
Project:	Project Sun - Phase I		
Our reference:	400602-MMD-00-XX-TN-C-0002		
Prepared by:	Nicolas Choveau	Date:	27 January 2023
Approved by:	Phil Roberts	Checked by:	Natalie Lewis
Subject:	Southampton Airport - foul water rising main crossing		

1 Introduction

Southampton International Airport Ltd (SIAL) has commissioned Mott MacDonald to develop the design of a 164m-long paved extension to the northern end of the existing runway at Southampton Airport. The design is now substantially complete, and SIAL has appointed a Contractor with the aim to start on site in April 2023.

This extension to the existing runway will require modification of ancillary infrastructure within, outside and including the current airfield security fence. This includes realignment of an existing Foul Water Rising Main (FWRM) that crosses the proposed location of the extended runway; the works to divert the FWRM are currently on site and undertaken by MGJV on behalf of Southern Water. The airfield security fence, which currently runs to the south of the new FWRM as it passes to the north of the runway, will be realigned to run on the north side of the FWRM. This will require the fence-line to cross the FWRM east of the runway.

The airport maintenance track, which currently crosses the new FWRM, will be realigned to cross further to the east.

Furthermore, an Approach Light mast will be relocated such that its new location will be immediately above the proposed route for the FWRM.

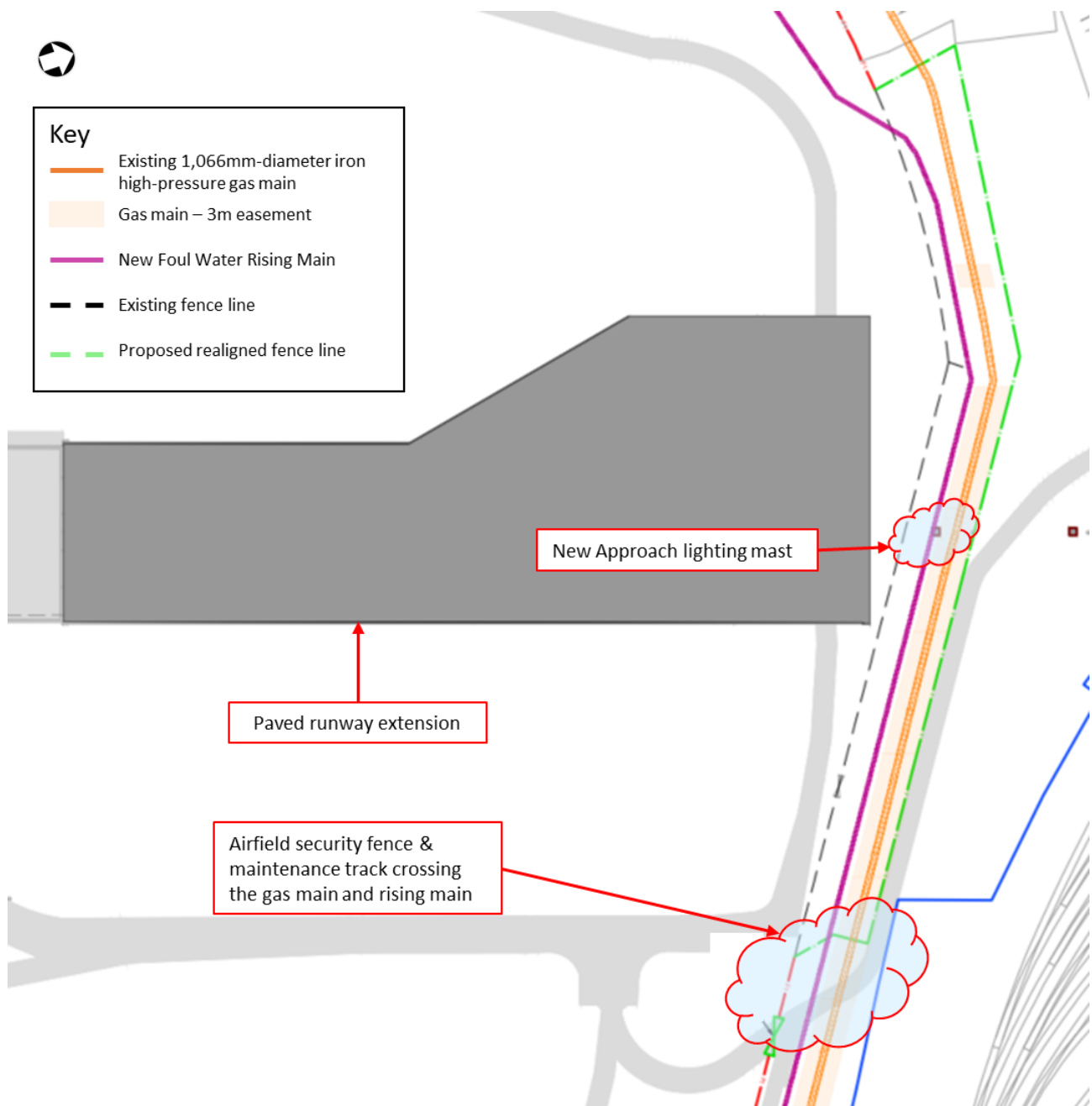
These crossings are indicated in Figure 1 on the following page.

