow tolerance. The water levels are maintained at full supply level through use of two independent water release systems, the sluice gates and flood gates.

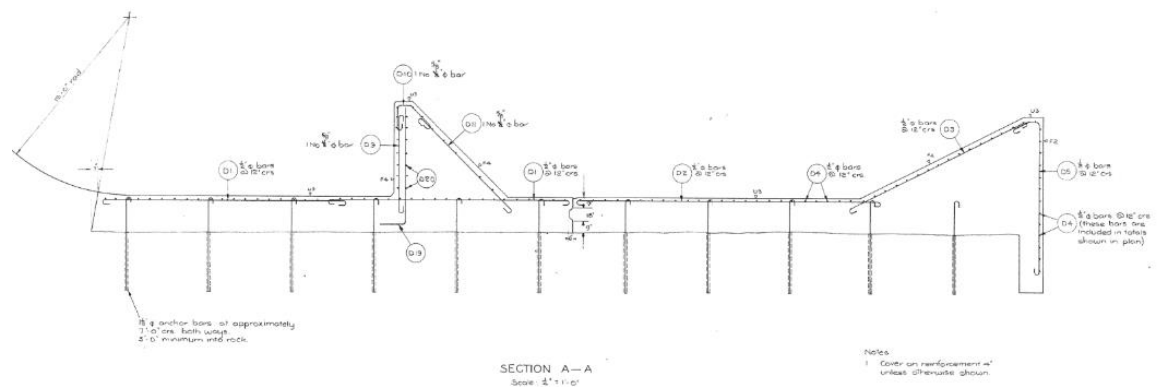
**Sluice gates.** Day-to-day water releases of up to 56 cumecs ( $\text{m}^3/\text{s}$ ) are controlled by three low level 1.2 x 1.2 m square sectioned low level outlet sluice gates located in the central part of the spillway. Each sluice gate can release approximately 19 cumecs when fully open. These sluice valves are hydraulically operated and automatically controlled for up to 40  $\text{m}^3/\text{s}$  discharge flow, collectively. For larger flows, the sluice gates can be manually overridden and discharge up to 56  $\text{m}^3/\text{s}$  collectively. Water released by the sluice gates is disrupted by the sluice deflector blocks and sprays in a pattern into the dissipator.

**Flood gates.** At inflows above 56  $\text{m}^3/\text{s}$  the sluice gates are closed, and the flow is passed via the five “fish belly” spillway flap gates. The flood gates are hydraulically actuated to allow water to spill over the top of the flood gates into the dissipator structure below. These gates are sequentially numbered from 1 to 5, spanning from the right (Western side) to left (Eastern side). Each gate stretches a distance of 30.5 meters, and they are interspersed by bridge piers that are 3.05 meters wide. When combined, the total length of this spillway system spans 165 meters. The gates are able to maintain this elevation up until flow rates of approximately 2,265  $\text{m}^3/\text{s}$  after which the lake level will start to rise. All five flood gates can release up to 9,600  $\text{m}^3/\text{s}$ .

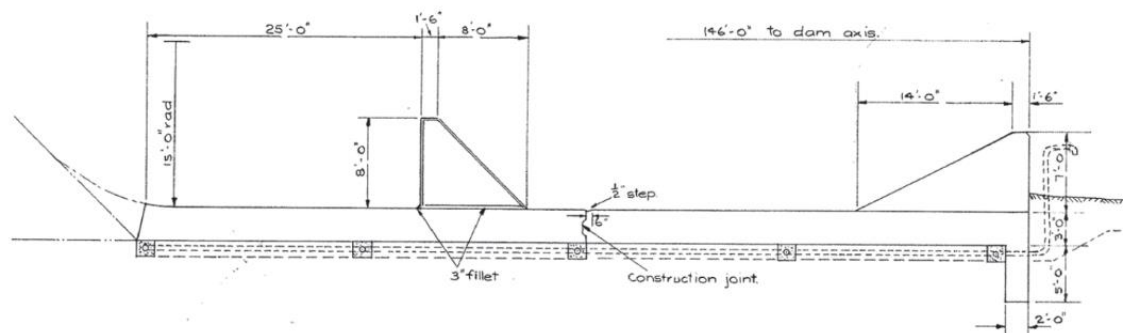
- (c) The water released through the sluice gates and flood gates possesses tremendous kinetic energy. If uncontrolled, the water has the potential to significantly erode unprotected areas downstream of the Dam. Such erosion, in turn, could undermine the dissipator and/or dam foundations and cause failure of the Dam. Accordingly, the Dam has been constructed with an energy dissipator structure immediately downstream to reduce the energy.

