

**Mote Park Lake Reservoir Engineering Services
Options Appraisal Report**

Appraisal Summary Table

KEY
Ideal
Desirable, but not ideal
Neutral
Not desirable, but not unacceptable
Unacceptable

Short list of options	Options					
	Option 1/1A		Option 2/2A		Option 3	
Options	C1		C2		A2 + C2	
Overview/ Description	50 to 65m m wide auxiliary spillway, on abutment (freeboard TBC) – formed with articulated concrete blocks (ArmorFlex or similar)		50 to 65m wide auxiliary spillway, on abutment (freeboard TBC) – formed with reinforced concrete steps		40m wide auxiliary spillway, on embankment (freeboard TBC); and 50m wide auxiliary spillway, on abutment (freeboard TBC) – both formed with reinforced concrete	
Notes					Use of articulated concrete blocks for C section of spillway not considered	
Costs - Construction Capital and Land aquisition/compensation)	Varies between £1.58 and £1.75m depending on width of spillway		Varies between £2.59m and £3.03m depending on width of spillway		£4.19m	
Category	Description and quantification of impacts		Assumptions and uncertainties		Description and quantification of impacts	
Assumptions and uncertainties						
Technical Issues						
Hydraulic Design - Floodwater levels	Flood water levels of between 24.01m AOD and 23.85m AOD achieved during a PMF flood event depending on width of spillway (wider spillway lower the flood water level)		Flood water levels of between 24.01m AOD and 23.85m AOD achieved during a PMF flood event depending on width of spillway (wider spillway lower the flood water level)		Lowest flood water levels	
Hydraulic Design - Spillway design	Either 1 in 3 or 1 in 4 slope can be used for spillway C		Either 1 in 3 or 1 in 4 slope can be used for spillway C		Spillway A requires concrete spillway Either 1 in 3 or 1 in 4 slope can be used for spillway C Either concrete or articulated concrete blocks can be used for spillway C	
Geotechnical Design	At time of writing all options are considered equally viable in terms of geotechnical design		At time of writing all Options are considered equally viable in terms of geotechnical design		At time of writing all Options are considered equally viable in terms of geotechnical design	
Civil Design	Relatively simple civil design		Relatively simple civil design however use of concrete adds complexity particularly where in-situ concrete is used.		Additional complexity with requirement to construct spillway at steeper gradient with restricted space. With additional likely requirement to carry out portion of works from Turkey Mill Pond.	
Buildability	The use of modular sections of articulated concrete blocks combined with the location of much of the works along the existing spillway makes construction relatively straightforward.		Constructability relatively straightforward with all works carried out on dryland (to existing spillway). Slight increase in complexity than Option 1 with use of reinforced concrete		Option difficult to construct due to works associated with spillway A (i.e. space constraints, requirement to construct spillway with steeper gradient, requirement to complete works on water, etc). Permanent removal of aesthetic backdrop for Turkey Mill. Potential financial loss to Turkey Mill (weddings).	
Health and Safety (operational)	Spillway finished with a suitable gradient (1 in 4). Surface finished with a suitable material (grass)		Concrete steps represent slight trip hazard however gradient of spillway and use of steps make risk of falling down spillway unlikely.		Concrete steps represent slight trip hazard however gradient of spillway and use of steps make risk of falling down spillway unlikely.	