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Figure 1: Proposed infrastructure crossing the Foul Water Rising Main



Source: Mott MacDonald, 400602-MMD-00-XX-DR-C-0044-Fence Alteration Layout

This note aims to provide further detail regarding the anticipated infrastructure to be installed across the new FWRM, including anticipated loading and frequency of trafficking on the maintenance track to support acceptance of the proposed design by Southern Water.

It is noted that guidance to build over or near to a public sewer is available on Southern Water's website¹ but does not cover building over pressurised rising mains.

¹ Build over or near to a public sewer ([southernwater.co.uk](https://www.southernwater.co.uk))

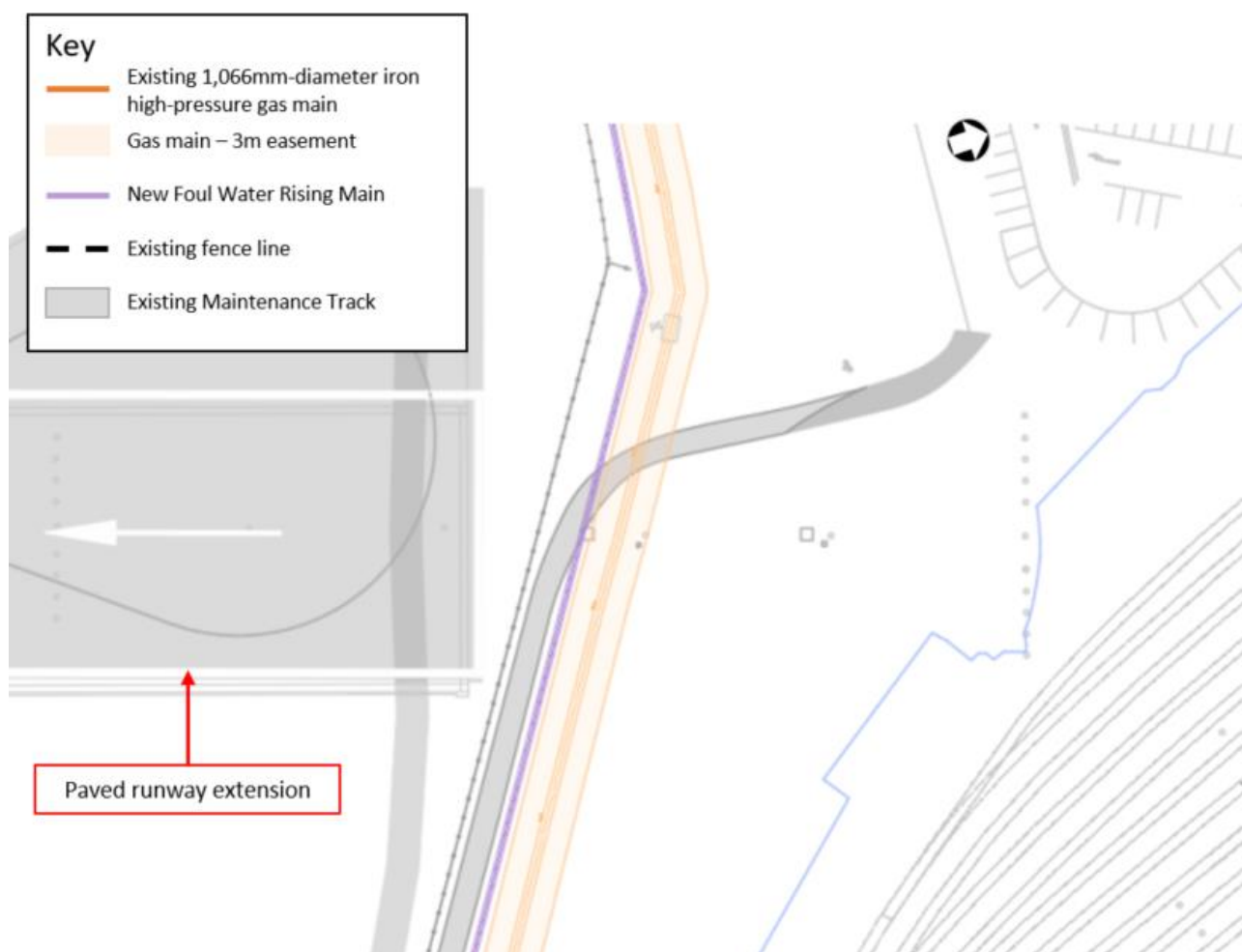
Whilst this note aims to provide sufficient information to Southern Water to assess and approve the proposed works in the vicinity of their asset, SIAL will continue to engage and consult Southern Water throughout the project during any works within the easement to ensure the FWRM is protected and agreed working practices are followed.

