SQ_CA_10 – WWU Sparsity estimation

March 2020

WALES&WEST UTILITIES

Contents

1 Introduction

This appendix is to quantify the impact of sparsity factors that Wales & West Utilities (WWU) is experiencing and expects to experience in RIIO-GD2.

We have provided a detailed regional factor paper (Appendix 9M – embedded in section 7), justifying sparsity impacts and explaining the materiality of these factors. This paper will further detail the cost pressures and any mitigations we are undertaking into GD2.

The SQ requested is detailed below;

'Please provide further information detailing the extent to which your network is impacted by sparsity factors. In doing this you should quantify the impact in £2018/19, note your calculation methodology and the time period over which you believe the additional costs are incurred. Please also note how your network currently mitigates these costs. Please advise if you are satisfied this information is already included in your Business Plan'

2 Sparsity in Wales & West utilities region

The topography, sparsity and density of a company's region is a key cost driver for many types of costs.

WWU's network is long, irregularly shaped and divided into three distinct geographic areas by the Severn Estuary and the Breacon Becons. This is clearly different to some other networks, most notably the West Midlands, which is almost circular-shaped.

WWU's area has clusters of customers but large empty patches around them and long driving times in between. For instance, five of the 15 national parks in the UK are located in WWU's area. These national parks split our networks and make road travel difficult, due to this geographical set up, along with the Severn Estuary, we operate three distinct networks. Moreover, along with Scotland and the East of England, the road network is not as developed as in other areas. For example, motorways exist in only parts of the area, leaving Cornwall and large parts of Somerset, Devon and Wales served only by A roads. We discuss this further along with a graphical display in appendix 9M page 17, Figure 3.5.

Overall, WWU's customer base is widely dispersed, with an average customer density significantly below the UK average. Wales and Scotland, as well as the South West of England, are generally sparser than England in total as set out in figure 3.6, page 18 of Appendix 9M. In contrast, London has by far the highest population density, with a population per squared km nearly 20 times the national average.

Given the topography, sparsity and density issues for WWU we have analysed our cost base for the impact areas and these are highlighted below (Table 1), we will discuss the impact on each one of these in the following subsections. Both sparse and dense regions will have relatively high costs, while regions in between these two extremes will have lower costs, that

is, there is a U-shape impact of sparsity/density on GDNs costs. This effect is similar to that recently estimated by Ofwat in PR19.[1] In this paper we focus on the impact of sparsity.

This paper does not cover the efficiency of the network, we discuss our efficient costs and savings to date (Appendix 9F – Productivity growth) and Ofgem benchmarking (Appendix 9C – Cost efficiency benchmarking consultant report). Specifically, we discuss emergency services and efficiency in our loss of metering Appendix (Appendix 9A – Loss of metering).

Table 1 – Sparsity impacts

Sparsity impact	Cost base affected
Increased travel times due to types of road	Labour costs
More depots are required, each of which needs to be staffed and stocked with specialist equipment	Emergency, repairs, maintenance, REPEX, property management, insurance
Additional costs of transporting materials to the depots	Emergency, repairs, maintenance, REPEX, property management, insurance
Fuel costs are higher	Emergency, repairs, maintenance, REPEX, connections
Additional vans are needed	Emergency, repairs, maintenance, REPEX, connections, Other CAPEX
More engineers are needed per customer, either on stand-by or carrying out alternative work when possible in order to be able to attend escapes within the time standard required	Emergency and operations management
More engineers are required to reach a new customer; and more managers are needed in sparse areas	Connections
More above-ground assets are needed	Maintenance, work management, mains reinforcement, LTS and AGIS—CAPEX
Difficult topography (e.g. valleys) and local ground conditions	Connections, mains reinforcement, REPEX
Higher reinstatement rates for leakage than for mains replacement. Sparse areas do not have that many gas pipelines, so mostly just need reinstatements for leakage	Reinstatements
Specialist contractors have to travel further to remote areas	CAPEX

There are increased costs associated with operating in sparsely populated areas relative to the average area, as defined in the region example below, especially when this involves difficult topography. Broadly speaking, there are two reasons for this:

[1] Ofwat (2019), 'Supplementary technical appendix: Econometric approach', January; and Ofwat (2019), 'PR19 final determinations: Securing cost efficiency technical annex', December.

