Ref:

Planning for Growth on the Hoo Peninsula Response Form

This response form has two parts to complete below.

Data Protection

Personal information gathered on this form will only be used for planning policy purposes and will be held in accordance with the requirements of the Data Protection Act 2018. Your contact details will be **kept confidential** but your comments will form part of the public record of the consultation and published on the council's website. Please address any questions or requests regarding our data processing practices to **planning.policy@medway.gov.uk**.

Details about how your information will be held and used are found on the link below: https://www.medway.gov.uk/info/200133/planning/714/planning_service_privacy_statement

Part 1 – Your Details

Name:
IAIN WARNER

Name of organisation (if applicable):
TETLOW KING PLANNING

Address:
[redacted]

Email:
[redacted]

Phone:
[redacted]

Ref:

Part 2 – Your Response

- This public consultation proposes a vision for growth on the Hoo Peninsula.
- The vision should help to make it clear what we want to achieve. It should be clear, realistic and locally distinctive.
- The vision is important because it will guide the objectives, policies and design principles.

The proposed vision is:

By 2037, Hoo St Werburgh will be a thriving rural town, sensitively integrated into the extraordinary landscape of the Hoo Peninsula. A valued place providing homes, jobs and services for vibrant communities. A small town with an attractive choice of travel connections. A place built for the future, and respecting the past.

1. **Do you get a clear sense of what the Hoo Peninsula will be like by 2037?**

   Yes ❑ No ✓

   Comments: While the vision for growth is set out there are still, in our opinion, too many technical uncertainties relating to the actual delivery of the vision as well as the lack of realistic timeframes to see the delivery of the vision.

2. **Does the vision describe the Hoo Peninsula as opposed to anywhere?**

   Yes ❑ No ❑

   Comments:

3. **Does the vision reflect your priorities?**

   Yes ❑ No ❑

   Comments:

4. **Is it concise and easy to understand?**

   Yes ❑ No ❑

   Comments:

5. **How can we measure success of achieving the vision?**

   Comments: The most obvious measure is to consider whether or not the vision if capable of being delivered in an appropriate timeframe and with the necessary infrastructure provision in place. Our technical review of the proposal in support of these comments sets out our view on the matter of infrastructure provision.

6. **Can you set out a better vision for growth on the Hoo Peninsula? Please tell us:**

7. **Please use the space below to make any other comments on the consultation document:**

   Please refer to the attached technical review of the infrastructure proposals relating to rail capacity.

PROPOSED STATION AT HOO – INITIAL DESKTOP REPORT

Authority & Brief

On 13 April 2020 Robert Skene Consulting (Ltd) was appointed by Odyssey Consult (OC) to undertake an initial desktop study into the likely feasibility of providing a new railway station on the Grain Branch at Hoo, close to the site of the former Sharnal Street Station, the rail service which might be provided to it, and the likely impact on other rail services. In addition, RSC was required to produce a set of questions which it is considered reasonable for promotors of the scheme to be able to answer.

Specific requirements of the brief were to briefly consider the following, at an initial desktop level of detail:

- consider where the terminus might be located on the Grain Branch, including consideration of Hoo, reinstatement of the alignment to Allhallows-on-Sea, extension to the village of Grain, or some other point on the existing alignment in the Isle of Grain;
- service options;
- operational considerations, including North Kent Line capacity, enhanced use of Hoo Junction, Gravesend stations, and freight use of the Grain Branch;
- whether a terminal station at Hoo could be compatible with freight use;
- potential financial and economic viability;
- engineering implications;
- signalling;
- station(s): where might they be located and what facilities would be required;
- is a Train Operating Company likely to serve the station.

Current Rail Infrastructure

The Grain Branch is a single track freight-only railway with basic infrastructure which leaves the North Kent Line (NKL) at Hoo Junction, some 5.35 km East of Gravesend Station. Naturally, the Up Direction is towards Hoo Junction, and the Down Direction is towards Grain.

There are both facing and trailing crossovers on the Gravesend side of the junction. Hoo Junction is a flat junction, thus Up services leaving the Grain Branch need to cross the NKL Down Line. There are extensive freight sidings at Hoo Junction on both the Up and Down sides of the NKL, and a reception loop and runround on the Up Side, with shunt necks.

The length of the branch between Hoo Junction and the boundary with DBS (the FOC[1] responsible for infrastructure beyond this point) is just beyond Grain Crossing LC, at 17.85 km, but the line continues further to the *BP Sidings* (connected directly to the reception sidings at Grain), *Thamesport Freightliner Terminal* (c1.56 km beyond the boundary), and the *Foster Yeoman Terminal* (c1.87 km beyond the boundary).

A private siding serving Brett Marine leaves the Branch at Cliff Ground Frame, some 2.35 km from Hoo Junction. A trap point on the private siding protects the Grain Branch. In addition to these, Marcroft Engineering operates a wagon repair and maintenance facility at Grain.

The Grain Branch is classed by Network Rail (NwR) as having *RA7* Route Availability and *W6* gauge. The former is a little surprising as copies of older *Route Directories*, issued by both Railtrack and NwR in RSC's possession indicate that the Branch has an *RA10* Route Availability, a figure that is more appropriate for bulk freight trains. Given that NwR has an obligation to maintain the infrastructure to at least the capability inherited by Railtrack on 1 April 1994, the latter figure should be assumed. Route Directories indicate the gauge as *W6A/B* (i.e. with a corner gauge exemption for containers), this is still somewhat of a limitation for container traffic from Thamesport, given the growth in hi-cube containers, which exceed this loading gauge on conventional container wagons. However, all Route Availabilities and gauges are acceptable for any passenger rolling stock that is likely to use the line. It is not believed that any current rolling stock used by Southeastern has has official gauge clearance for the Grain Branch, but RSC considers that obtaining this should be little more than a formality.

The line is subject to a 40 mph line speed limit but the connection and facing crossover at Hoo Junction are subject to a 20 mph permanent speed restriction (psr) (the trailing crossover has

[1] Freight Operating Company.

a 15 mph psr, but this crossover is not relevant to the proposal). Approach speed limits are also enforced on all but one of the six level crossings on the branch, as follows:

Wybourne LC	(AOCL[2])	15 mph, in either direction
Stoke Creek LC	(UWC[3])	15 mph in Down Direction & 20 mph in Up Direction
Recreation LC	(UWC)	None
Middle Stoke LC	(UWC)	35 mph in Up Direction
Stoke LC	(ABCL[4])	35 mph in Down Direction & 25 mph in Up Direction
Grain LC	(MCG[5])	35 mph in the Down Direction

Only Wyborne LC is located between Hoo Junction, and the location of the proposed station. Stoke LC appears to have been replaced by an overbridge and consequent road realignment recently, and thus no longer appears to be relevant.

The Grain end of the Branch is reached by passing through flood protection gates, some 17.32 km from Hoo Junction, thus the terminals at the end of the Branch are outside the flood protection zone. There is an approach speed limit of 25 mph to these, in either direction.

The Grain Branch is not fitted with track circuit block working, as would be required to operate a passenger service. Instead, it has basic signalling only, the single line is divided into two single line sections: Hoo Junction to Cliffe, and Cliffe to Grain. Hoo Junction to Cliffe is controlled by *Ashford Area Signalling Centre* (Ashford ASC), while Cliffe to Grain is worked by a token system, with token instruments at either end of the section. In itself, the token system would be suitable for passenger use, but only if signalling on the Hoo Junction to Cliffe section met passenger standards. AWS[6] is only provided at signals with NK signal numbers (i.e. those at and protecting Hoo Junction and *Signal NK509*, protecting the private siding at Cliffe in the Up Direction. None of the signals on the Branch appears to be fitted with TWPS[7], as would be required for passenger operations. Permissive working between Hoo Junction and *Signal NK509* is prohibited.

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2 Automatic Open crossing Controlled Locally.

3 User Worked Crossing.

4 Automatic Barrier crossing Controlled Locally.

5 Manually Controlled Gates.

6 Automatic Warning System.

7 Train Protection Warning System.

The area is controlled by Ashford ASC, local interlockings are provided at Gravesend and Hoo Junction. RSC is aware that there is limited spare capacity available within the Solid State Interlocking (SSI) at Hoo Junction (*Interlocking NH*), and does not believe that there is sufficient capacity available within the present SSI to signal the Grain Branch to passenger train standards. RSC acted as lead rail consultant for the new rail terminal at Northfleet, opened in 2012. In planning it, it was found that there was insufficient capacity within the Gravesend SSI (*Interlocking NG*) to accommodate both the new connection to Northfleet Terminal, and the remodelling of Gravesend Station (undertaken in 2013). In consequence, the interlocking boundary between Gravesend and Hoo Junction was moved towards Gravesend, to transfer functions from Gravesend SSI to Hoo SSI; this released the necessary capacity at Gravesend, but left little spare capacity at Hoo Junction, or indeed in either SSI. It is believed that the remodelling of Gravesend Station subsequently released modules within the Gravesend SSI, but that this gain was modest, and certainly insufficient for major additional signalling works[8].