2 Maintenance Track

2.1 Existing Information

An unsurfaced maintenance access track currently runs east from the Airport's Long Stay Car Park, passing to the north of the runway. It is used occasionally by the Airport's contractor for maintenance purposes, with access controlled by a locked gate to prevent use by the public.

Figure 2: Existing maintenance track above the gas pipeline



Source: Mott MacDonald

No intrusive survey has been carried out on the track and its structure is unknown. It is understood that SWS has not designed specific protection measures (i.e. load-relief structure) to be put in place during construction of the new FWRM and reinstatement of the maintenance track above.

Where the track crosses the new FWRM, it is understood from the latest designs that the main runs at a depth of c. 1.30m below ground level.

2.2 Anticipated Life of the Re-aligned Maintenance Track

As part of the Solent Freeport, the Airport has plans to develop land north-east of the runway in the near to medium-term which would require the complete removal of the maintenance track outside the airfield security fence rendering the track crossing of the FWRM redundant. It is therefore anticipated that the re-aligned track indicated in Figure 1 will remain in-situ for 24-36 months only.

As for all developments, uncertainty remains and it is possible that current expectations are not met, resulting in the re-aligned track remaining in-situ for a longer period of time.

2.3 Anticipated Traffic Loading

Trafficking of the re-aligned maintenance track will be limited to a discrete number of movement types, outlined below.

2.3.1 Airport Maintenance

Once re-aligned, there is no expectation that maintenance access traffic will fundamentally change compared to the existing situation. We have been advised by SIAL that the track is currently used predominantly by “4x4” vehicles for maintenance of the adjacent airport fence and landscaping.

The total number of movements by maintenance vehicles is anticipated to be around 20 per year (10 maintenance activities), with occasional movement of light truck (7.5T).

2.3.2 Construction Traffic

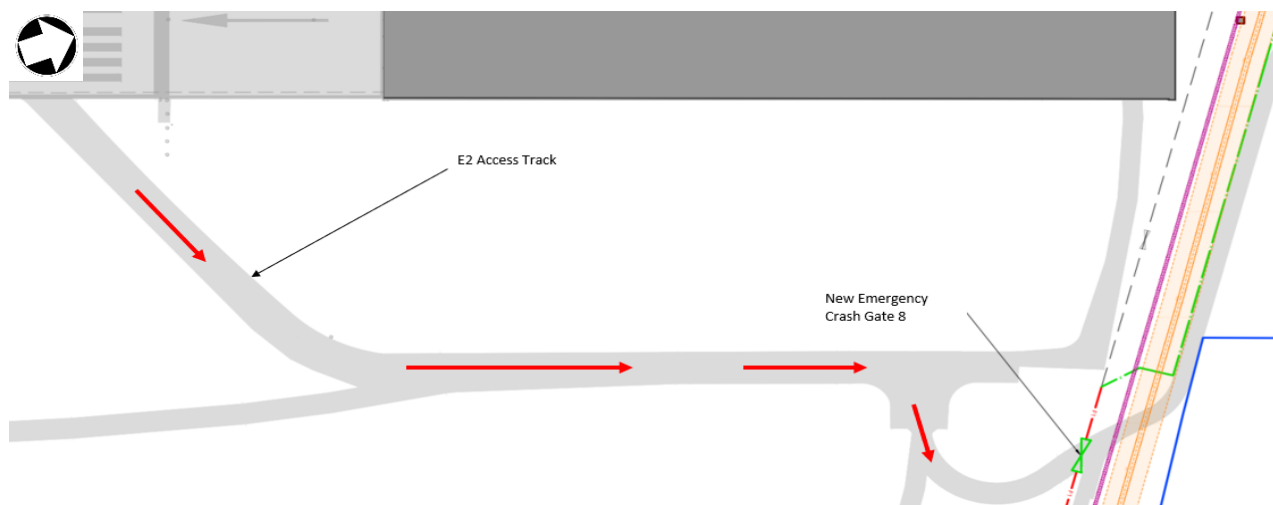
For the runway extension works, the contractor compound will be located west of the runway, near the existing fuel farm. Access to the project site will be via the existing airside road and therefore trafficking in the vicinity of the FWRM will be limited to the minimum necessary (i.e. for the realignment of the track itself and for the construction of the re-aligned security fence).

