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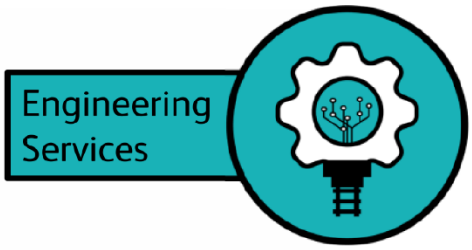

Saltash Platform Train Interface Improvements

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Executive Summary

The existing stepping distance of the UP platform 2, Saltash Station is currently non-compliant. This report considers two options to improve the current stepping distance, namely.

- Option 1 To realign and level the existing 81m operational platform
- Option 2 As option 1 but to also provide an additional 76m platform extension to the high milage that would allow a 5 car 80x, or any DMU up to 5 coaches in length to be accommodated.

The report includes potential civils interventions that could be considered to accommodate both Option 1 and 2.

The report is a Pre-PACE study only by track and civils disciplines to show a potential solution is possible. The report includes recommendations for the next PACE stages should the project progress, which would include input from additional disciplines, including signalling, fire engineering and E&P.

Figure E1: Platform 2 upper platform in image – with potential to extend platform to the compound area visible within top of image

Contents

1 Introduction

At the request of Wales and Western Capital Delivery this report summarises a brief pre-PACE review to determine the practicability of improving the stepping distance of the UP platform 2 at Saltash Station.

Existing gauging data from RGDS was exported to review existing platform heights and offsets (Also known as Y and X values) for the Up Platform 2. It was found that the existing platform has significant non-compliances to both heights and offsets, which increase stepping distances for passengers between the train and the platform.

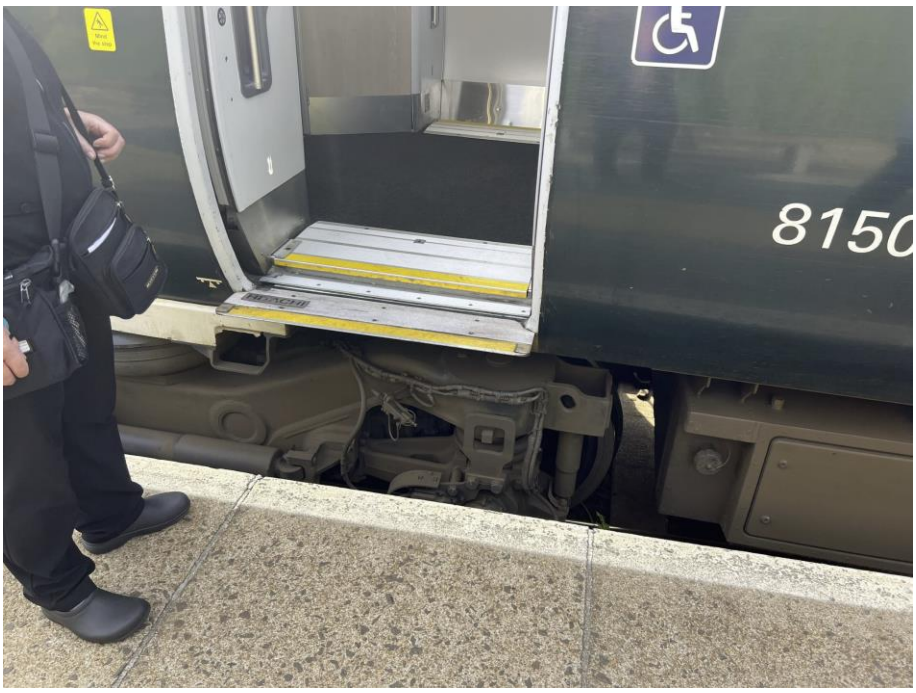

Figure 1: Photograph of the PTI between Saltash Up Platform 2 and a GWR Class 80X unit.

Large stepping distances are known to increase risks associated with the PTI, for example persons falling in the gap between platform and train, who may suffer injury from the fall. In the worst cases, a person falling in the gap and then the train being dispatched can cause fatalities.

The non-compliant stepping distances also mean that the railway is less accessible. A wide range of passengers are PRMs, and the large gap could make them less confident or unable to use rail services.

ESDD has conducted a Pre-PACE investigation to identify opportunities to improve the PTI issues at Saltash station, to improve safety and accessibility at the station.