## 5.4 The Dissipator

- (a) Scrivener Dam has a USBR Type III stilling basin energy dissipator (**Dissipator**) which disperses much of the kinetic energy from the sluices and water spilling over the floodgates. This mitigates the damage that the water would otherwise cause below and to the Dam itself.
- (b) The Dissipator consists of the following components:
- Dissipator slab.** The dissipator is comprised of a 915mm (3') thick slab cast directly on the excavated rock foundation (the actual slab thickness varies from 915mm to approx. 1,100mm thick;
  - Ground anchors.** The slab is anchored into the rock with 28 mm (1 1/8") diameter anchor bars. The anchor bars are embedded 1.5m (5') into the rock and are spaced in a 2.1 x 2.1m (7' x 7') grid. Refer to the following image:

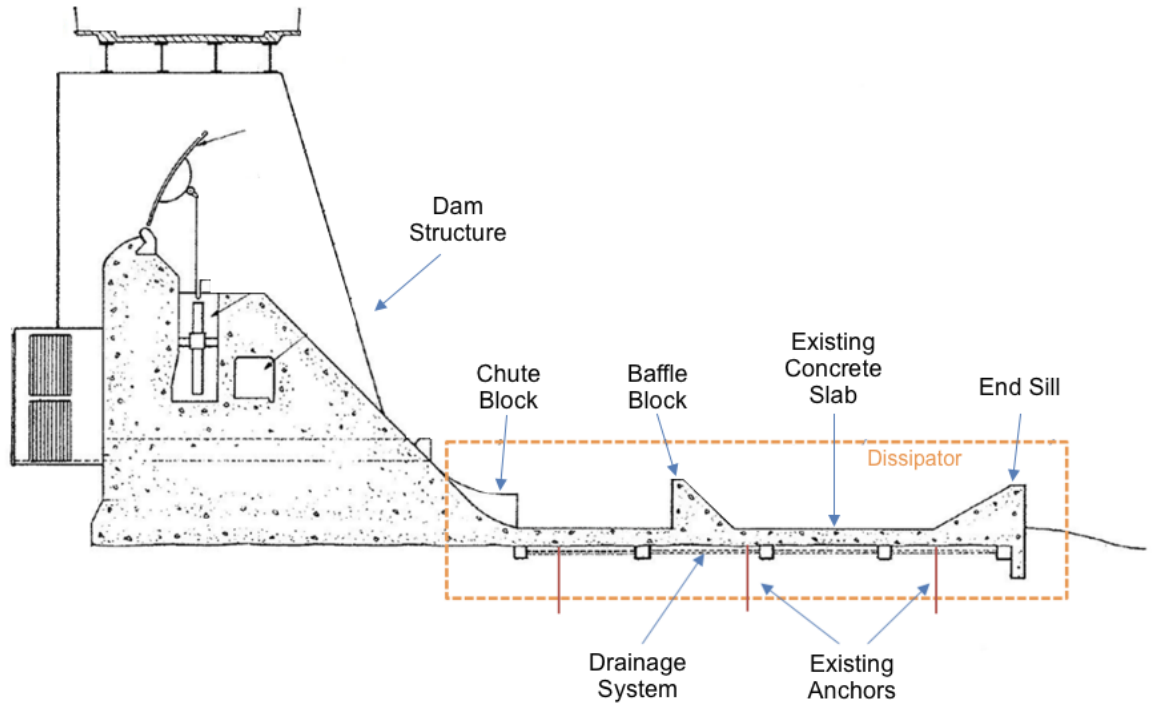


- Under-slab drainage system.** The slab is equipped with a system of 152mm (6") diameter open jointed concrete pipes, under the dissipator, that provide under-slab drainage. These pipes are encased in a layer of no-fines concrete and are spaced at a roughly 5.9 m spacing running parallel to the dam axis. These drains are intended to allow any seepage passing under the dam to be collected and discharged and thereby relieve uplift pressures underneath the slab. There are no provisions for drain cleanouts and the condition or effectiveness of the under-slab drainage is unknown. Refer to the following image:



- Chute blocks.** There are chute blocks to redirect and split the water plunging into the dissipator. Refer to the image below;
- Baffle blocks.** Baffle blocks are used to generate turbulence and dissipate the kinetic energy of water. Refer to the image below; and
- End sill.** An end sill increases the depth of water in the dissipator basin and directs the flow of the water upwards. Refer to the image below.