The total number of movements by construction vehicles on the track is currently unknown but are expected to be limited and controlled, if required.

2.3.3 Emergency Vehicles

The existing Crash Gate 8 (CG8) located directly north of the runway will be relocated to the east, meaning that in the unlikely event of an Airport emergency north of the airfield security fence, the Airport's fire fighting vehicles may access the incident site via the E2 access track and CG8, crossing the FWRM.

Figure 3: Emergency route for Fire Fighting vehicles



Source: Mott MacDonald, 400602-MMD-00-XX-DR-C-0044-Fence Alteration Layout.pdf & SIAL, Peri track access.docx

The Airport's Fire Service confirmed that the track would not be used for training but only in the event of an actual emergency. The largest vehicle currently operated by the fire service is the Rosenbauer Panther², a 39,000kg, 3-axle Aircraft Rescue and Fire Fighting Vehicle.

The total number of movements by emergency vehicles over the life of the track is anticipated to be zero, however its use cannot be ruled out.

2.4 Proposed Maintenance Track Design

2.4.1 Design Methodology

It is intended that the re-aligned maintenance track is unpaved at the crossing with the FWRM, as per the existing track.

A conservative design has been developed based on the Giroud-Han design method which is widely used to determine the thicknesses of unreinforced and geosynthetic reinforced aggregate bases for unpaved roads over soft subgrade^{3,4}. *Secucalc*, a proprietary software provided by manufacturer Naue Geosynthetics was used to produce this design.

Two designs have been produced, with and without a geosynthetic reinforcement ("geogrid").

2.4.2 Design Parameters

Ground conditions

Geotechnical investigations have been carried out in the vicinity of the maintenance track as part of the runway extension works and it has been determined that a CBR of 4% is appropriate to use across the site.

² https://www.rosenbauer.com/fileadmin/sharepoint/products/airportvehicles/panther/TEST_Datenbltter/DS_PANTHER6x6neu_A146_X2S0081_V2_en.pdf

³ Giroud, J. and Han, J-H. 2004a. Design method for geogrid reinforced unpaved roads. I – Development of design method. Vol. 130. No. 8. pp 775-786. Journal of Geotechnical and Geo-environmental Engineering. American Society of Civil Engineers.

⁴ Giroud, J. and Han, J-H. 2004b. Design method for geogrid reinforced unpaved roads. II – Calibration and applications. Vol. 130. No. 8. pp 787-797. Journal of Geotechnical and Geo-environmental Engineering. American Society of Civil Engineers.

Design life

As a result of the uncertainty with regards the future development east of the airport, a design life of 10 years has been used.

Traffic loading

Due to the uncertainty related to trafficking by heavy vehicles (i.e. construction and emergency vehicles), two cases have been run:

Load Case 1:

- 3 standard axles per month for maintenance vehicles,
- 1,000 standard axles for construction traffic (conservative assumption),

Load Case 2:

- 1 fire truck per year with an assumed weight of 70,000kg (conservative use of software vehicle database).

For both designs, a 1100kPa tyre pressure was used.

2.4.3 Output Design

The design developed based on the inputs mentioned in sections 2.4.1 and 2.4.2 shows that the traffic “Load Case 1” results in the most onerous design requirements. The proposed designs are hence based on this anticipated worst-case loading scenario, resulting in:

- With a geogrid: 200mm Type 1 granular base + geogrid (assumed to be Naue Secugrid 40/40).
- Without geogrid: 350mm Type 1 granular base

Due to the constraints of the site and the availability of Type 1 material, the unreinforced design has been selected.

Given the depth and condition of the FWRM, the low frequency of trafficking and the precent of similar, unpaved tracks crossing the existing (pre-diversion) foul water rising main, it is understood that no specific protection measures shall be required for the realigned maintenance track to cross the new FWRM. This conclusion is subject to approval by Southern Water on the basis of their design requirements, not currently shared with SIAL.