2 Abbreviations and references

2.1 Abbreviations

DMU	Diesel Multiple Unit
ESDD	Engineering Services Design Delivery
GWR	Great Western Railway
PACE	Project Acceleration in a Controlled Environment
PTI	Platform Train Interface
PRM	Persons of Reduced Mobility
RRAP	Road-Rail Access Point
RGDS	Railway Gauging Data Solution
SDO	Selective Door Operation

2.2 References

NTSN-INF	National Technical Specification Notice – Infrastructure
GIRT7073	Requirements for the Position of Infrastructure and for Defining and Maintaining Clearances
RIS-7016-INS	Interface between Station Platforms, Track, Trains and Buffer Stops
NR/L2/TRK/2102	Design and Construction of Track
NR/L3/TRK/2049	Track Design Handbook

3 Investigation

3.1 Track

Data from RGDS was used to provide existing heights and offsets (Y and X values) for the station, shown in Appendix A. The entire platform is non-compliant, with significant sections more than 150mm away from compliance.

It is assumed that all trains stop at the existing stop-car markers, and that trains do not stop beyond this point, even if signal P3 is showing a proceed aspect on the train's approach. While the section of platform low mileage of signal P3 is assumed to not be used, it does appear to presently be maintained to the same level as the operational part of the platform. There may be some opportunity to achieve a maintenance saving in this area.

It is assumed that all trains that are longer than the available platform length are capable of SDO.

It is assumed that vehicles are not regularly attached / detached at Saltash Station, so therefore it is assumed that the circumstances mentioned in the NTSN-INF requiring gradients to not exceed 2.5mm/m are unlikely to apply.

None of the proposed options propose moving the train stopping point, so as such there will be no changes to acceleration / braking characteristics associated with track gradients throughout the site.

Note that there is currently an ongoing resignalling project in the Plymouth area which may require correlation with this scheme in subsequent design stages.

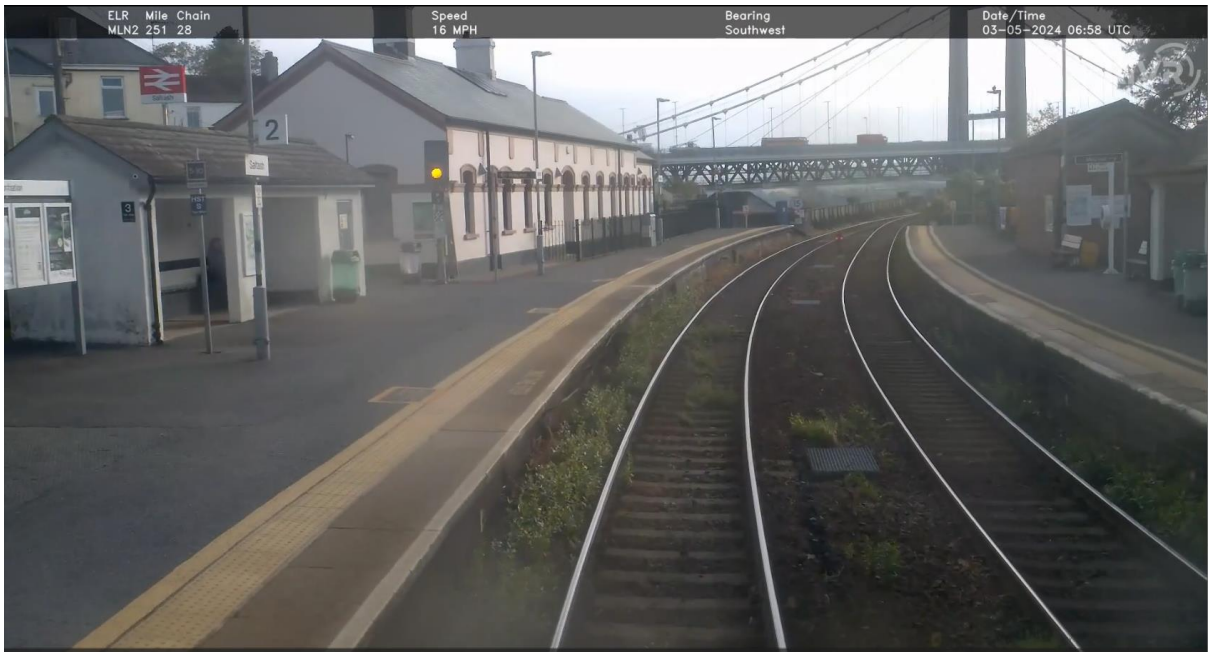

Figure 2: AIVR Extract showing the location of Signal P3 and the train stopping point markers.