- (c) Together, the chute blocks, baffle blocks and end sill effectively reduce the kinetic energy of water releases and minimise potentially damaging erosion downstream of the Dam.
- (d) A pictorial overview of the Dissipator components is show on the following figure.



- (e) The following image shows an aerial view of the Dam from downstream.



- (f) The following image shows an aerial image of the Dam with the Dissipator highlighted in red.



- (g) The dam dissipator has five bays, adjacent to the five gates. Bays 1 and 5 are located 3m (10') higher than Bays 2 and 3. Bay 4 provides a sloping transition between the different slab elevations of Bay 3 and Bay 5 as shown in the following image.



## 5.5 Need for the Works

- (a) A detailed design review of the Dam was undertaken by the NCA's dam safety engineer in 2014 and was again reviewed in 2016. The review identified several risks associated with the stability of the Dissipator structure under flood conditions. The review noted that if the drainage system does not function as intended and significant uplift pressures develop, the Dissipator slabs could lift – which could ultimately lead to failure of the Dam.
- (b) During routine inspections of the Dam in 2015, gaseous bubbles were also observed to be coming through the Dissipator slab joints. This highlighted the fact that none of the concrete slab joints were constructed with water stops. These open joints could allow water to move through them, creating voids and allowing transient uplift pressures on the underside of the Dissipator. These pressures could in turn cause damage or destruction of the Dissipator.
- (c) In order to better understand the issue and pressures (differential and transient) generated in the Dissipator, the NCA commissioned the UNSW Water Research Laboratory to build and study a 1:40 physical hydraulic model of the Dam. The model was used to understand how the Dam functioned under a range of different operational scenarios.
- (d) The modelling project found that the uplift and transient pressures developed in the dissipator were of such magnitude and frequency that the Dissipator could fail under certain conditions.
- (e) Furthermore, the study identified strong recirculation in the river downstream of the Dam which could cause damaging erosion to the downstream abutments of the Dam in the extreme flood conditions.
- (f) Following review by the NCA's dam safety engineer, it was recommended that a project be undertaken to strengthen the Dissipator of the Dam to minimise risk to the safety of the Dam during flood operations.

## 5.6 Project Objectives

- (a) The purpose of the proposed Works is to strengthen the Dissipator to rectify known structural deficiencies and to ensure ongoing safe operation of the Dam.
- (b) The Project Objectives include the following activities:
  - (i) Install new fit-for-purpose ground anchors to provide adequate restraint against uplift pressures.

- (ii) Install a new topping slab over the existing slab to tie the dissipator to the ground anchors and to enable the installation of water stops to prevent transient pressure transmission. New baffle blocks are also required to maintain the Dissipator's geometry.
- (iii) Install new erosion protection on the downstream abutments of the Dam to minimise risk of erosion of these areas during flood operations.

## **5.7 Designer and Design Works**

- (a) In 2021, the NCA engaged GHD to explore options and undertake concept design for the Works. Following the concept design, the NCA engaged GHD to progress the concept design through to detailed design.
- (b) Detailed design was completed in early November 2023, along with the finalisation of drawings and specifications in January 2024.

## **5.8 PWC approvals**

- (a) In August 2023, the project was referred to the Parliamentary Works Committee (PWC) for review, public consultation and approval.
- (b) PWC approval for the project was provided in November 2023.

## **5.9 Head Contractor Procurement**

- (a) The Project is currently in the process of procuring the services of a Head Contractor for the delivery of the construction stage of the project.
- (b) Once engaged, the Head Contractor will prepare for the Temporary Works; and, will, with the assistance of the NCA, submit a second Works Approval for the temporary works component of the project.



## 6. Reference documents

### 6.1 Overview

- (a) This section details the drawings, specifications and other documents that jointly form the reference material for the Works Approval application.
- (b) Please note, that some of these documents are sensitive in nature and are not for general public consumption. In particular, this includes the 'Scrivener Dam DSP – 100% Design Report (GHD)'.