- Variable costs are likely to be higher. For example, it takes longer for engineers to drive to remote places, than the average area and it is more expensive to build or repair pipes in topographically difficult areas. Average travel time in sparse areas is circa 40 minutes more than urban areas with good road networks and the cost of backfill and reinstatement can be more expensive depending on regions by up to 30%. It may be more difficult to get to essential places such as quarries or tips. More kilometres of mains (and thus higher maintenance costs) are required to serve the same fixed number of customers compared to other areas;

- Fixed costs are likely to be higher. For example, all escapes need to be attended within one or two hours, requiring engineers to be within a certain radius (in terms of driving times). Therefore, we require a fixed number of engineers to support emergency work regardless of the level other work available.

At the same time, dense urban areas are also likely to be more costly to serve than the average area i.e. Bristol due to a compact city centre and increased traffic volumes. This is because of above and below ground congestion of assets lowering the productivity of workers when carrying out works. Moreover, road congestion leads to increased travel times between jobs. Both sparse and dense regions will have relatively high costs, while regions in between these two extremes will have lower costs, that is, there is a U-shape impact of sparsity/density on GDNs costs. This effect is similar to that recently estimated by Ofwat in PR19.2 In this paper we focus on the impact of sparsity.

For discussion in the following sections we use the three below regions;

	West Wales	Cardiff	Bristol
Area km²	3,481	538	706
No of customers	202,862	249,632	375,977
Customer per km²	58.28	463.83	532.55
Length of network (km)			
Metallic and PE	1,926.70	2,145.36	2,288.68

We have assumed Cardiff is an equivalent of an 'efficient' GDN for these purposes, West Wales is low density difficult urban area, Bristol high density heavily congested area and Cardiff the average mix across our network.

Within our own internal efficiency toolkit (NEF – Network efficiency factor) Cardiff ranks as one of the highest performing networks in relation to achieving all outputs with an efficient cost set for the region. We tend to benchmark any costs or workload outputs against this region.

As you will see, as a major city in our network it is reasonably compact, with an average customer density, (Appendix 9M compares this further to UK averages), and average network length. We operate West Wales as one region given the number of customers and similar network length as Cardiff, which is why we use these two networks in our comparison.

[2] Ofwat (2019), 'Supplementary technical appendix: Econometric approach', January; and Ofwat (2019), 'PR19 final determinations: Securing cost efficiency technical annex', December.

3 Sparsity impact on Emergency and repair

WWU operates in a significantly more sparsely populated environment than other GDNs based on the evidence included in Appendix 9M page 21 regarding population density.

This creates additional costs caused by our operating environment. Specifically, to meet emergency standards, we need to station our skilled engineers and managers at depots or drop off points or ensure they live within a one-hour travel radius of all populated areas regardless if there is a gas connection or not. However, depots in sparsely populated regions will have lower utilisation rates leading to higher labour costs relative to the number of emergencies and repairs carried out.

Below is an extract from our performance management system in 2018/19 of two regions displaying a significant difference in the number of jobs and travel times (Emergency jobs only).

Cardiff region

PMF EMS Rolled Up Performance from Work Orders - 2019

EMS Job Category	EMS Measure	Target Time (excl. 15 min travel)	No of Jobs Visited	Completed Jobs	No of Compl Jobs CR	Access Rate %	Average Actual Job time incl Enroute time	Total Credit	PMF Income	%
UncontrolledEscape	Hours	0.50	2,843	2,843	2,843	100	1.03	127,935	127,335	72.5
ControlledEscape	Hours	0.50	2,496	2,496	2,496	100	0.99	112,320	112,030	78.5
PriorityEscape	Hours	0.56	699	699	699	100	1.38	33,855	34,385	58.6
OutsideEscape	Hours	1.12	2,897	2,897	2,897	100	1.33	238,410	193,115	102.9
M1Meterwork	Hours	0.63	1,970	1,970	1,838	93	0.78	97,414	55,198	113.7
M2MeterWork	Hours	0.60	2,840	2,840	1,634	58	0.65	80,472	57,566	130.9
TSE Hire	Hours	2.00	324	324	324	100	1.08	43,740	79,220	207.9
M1Network	Hours	0.42	2,399	2,399	2,399	100	0.55	96,665	75,390	122.3
M2Network	Hours	0.23	516	516	516	100	0.47	14,955	15,791	103.5
Survey	Hours	1.14	1,713	1,713	1,713	100	0.48	142,860	55,466	290.7
P&R	Hours	0.42	3,688	3,688	3,688	100	0.32	147,520	73,760	205.6
P&R+	Hours	2.67	690	690	690	100	1.53	120,750	20,700	190.0
PEMS	Quantity	0.00	0	1,499	1,499	0	0.00	37,475	14,990	X
IGT	Quantity	0.00	0	16	16	0	0.00	240	160	X
I&C Assist FCO	Hours	2.08	20	20	20	100	1.45	2,800	0	161.0
I&C Diaphragm Work	Hours	0.93	147	147	147	100	1.50	10,405	8,020	78.4
I&C Rotary Work	Hours	4.67	8	8	8	100	2.99	2,360	1,600	164.6
Smart Metering	Hours	1.46	280	280	280	100	2.00	28,796	35,102	65.6
DISTRICT GOVERNORS	Hours	6.78	23	23	23	100	4.43	7,660	30	136.3
TRANSMISSION PRS A/O	Hours	2.01	113	113	113	100	1.36	13,920	196	166.7