Detailed gauging work to determine the exact platform heights and offsets for any proposed intervention would be determined at the next design stage. However, typical indicative values based on Appendix C of GIRT7073 would be:

Nominal Platform Height above running edge of rail	Y=915mm
Nominal Platform Offset from running edge of rail	X=730mm

Platform offset will increase where the through radius is less than 360m. For example, at R=300m the typical offset would be X=745mm. This increased offset is required to provide structure gauging clearance through platforms with tight radii.

3.1.1 Option 1 – Platform Alterations to Existing Platform

For this option, works to 81m of the surface of the existing platform between Signal P3 and the existing high milage top of ramp would be undertaken to achieve compliant platform heights and offsets. Train stopping positions would remain as existing.

The platform to low mileage of Signal P3 would become non-operational and a pedestrian fence provided along the platform edge 1624mm offset from nearest rail, with anti-trespass matting between fence and edge of platform. The hard standing area of the platform would remain accessible.

This option would provide improved stepping distances, albeit within the constraints associated with the tight radius (R=300m) of the existing track alignment.

3.1.2 Option 2 – Platform Extension with Alterations to Existing Platform

ESDD has produced a sketch showing a potential option to provide a 76m platform extension to the high mileage end of the Up Platform at Saltash Station. The proposed works would comprise of:

- Installation of a new 76m platform extension with a width of 3.3m.
- Works to 81m of the surface of the existing platform between Signal P3 and the existing high milage top of ramp (As per option 1) to achieve compliant platform heights and offsets.
- Making the platform to low mileage of Signal P3 out of use by installation of anti-trespass matting and/or fencing (As per option 1), as trains will not stop in this part of the platform.

The proposed design fully accommodates a 5 car Class 80X train, or any other DMU up to 5 coaches in length. Longer trains would still require use of SDO. For comparison, in the existing situation, only the front two cars of an 80X can be accommodated from the current stop car marker position.

This option would provide improved stepping distances, and the platform extension would be sited on a shallower radius of R=1302m, creating an overall risk reduction of PTI incidents over Option 1.

The increased platform length could also improve operational performance and resilience by reducing dwell times by reducing the use of SDO. This would also provide an improvement for the passenger experience, as passengers are less likely to be over-carried beyond Saltash station if they are in the wrong part of the train, and will find it easier to board/alight.

The LIDAR survey indicates that there is sufficient width to install a 3.3m wide platform extension between the retaining wall and running edge of rail. 3.3m has been assumed as the desirable platform width to provide sufficient room for a 1.8m long PRM access ramp and a 1.5m manoeuvring area to provide safe, efficient capability for PRMs to board / alight rail services.

It is not recommended to provide a further extension beyond 76m as this would have an adverse impact on maintenance vehicles accessing the area from the maintenance compound and temporary / informal RRAP. There are limited alternative RRAPs in the vicinity thus removal is not recommended.

Figure 3: Overview of the site of the proposed platform extension, showing maintenance access compound and retaining wall.

This option is compliant with RIS-7106-INS clause 2.1, requiring platform extensions to be located on radii not less than 500m.

The gradient on the platform extension varies due to the vertical curve present in the track alignment. The average gradient from Signal P3 to the proposed limit of platform extension is 1:327, which is steeper than the 1:400 (2.5mm/m) mentioned in section 4.2.3.3 of the NTSN-INF, however the circumstances mentioned in the NTSN-INF are unlikely to apply in Saltash Station.

The regressed geometry indicates deficiency values above exceptional maximum (D=157), and maximum Rate of change of Deficiency values (RcD=70mm) for 45mph, however trains will likely be below these speeds as they approach the 15mph speed restriction. At the next design stage, a graduated speed profile should be considered to identify maximum achievable speeds.

3.1.3 Discounted Options

A track lower and slue (Via either full track renewal or ballast cleaning machine) has been discounted, as tying into the existing alignment on Royal Albert Bridge is likely to be impractical.