3 Security Fence

3.1 Existing Information

The design provided by Southern Water indicates that at the location of the proposed crossing of the FWRM by the fence-line, the crown of the main will be 1.60m below ground. This assumes that ground levels following the construction of the FWRM are identical to those recorded prior to the works taking place.

3.2 Design Requirements

Airfields are highly secure environments and as such need to conform to stringent standards when it comes to the security fence. These standards are detailed in BS 1722: Part 10 and will require the installation of fence posts every 3m and therefore it is expected that post foundations will be required within 1.5m of the FWRM.

3.3 Proposed Design

A typical detail is provided in Appendix A of this technical note.

At present, two solutions are anticipated for the foundations of the posts:

- Standard foundation for intermediate posts where required,
- Installation of a top and bottom rail with floating posts when these are located within the easement.

At the time of writing this technical note, the choice of fence supplier is yet to be finalised and therefore final design of the fence and foundations for the posts is not available however, both options are proposed to Southern Water for their assessment and approval.

4 Approach Lighting Mast

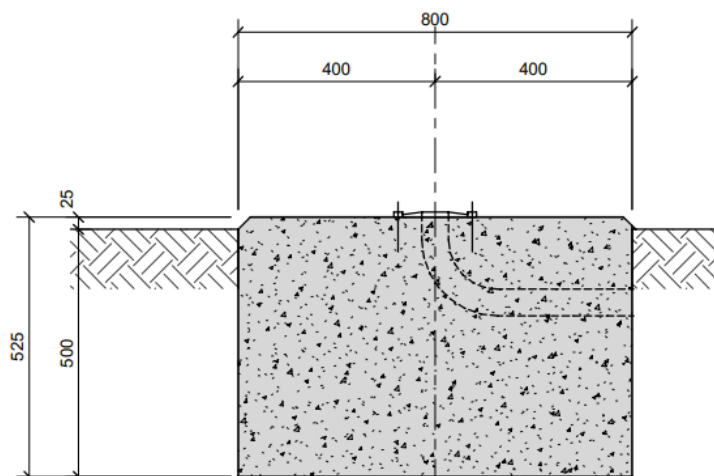
4.1.1 Proposed Design

The runway extension also requires the relocation of an existing 1.49m high approach lighting mast. This proposed mast will be located immediately above the new FWRM as shown in Figure 1.

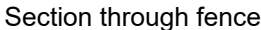
Discussions with regards to this element of the works have been held with AECOM, acting as Aviation Advisor for MGJV (contractor carrying the FWRM works on behalf of Southern Water). The advice provided by AECOM is that the amount of cover at this location seems reasonable and therefore it is understood that no specific mitigation measure (e.g. protection slab) is required.

Although yet to be finalised, it is currently anticipated that the foundation for the approach light will be a C28/C35 (PAV1 concrete designation) pad of the following dimensions: 800 x 800 x 525mm. This would ensure approximately 970mm cover over the FWRM with very limited dynamic loads applied to the Approach Light pole.

Figure 4: Draft Approach Lighting Foundation – Cross-section



A. Fencing - Typical Detail



INTERMEDIATE POST
SCALE 1:25



STRAINING POST
SCALE 1:25



B. FWRM Crossing – communication with Aecom

Nicolas Choveau

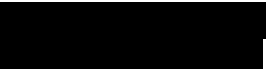
From: Greenslade, Elliot <elliot.greenslade@aecom.com>
Sent: 08 November 2022 16:23
To: Nicolas Choveau
Subject: RE: MGJV - Foul Rising Main Diversion

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Hi Nicolas,

Yes this was something that was picked up in our review and we raised it with MGJV. I think the issue is more to do with future access and maintenance problems to both the rising main and light due to their proximity rather than the amount of cover. Nevertheless, should the two need to coexist then the amount of cover seems reasonable but the contractor may want to consider a protection slab above the pipe to transfer any load from the lighting fixture and foundation.