The Grain end of the branch is controlled from the *Grain Crossing Signal Box*, this is a mechanical box with a, small, 9 lever frame, and dates from the construction of the Branch in 1882. In addition to Grain LC, and the siding access at Grain, this controls the single line between Cliffe and Grain, while the portion of the Branch between Hoo Junction and Cliffe is controlled by Ashford ASC. RSC believes that the boundary between Ashford ASC and Grain Crossing SB occurs at Cliffe Ground Frame. Traditional semaphore signalling is provided at Grain at protect the level crossing, including a fixed distant signal, this is of Southern Railway (1923-1947) pattern: based on experience elsewhere, were a regular passenger service to be extended this far RSC considers that NwR would insist on resignalling with modern colour light signalling controlled by a digital interlocking from Ashford ASC.

The junction with the private siding to Brett Aggregates at Cliffe is controlled by a mechanical ground frame located at its junction with the Grain Branch (*Cliffe Ground Frame/Cliffe GF*). RSC believes that tablet instruments for the Western end of the section of the line between Cliffe and Grain is located here, and are traincrew/shunter operated. RSC further believes that the ground frame is operated using using key token release, and in consequence, trains on the private siding are ‘locked out’ into it, enabling other trains to use the Branch. The tablet release

[8] The issues are exacerbated by the ‘Module 63 problem’ in the SSI used, which prevents the use of this slot for safety/reliability reasons, in addition, Module 1 is used for SSI internal functions, and others are used for interlocking proving purposes. There are 64 module slots in each SSI, and many of the modules will only control a single signal, or a signal and a set of points.

is controlled via an interface with Hoo Junction SSI: the release functions being part of the same module that controls signal *NK509*. There is not believed to be any accommodation for a shunter or signalman at Cliffe GF.

All trains need to stop at Cliffe GF to either pick up or return the tablet for the Grain end of the branch. Typically, the *Working Timetable* (WTT), has allowances for each train of 3 minutes in the Up Direction, and 2 minutes in the Down Direction to exchange tokens/tablets. It should be self-evident that this loss of time, especially when coupled to the time that would also be taken to decelerate to a stop, and accelerate back to up to line speed again, would be problematic for a passenger train service that needs to have a journey competitive with other modes. The only way of speeding this system up, other than complete replacement of the signalling system, would to provide a cabin over the tablet machine, and permanently man it, enabling tablets to be exchanged by pouch, with the train slowed to walking pace.

The Grain Branch is not electrified, nor has it ever been. Nor is there any electrification of Hoo Junction Sidings or Reception Siding[9]. The NKL is electrified using the 750V dc third rail system.

As noted above, the proposed new Hoo railway station would be located close to the site of the former Sharnal Street Station, this was some 7.84 km from Hoo Junction.

The final passenger service over the Branch (see below) operated as a shuttle between Gravesend and Allhallows-on-Sea. This terminated in either Platform 1 or Platform 2[10] at Gravesend Station, its use being facilitated by the platforms being located on loops clear of the main running lines, with through lines running through the middle of the station, enabling through trains to bypass trains terminating at the station[11]; however, as a part of the remodelling of Gravesend Station, the ability to terminate trains arriving in the Up Direction (i.e. from the East) was lost. Instead a new through platform was constructed on the site of the through lines (now designated at *Platform 1*), while the original Platform 1 (now *Platform 0*) configured for

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[9] At one time they were fitted with the rare 600V OHLE system for electric freight locomotives, but this was removed at least forty years ago.

[10] Written accounts state that Platform 2 was used, but there is abundant photographic evidence of Platform 1 being used as well.

[11] However, between duties, the push-pull service employed latterly, was sometimes either berthed in the Up Bay platform, at the London end of Platform 1: a somewhat awkward movement from Platform 2, or was shunted onto either the Down Through line or the Up Through line to allow other trains to call at the station.

terminating trains arriving in the Down Direction only, although NwR's Sectional Appendix does indicate that the Platform 1 (only) is configured for bi-directional working.

It does not appear that, for practical purposes, it would be possible to reconfigure Platform 0 at Gravesend to accept trains arriving from the Grain Branch. This is because the need for the new Platform 1 to accommodate twelve car trains has resulted in it being constructed across the position of the former crossover between the old Platform 1 and the Down Line at the Hoo Junction end of the station. Any new crossover would therefore need to be constructed further to the East, in turn, this would entail widening the covered way over the alignment at Railway Place/Stone Street. Not only would his be a major civil engineering undertaking, and very disruptive, but would also necessitate demolition of the historic building located above. Furthermore, as noted above there is little spare capacity in the Gravesend SSI, and certainly not enough to signal Platform 0 for trains arriving in the Up Direction, and those departing in the Down Direction, as well as controlling and protecting the new connection to the Down Line that would be required.

Similarly, Platform 2 could not return to being a terminal platform for Grain Branch trains as the loss of the former through lines would make this a timetabling impossibility. A further issue is that, as noted above, the existing Gravesend SSI is likely to have insufficient spare capacity to install either the necessary reversible signalling, or to control the new facing crossover that would be required at the Hoo Junction end of the station layout: this would take less SSI module capacity than the option above, but it is still likely to be more than the spare capacity available.

Historic Background

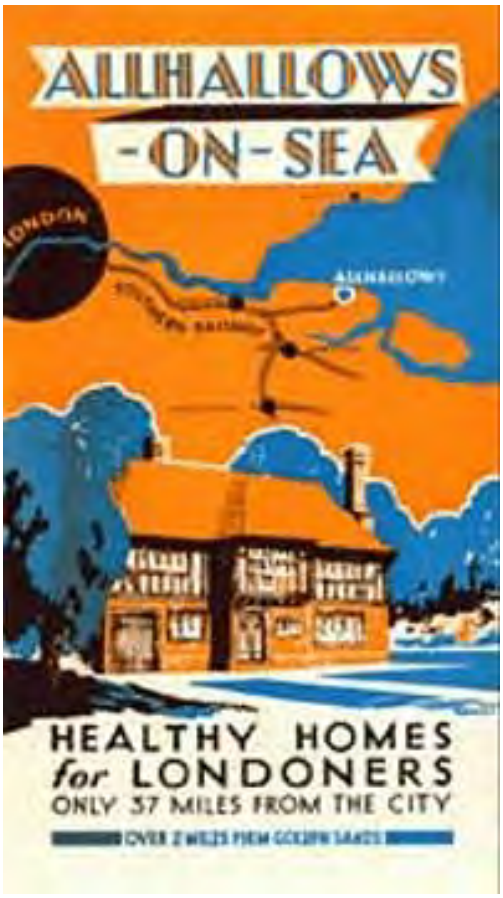
The Grain Branch has a somewhat convoluted history. It was opened by the South Eastern Railway (SER) in 1882, to provide ferry services to the Continent from Port Victoria (a pier on the River Medway at the eastern end of the peninsular at Grain) [12], originally having been promoted and construction started by a nominally independent company. This was

[12] This concept stemmed from complex factors, driven by the excessive competition between the SER and the rival London Chatham & Dover Railway (LCDR). In simple terms, a receipt pooling arrangement had been reached for continental traffic via the Channel Ports, in a rare moment of rapprochement. The LCDR later sought to circumvent this by introducing a ferry service between Queenborough Pier and The Netherlands, which was outwith the pooling agreement. The construction of Port Victoria was the SER riposte. The essential point is that the line was constructed through blinkered commercial antipathy, rather than a dispassionate view of financial viability. Once the SER and LDCR had been (effectively) forced to merge by their disgruntled shareholders in 1898 the purpose of the Hundred of Hoo Railway (and the Queenborough Pier service) disappeared.

commercially unsuccessful, with a vestigial passenger service lingering on to 1951 (being cut back to a new station at Grain thereafter), carrying oil refinery workers at shift times, some years after the remains of the pier had been demolished, and fifty years after ferries had ceased to run. It was originally styled *The Hundred of Hoo Railway*, and was built at minimum cost by the, increasingly financially crippled, SER and the under-capitalised original private company, and was lightly engineered as a result. It had a single-track formation, and is still thus.