West Wales region

PMF EMS Rolled Up Performance from Work Orders - 2019

EMS Job Category	EMS Measure	Target Time (excl. 15 min travel)	No of Jobs Visited	Completed Jobs	No of Compl Jobs CR	Access Rate %	Average Actual Job time incl Enroute time	Total Credit	PMF Income	%
UncontrolledEscape	Hours	0.50	380	380	380	100	1.38	17,100	17,080	54.6
ControlledEscape	Hours	0.50	342	342	342	100	1.19	15,390	15,390	83.3
PriorityEscape	Hours	0.53	98	98	98	100	1.42	4,590	4,600	54.8
OutsideEscape	Hours	1.09	466	466	466	100	1.81	37,530	29,845	74.1
M1Meterwork	Hours	0.63	374	374	352	94	1.06	18,656	11,257	93.6
M2MeterWork	Hours	0.62	449	449	279	62	0.92	14,139	11,034	94.4
TSE Hire	Hours	2.00	23	23	23	100	1.12	3,105	4,766	201.1
M1Network	Hours	0.43	404	404	404	100	0.87	16,405	12,705	77.6
M2Network	Hours	0.26	36	36	36	100	0.57	1,101	1,271	88.9
Survey	Hours	1.01	222	222	222	100	0.71	16,735	7,366	177.1
P&R	Hours	0.42	2,462	2,462	2,462	100	0.11	98,480	49,240	613.2
P&R+	Hours	2.67	526	525	526	100	0.64	91,875	15,750	455.1
PEMS	Quantity	0.00	0	294	294	0	0.00	7,350	2,940	X
IGT	Quantity	0.00	0	3	3	0	0.00	45	30	X
I&C Assist FCO	Hours	2.08	2	2	2	100	2.25	280	0	103.7
I&C Diaphragm Work	Hours	0.95	33	33	33	100	1.83	2,370	1,890	65.6
OTHER OPERATIONAL COSTS	Hours	1.00	4	4	4	100	0.02	240	0	7,500.0
Service Disconnect - Large Diameter	#	0.00	0	1	1	0	2.92	120	0	8.6
Overall Result		0.71	5,820	6,118	5,926	102	0.65	345,511	185,162	149.0

One region being sparse (West Wales), where there is significantly less population, poorer roads and less work to utilise the First Call Operatives (Emergency operatives (FCO)) on.

The other (Cardiff) where it is densely populated with major A roads and significantly more work to utilise.

We have used Cardiff as our benchmark urban area, its less densely populated than Bristol and includes some outlying villages in close proximity. Given Cardiff's population and road network this would be classed as a large town in most other GDNs analysis.

Over the course of GDPCR1 and GD1, we have worked to upskill all our FCOs to undertake activities that are beyond their core emergency role. This includes, for example, purge and relights on Repex work, connections surveys and assisting with maintenance activities. In sparse areas even these types of work can be limited, resulting in high levels of unproductive time whilst still maintaining appropriate rotas to provide emergency cover, as shown by the number of jobs available between areas in the example below;

As you can see the weighted workloads for 2018/19, the last available complete year, completed in Cardiff is 122% more work than West Wales and the people required to do this work is not reflective (Only 41% more resources required). This demonstrates the ability to utilise and mitigate unproductive time in urban areas due to availability of work yet the inability to do so in sparse areas.