### 6.2 Principal's Design Documentation

- (a) GHD has prepared the drawings for the Works. The Head Contractor is required to construct the Works in accordance with these drawings.
- (b) The following drawings have been included in the Works Approval application:

Drawing Number	Name
12591211-G001	COVER SHEET, LOCALITY PLAN AND DRAWING INDEX
12591211-G002	GENERAL NOTES
12591211-C005	SITE PLAN GENERAL ARRANGEMENT
12591211-C010	CIVIL ABUTMENT EROSION PROTECTION GENERAL ARRANGEMENT
12591211-C020	CIVIL ABUTMENT EROSION PROTECTION - LEFT ABUTMENT
12591211-C025	CIVIL ABUTMENT EROSION PROTECTION - SECTIONS
12591211-S102	STRUCTURAL EXISTING DISSIPATOR ARRANGEMENT PLAN AND SECTION
12591211-S103	STRUCTURAL EXISTING DISSIPATOR SECTION
12591211-S104	STRUCTURAL EXISTING DISSIPATOR DETAIL
12591211-S105	STRUCTURAL EXISTING CHUTE BLOCK REINFORCEMENT DETAILS
12591211-S111	STRUCTURAL DISSIPATOR UPGRADE GENERAL ARRANGEMENT
12591211-S121	STRUCTURAL DISSIPATOR CONCRETE OVERLAY TYPICAL SECTION
12591211-S131	STRUCTURAL DISSIPATOR BAY 1 AND 2 PLAN
12591211-S132	STRUCTURAL DISSIPATOR BAY 3 AND 4 PLAN
12591211-S133	STRUCTURAL DISSIPATOR BAY 5 PLAN
12591211-S141	STRUCTURAL DISSIPATOR TYPICAL JOINT DETAILS
12591211-S142	STRUCTURAL TYPICAL UPSTREAM TIE-IN DETAILS
12591211-S143	STRUCTURAL BAY 1 TIE-IN DETAILS
12591211-S151	STRUCTURAL ANCHOR SCHEDULE AND TYPICAL PASSIVE ANCHOR DETAIL
12591211-S152	STRUCTURAL BAFFLE BLOCK AND ENDSILL SECTION
12591211-S161	DISSIPATOR UPGRADE DRAINAGE ARRANGEMENT
12591211-S162	DISSIPATOR UPGRADE SUMP AND SLOT DETAILS

12591211-S201	STRUCTURAL REINFORCEMENT PLAN – BAY 1 AND 2
12591211-S202	STRUCTURAL REINFORCEMENT PLAN – BAY 3 AND 4
12591211-S203	STRUCTURAL REINFORCEMENT PLAN – BAY 5
12591211-S211	STRUCTURAL REINFORCEMENT TYPICAL SECTION
12591211-S212	STRUCTURAL REINFORCEMENT TYPICAL SECTION BAFFLE BLOCK
12591211-S213	STRUCTURAL REINFORCEMENT UPSTREAM DETAIL
12591211-S214	STRUCTURAL REINFORCEMENT END SILL DETAIL
12591211-S215	STRUCTURAL REINFORCEMENT SUMP AND SLOT
12591211-S216	STRUCTURAL REINFORCEMENT TYPICAL SECTION UPSTREAM DETAIL
12591211-S301	GUAGE BOARDS LOCATION PLAN AND STAFF GUAGE DETAIL
12591211-S401	DISSIPATOR UPGRADE INSTRUMENTATION PLAN

### 6.3 Design related reports

- (a) A number of design related documents, that capture and provide some of the design history of the Project, have been aggregated for the project.
- (b) The design related documents include the following:
  - (i) **Scrivener Dam DSP - 100% Design Report (GHD)**. This report is the final design report for the design development of the Scrivener Dam Dissipator Strengthening Project.
- (c) These documents have been included in the Works Approval application.

### 6.4 Investigations and study reports

- (a) A number of investigations were undertaken during the design stage of the Project. These investigations, and the corresponding reports, provided the Principal and GHD with information to be considered as part of the Project.
- (b) The investigations and study reports are as follows:
  - (i) **Scrivener Dam DSP - Environmental Impact Study (GHD)**. This is the final report for the Environmental Impact Study (EIS) for the Project and was undertaken in 2023. The EIS covered environmental topics, cyclist and traffic impact assessments. This report also covers the Head Contractor's environmental and traffic responsibilities as part of the Project.
  - (ii) **Scrivener Dam DSP - Heritage Impact Assessment (Duncan Marshall)**. This is the final report for the heritage impact assessment of the works on the heritage listing of Scrivener Dam.
  - (iii) **Scrivener Dam DSP - Cultural Heritage Impact Assessment (CHMA)**. This is the final report for the cultural heritage impact assessment of the works on aboriginal culture and heritage on the project site.
- (c) These documents have been included in the Works Approval application.

## **7. The Head Contractor's Activities and the Works**

### **7.1 Overview**

- (a) This section provides a high level overview of what works will be required to be done as part of the project.
- (b) The Project will require the following activities:
  - (i) Temporary Works,
  - (ii) The Permanent Works, and
  - (iii) Site remediation.