The commercial failure of the passenger service led to initiatives to develop freight traffic, by establishing industry on the Hoo Peninsular; this was more successful: various industries, and freight sidings have come and gone over the years, which continues to the present day, and provides the reason for retention of the line.

In 1906 six halts were opened in search of more passengers. Further efforts were made to stimulate passenger traffic on the Hoo Peninsular by the Southern Railway, which opened a 2.81 km spur, leaving the Grain Branch at Stoke Junction, to Allhallows-on-Sea in 1932, which it hoped to develop as a holiday resort, and commuter town. A period advertising poster to promote it, produced by the Southern Railway is reproduced alongside, this was part of an energetic publicity campaign to promote the resort. While initially successful, despite the bankruptcy of the developer due to failure of houses to sell, increasing car ownership after the Second World War, coupled with the limitations imposed by the constraints of the railway infrastructure, and rising public expectations for the quality of resorts and places to live, resulted in traffic dwindling to a low level quickly. All passenger services were withdrawn in December 1961: the railway failing survive even long enough to become a victim of the 'Beeching Cuts'.



Passenger services to Grain Station ceased at the same time.

Existing Rail Services

On a typical midweek day[13], there are a total of between 43 and 47 timetabled freight paths to and from Grain and a total of between 22 and 24 to and from the Brett Marine Terminal at Cliffe, a maximum total of 71. This, however, grossly overstates the number of freight services that actually operate, as freight trains operate flexibly, in accordance with demand: paths are required to all possible destinations, and to cover the maximum supply envelope for each. The reliability with which services operate varies considerably with the type of train: intermodal trains, such as those from Thamesport, can be expected to run dependably (in normal circumstances), in contrast trains of construction materials, such as those from the Foster Yeoman aggregate import terminal, and the Brett Marine dredged aggregate reception terminal, run erratically, driven by the vagaries of the construction industry.

Efficient use of limited capacity on the national rail network dictates that excessive provision is not made for trains that do not run. In consequence, freight trains that run infrequently are often allocated *Q Paths*, these are conditional paths, that depend on other trains not running; sometimes several trains will share the same the same path, of which only one can run. NwR's timetable database indicates that the overwhelming majority of trains on the Grain Branch run to *Q Paths*, for example, Monday to Friday there are four *Q Pathed* empty trains scheduled to arrive at the Foster Yeoman terminal at Grain at 00.08½h, from Harlow, West Thurrock, Ferme Park, and Purley: clearly only one of these can run on a particular day. If one takes out services that are obviously mutually exclusive, this reduces the maximum number of daily freight trains to 24 Up and 25 Down trains (on a Wednesday)[14].

The current Coronavirus crisis has resulted in a major reduction in the number of trains operated, while the publicly available access to the NwR timetable only extends for fourteen

[13] Note that there appear to be more viable paths allocated in the Down Direction than in the Up Direction, and while the number of Up and Down trains does not necessarily need to balance on any one day, over time they need to; accordingly, the number of viable Down paths has been reduced slightly herein from the maximum value, to reflect the feasible maximum.

[14] Freight traffic tends to be at its busiest between Tuesdays and Thursdays. Mondays tend to be particularly quiet as a result of few incoming trains arriving in the morning, after the weekend. Therefore, it is almost always best to examine peak freight use by looking at Tuesdays, Wednesdays, Thursdays, and (sometimes) Fridays.

days in arrears. Therefore, it has not been possible to report the precise number of trains that operate under normal circumstances. Over the seven day period between 8 and 14 April 2020, a total of just 27 trains ran. Published sources indicate the normal level of service to be around the one train per hour level, which has therefore been assumed herein.

Freight train operations are less permanent than passenger operations: the need for particular commodities, and the fortunes of particular companies change over time, and thus freight flows can dwindle and disappear, while new ones materialise. Accordingly, it is the future freight trends that are pertinent to any passenger operation on the Grain Branch, which of necessity would take several years to implement, rather than current or historic freight traffic trends. Naturally, future demand projection is fraught with error; nevertheless, all four of the current freight terminals on the Branch appear to have clear trajectories:

Foster Yeoman: this terminal has the greatest number of timetabled trains on the Branch at present, importing aggregate[15]. A number of the major mainland sources of crushed rock aggregate are reaching the end of their natural lives (East Midlands, Mendip Quarries, etc.), and successive Governments have shown no strategic vision for their replacement; therefore, by default, increasing quantities of crushed rock aggregate will need to be imported, whether from the Foster Yeoman (FY) quarry at Glensander in Scotland, or from Norway. This is particularly true of London and the South East, which has almost no sources of crushed rock. It therefore appears inconceivable that rail tonnages from the FY import terminal at Grain will decrease, indeed the opposite is likely. Fluctuations from year to year are inevitable, as demand is driven by the level of activity in the construction industry, which in turns tends to be driven by the economic cycle.

Brett Marine Aggregates: this terminal has the second greatest number of timetabled paths on the Branch, it imports aggregates marine dredged aggregates, understood to be dredged from the Thames Estuary. Given the lack of crushed rock in the South East, the extraction of sands and gravels is important at a regional level, and given the planning difficulties, and the limited life of individual sources, it is a constant struggle for aggregate companies to keep up with demand. Thus, it appears unlikely that rail tonnages from this terminal would decrease in the foreseeable future.

[15] In essence, there are four types of aggregates: sands, gravels, crushed rock (of various grades), and secondary aggregates (recycled materials, which limit the need for primary aggregates). All of these have specific uses.

Thamesport: the importance of Thamesport has declined dramatically in recent years: twenty years ago it was one of the UK's five main deep sea container ports, now it appears to be 'hanging on by its fingernails'. This has been driven by a number of factors, and not just the emergence of the major new intermodal port at Thames Gateway. One factor was the volume-driven cost structure of intermodal port and terminal operation, where the strong grow stronger and the weak dwindle: Thamesport never managed to develop the critical level of traffic needed to challenge the duopoly of Felixstowe and Southampton, who were able to use their advantage to significantly increase market share in an expanding market, squeezing out the smaller players. The lack of gauge clearance on the NKL for the increasing number hi-cube (9'-6") containers, on standard wagons, was a further factor. It is possible to postulate two alternate futures for Thamesport: one in which it ceases operations, and the other in which it continues as a small feeder port serving the South East corner of England. Neither offers much future for a rail service. However, only a vestigial rail service Thamesport remains in any event: just nine trains per week are timetabled to and from the terminal, thus closure of the terminal would make little difference to the overall level of freight activity on the Branch.

BP: refining activity on the Isle of Grain ceased in 1982, as part of the progressive decline in UK refining capacity, since when it has acted as a storage terminal. A mixture of pipelines and product swaps between the majors has decimated oil by rail traffic over the past fifty years, leaving only a small rump of traffic that cannot be moved by pipeline, mainly bituminous traffic, and low volume off-pipeline flows. In consequence, only eighteen trains per week, and a maximum of three trains per day are now timetabled to and from Grain oil storage facility, and fewer still are likely to actually run. The notable feature of the oil traffic is that it is a seven day per week operation: only these trains and a single Brett Marine train run on Sundays, although this would be the least critical day of operation for a passenger service, due to the general reduction in the number of trains operated on the national rail network on this day.

From the above it can be deduced that the current level of freight activity on the Grain Branch appears unlikely to decrease, and, if anything, is likely to increase.

The following booked train timings on the Grain Branch in daytime are typical:

Grain (Old Station) to Hoo Junction (intermodal)	29 minutes

Grain (Old Station) to Hoo Junction (bulk)	36 minutes
Hoo Junction to Grain (Old Station)	25 minutes
Signal NK509 (dep) to Hoo Junction (intermodal)	7½ minutes
Signal NK509 (dep) to Hoo Junction (bulk)	9 minutes
Hoo Junction to Signal *NK509* (arr)	4 minutes

Note, it is to be expected that booked timings are longer in the Up Direction, due the need to apply a junction margin at Hoo Junction; in the early hours of the morning there is much less need for a junction margin, and thus the Up and Down timings are more closely matched. It is also to be expected that intermodal trains are timetabled to be faster than bulk freight trains, and have better performance characteristics, even though the TOPS codes indicate that the intermodal services to Thamesport operate to *Class 6* timings, rather than the *Class 4* timings that one would expect.

The NKL has an intense passenger service in the morning and evening peak, particularly on the approaches to London, where it can be assumed that no capacity for another regular service exists. But, as a broad generalisation, the available capacity increases progressively as one moves further from London. Indeed, there appears to be spare capacity between Gravesend and Hoo Junction.