	West Wales	Cardiff	% variance
Weighted workload (Effort credits million of minutes). 18/19	448,102	993,130	122%
Headcount - Engineers	32	45	41%

Using this example, we are only able to utilise our emergency and repair teams to the maximum number of jobs available in the region, we already only employ the minimum to achieve the license obligations for emergency and repair. This minimum is based on a standby rota governed by the working time directive, not allowing engineers to be working more hours than safe to do so. For Wales & West Utilities this a one in four rota. This means engineers can only work one night in every four nights on out of hours which drives the minimum headcount where there are low workloads. Considering we are currently achieving our standard of service in line with license obligations, we need to be funded to deliver the emergency and repair service. We have calculated as per GD1, if our sparse regions could achieve the same level of utilisation as urban areas we would need to be funded for a regional factor of £5.5m in 18/19 prices per annum. See summary workings below,

	Resources (FTE)	Cost £m	
Emergency	53	£	3.90
Repair	23	£	1.65
Total	**76**	**£**	**5.55**

These costs include the full cost of resource as detailed below;

- Salaries
- Overtime
- Shift allowance
- National insurance
- Pension costs
- Vehicles (includes additional vehicles where required in sparse areas), this includes cost of maintenance repair and relevant road tax
- Fuel (which covers travel time impact)
- Personal protective equipment

Direct Management associated with these teams have been included in the resource numbers which stands at 5 FTEs or 9% of the operational direct management of emergency and repair. The average ratio of first line managers to engineers, in emergency, is one manager to sixteen engineers but West Wales is one manager to six engineers.

The RIIO-GD1 allowance of sparsity was £3.5m pa (18/19 prices) for Wales & West Utilities (WWU) which didn't consider the repair function, the management time or the full cost of resource – just the wages line of the BPDT.

Comparing just the emergency function to the RIIO-GD2 calculation you can see a slight increase to £3.9m (emergency only), this includes management and full resource costs as per

detailed list above. Our calculation would be broadly in line with Ofgem's emergency calculation from RIIO-GD1.

4 Number of depots required

In order to satisfy service level requirements, provide appropriate support to our mobile field force and to properly manage the asset base, WWU operates a number of offices, depots and secondary "drop off points" across our large and disperse operating region.

Over the 15 years that we have operated the business we have significantly rationalised our property portfolio following a strategic review of our ongoing requirements, which has resulted in a reduction of around 40% of property and facilities operating costs since 2006. However, despite this significant cost reduction, our costs may still look relatively high given some obvious factors;

- The number of properties still required in order to adequately support our operational activities across a large and disperse geography.
- Owned versus leased property – The Ofgem analysis of cost does not recognise the impact of buy versus lease decisions taken by each of the GDNs, with Ofgem only reflecting on operating cost. WWU has, as part of its property strategy, examined buy versus lease analysis to ensure we make the best whole life cost decisions in the interest of gas consumers and is therefore reflected in our demonstration of efficient property costs in appendix 9K.

To support our RIIO-GD2 business plan we have had our property and facilities portfolio independently benchmarked to ensure value for money across all sites (Appendix 9K). For the purpose of the sparsity calculation we will not be demonstrating the cost-efficient nature of each deport/drop off point, this has been justified in great detail in the independent report as referenced above. The results show us to be better than the industry average for property and facilities costs making us relatively efficient per site/depot in spite of our extended geography. This demonstrates that, where we can, we are minimising costs, even below those of GDNs whose geography may be more amenable to lower costs.

We currently have 28 active sites within our network, comprising 1 head office, 1 centralised stores/stock system, 7 main depots and 19 drop off points.

The main depots are situated at strategic locations around our network to enable stock and logical ease.

The drop off points are unmanned stores, with a relatively small stock base to help support the sparse areas without the need to drive back to centralised depots.

The benefits of having drop off points, in addition to depots, mean we can operate as efficiently as possible.