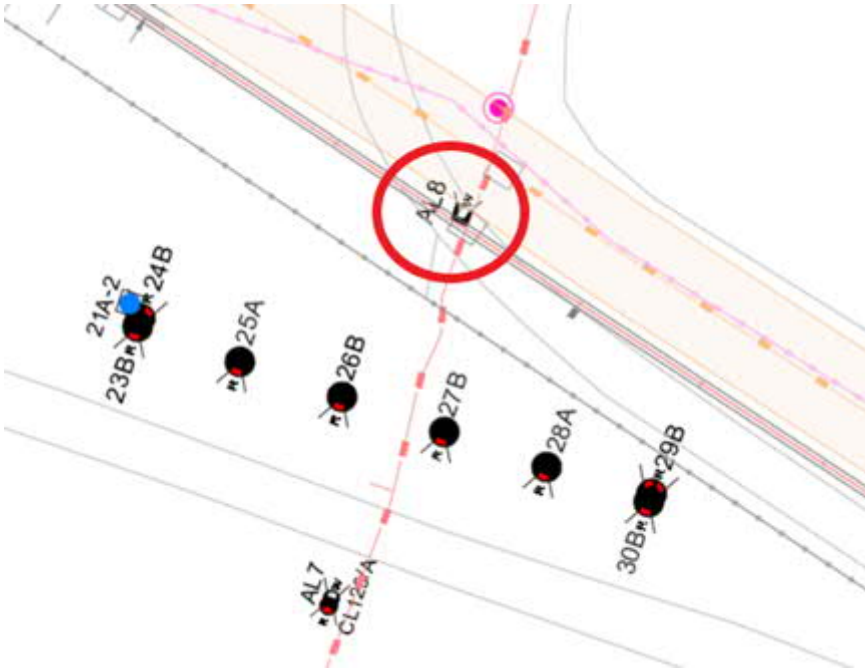
Kind Regards,

Elliot Greenslade
Principal Engineer, Aviation


From: Nicolas Choveau <Nicolas.Choveau@mottmac.com>
Sent: 07 November 2022 17:10
To: Greenslade, Elliot <elliot.greenslade@aecom.com>
Subject: RE: MGJV - Foul Rising Main Diversion

Hello Elliot,

We have received the revised alignment for the Foul Water Rising Main and note that the proposed route appear to run close (or under) a proposed approach light.



We note that the pipe will run approximately 1,400mm below ground (top of the pipe) under the proposed light and therefore a healthy cover should remain to the bottom of the foundation. Are you able to advise how much cover is required above the pipe so that can ensure both infrastructure can coexist at this location and whether this is something you have looked at as part of your study?

Thank you,

Nicolas Choveau

Pronouns: he, him, his

Principal Airfield Engineer

D +44 (0)20 8774 2889

From: Greenslade, Elliot <elliott.greenslade@aeom.com>

Sent: 10 October 2022 16:17

To: Nicolas Choveau <Nicolas.Choveau@mottmac.com>; John Holden SUP <john.holden.sup@glasgowairport.com>; Mike Weeks <mike.weeks@iconicprojectmanagement.com>; nick.walton@mgjv.co.uk

Cc: Phil Roberts <Phil.Roberts@mottmac.com>

Subject: RE: MGJV - Foul Rising Main Diversion

Caution: This is an external email and has a suspicious subject or content. Please take care when clicking links or opening attachments. When in doubt, contact your IT Department

Hi Nicolas,

That's perfect thank you.

Elliot Greenslade



From: Nicolas Choveau <Nicolas.Choveau@mottmac.com>

Sent: 10 October 2022 15:52

To: Greenslade, Elliot <elliott.greenslade@aeom.com>; John Holden SUP <john.holden.sup@glasgowairport.com>; Mike Weeks <mike.weeks@iconicprojectmanagement.com>; nick.walton@mgjv.co.uk

Cc: Phil Roberts <Phil.Roberts@mottmac.com>
Subject: RE: MGJV - Foul Rising Main Diversion

Hi Elliot,

The eTransmit file of the requested file is too large to send via email. I have set up a [ftp site](#) that you can access with the following credentials:

username: ni2996
password: 9KZLP1qO8L

Data stored on the FTP site will be purged on 17/10/2022 15:47. After this date data will be unrecoverable.

Let me know if there is any issue with the file.

Kind regards,

Nicolas Choveau

Pronouns: he, him, his
Principal Airfield Engineer

D +44 (0)20 8774 2889

From: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Sent: 07 October 2022 12:45

To: Greenslade, Elliot <elliott.greenslade@aecon.com>; Phil Roberts <Phil.Roberts@mottmac.com>; John Holden SUP <john.holden.sup@glasgowairport.com>; nick.walton@mgjv.co.uk

Subject: Re: MGJV - Foul Rising Main Diversion

Understood.