Standard operating practice on Southeastern is to have a regular service pattern, operating at the same minutes past each hour in the off-peak period, but with additional trains, and a less regular time interval pattern, in the peaks. Gravesend Station currently enjoys the following off-peak service:

Victoria – Gravesend (stopping)	2 per hour	Terminates
Charing Cross – Gravesend (fast Dartford to London)	2 per hour	Terminates
Luton – Rainham (*Thameslink*)	2 per hour	Stops
St Pancras International – Faversham (*Javelin*)	1 per hour	Stops
St Pancras International – Ramsgate (*Javelin*)	1 per hour	Stops

Additional services operate in the peak.

During the off-peak period four passenger trains per hour pass Hoo Junction in either direction. But in the evening peak this rises to a maximum of six per hour in either direction.

In contrast with freight traffic, there is no reason suspect that is likely to be any great change in the pattern or frequency of passenger services, other than might be introduced by the present proposal: while a significant overhaul of *Thameslink* services is planned on completion of the *Thameslink Programme* (originally called the *Thameslink 2000* programme, it was planned to be in place by the Year 2000, but is still not complete, providing a powerful example of NwR's and the Government's (both major parties) inability to deliver major rail projects), it is still proposed that two off peak services per hour will operate between Luton and Rainham via Gravesend. In the longer term, increasing passenger numbers are likely to lead to an increase, rather than a diminution, in the number of rail services.

Typical current journey times from Gravesend Station to other key destinations (outward direction, off peak) are as follows:

St Pancras International (*Javelin*)	24 minutes
St Pancras International (*Thameslink*)	75 minutes
London Victoria	65 minutes
London Charing Cross	55 minutes
London Bridge	45 minutes
Dartford	11 minutes
Rochester	15 minutes
Chatham	18 minutes

Southeastern trains are formed of a variety of classes of electric multiple units (emus) from the Southeastern fleet, and are up to twelve cars long.

Thameslink services are formed of Class 700 emus and normally run as eight car trains.

Operational & Commercial Implications of Proposed New Station

Operational

Any passenger service on the Grain Branch would need to fit the operating practice of regular off-peak services, operating on a clockface pattern. RSC suggests that to be attractive to potential users that a maximum service interval of 30 minutes would need to be provided.

Given the lack of capacity into London, and the inability to terminate Up services at Gravesend Station[16], the obvious way to serve the Hoo Branch, would be to extend services that currently terminate at Gravesend. The only other option would appear to introduce a new service between the Grain Branch and Dartford Station; however, this does not appear to be an attractive option, partly because the feasibility of finding platform capacity at Dartford is questionable, which might well eliminate this option on feasibility grounds, and secondly, on cost/financial feasibility grounds: it would be more expensive to run a new stand-alone service than extend an existing service, which would negatively impact on financial and operational feasibility of the entire scheme.

The obvious candidates for extension are the half-hourly services to London Victoria and London Charing Cross, extension of either would give a 30 minute service frequency, while extension of both would give a 15 minute service frequency. It has been assumed herein than only one of these services would be extended, since not only would a 15 minute service appear excessive for the patronage that is likely to be available, it would cause serious operational difficulties on the single line of the Branch, would require two passenger trains to be held on the Branch while operating freight service and while there are various ways in which this might be managed, all have multi-million pound CAPEX implications, and it would increase the operational difficulties of Hoo Junction.

Either of the two services could be extended, as their timetabled off-peak layovers at Gravesend are fairly similar: 11 minutes for the Victoria service, and 9 minutes for the Charing Cross service. Naturally, the longer the layover the greater the potential to enhance the efficiency of asset and (possibly) staff utilisation through service extension, and reduction in

[16] Even though Platform 1 appears to be reversibly signalled RSC does not consider that it would operationally feasible to do so, on platform occupancy grounds: a half hourly service would prevent us of this platform for at least a quarter of every hour.

the additional rolling stock requirement of the extended service. In this case, as the layovers are close to minimum values, there is no efficiency gain to be had from the proposed re-opening of the Grain Branch to passenger services.

However, any new service is configured platform occupancy at Gravesend Station is an issue that would require careful examination. This issue is most acute in the peak periods, and is one in which a detailed review is outwith the scope of this initial desktop report. Extending services that already terminate at Gravesend does not alleviate the issue, as these would be switched from *Platform 0* to *Platform 2*. RSC has briefly examined the off-peak position, and believes that there is unlikely to be an issue in the off-peak period.

Given the need for freight services to use the Grain Branch throughout the day, how services terminate on the Branch is of crucial importance. The difficulty of the issue is compounded by the fact that, unlike passenger services, freight trains rarely run to a clockface pattern, and certainly do not on the Grain Branch. This is not only because of the demands of freight users and customers, and FOC rostering requirements, but because pathing long distance freight trains is a complex matter, as they can pass through several timetable zones, through several congested nodes, and because of the need in places to flight freight services on some lines; in consequence freight paths tend to be fitted-in, in a manner which can appear random to the outsider. Compounding this is the fact that freight services can often run early or late[17]. It might be argued that Hoo Junction yards might be used as a buffer to isolate the Grain Branch from erratic freight train timings elsewhere on the national rail network, but RSC does not accept this: holding freight services would cost the FOCs money, which undoubtedly would have to be found directly or indirectly from the passenger operation; any such proposals would generate strong, and quite possibly fatal, objections from FOCs during the *Network Change* process; and RSC doubts that this would be possible for all freight trains in any event.

If passenger services were to terminate at a single platform station on the main running line at Hoo, RSC projects that this would occupy the single line between Cliffe and Grain for between

[17] In most cases, a freight train is only classed as late if it is more than 15 minutes late, so exact time adherence is less important.

27 to 42 minutes every hour, depending on option[18]. It should be clear to all that this would be unacceptable. There are three possible solutions to this problem:

1. to locate the platform at Hoo clear of the running line, this would require a signalised connection to the Branch;
2. to reinstate the station at Grain, which was built in 1951 for twelve coach trains, this would require the boundary between NwR and DBS to be moved further East, the signalled area to be extended accordingly, the extant platform to be refurbished, public access, passenger information systems, lighting, etc. to be installed, and all level crossings on the line brought up to a standard suitable for passenger operation, and relocation of the Marcroft facility; or
3. to reinstate the Allhallows-on-Sea Branch, at least in part (see below).

All of these possible solutions have multi-million pound additional costs. *Option 1* would have the lowest CAPEX, *Option 2* would incur an eight figure additional CAPEX, and increased OPEX, and appears likely to generate little additional revenue, *Option 3* is likely to be little, if any, more expensive than *Option 2* in CAPEX terms and cheaper in OPEX terms, while gaining additional revenue from the proposed new development at Allhallows. Accordingly, RSC suggests that *Option 2* can be dismissed. RSC is sceptical whether the additional revenues that *Option 3* should generate over *Option 1* would be sufficient to justify its higher costs.

A further consequence of the single line occupancy times is that a passing loop would be required on the Branch, with a half-hourly service, as the Up and Down trains would need to cross each other on the single line, even if the line speed were to be improved and speed restrictions eased, as proposed herein. If no such improvements were made, two passing loops would be required. Indeed, without them it appears that even an hourly service would require a passing loop. Naturally, a 15 minute service interval would require even more passing loops, or more probably, at least partial, double tracking.

As noted, above Up services from the Grain Branch would need to cross both the Up and Down tracks of the NKL. Trains coming off the Grain Branch can only cross the Down NKL when the signals have cleared behind the proceeding NKL Down service, with a sufficient clear window

[18] Figures bases on RSC's journey time estimates (*qv*). Lower figure is that with line speed improvements, etc., higher figure is without these.

to prevent delay to the following NKL Down service, and into a suitable gap between Up NKL trains. When timetabling trains, junction margins need to be added into train timings for moves such as this: an additional two minutes for Up trains would be fairly normal allowance. Detailed examination of the capacity of Hoo Junction is outwith RSC's present brief; RSC's suspects that there should be no great problems in the off-peak period, but that this issue is likely to be more challenging in the peaks, where, at best, Up trains from Hoo might have to wait at the approach signal for a path. Given that NwR has been working with the promoter on the scheme for some years (see below), NwR has no doubt performed *Railsys*, or similar, simulation to establish the feasibility, or otherwise, of the Hoo Junction aspects of the scheme.

Commercial

Given the foregoing, it appears inconceivable that the operator of the proposed new service could be other than *Southeastern*; it is necessary to consider its likely perspective therefore.