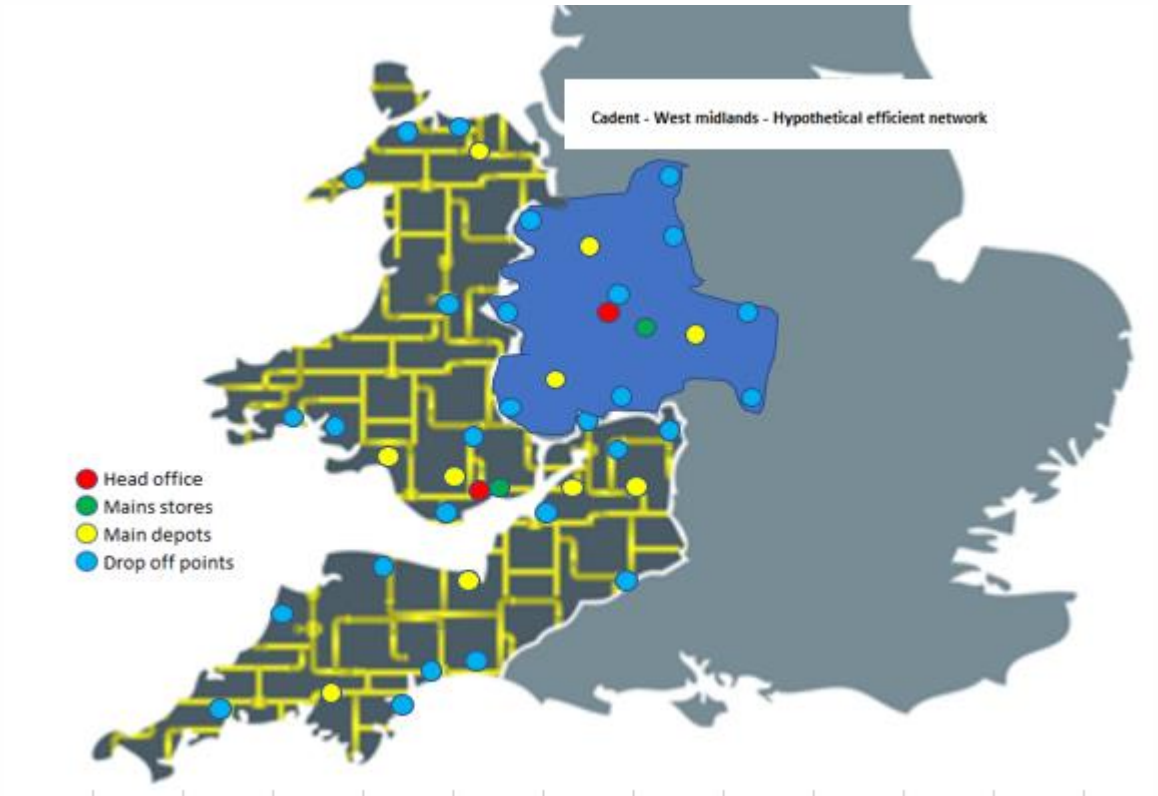
- Less travel time back and forth between main depots
- Less fuel consumption
- Customer experience improved as we can gather additional materials quicker
- Lower costs than having more local depots

In relation to sparsity, it is the depots and drop off points that are the biggest cost drivers, the main depots are situated at strategic points throughout our network but the drop off points can be at the extremities being used by only a handful of resources. Therefore, we are focussing on the sparse depots and drop off points.

As we mention in the regional factor appendix and in section 2, our network is irregularly shaped and separated by the Severn Estuary and Brecon Beacons meaning we end up with an increased number of depots and drop off points compared with other GDNs which have compact networks for example Cadent's – West Midlands GDN.

We are limited on how we mitigate these costs, but as demonstrated in Appendix 9K, we have made our depots and drop off points as efficient as possible and the cost of operating them is currently below UK industry average per site.

If we didn't have these low density rural regions to support, we could operate with less locations, the below chart shows the number of depots and drop off points West midlands could operate with using the same strategic positioning as WWU.



This could result in a reduction of depots and drop off points if we didn't have such a sparse, irregular shaped network intersected by the Severn Estuary and Brecon Beacons national park.

Type of depot	WWU	Cadent - WM	% difference
Head office	1	1	0%
Main depots	7	3	57%
Mains stores	1	1	0%
Drop off points	19	9	53%
Total	**28**	**14**	**110%**

Based on this analysis we need to be funded for the additional depots and drop off points we are incurring costs for to ensure we continue to deliver the service levels and license obligations we are currently achieving. Noting West Midlands is at the opposite end of the spectrum when it comes to sparsity, our estimation of a reasonable level if we didn't have the irregular shape issues is included in the table below showing the incremental cost impact of these additional depots and drop off points;