Phil, OK for you to share the relevant detail

Mike

Mike Weeks
Project Manager
Iconic Project Management Ltd


From: Greenslade, Elliot <elliott.greenslade@aecon.com>

Sent: Friday, October 7, 2022 12:28:13 PM

To: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>; Phil.Roberts@mottmac.com <Phil.Roberts@mottmac.com>; John Holden SUP <john.holden.sup@glasgowairport.com>; nick.walton@mgjv.co.uk <nick.walton@mgjv.co.uk>

Subject: RE: MGJV - Foul Rising Main Diversion

Hi Mike,

The concern is not so much with the existing approach lights as you mention but that of the position of the future approach lights when the extension is completed. I understand from the drawings provided that the configuration of the future approach lighting and supporting P&D infrastructure changes.

Happy to discuss in next meeting.

Kind Regards,

Elliot Greenslade
Principal Engineer, Aviation

From: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Sent: 07 October 2022 12:22

To: Greenslade, Elliot <elliott.greenslade@aecom.com>; Phil.Roberts@mottmac.com; John Holden SUP
<john.holden.sup@glasgowairport.com>; nick.walton@mgjv.co.uk

Subject: Re: MGJV - Foul Rising Main Diversion

Hi Elliot,

Can we pick this up on the next site visit please.

MGJV are aware of the approach light infrastructure and completed trial holes to validate location.

We have also assessed on site and there is no approach light directly above the diversion route.

Thanks,
Mike

Mike Weeks
Project Manager
Iconic Project Management Ltd

From: Greenslade, Elliot <elliott.greenslade@aecom.com>

Sent: Friday, October 7, 2022 12:14:16 PM

To: Phil.Roberts@mottmac.com <Phil.Roberts@mottmac.com>

Cc: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Subject: RE: MGJV - Foul Rising Main Diversion

Hi Phil,

I hope you are well?

AECOM have been appointed by MGJV to support them in an aviation advisory role for the works in which they are carrying out to divert an existing foul pipe just North of the proposed runway extension.

Upon inspection of the drawings for the extension produced by MM, there are some concerns in relation to the proximity of the proposed pipeline alignment relative to the proposed future RWY 20 approach lighting. In order to assess this in more detail are you able to provide me with the .dwg CAD file of the attached drawing and confirm if that is most up to date layout?

Kind Regards,

Elliot Greenslade
Principal Engineer, Aviation

From: Greenslade, Elliot

Sent: 24 August 2022 16:51

To: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Cc: Daryl Huckle (MGJV) <Daryl.Huckle@mgjv.co.uk>; Rod Smith (MGJV) <rod.smith@mgjv.co.uk>; Scrafton, Marcus

<marcus.scrafton@aeom.com>; Danyel Pullen (MGJV) <danyel.pullen@mgjv.co.uk>; John Holden SUP <john.holden.sup@glasgowairport.com>

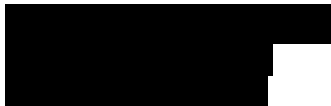
Subject: RE: MGJV - Foul Rising Main Diversion

Hi Mike,

Thanks very much for this – I'll take a look and let you know If I need anything else.

Kind Regards,

Elliot Greenslade



From: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Sent: 24 August 2022 16:42

To: Greenslade, Elliot <elliott.greenslade@aeom.com>

Cc: Daryl Huckle (MGJV) <Daryl.Huckle@mgjv.co.uk>; Rod Smith (MGJV) <rod.smith@mgjv.co.uk>; Scrafton, Marcus <marcus.scrafton@aeom.com>; Danyel Pullen (MGJV) <danyel.pullen@mgjv.co.uk>; John Holden SUP <john.holden.sup@glasgowairport.com>

Subject: [EXTERNAL] RE: MGJV - Foul Rising Main Diversion

Hi Elliot,

Please see attached further information for the approach lights.

Mike

From: Mike Weeks

Sent: 23 August 2022 23:24

To: 'elliott.greenslade@aeom.com' <elliott.greenslade@aeom.com>

Cc: 'Daryl Huckle (MGJV)' <Daryl.Huckle@mgjv.co.uk>; 'Rod Smith (MGJV)' <rod.smith@mgjv.co.uk>;

'marcus.scrafton@aeom.com' <marcus.scrafton@aeom.com>; 'Danyel Pullen (MGJV)' <danyel.pullen@mgjv.co.uk>; 'John Holden SUP' <john.holden.sup@glasgowairport.com>

Subject: RE: MGJV - Foul Rising Main Diversion

Hi Elliot,

To follow my note below... Below is the extract from the MGJV works contract with FOD and bird details:

In addition, attached the Long Section for the approach lights. This drawing relates to the proposed lighting arrangement after we've completed the extension (although you can infer the current lighting heights from the drawing). I'll see if I can get hold of a drawing showing the existing condition.