There are two elements to the commercial case for the scheme as far as an operator is concerned:

1. Would introducing a passenger service over the Grain Branch enhance profitability for the operator?
2. At the level of individual stations, would a station call enhance profitability? This applies both to any new stations on the Branch, and to any other calls that are introduced at other stations in consequence.

Stopping trains costs train operators money, both directly (e.g. energy, brake wear, number of door operations, traincrew costs from longer end-to-end times, etc.), and indirectly (loss of income from other station pairs due increased journey time, and reduced service reliability and robustness, leading to increased penalty/compensation payments).

There therefore needs to be a business case for the operator to operate the proposed new service, and also to stop a train at any new station, in which it considers that increased revenue from the additional station stop(s) is greater than the costs, and other revenue losses, that it would incur. In some cases, external funding, or other incentives, can be required to tip the balance.

The easiest way to ensure that both a passenger service over the Branch is operated and that all station are used would be to have its use written by the DfT[19] into the service specification for the next South Eastern franchise agreement. Naturally, this would require the DfT to be convinced of the merits of the scheme. RSC's experience The DfT will require the promoter to demonstrate (to *Green Book* standards), that both the direct operating costs of the scheme are less than the extra revenue that would be generated, and that the BCR[20] exceeds a threshold that it will set: normally 1.5:1, but the DfT is normally more comfortable with values in excess of 2. Developing a scheme to *Green Book* standards is costly: in the case of this scheme RSC considers that it would be well into six figures.

Schemes of this nature, that depend on future development for viability are difficult to 'stack up', because of the lag between the CAPEX and the timescale required to revenues to exceed OPEX. In RSC's experience, the DfT normally requires a scheme to break even within three years. This appears challenging for the proposed scheme, and it appears to RSC that it is likely to be dependent on the promoter underwriting the operating costs to have any chance of commercial reality.

NwR tend to take an even more jaundiced view of new stations than operators, this is because of the way that the railway industries financial structure operates: essentially, over 90% of NwR's income can be considered to be fixed, for providing the infrastructure on which franchised services can operate, but being subject to penalty payments for failing to provide this. Naturally therefore, although NwR is legally required to facilitate enhancements to the national rail network, it tends to be nervous about anything that uses more network capacity, or reduces network robustness or resilience. For this reason, the delivery process is exhaustive, time consuming, and expensive (see below), and designed to shield NwR from risk. It would be unrealistic to expect that NwR would be genuinely excited by the prospect of reintroducing a passenger service on the Grain Branch, or would welcome it, privately.

[19] Department for Transport.

[20] Benefit:Cost Ratio.

The Delivery Process

The scheme development process for works subject to NwR technical approval is a rigidly defined process known as the Governance for Railway Investment Projects process (the GRIP process). There are eight GRIP stages as follows:

1. Output definition
2. Feasibility
3. Option selection
4. Single option development
5. Detailed design
6. Construction test and commission
7. Scheme hand back
8. Project close out

Many participants consider the GRIP process, which was originally imported as a risk-averse process from the nuclear industry, to be somewhat unwieldy, excessively bureaucratic, and unsuited for smaller projects. However, there is no alternative to adhering to this process if works are required to NwR infrastructure, or on its operational lands.

There is a two-stage design process: at *GRIP 3*, and at *Stages 4* and *5*. The relative importance of these two stages varies with the discipline, for example the major design input for permanent way is at *GRIP Stage 3*, whereas that for signalling occurs at *GRIP Stage 4/5*. One of the greatest criticisms that RSC would level against the GRIP process is that NwR makes a change of its project team between *GRIP 3* and *GRIP 4* mandatory. This has three unfortunate impacts:

1. effort expended on a minor scheme in producing and approving an intermediate design output;
2. loss of momentum due to the learning curve of new NwR project management team;
3. unwillingness to allow minor, and inconsequential, unresolved design issues continue through into *GRIP Stage 4*, forcing the entire scheme to pause while these are resolved, this appears to stem from a universal concern of the *GRIP 3* team to avoid explicit or implicit criticism from their *GRIP 4/5* colleagues.

In addition to the above, there are GRIP Stage Gate Reviews. The number of these that are held is at the discretion of NwR, on the largest and most complex schemes they could be held at the end of each GRIP Stage. However, even on the simplest schemes there is mandatory minimum of four, most crucially at the end of *GRIP Stages 3* and *5*. *"Stage Gate Reviews are key checkpoints within a project to establish that a project has delivered products that were specified to be delivered, and if a project can proceed to the next Stage"*.

In theory, it is possible to jump GRIP stages at the start of a project, but much depends on the attitude of the individual NwR staff involved. However, in the case of the proposed Hoo Station, the need to develop a business case, is likely to militate against this.

The process of getting technical sign off at each GRIP stage can be frustrating, and can sometimes be held hostage by intra-disciplinary disagreements within NwR: on occasion RSC has had to support clients in their attempts to broker an agreement between different technical disciplines within NwR. In RSC's experience it is rare for NwR's approvals at the design stage to be received by the due date.

A fundamental procurement decision that will need to made at an early stage would be whether to procure the project from NwR under either:

- a *Development Service Agreement* (DSA); or
- a *Basic Asset Protection Agreement* (BAPA)/*Asset Protection Agreement* (APA).

Under the DSA, the client engages NwR to provide the station, NwR will manage the entire project, who procuring all the services required to deliver the entire project, with the client paying the bills. Whereas under the BAPA/APA[21] route the client is responsible for procuring the design and construction of the station, with NwR only being responsible for design approvals, and industry processes such as *Network Change*. The conventional wisdom is that the DSA route is more expensive, whereas the BAPA/APA route gives the client more control, and oversight, over the project. RSC's normal advice is that clients go down the BAPA/APA route, procuring a design & build contract from *GRIP Stage 3* onwards, but the task of concluding an APA cannot be underestimated: in one project that RSC was involved with, the

[21] A BAPA is used for the early stages, which needs to be converted into a more complex APA for the construction phase.

client's and NwR's legal teams took ten months to finally agree the wording of an APA, despite the existence of a standard template approved by the ORR.

Frequent changes of NwR project manager are also common (six in five years on one project that RSC worked on), which can either arrest or accelerate progress on a project, depending on the relative qualities of the project managers: NwR has some outstanding project managers, but others who are less so.

While the GRIP process is likely to dominate matters, once it has commenced, there are, however, other processes that need to be considered, not the least of which would be to gaining the support from the TOC[22] for the new station, and to guarantee that it would stop its trains there; or else to have the project adopted by the DfT. There are other industry approvals, e.g. *Network Change*, but none of these are as problematic as the GRIP process.

Constructing the station would require possessions[23] of the railway to construct. While these can be arranged at short notice, there is a sliding scale of possession charges, which increase heavily as the notice period reduces, meaning that possessions need to be booked more than a year in advance to avoid a booking fee. Nevertheless, possessions are costly, not least due to the compensation costs that have to be paid to train operators; therefore, wherever possible, possessions should be shared with other schemes, and with NwR maintenance activities, to spread the costs. NwR have teams of possession planners, in RSC's experience these are expert in their jobs, and helpful in finding solutions.

Projected Journey Times

In steam days, the timings varied over the years: initially timings of as little as 18 minutes were booked between Sharnal Street and Gravesend, stopping only at Cliffe, with additional halts the best time had increased to 23 minutes by 1924, and remained at a similar level until closure in 1961, when 23 minutes was a typical timing, and it appears that 21 minutes was the fastest

[22] *Train Operating Company*, i.e. rail passenger service operator.

[23] Temporary closures of a line, or part of a line, to enable construction activities close to the railway to be undertaken, that are considered to be hazardous while trains are running (e.g. platform construction). These can vary from temporary blocks between trains for minor activities, through *Rules of the Route* possessions at times when no trains are scheduled (often in the early hours of the morning), to weekend possessions (often of 56 hours), through to multi-day closures on the largest projects. Possessions other than *Rules of the Route* possessions involve train diversions and/or bus replacement services, which incur compensation charges.

timing. Timings between Gravesend and Allhallows-on-Sea at closure varied between 33 and 40 minutes in the Up Direction, and between 30 and 35 minutes in the Down Direction.