### **7.2 Head Contractor involvement**

- (a) The NCA is in the process of procuring the services of an experienced and competent Head Contractor to undertake all of the works required to complete the project.

### **7.3 Temporary Works summary**

- (a) The Head Contractor will be required to complete all Temporary Works required to complete the Works.
- (b) The Head Contractor will be required to design, certify, gain approval for, construct, inspect, and maintain all Temporary Works.
- (c) The Temporary Works includes the following (without limitation):
  - (i) site fencing;
  - (ii) silt fencing, erosion protection and other environmental controls as required;
  - (iii) traffic, cycle and pedestrian management and safety measures. The Head Contractor will also be responsible for preparation, approvals, implementation and maintenance of TMPs;
  - (iv) establishment of a site compound, including access from existing roads, parking areas, site offices, equipment storage and laydown areas, assembly and handling areas and other required facilities;
  - (v) vehicle and pedestrian access roadways and pathways into and around the Site;
  - (vi) working platforms;
  - (vii) river crossing(s) to allow access to the western side of the Scrivener Dissipator;
  - (viii) coffer dams to allow for dewatering, diversion and damming of an enclosed area in order for day-to-day water releases from the Scrivener Dam and for the Works to occur concurrently;
  - (ix) dewatering infrastructure to dewater the work area inside the coffer dam and to maintain a dry and safe worksite;
  - (x) access into the Scrivener Dissipator; and
  - (xi) noise abatement measures.

### **7.4 Permanent Works summary**

- (a) The Head Contractor is to deliver the Permanent Works.

- (b) The Permanent Works have been designed by GHD and are documented on the design drawings and in the technical specifications. The Head Contractor will be required to complete the Permanent Works in accordance with the Principal's Design Documentation and Technical Specifications.
- (c) The Works include the following, but are not limited to:
  - (i) baffle block removal;
  - (ii) anchor hole drilling and preparation;
  - (iii) anchor preparation and installation;
  - (iv) slab preparation;
  - (v) concrete supply, placement and finishing;
  - (vi) new baffle block construction;
  - (vii) instrumentation installation; and
  - (viii) abutment erosion protection.

## 8. The Permanent Works

The following provides more details on the Permanent Works.

### 8.1 General

The Head Contractor must construct the Permanent Works in accordance with:

- (a) the Principal's Design Documentation, and
- (b) the Technical Specifications.

### 8.2 Staging the Works

- (a) The Head Contractor will be required to construct the Works in stages so that the Works can be undertaken in a dry site whilst allowing for water releases from Scrivener Dam as required.
- (b) The Head Contractor will be responsible for the design staging of the works.

### 8.3 Baffle block demolition

- (a) The Head Contractor will be responsible for the demolition of the existing baffle blocks.

### 8.4 Anchoring

- (a) The Head Contractor will be responsible for the procurement of, preparation for and installation of ground anchors.
- (b) There are approx. 700 new ground anchors.
- (c) These anchors are 50mm and 57mm BBR-H500/550 double corrosion protected and are to be prepared, installed and grouted into holes drilled through the existing dissipator slab and into the foundation rock under the dissipator. The top of the anchors will be cast into the new Dissipator overlay slab concrete.
- (d) The depth of the anchors varies by location.

### 8.5 Slab construction

- (a) A new 500mm nominal thick reinforced concrete overlay slab will be constructed on top of the existing dissipator slab. This concrete overlay slab will increase the strength of the dissipator and will be held down by the approx. 700 new ground anchors. The new slabs have a slight fall on the surface.
- (b) The overlay slab generally includes a grid of 28mm thick steel reinforcement bars (at 200mm centres), installed at the top and bottom, and encased in concrete.
- (c) The slab will require the installation of water stops and anchor bars.

### 8.6 New baffle block construction

- (a) New baffle blocks are to be reconstructed on top of the new overlay slab.
- (b) The new baffle blocks are to be reconstructed to the same dimensions and in the same location, relative to the dissipator slab, as the existing baffle blocks, to ensure the geometry of the new dissipator structure is the same as the existing structure.
- (c) Further detail can be found on the drawings and in the technical specifications.

## **8.7 Abutment erosion protection**

- (a) Identified in previous studies and investigations, erosion of the left abutment (looking downstream) of the Dam, above the training wall, caused by fast flowing water could undermine the structure of the Dam during flood operations.
- (b) The Head Contractor must install erosion protection to protect against the potentially damaging erosion.
- (c) Further detail can be found in the Principal's Design Documentation and the Technical Specifications.