Thanks

4.5.3 Work Areas and Daily Hand back of Site

Work will take place in landside areas only. Work will be split between both unrestricted and night-time working periods The Contractor does not use the Site for any other purpose other than carrying out the works. During the night-time working zone the Contractor is responsible for handing back the site to the SIAL Airside Operations team at the end of each working shift to enable the safe and uninterrupted service of the airport.

- a. Throughout the works, the Contractor is to ensure that all construction areas are protected from Foreign Object Debris (FOD). Dust is to be kept to a minimum and prevented where reasonably practicable.
- b. It is imperative that the Contractor constantly monitors the works to ensure that there is no possibility of any incidents of FOD damage due to poor housekeeping.
- c. The fence line and gates along the security fence (include access routes leading to the gates) must be kept clear of all materials and equipment.
- d. All deliveries, materials, waste, skips, storage, tools and equipment (etc) are to be securely fixed and covered throughout the works. This includes material, equipment and waste stored within site compound areas.
- e. Excavations and trenches need not be backfilled and covered prior to handback to SIAL Airside Operations at the end of each shift. However open excavations should be:
 - a. Free of debris, loose materials and FOD
 - b. Protected from jet blast (cover by tar spray / fixed net / physical barrier / other means as recommended by the Contractor and agreed by SIAL)
 - c. Graded and finished such that bird activity is not encouraged (i.e turned soil and water ponding will attract birds)

From: Mike Weeks

Sent: 23 August 2022 18:42

To: elliott.greenslade@aecom.com

Cc: Daryl Huckle (MGJV) <Daryl.Huckle@mgjv.co.uk>; Rod Smith (MGJV) <rod.smith@mgjv.co.uk>; marcus.scrafton@aecom.com; Danyel Pullen (MGJV) <danyel.pullen@mgjv.co.uk>; John Holden SUP <john.holden.sup@glasgowairport.com>

Subject: RE: MGJV - Foul Rising Main Diversion

Hi Elliot,

I received your message (please see my updated e-mail address, I'll come back to you with details by the end of the week.

As a quick response to questions 2 & 3...

2. Requirements for FOD are included in SWS's works contract with MGJV

3. Similarly, there is a requirement within the works contract to mitigate and manage factors that could increase the likelihood of bird-strikes (e.g. eliminate any ponding / covering exposed soil)

Thanks

From: zzz_Mike Weeks <zzz_Mike.Weeks@agsairports.co.uk>

Sent: 22 August 2022 15:41

To: Mike Weeks <Mike.Weeks@iconicprojectmanagement.com>

Subject: FW: MGJV - Foul Rising Main Diversion

From: Greenslade, Elliot <elliott.greenslade@aecom.com>

Sent: Monday, August 22, 2022 3:40:40 PM (UTC+00:00) Dublin, Edinburgh, Lisbon, London

To: zzz_Mike Weeks <zzz_Mike.Weeks@agsairports.co.uk>

Cc: Daryl Huckle (MGJV) <Daryl.Huckle@mgjv.co.uk>; Rod Smith (MGJV) <rod.smith@mgjv.co.uk>; Scrafton, Marcus <marcus.scrafton@aecom.com>; Danyel Pullen (MGJV) <danyel.pullen@mgjv.co.uk>

Subject: MGJV - Foul Rising Main Diversion

You don't often get email from elliott.greenslade@aecom.com. [Learn why this is important](#)

Good Afternoon Mike,

I have been provided your contact in relation to the works that Morrison/Galliford Try (MGJV) are undertaking on behalf of Southern Water to divert an existing foul rising main at Southampton Airport. Unless you are not already aware MGJV have appointed us to help support them in an aviation advisory role.

I was hoping you could help me in providing the following information for the project:

1. A Long Section through the existing RWY 20 Approach lighting which shows the elevation of each lighting fixture and;
2. Any specific SIAL working practices/documentation in relation to the mitigation/control of FOD during construction works
3. Any specific SIAL working practices/documentation in relation to the wildlife/bird hazard protection during construction works

Kind Regards,

Elliot Greenslade, BSc (Hons) MSc
Principal Engineer, Aviation, EMEA



elliott.greenslade@aecom.com

[Click here to connect with me on LinkedIn](#)

AECOM
Midpoint
Alençon Link
Basingstoke, RG21 7PP
T 44-1256-310-200 F 44-1256-310-201
aecom.com

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