If the existing line speeds, psrs, approach speed limits, and the token exchange system at Cliffe were to remain unchanged RSC considers that typical journey times from the proposed new Hoo Station are likely to be of the following order (for the purposes of this exercise, travelling times to Hoo Station can be assumed to be 3 minutes less in most cases, direct service to Victoria/Charing Cross assumed):

Gravesend	25 minutes
St Pancras International (*Javelin*)	56 minutes
St Pancras International (*Thameslink*)	109 minutes
London Victoria	90 minutes
London Charing Cross	80 minutes
London Bridge	70 minutes
Dartford	36 minutes
Rochester	48 minutes
Chatham	51 minutes

If on the other hand the line speed were to be increased to 60 mph, the approach speed limits to Wyborne LC were to be removed, and the line re-signalled on the track circuit block system throughout, as discussed below, then RSC would anticipate that the journey times from the station would be likely to improved as follows (for the purposes of this exercise, travelling times to Hoo Station can be assumed to be 2 minutes less in most cases):

Gravesend	16 minutes
St Pancras International (*Javelin*)	47 minutes
St Pancras International (*Thameslink*)	100 minutes
London Victoria	81 minutes
London Charing Cross	71 minutes
London Bridge	61 minutes

Dartford	27 minutes
Rochester	39 minutes
Chatham	42 minutes

It should be noted that none of the above times assume that any delays would occur at any of the passing loops, through which trains would pass at full line speed. This is a somewhat heroic assumption, which would only be achievable with both a higher degree on operational discipline than is achievable on the, complex and difficult to operate, South Eastern network, and if extended passing loops were provided. Even then, 60 mph turnouts would be required, which are large and costly items that would be unlikely to be provided: in reality 40 mph turnouts are likely to be best that would be provided. The above times should therefore be seen as somewhat optimistic.

Subject to suitable signalling and level crossing protection arrangements, there appears no technical reason why the line speed could not be increased to the same 70 mph speed limit as the NKL, but only around 30 seconds in journey time would be gained, although the increase in CAPEX is also likely to be minimal.

Rolling Stock Implications

Either scenario would require the TOC[24] to have more units in service to cover the increased cycle time of the extended service, but the answer is different in each case. If the existing line speed, etc. were not to be increased then an additional two trains, equivalent to six four car emus would be required for a half-hourly service. Whereas, if the speeds were to be improved as described above a single additional train (three emus) would suffice.

While it might be possible that *Southeastern* might be able to find some of the additional rolling stock from within its existing fleet, by improved utilisation, this should not be assumed, as TOCs devote considerable effort to utilising their, expensive, rolling stock efficiently, and have optimised fleet utilisation over many years. It should therefore be assumed that this number of additional sets will need to be leased.

[24] Train Operating Company: an operator of franchised rail passenger services.

It is an unfortunate fact that, as it only appears possible to serve the Grain Branch by extending a terminating service from Gravesend, that it will be necessary to procure more additional emus than the likely patronage on the Hoo Branch would justify, as the train length is driven by capacity requirements closer to London. Given the very high costs of leasing rolling stock, this cannot but have a severe negative impact on the commercial viability of attempts to re-introduce a passenger service on the Grain Branch.

Engineering Aspects

Overview

As discussed above, implementing this scheme would involve more than simply constructing a station: it would be necessary to bring the parts of the line used for passenger services up to suitable standard for regular passenger operation. Some of the works would be mandatory safety requirements, or works that NwR would require in discharging its role as a *Duty Holder* under ROGS[25], while others would be required to make rail competitive with other modes. Essentially, the following minimum works would be required:

- construction of new station;
- complete re-signalling of line;
- bringing permanent way up to passenger standards;
- electrification of parts of the Branch used by passenger services;
- replacement of level crossings on passenger route;
- line speed enhancement.

In addition, there are other option-dependent works that would be required were these to be exercised, these include:

- any further stations from extension beyond Hoo;
- any further intermediate stations, e.g. Cliffe;
- reinstatement of branch to Allhallows-on-Sea;

[25] *The Railways and Other Guided Transport Systems (Safety) Regulations 2006*.

- train berthing facilities.

It is understood that NwR have been considering the infrastructure enhancements that would be required to re-introduce a passenger service on the branch for some time: *"Network Rail's System Operator team are working with Medway Council to identify the challenges of reintroducing passenger services to the Grain Branch"*[26]. RSC therefore considers that it would be reasonable to expect that promoter should have a good grasp of the works that are required, and the main technical challenges that would need to be faced. It should therefore already have answers to these questions.

Station Facilities

As noted above, Hoo Station would need to have a platform long enough to be able to accommodate twelve car trains: an absolute minimum length of 245.2 metres. If the platform is constructed as a terminal platform, clear of the running line additional overrun will be required beyond the platform to the stops, as dictated by a risk analysis undertaken to RSSB[27] standards.

The form of the station will be determined by the decision on where trains terminate on the Grain Branch. If trains were to continue beyond Hoo Station to Allhallows-on-Sea or Grain, then only a single platform on the running line would be required. This would not even require specific signalling. But if, on the other hand, trains were to terminate at Hoo then the platform track would be a spur off the main running line (possibly on the same formation and parallel to it). This would require a power worked turnout to be provided, and for this connection to be protected by signals in either direction, most likely with a junction indicator on the approach. In effect, this would then split the Grain Branch into three single line sections: Hoo Jcn-Cliffe, Cliffe-Hoo Station, Hoo Station-Grain. Naturally, this second option would increase the cost of the station considerably, probably by around £7M plus contingencies.

Platform canopies will need to be provided over at least part of the length of the platform. Ticket machines, seating, CCTV, panic alarms, and passenger information systems would also be required.

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[26] *South East Route: Kent Area Route*, NwR, May 2018.

[27] Rail Standards and Safety Board.

Naturally, effective integration with other transport modes would be key to the success of the new railway station. As such interchange with bus, 'kiss and ride', taxi bays, shot term 'station business' parking, and disabled parking should be provided as close to the platform, as is possible. Behind this a dedicated station car park will be required, of more than adequate size for the maximum anticipated use, so that users can always be sure of finding a parking space (otherwise many potential users would avoid the station), electric vehicle charging points should be provided, with passive provision to increase the number of these easily, as electric vehicle use increases. The cost of car parking is likely to be key determinant of the ability of the station to attract users from elsewhere on the Hoo Peninsular, this could be a problem, as successful station car parks can be seen as unregulated 'cash cows' by TOCs.

The size of the car park would be heavily determined by whether the catchment area of the station is to be the entire Hoo Peninsular, or whether other stations are provided on the peninsular.

Signalling & Level Crossings

Insofar as signalling is concerned, the *de minimis* works to permit regular passenger services onto the Grain Branch would be to provide TPWS on all the signals protecting passenger train movements, convert the Hoo Junction to Cliffe portion of the line to a track circuit block system, installation of at least one signalled passing loop, and a facing point lock on the turnout to the Cliffe private siding, which given that it was installed after passenger services ceased, might well not be so fitted. The turnout into Hoo Junction Down Sidings might also require facing point lock protection. However, not only would even this limited work exceed the available capacity within *NG* SSI in RSC's opinion[28], but it would not provide a working solution, in view of the inability to terminate trains on the running line at the proposed Hoo Station without disrupting freight operations.

Thus, the minimum signalling works would consist of TPWS, one/two signalled passing loops (number dependent on option), plus (probably) facing point protection where required, at least five signals, and a power worked turnout at and protecting the new Hoo Station, relocation of the token machine from Cliffe to Hoo, and enhancement of the capacity of *NG* SSI.

[28] RSC believes that the works described below would require 15 to 20 modules in the SSI, way beyond the available module slots.

The enhanced SSI capacity could be delivered either by splitting the existing *NG* interlocking into two geographic areas, or by replacing the SSI by a more modern interlocking with several times the capacity of the existing SSI. Either approach should give more than sufficient capacity for any works envisaged on the Grain Branch. But both approaches would require a new digital interlocking to be provided.

However the adjustments to the local interlocking capacity are made, any interventions with the functions of an SSI are phenomenally expensive, given the design, checking, installation, and testing requirements. Once this expenditure is invoked it would then become a nonsense not to re-signal the Grain Branch to modern standards, as, provided that everything is designed in from the outset, the incremental additional cost that would be incurred would be a small fraction of the total cost.

Thus, RSC considers that the only sensible solution is to re-signal the entire line on the track circuit block principle to passenger train standards as far as Grain LC/Stoke Junction. The connection to the Brett Marine private siding at Cliffe would become a signalised and power worked connection, with private siding working commencing beyond the signal protecting the Grain Branch on the private siding leg. Token exchange, and the need for trains to stop, at Cliffe would be abolished. The signalling would be designed for the maximum line speed envisaged.

Additional telecoms equipment would be required (e.g. signal post telephones), this might require an upgrade and/or extension of the local railway telecoms network.