3.2 Civils

From photographs the existing up platform appears to be of traditional construction ie. solid brick front wall with fill behind.

The change to platform height / offset gauge could be achieved through two alternative solutions.

a. Removal of existing edge coping and surfacing where necessary and relay along the length of the platform to new height and offset position. Possibly considering the use of precast concrete coping slabs of extended length (into platform width) that can accommodate the over-sail necessary.
b. Use of an extension system such as the Mountbridge ™ system by Dura which allows existing platforms to be overlaid and regauged similar to the system in Fig 4 using fibre reinforced polymer (FRP) mounting systems and floor plates. The system in principle would provide a much quicker construction time than full relaying of coping stones, albeit the significant over-sail that could be necessary for each mounting run at this site (far greater than shown in Fig 4) may necessitate local support, that could be easily designed.

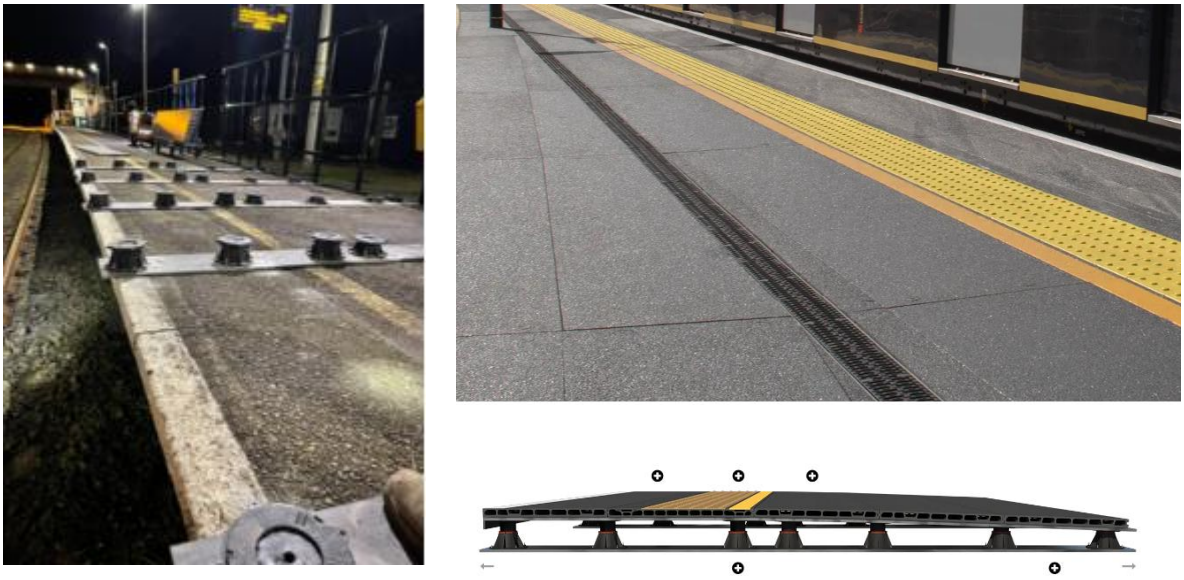

Figure 4: Mountbridge ™ by Dura

For both options considered above a full topographical survey (including gauge sweep) / utility survey would be necessary to determine such features as:

- Fully ascertain scope of cope edge x/y offset positions.
- Determine tie in with existing surface levels, and ensuring a backfall from platform coper edge to either back of platform (where narrow) or to a point where two opposing cross falls can meet where wider platform.
- Drainage strategy.
- Interface with existing buried services, covers, street furniture, buildings and walls.

For Option 2 the platform can be extended from the end of the existing platform, Fig 5.

Figure 5: End of existing platform where extension can commence (start of fence) – careful consideration of interface with existing retaining wall necessary

As discussed previously the platform, circa 3.3m clear width, would extend into the existing NR compound area, shown within fig 6.

Figure 6: End of existing platform /compound area that would accommodate any platform extension – noting the compound would remain behind the platform and the RRAP maintained.

Any platform extension may consist of

- FRP modular construction.
- Light weight modular expanded polystyrene platform system with precast concrete top slab.

The option would require the following to be considered at the next design stage.