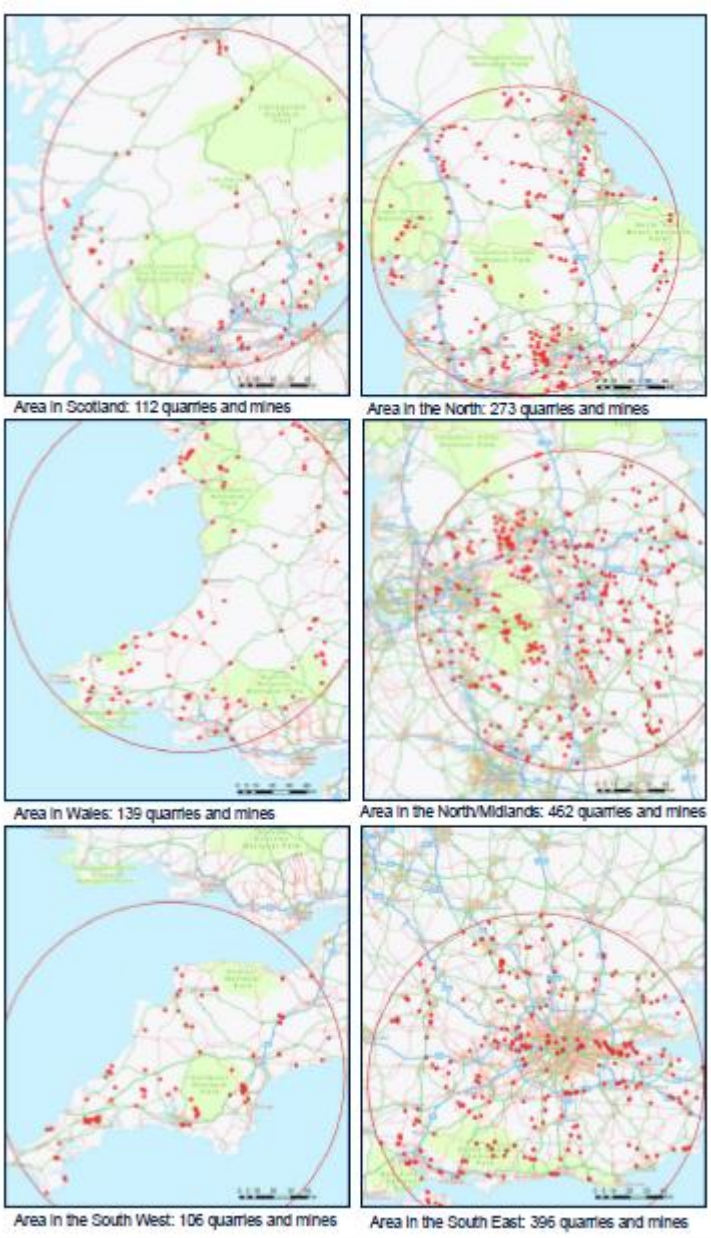
Type of depot	WWU additional depots	Cost £m
Head office	0	0.0
Main depots	3	0.4
Mains stores	0	0.0
Drop off points	10	0.3
Total		**0.7**

We would expect these to be included in the sparsity calculation based on the fact it was recognised and rewarded historically for labour but the corresponding overheads associated with operating in these sparse areas was not.

5 Reinstatement and logistics impacts

In order to carry out the majority of our groundworks we require materials like, backfill, tarmac and concrete. Depending on surfaces, we can require all materials across all jobs. We also require the ability to remove and dispose of surplus excavated material (spoil).

Access to quarries and tips is essential for GDNs to carry out ground work. Larger distances/driving times to the nearest quarry are therefore a cost driver for such activities that varies across regions. This is illustrated in maps below, which shows similar-sized areas in the UK and the number of mines and quarries within this radius.



The lack of access to quarries and mines has an impact on the mains replacement and repair activities, the rates included within our detailed project by project mains replacement programme in the business plan includes these cost pressures.

The following sections discuss the specific cost pressures we are experiencing due to our unique network shape, the rates included have been market tested and competitively tendered within our network to ensure the most efficient costs can be secured.

5.1 Surplus excavated material (Spoil)

Spoil has to be disposed of where it cannot be re-utilised on site. Therefore, we require access to tips to responsibly dispose of any surplus materials.

Tips across our region vary in distance from our operational sites and can be up to 2 hours' drive in sparse areas versus 20-30 minutes in an average town/urban area and around 1 hour in Bristol/dense areas, due to the location of tips within our geography.