RSC considers that retention of Wybourne LC as an AOCL is unlikely to acceptable to either the *Duty Holder* or the ORR if a half-hourly passenger service were to be introduced on the line. Accordingly, a full barrier crossing would be *de rigueur*, most likely with CCTV surveillance and obstacle detection. This would have the advantage that it would eliminate the 15 mph approach speed limits on this crossing. CCTV coverage would be monitored from Ashford ASC

In the event that the service were to continue to the East of the proposed Hoo Station all of the crossings, other than Grain LC, would require similar replacement. But if a service were to be provided to Grain Station, RSC suspects that NwR would insist on the replacement of Grain Crossing Signal Box in any event, and thus Grain LC would be replaced in modern form as well.

An ergonomic study would be required at Ashford ASC to verify that train control on the Grain Branch, and monitoring CCTV coverage from level crossings is within a signaller's capacity. Given, that the standard is that a single signaller is only permitted to monitor CCTV coverage from four level crossings, it may very well be that an additional signalling desk would be required within Ashford ASC, with significant CAPEX and OPEX implications.

Permanent Way

A permanent way condition survey would be required before RSC could comment meaningfully on the works that would be required to bring it up the standards required for passenger operation, and for higher speed running. However, while RSC is sure that NwR maintains the track competently to a standard suitable for freight-only use, this is not the same standard as would be required for the proposed scheme. Projects that convert British freight-only lines into passenger lines, or which seek to increase line speeds always require extensive quantities of track renewals, and the remainder of the track to be re-fettled.

The condition of the formation is likely to be more of a concern than is normally the case, given that parts of the formation run across marshland. Although, passenger trains impose much lower axle loads than loaded bulk freight trains, the geometric and stability standards that the formation must meet are higher. In consequence, it is possible that expensive and disruptive remedial works to the formation might be required, although RSC believes that this should be seen more as a risk factor, than as a cost item that should be included in cost estimates, at present.

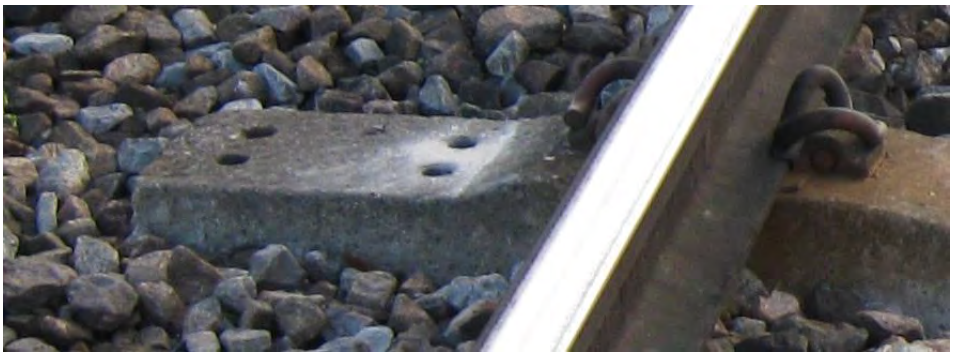
Electrification

All of the possible service options would entail the operation of electric multiple unit (emu) rolling stock, and any parts of the Branch over which passenger services operate would therefore need to be electrified on the 750V dc third rail system that is standard on this part of the national rail network. The promotor might attempt to claim that hybrid or battery technologies, that are now starting to appear in the rail industry might be used; however, RSC does not consider this a credible argument in the present case, given that viability appears to depend on extending an existing service over the Branch, and thus all trains in the existing service group would need to be replaced by hybrid units, at a cost of many tens of millions of pounds.

Given that the Office of Road and Rail Regulation (ORR), the statutory safety body from whom the *Duty Holder* (NwR) would need to obtain approval, is opposed to further extension of the third rail network, it is by no means certain that the ORR would grant approval to electrify the Branch. However, RSC believes that it is more probable than not, that approval would be granted as a *"small infill electrification"* scheme. Nevertheless, enhanced safety features, beyond those encountered on the heritage third rail network are likely to be required, including clip-on insulating plastic shrouds around the sides and underside of the third rail throughout, and enhanced grids at crossings.

Given, that it would be necessary to cater for twelve car trains, RSC believes that although it should be possible to electrify to Hoo with single additional substation this is likely to need to be rated at around 6-7 MW. Were the passenger operation to be extended further to either Allhallows-on-Sea or Grain, either one or two more substations would be required. Power supplies to the substation(s) and feeders would also need to be provided, although RSC suggests that, given the legacy of power generation on the Hoo peninsular that a suitable power supply runs to substations should not be difficult to arrange, or be exceptionally costly.

Third rail requires special sleepers and bearers to support the insulators holding the third rail, shown in the photograph below, at least every fourth sleeper or bearer needs to be thus. As a non-electrified line, it is unlikely that there are any of these special sleepers on the Branch. Where the permanent way will require complete renewal to make the line suitable for regular passenger use and/or higher speeds, fitting suitable sleepers and bearers at renewal should present no problem, but where the existing track can be retained, every fourth sleeper would need to be replaced with one able to mount an insulator.



A modern aluminium conductor rail with a stainless steel rubbing face would be provided.

Reinstatement of Allhallows-on-Sea Branch

As noted above, one option for resolving the inability to terminate trains at Hoo on a platform on the running line is to reinstate the former Allhallows Branch, to exploit the planned development in this vicinity. Satellite imagery indicates that the formation of this Branch is still intact. The principal issue is that the former station site at Allhallows-on-Sea has now become a mobile home park. While, in theory, this could be cleared, there appears to be no reason why the station needs to located on its former site, indeed a location further South on the old formation would appear to serve the centre of the proposed new development better, and would be cheaper to construct: the further South on the old formation that the station is constructed, the lower that the CAPEX and OPEX would be. In railway operational terms, the station would fulfil its role if it were located at Stoke Junction, but not perhaps in transport terms: RSC assumes that were the Allhallows option to be implemented, the first 2.0 km of the Branch would be reinstated, terminating on the South side of Binney Road, to avoid a road crossing, whether at grade, or grade separated.

This extension of the passenger service would require at least one additional passing loop, even with a 60 mph line speed and abolition of all level crossing approach speed restrictions. Otherwise the signalling should be much the same as the option of terminating at the proposed Hoo Station: effectively the connection and signalling that would have been provided at Hoo would be relocated to Stoke Junction[29]. RSC assumes that one train working by means of track circuit block, would be provided North of Stoke Junction[30], and that Allhallows would be a single platform station, twelve cars long, with the same facilities as previously described for Hoo.

Given that the trackbed appears to be *in situ*, restoration of the permanent way should be fairly straightforward. Since this section of alignment runs across one of the more marshy parts of the Hoo Peninsular (largely) on a low embankment, the first task would be to test the bearing strength of the formation, and it is not inconceivable that expensive formation treatment works could be required, although this is not a foregone conclusion. In any event it would be necessary to install a new track drainage system, including a drainage membrane and a blinding layer across the entire width of the formation, as well as French drains, probably to

[29] Just one extra distant signal is likely to be required.

[30] In all, RSC estimates that up to the equivalent of forty SSI modules might be required for the total signalling works, in the event that the option of extending to Allhallows-on-Sea were to be exercised.

both sides of the embankment, given the ground conditions. Fresh, new, bottom ballast would be laid over this, on which concrete sleepers would be laid (NwR's current standard is to use the stronger and more expensive *G Series* sleepers, in lieu of *F Series* sleepers, which RSC suggests would be more appropriate of this section on line[31]), and top ballast spread. RSC envisages that continuously welded rail (cwr) would be laid, although the curve onto the Allhallows spur at Stoke Junction appears to be right on the 400 metre horizontal curve radius limit for cwr, and long-welded rail might be required on this curve instead.

The reinstated alignment would require a secure sheep-proof fence to be installed to either side for its entire length.

It is apparent the former trackbed has become farm internal roadway for almost its entire length. Thus, reclaiming it would require sensitive negotiation with the landowner, and it is likely, that as part of the compensation package for the land purchase, that an alternative all-weather roadway would need to be constructed for the entire length of the line. Severance of farmland is likely to be an issue, which would require at least one accommodation bridge to be provided; although it is likely to be cheaper to simply purchase, and re-sell, all of the land on one side of the alignment.

Likely Costs & Timescales

Estimated station CAPEX has a broad spectrum at the present level of detail: the size of the station, and the level of architectural ambition employed would be a key a determinant, as would the extent of the signalling modifications that would be required. It has been assumed herein that a modest stations would be provided.

The railway would have to remain 'live' throughout the construction process, with works close to the track being undertaken under possessions, and the station (and all other works in vicinity of the railway) would be need to be built by contractors accredited under RISQS[32].