- Topographical survey.
- Utility surveys.
- Impact on existing CCTV, PA, and fire strategy.
- Ground investigation.
- Ecology.
- Existing DNO capacity / additional requirements.
- Lux surveys.
- Additional Track input to support design development
- Signalling / E&P input who have not formed part of this initial Pre-PACE study.

Figures 7, 8, and 9 show the current Network Rail land ownership, Operational area and a conservation area to the north of the platform, respectively, that would all be considered as part of the next design phase.

Figure 7: Network Rail land ownership (green) – showing all work proposed would be within NR land.

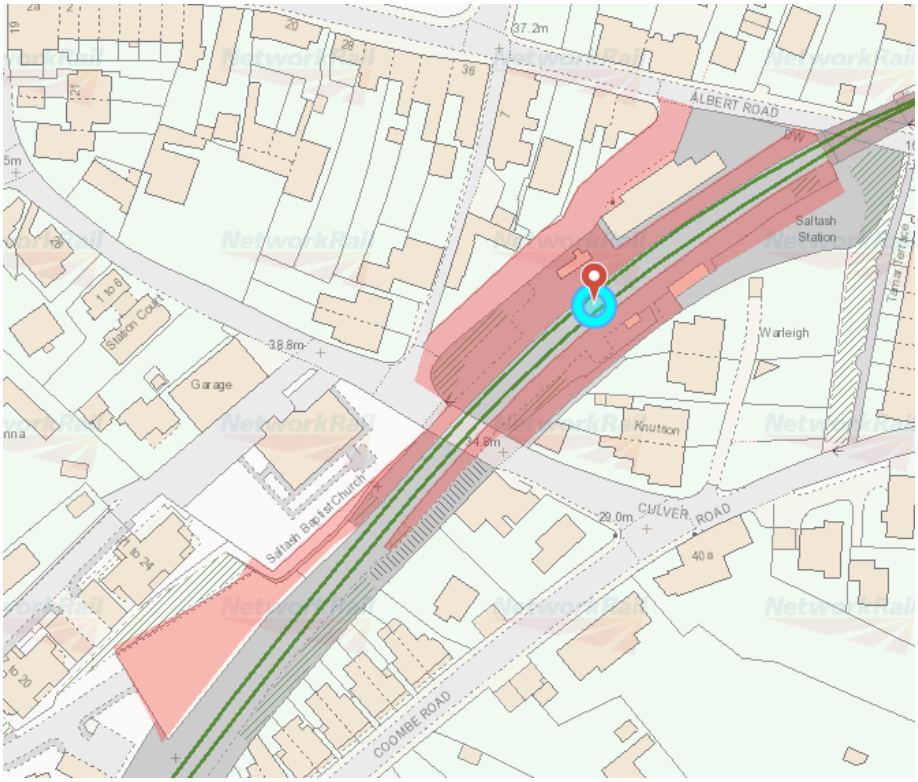

Figure 8: Operational estate (red)