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Assumptions and uncertainties						
Economic Impacts						
Capital cost	Varies between £1.58 and £1.75m depending on width of spillway		Varies between £2.59m and £3.03m depending on width of spillway		£4.19m	
Maintenance Cost	Low maintenance costs - maintenance limited to grass cutting and regular inspections.		Neutral maintenance costs - maintenance of concrete required (including face of spillway)		Neutral maintenance costs - maintenance of concrete required (including face of spillway)	
Land acquisition / Compensation Cost	Land acquisition and compensation costs likely to be insignificant with limited impact on Turkey Mill anticipated.		Land acquisition and compensation costs likely to be insignificant with limited impact on Turkey Mill anticipated.		Land acquisition and compensation costs likely to be relatively high with significant impact on Turkey Mill through construction of spillway A	
Environmental Impacts						
Water Quality	Scheme will directly affect non-statutory designated Mote Park and River Len Local Wildlife Site (LWS), and the River Len WFD waterbody.		as for Option 1/1A		as for Option 1/1A	
Biodiversity and legally protected flora & fauna (incl. migratory fish)	Potential presence of badgers and nesting birds has been highlighted within the Scheme area. Species not confirmed to be present in the Scheme area but known to be present within 1km include bats, dormouse, reptile, water vole, otter and Desmoulin's snail. No invasive species were recorded within the Scheme area. Need for further surveys to inform extent of potential effects on protected species and required mitigation. Potential effects on biodiversity, including indirect effects on nationally designated nature reserves at River Len and Vinters Park (distance of approx. 0.4km and 0.5km, respectively), and the Spot Lane SSSI (approx. 2.3km away).		The ecology survey was carried out at a sub-optimum time of year for invasive species. Need for further surveys to inform mitigation. as for Option 1/1A		as for option 1/1A as for Option 1/1A with additional effects on aquatic habitat in Turkey Mill - European eel (Anguilla anguilla) was recorded at Turkey Mill in a 2017 EA fish survey - this species is internationally protected. Need for further surveys to inform extent of potential effects on protected species and required mitigation.	
Archaeology and Cultural Heritage	The proposed development may result in moderate indirect adverse impacts to Mote Park Grade II Registered Park and Garden, specifically to the designed vistas along Mote Avenue to and from Mote House. Furthermore the assessment has shown that the site may contain remnants of post-medieval fabric relating to the original dam or other landscape and building works within this area of the park, which may be subject to direct adverse impacts. In addition, impacts to the character and therefore the significance of the park may arise from inappropriate design. The proposed development will however provide long term flood protection and thereby reduce risk of damage to the settings of designated heritage assets including, but not limited to Mote Park Grade II Registered Park and Garden and the Turkey Mill complex. On balance the proposed development will have a neutral effect upon archaeology and cultural heritage. Potential indirect effects on the College of All Saints (Scheduled Monument) and several listed buildings within the Study Area. The introduction of cast stone balustrade to West Drive Bridge will also directly and adversely affect the suite of buildings and structures. It is recommended that advice be sought from relevant heritage personnel at Maidstone Borough Council, and in consultation with the Gardens Trust, bearing in mind the engineering requirements of the proposal. It is possible that an alternative detail may be utilised to minimise the adverse effects and still meet functional requirements.		To mitigate the potential for direct adverse impacts on currently unknown archaeological remains, implemented mitigation measures entailing appropriate recording actions would preserve sites by record before partial loss or destruction thereby reducing the significance of any adverse effect. The detailed design should be sympathetic to the character within the park area. The significance of effects is assessed as being the same for all options and it is noted that there may be scope for mitigation through further archaeological works. as for Option 1/1A		as for option 1/1A as for Option 1/1A	
Trees and Landscape & Visual	Trees - option will inevitably result in significant loss of tree cover, as the proposals will be carried out in an enclosed part of the site where there are a significant number of existing trees. The construction of the crest wave wall is likely to affect some trees on neighbouring property at Turkey Mill Pond. These are the ash T3004 (Grade B), London plane T480 (Grade B), and Sycamore T481 (Grade C) - all included in Group G3021. Loss of trees and changes in topography that could adversely affect the setting of Mote House, and the late eighteenth/ early nineteenth century English landscape park. Loss of trees causing potential beneficial effects on sequential views for pedestrian visitors from Mote Avenue entrance (effect on recreational resource). Landscape - The area likely to be affected by the proposed option falls entirely within Landscape Character Area 1: Park Entrance which includes a sub-character area 1A: North Edge. The sub-character area is identified for its atypical visual connectivity with neighbouring land uses outside Mote Park; specifically the Turkey Mill complex to the north, and the prominence of the park wall along the top of the dam. Loss of the Park Wall and replacement with a new structure (wave wall) will directly and adversely affect the complete suite of park buildings and structures either by Daniel Asher Alexander or closely following his style; the use of local ragstone and the simplicity of buildings and other features constitute a unique set of structures, contrasting with the style of other English landscape parks of the same period; Potentially adverse visual and experiential effects on pedestrian visitors to Mote Park accessing the park from entrance on Mote Avenue, and on all visitors using the popular lakeside seating and picnic areas. Potentially adverse visual and experiential effects on visitors to Turkey Mill Lake, used as a wedding venue.		An Arboricultural Impact Assessment and Arboricultural Method Statement will be prepared to protect trees to be retained, based on the preferred option. However, it is recommended that additional impact assessment be carried out as part of the ongoing design process to inform mitigation proposals. Consultation is required with the Gardens Trust to assess significance of impacts on historic landscape values. as for Option 1/1A		as for option 1/1A as for Option 1/1A with additional effects on Tree Group G3021 consisting primarily of mature yew, growing on the southern bank of Turkey Mill Pond and highly visible from views to the north; the Wellingtonia (tree no.3020) to the north-east and ash (tree no. 3004) to the south are the two most prominent individuals within the group. Landscape - Extensive landscape remediation required at Turkey Mill due to temporary haul road. as for option 1	
Soils, geology and geomorphology	Effects on natural resources from physical changes to the topography of the area (including potential production of solid waste) will be minimised through good practice employed during detailed design and construction.		as for Option 1/1A		as for Option 1/1A	

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Social Impacts	Assumptions and uncertainties		Assumptions and uncertainties		Assumptions and uncertainties	
Recreational use of the lakes	Work will be undertaken in the channel. The overall effect on water users should be minimal. Use of the picnic area to the south of the West Drive will be temporarily affected during construction.	In order to undertake this work flow in the reservoir will have to be temporarily diverted. This can be achieved by constructing a temporary low dam at the outlet culvert to the spillway. Additionally, the percentage opening of the existing valve in the gate house will need to be increased to allow more flow to be diverted to Turkey Mill. This assumes that the single operable valve still operates.	as for Option 1/1A		For Option A2, the water level in Turkey Mill would have to be lowered to construct this option. For Option C2, work will be undertaken in the channel. The overall effect on water users should be minimal.	
Traffic & Transport	There are four major A-roads which run alongside the vicinity of Mote Park, namely the A20 to the north, the A249 (which runs to the M20) and A229 to the west, and the A274 (Sutton road) in the South, which all run into Maidstone Town Centre, where there is The Mall shopping centre, three large supermarkets (two Tesco superstores and one Sainsbury's store), a retail park, several restaurants, retail stores and hotels, and The Somerfield Hospital. Maidstone Leisure Centre and Mote Park Indoor Bowls Club are both less than 1km away from the proposed works, and Bearstead Golf Club approximately 2km away. A traffic and transport assessment will be completed to inform required mitigation. If necessary, a Traffic Management Plan will be prepared to plan traffic movements including: timings, routes, traffic restrictions, diversions and calming measures, deliveries and queuing etc.		as for Option 1/1A		as for Option 1/1A	
Access Arrangements	Minor reinstatement to West Drive road due to construction plant movement.	Access from within Mote Park	Minor reinstatement to West Drive road due to construction plant movement.	Access from within Mote Park	Extensive temporary haul road required. Access to Turkey Mill will have to be provided from Mote Park causing comparatively more disruption.	