As these sites vary regionally and demand theory can be applied, below are the rates we currently pay 2018/19 on average across each of our operational regions in 2018/19 prices;

Spoil Rates (T)	£s
OperationalAreas	Rate
EAST_WALES	8.18
WEST_WALES	7.25
NORTH_WALES	9.63
WILTS_GLOS	15.79
BRISTOL_BATH	10.14
DEVON	34.36
EXETER_SOMERSET	14.85
CORNWALL	34.36

You will note Cornwall is significantly higher than some of the other regions, and generally the cost of tipping is higher in the South West higher than Wales. This is mainly down to protected areas, levels of urbanity and population and availability of tipping sites in the region.

5.2 Backfill materials

Backfill materials are required to fill excavations, we cannot always reuse materials from the excavations and some procured backfill materials have to be used on sites to comply with the "specification of the reinstatement of openings in highways" (SROH) regulations, these backfill materials are to be used on all excavations as per the specifications.

The current 2018/19 rates we pay to quarries are detailed below,

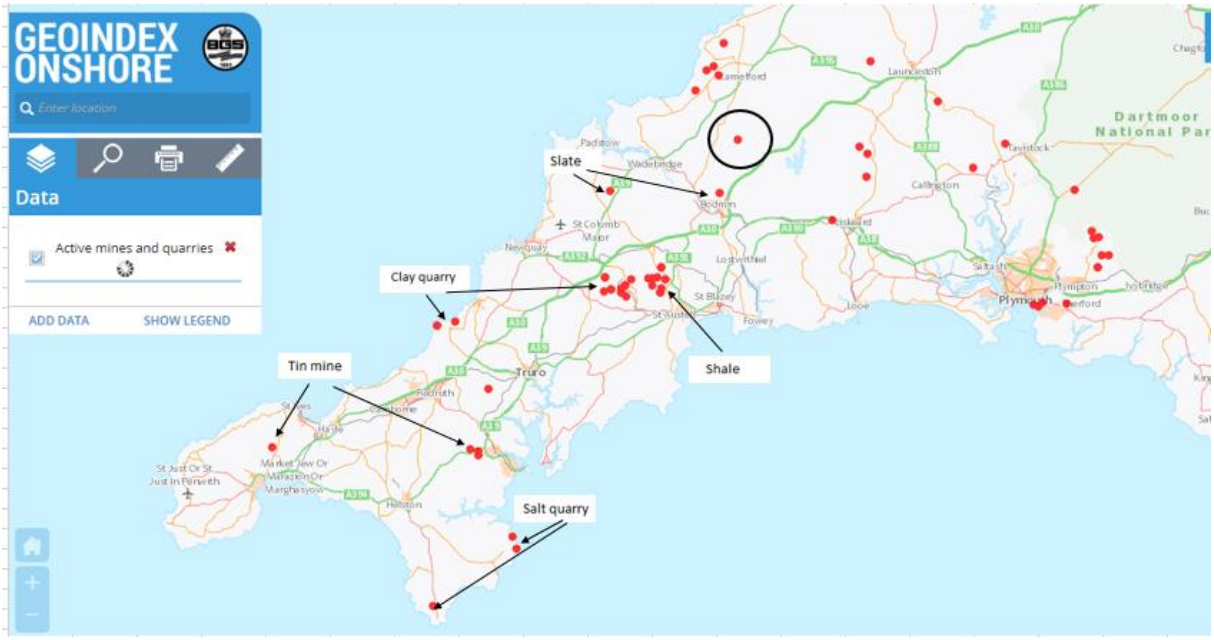
Backfill Rates (T)	£s
OperationalAreas	Rate
EAST_WALES	11.94
WEST_WALES	11.94
NORTH_WALES	12.32
WILTS_GLOS	13.44
BRISTOL_BATH	11.18
DEVON	14.02
EXETER_SOMERSET	14.02
CORNWALL	13.25

As part of the RIIO-GD2 costing process we have calculated the volume of materials required for the business plan, and even though there are small differences between rates, depending on the regional volumes, this can have a material impact. Our biggest cost driver for these costs are the distances these quarries are from our operational sites in the sparse areas.

The cost drivers that impact this material are detailed below;

- Distance from the excavations and back to quarry (Travel time)
- Fuel consumption
- Size of material load required

Below shows an example of the closest quarry to our Cornwall extremity, which is over 1 hour from sites near Helston (1.5 hours plus, during summer and school holidays) each way. Our logistics teams are having to drive to these sites and deliver in the region which compared to, say Bristol, is circa 1.5 hours additional round trip travel time.