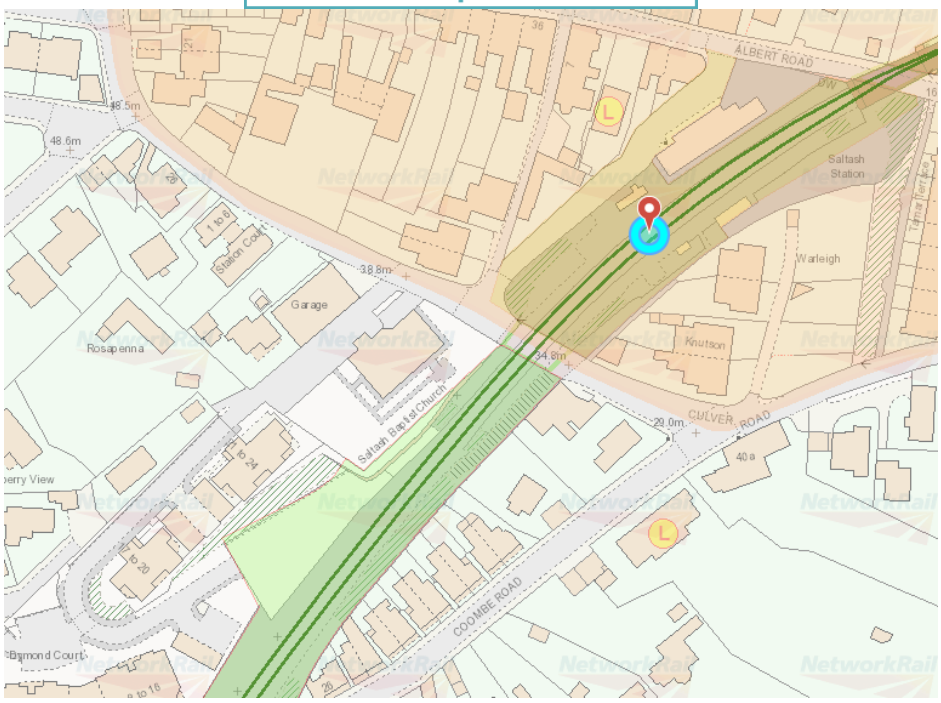

Figure 9: Plan showing conservation area on the north side of platform

4 Conclusion

The existing stepping distance of the UP platform 2, Saltash Station is currently non-compliant. This Pre-PACE report has suggested two options to improve the current stepping distance, namely

- Option 1 To realign and level the existing 81m operational platform.
- Option 2 As Option 1 but to also provide an additional 76m platform extension to the high milage that would allow a 5 car 80x, or any DMU upto 5 coaches in length to be accommodated.

The report also includes potential civils interventions that could be considered to accommodate both Option 1 and 2, and surveys that would be necessary to inform any design.

Appendix A - Existing platform heights and offsets (Y and X values)

Saltash Station Up Platform 2

Distance (km)	Cant (mm)	Radius (m)	Side	Platform X (mm)	Platform Y (mm)	Nominal Compliant X (mm)	Nominal Compliant Y (mm)	Distance to Compliance X (mm)	Distance to Compliance Y (mm)
404.413	-61	-321	Right	797	839	739	915	58	76
404.418	-62	-315	Right	815	844	741	915	74	71
404.424	-61	-322	Right	835	853	739	915	96	62
404.428	-64	-330	Right	836	859	737	915	99	56
404.434	-66	-330	Right	855	868	737	915	118	47
404.438	-63	-324	Right	877	858	738	915	139	57
404.444	-61	-318	Right	864	857	740	915	124	58
404.448	-64	-316	Right	846	833	740	915	106	82
404.453	-68	-324	Right	833	816	738	915	95	99
404.458	-71	-323	Right	795	828	738	915	57	87
404.463	-65	-311	Right	787	812	742	915	45	103
404.468	-64	-297	Right	752	807	746	915	6	108
404.473	-72	-285	Right	749	776	749	915	0	139
404.478	-65	-273	Right	755	765	753	915	2	150
404.483	-66	-267	Right	791	760	755	915	36	155
404.489	-68	-276	Right	817	767	752	915	65	148
404.493	-67	-301	Right	852	777	744	915	108	138
404.499	-67	-341	Right	881	803	734	915	147	112
404.503	-62	-391	Right	861	811	730	915	131	104
404.509	-62	-433	Right	887	827	730	915	157	88
404.513	-59	-498	Right	874	831	730	915	144	84
404.518	-58	-591	Right	843	850	730	915	113	65
404.523	-57	-674	Right	816	869	730	915	86	46
404.529	-59	-761	Right	807	882	730	915	77	33
404.533	-59	-929	Right	827	895	730	915	97	20
404.538	-57	-1101	Right	965	926	730	915	235	-11
404.539	-57	-1129	Right	992	910	730	915	262	5
404.539	-57	-1129	Right	993	908	730	915	263	7

NOTE: THIS TABLE IS FOR INDICATIVE USE ONLY AND DOES NOT DEMONSTRATE POSITIVE CLEARANCES ARE OBTAINED, EVEN IF X AND Y VALUES ARE COMPLIANT

Key:

- Within 15mm of compliance
- Within 50mm of compliance
- More than 50mm from compliance
- Existing Compliant Value
- Existing Non-Compliant Value

Appendix B - Horizontal and Vertical Track Sketch for Option 2

See drawing 166182-NRD-MLN2-DRG-ETR-100001 P01

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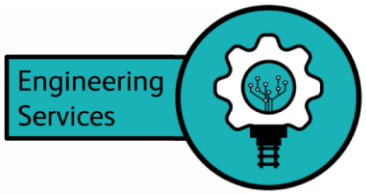

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