No stations other than at Hoo and Allhallows (Allhallows option only) have been assumed.

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[31] This is likely to be enforced for any track renewals that are required on the Grain Branch. Although this would be more appropriate where 25.4 tonne axleload freight traffic is operating.

[32] The *Railway Industry Supplier Qualification Scheme*, administered by the RSSB (Rail Standards and Safety Board), this has replaced NwR's earlier *Link-Up* scheme.

Exclusive of the costs of land purchase, planning approvals, and rolling stock, RSC initial estimate is that the indicative CAPEX range would be between £55M and £85M for the option of running to Hoo, and between £105M and £150M for the option of running to Allhallows-on-Sea. These figures assume that the project would be tightly managed, to a standard somewhat better than is the norm on Britain's national railway network, functional stations are provided, with the minimum facilities described herein provided, and that the stations are devoid of architectural pretention. They also assume that the APA/BAPA procurement route is selected; RSC's estimates would have been higher were the DSA route to be used. It can be seen, therefore, that there is considerable potential for costs to escalate well above those quoted herein, which should be considered the minimum achievable costs.

Given the processes outlined above, if one assumes that once the client 'presses the go button', the project is pursued without hesitation, so that each activity proceeds immediately from the next, the fastest possible implementation time for the project would be around 3½ years, while a timescale of 4½ to 7 years is more realistic. In reality, few projects are pursued with such unrelenting zeal by clients, resulting in a 'stop-go approach' which can add several years to timescales.

Conclusions

It is considered that the proposal is technically and operationally feasible but, there are a number of challenges, which include:

- Grain Branch is not signalled to passenger standards;
- there is insufficient capacity in *NG* SSI at Hoo Junction to signal the line to passenger services;
- permanent way has only been maintained to standards appropriate for a 20 mph freight only line;
- level of freight use of the Grain Branch, which RSC considers is more likely to increase than decrease, overall;
- consequent inability to terminate passenger services on the running line at Hoo;
- current speed restrictions and token exchange arrangements on the Grain Branch would prevent journey times that are competitive with other modes;

- need for passenger trains to cross each other on the Grain Branch under most service scenarios;
- inability to terminate proposed Branch services at Gravesend Station;
- length of trains that could be extended to form Grain Branch service;
- existing level crossings on Branch are not suitable for a passenger service to be introduced in their current form;
- operation of Hoo Junction.

RSC considers that all of the above issues could either be rectified, or worked around, albeit at considerable cost.

The most sensible service option appears to be to extend the half hourly service from either London Victoria, or London Charing Cross that terminate at Gravesend, currently. This should be accompanied by an increase to the line speed on the Grain Branch to at least 60 mph, in conjunction with elimination of the current approach speed limits, and token exchange at Cliffe.

Even with these improvements RSC anticipates that journey times from the station would only appear attractive for potential users to Gravesend, Dartford, and the stations that adjoin these: even under the most optimistic assumptions it would take over an hour to reach London Bridge Station on a direct service, and 39 minutes to reach Rochester Station.

RSC's initial view is that the minimum CAPEX of the proposal is likely to lie in the range between £55M and £150M, dependant on option, but there appears to be considerable potential for costs to escalate well beyond this level.

There appear to be three possible ways in which the service might terminate, without causing unacceptable disruption to freight services:

- in a bay platform, clear of the running line, at the proposed Hoo Station;
- by bringing the former Grain Station back into use, and restoring the loops at Grain to a signalised area;
- reinstating part of the former Allhallows Branch and providing a new station at Allhallows-on-Sea;

The fastest possible implementation time for the project is considered to be 3½ years, from the time that a firm commitment is made to proceed through the *GRIP* system, but an implementation time in excess of five years is more likely.

Evaluation of the likely patronage and the likely CBR of the scheme will be a matter for others, qualified in the field, which RSC is not, to consider; but, based on decades of previous experience, RSC would be pleasantly surprised if the proposed scheme were to be anywhere remotely close to either financial or economic viability.

Questions that Need to be Answered

RSC suggests that the following questions might be included amongst those that the promoter should be required to answer:

1. Between which stations is it proposed that the service would run, given that Platform 2 at Gravesend Station can no longer terminate trains arriving in the Up Direction, and the former through lines have been abolished, which could have been used to bypass terminating trains?

2. Would it be feasible to terminate trains on the running line at the proposed Hoo Station, given the freight services that use the line, and the pathing requirements for the passenger service in either direction? If not, what other terminal arrangements are proposed, and what would be the likely cost implications of these?

3. Does the promoter consider that current maximum permissible line speed on the Grain Branch, coupled to the various permanent speed restrictions (psrs), approach speed restrictions, and token exchange at Cliffe GF/signal *NK509* would permit:

    a. a service that offers journey times that are compatible with those offered by other modes; and

    b. would enable any services that are extended to turn round at either the proposed Hoo Station, or some other point on the Hoo Branch, to be turned round within the available window to meet their Up path timetable slot? (Please demonstrate this).

If not, what increases to line speed and psrs are proposed?

4. What journey times are anticipated between the proposed Hoo Station, and other key destinations? In deriving this, what pathing and junction margins have been included, and what upgrade works have been assumed?

5. Is it proposed to provide any other new stations, other than Hoo, as a part of the scheme, or upgrade any existing station.

6. Please could the promoter demonstrate that the proposal would be feasible in junction capacity terms at Hoo Junction, particularly in respect of the impact of Up trains from Hoo on North Kent Line services, given the need for a crossing movement.

7. Please could the promoter demonstrate that the proposals are feasible in platform capacity terms at Gravesend Station.

8. Would any modifications to existing train paths, or additional train services be required to the West of either Gravesend Station, or Ebbsfleet Station?

9. The Grain Branch is not signalled to passenger train standards. What works are proposed to bring the signalling system on the Grain Branch up to the standards required for passenger services, and what would the likely cost be?

10. Given that it appears that there appear to be insufficient spare modules within the *NG* SSI at Hoo Junction to enable the Grain Branch to be signalled to passenger standards from it in its present form, what strategy is proposed is deliver the resignalling, and what would be the likely capital cost and timescale?

11. Wyborne Level Crossing is of the AOCL form, does the promotor accept that the *Duty Holder,* and regulatory authorities would be unlikely to accept its retention in this form if a regular passenger service were to be introduced? What working assumptions and CAPEX allowance have been made for its renewal in the promotor's proposals?

12. If it is envisaged that the passenger service is extended beyond the proposed Hoo station in the Down Direction, what are the promoter's proposals in respect

of Stoke Creek LC, Recreation LC, Middle Stoke LC, and Grain LC? Or whichever of these are appropriate to the service extension proposed?

13. Would the proposals have any impact on current or future freight services on the Grain Branch? Is so what would they be, and have these been discussed with the FOCs and customers concerned? Have any indications been given by the FOCs that they would support a *Network Change* application for the proposed scheme?

14. Does the promoter accept that the line would require electrification to operate passenger services? If not why not, and what alternative would be adopted? Which electrification system would be adopted? What is the estimated CAPEX of the solution proposed by the promoter?

15. What upgrades to the permanent way does the promotor believe will be necessary to bring the Grain Branch up to passenger standards, and how much money has the promoter allowed for this?

16. Does the promotor accept that it would be necessary to design any new station on the branch to accept twelve car trains? If not, why not?

17. How would the new station be procured? (i.e. would the DSA or APA process be used, and what would be the development, design and construction strategy?)

18. What would be the implications on freight services of the possessions required to construct the station, and the resultant costs incurred.

19. What is the estimated total capital cost and timescale to provide the proposed station, and all associated works required to provide a passenger train service (including the sums identified above)?

20. What discussions have been held with Network Rail (NwR), Southeastern, and the DfT? What support has been forthcoming? What has the promoter been instructed/requested to demonstrate before the scheme could be implemented?

21. Has Southeastern given any commitment that it would use the new station, were it to be constructed, or has the DfT given any commitment that it is use would be written into the next franchise specification?

22. The DfT only supports schemes where the revenue generated exceeds any increased costs. What are the estimated costs and revenues of the proposal? Please indicate the fare and trip number assumptions made in the current revenue estimate, and disaggregate the costs into at least the assumed infrastructure (e.g. NwR charges), and train operating costs.

23. After how many years is it anticipated that the project would break even in OPEX terms?

24. What is the BCR (Benefit:Cost Ratio) currently projected?

25. Is any third party given a firm and binding commitment to support CAPEX, and/or OPEX? If so by how much?

In addition, it will be necessary to ask some detailed questions in respect of the anticipated demand, and the financial and economic viability. It is assumed that these questions will be framed by others.