5.3 Reinstatement of excavation

To complete the closure of an excavation, carriageways, and footpaths, need tarmac as a top layer, this is an outsourced activity by all GDNs due to the complexity of process and specialised equipment required. Most tarmac operators serve many utilities, local authorities and construction sites which allows them to be more efficient than if a GDN operated its own reinstatement activity, allowing them to charge accordingly depending on demand and quarry supply rates. Across our geography we are seeing the following costs:

Reinstatement Rates (m²)	Road categories			
OperationalAreas	C/W 1/2	C/W 3/4	FW	VERGE
EAST_WALES	112.14	77.61	57.84	21.50
WEST_WALES	121.68	78.46	58.78	21.33
NORTH_WALES	136.80	93.09	69.27	35.19
WILTS_GLOS	143.74	74.52	58.64	22.12
BRISTOL_BATH	122.31	73.40	57.54	21.96
DEVON	116.79	83.31	67.05	31.30
EXETER_SOMERSET	138.43	85.65	61.11	34.95
CORNWALL	116.79	83.31	67.05	31.30

Most of the work we carry out is in road category 3/4 which includes most residential streets where the majority of mains replacement is carried out. From the table above you will see the differing reinstatement rates across the regions, you will notice extremities are higher than some of the urban regions.

Using Cardiff and Bristol as the comparative base, considering number of trips, the volume of spoil and virgin aggregate required per annum in RIIO-GD2, the calculations are summarised below;

Region	% Workload	% Open Cut of Total	Volume of Quarried stone requirement (T) per annum
BRISTOL_BATH	14%	25%	66,824.99
CORNWALL	7%	24%	27,183.42
DEVON	14%	16%	49,056.41
EAST_WALES	15%	18%	59,533.08
EXETER_SOMERSET	20%	18%	79,576.64
NORTH_WALES	7%	16%	24,461.41
WEST_WALES	9%	25%	40,826.18
WILTS_GLOS	15%	24%	64,647.53
Total	**100%**	**20%**	**412,110**

The cost impact of the sparse areas is detailed below;

£m - 18/19 prices				
Region	**Spoil**	**Stone**	**Reinstatement**	**Total**
BRISTOL_BATH	-	-	-	-
CORNWALL	0.4	0.0	0.0	0.4
DEVON	0.7	0.1	0.1	0.8
EAST_WALES	-	-	-	-
EXETER_SOMERSET	0.5	0.1	0.2	0.8
NORTH_WALES	0.0	0.0	0.1	0.1
WEST_WALES	- 0.0	- 0.0	0.0	- 0.0
WILTS_GLOS	-	-	-	-
Total	1.6	0.2	0.4	2.1

These impacts were not considered during RIIO-GD1, however reviewing and producing a new repex contract enabled us to better understand our cost base, and the regional factors associated with the mains replacement programme on sparse areas.

Reinstatement and logistics impact summary

The total impact on reinstatement, quarries and tipping (Section 5) within our region is £2.1m per annum. We have mitigated as much of this as possible through negotiating new contracts with local suppliers, looking to use as much recycled materials as possible and creating our own logistics process to streamline the delivery of materials. Whist doing these things we have ensured customers still get high standards and we comply with the relevant guaranteed standards.

6 Summary of sparsity impact

The current impact of sparsity across Wales & West Utilities is £8.4m per annum; we operate a large irregular shaped network which requires additional resource to comply with license obligations, specific materials in close proximity to working regions and excavations to be appropriately reinstated.

The table below summarises the sparsity cost to Wales & West Utilities;

18/19 prices £m			
Sparsity item	**Ofgem impact category**	**Paper section**	**Value per annum £m**
Labour - Emergency service	Opex - Emergency	Section 3	£ 3.90
Labour - Repair	Opex - Repairs	Section 3	£ 1.65
Depot and facilities	Opex - Facilities	Section 4	£ 0.75
Reinstatement and logistics	Mains replacement	Section 5	£ 2.12
Total			**£ 8.42**

These costs are currently embedded in our business plan cost base and should be adjusted out pre- regression and added back as a post regression adjustment to account for the sparse costs we are experiencing.

7 Appendix references

Appendices referenced in this document are embedded as below;

Appendix 9M – Regional factors cor

Appendix 9K – Office & depot prop