

P145484 GIS Assignment 2

by Cerys Bethan Nickels

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Portfolio Report

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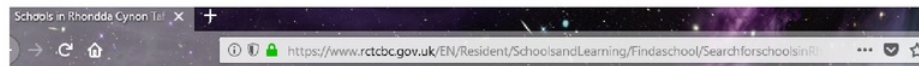
Introduction

The brief was to create a location-based service (LBS) or location-based intelligence (LBI) system using the workspace that was created for assignment 1, adding on additional layers as required to enhance the usability of the end application. This application is interactive, displaying information about the comprehensive schools within the Rhondda Cynon Taf County Council Borough.

According to Küpper [1], location-based services, or LBS, are: “mobile services for providing information that has been created, compiled, selected or filtered under consideration of the user's current locations or those of other persons or mobile devices”. It is expected that there will be 7.5 billion downloads of applications that will rely on this technology by 2019 [2]. There are many uses, including the following: [2], [3]

- Tracking or navigation devices/ applications – to find where you want to go, and the fastest route, or for monitoring/ managing mobile members of staff within a workplace.
- Proximity-based marketing – deliver personalised advertising for the local area.
- Digital cameras and fitness gear (e.g. Fitbit) – for photo location and to track routes.
- Laptops/tablets/ smart phones & watches – applications often use the built-in GPS location.
- Travel information and roadside assistance – saves time by rerouting you away from busy areas and directing assistance to you when needed.
- Healthcare – To locate staff and patients, to effectively allocate resources and skills, reducing admin costs, time and improve the overall service of care patients receive. It can also be used to provide safety for community based staff, by being monitored for when issues arrive.
- Fraud prevention – providing another layer of security by matching up the location of credit/ debit card purchases/ usage with smartphone location.

Retrieving Secondary School Data



Schools in Rhondda Cynon Taf - Search for a school

View information about schools in your local area including addresses, telephone numbers and Headteacher details.

- [Aberdare Community School](#)
- [Bryn Celynnog Comprehensive School](#)
- [Cardinal Newman RC Comprehensive School](#)
- [Ferndale Community School](#)
- [Hawthorn High School](#)
- [Mountain Ash Comprehensive School](#)
- [Pontypridd High School](#)
- [Porth Community School](#)
- [St John Baptist CIW High School](#)

Figure 1: Researching Schools Within Rhondda Cynon Taf

Research was conducted into the current secondary schools within RCT council [4], with the information collected from the council website, and the rankings are from the Wales Online article [5]. This information was gathered into the spreadsheet below, with the coordinates from Google Maps: [6]

School	Address	Postcode	Band	Phone	Website	Longitude	Latitude
Aberdare Community School	The Ynys Site, Aberdare	CF44 7RP	Amber	01685 888500	http://aberdarecommunityschool.org.uk/	51.712648	-3.439064
Bryn Celynnog Comprehensive School	Penycoedcae Road, Beddau	CF38 2AE	Yellow	01443 203411		51.55953	-3.35963
Cardinal Newman RC Comprehensive School	Dynea Road, Rhydyfelin	CF37 5DP	Green	01443 494110	http://www.cardinalnewman.co.uk	51.584624	-3.303339
Ferndale Community School	Excelsior Terrace, Maerdy	CF43 4AR	Yellow	01443 755337		51.66929	-3.47178
Hawthorn High School	School Lane, Hawthorn	CF37 5AL	Yellow	01443 841228	http://www.hawthornhighschool.co.uk/	51.578556	-3.30727
Mountain Ash Comprehensive School	New Road, Mountain Ash	CF45 4DG	Red	01443 479199		51.688659	-3.389803
Pontypridd High School	Albion Community Campus, Cilfynydd	CF37 4SF	Yellow	01443 486133		51.624044	-3.321676
Porth Community School	Cemetery Road, Porth	CF39 0BS	Red	01443 682137	http://www.porthcommunity.org.uk	51.616684	-3.419336
St John Baptist CIW High School	Glan Road, Aberdare	CF44 8BW	Yellow	01685 875414	http://www.stjohnbaptist.org.uk	51.714734	-3.457515
Tonyndy Community College	Llewellyn Street, Tonyndy	CF40 1HQ	Yellow	01443 436171	http://www.tonyndycollege.co.uk	51.615942	-3.455755
Tonyrefail Community School	Gilfach Road, Tonyrefail	CF39 8HG	Yellow	01443 670647	http://www.tonyrefailschool.net	51.581849	-3.440388
Treorchy Comprehensive School	Pengelli, Treorchy	CF42 6UL	Yellow	01443 773128	http://www.treorchycomp.org.uk/	51.658379	-3.510683
Y Pant Comprehensive School	Cowbridge Road, Pontyclun	CF72 8YQ	Green	01443 562250		51.528907	-3.39064
Ysgol Gyfun Cwm Rhondda	Heol Graigwen, Cymmer	CF39 9HA	Green	01443 680800	http://www.ysgolcymmer.co.uk	51.605817	-3.413561
Ysgol Gyfun Garth Olwg	Main Road, Church Village	CF38 1DX	Yellow	01443 570057	http://www.gartholwg.co.uk/	51.564504	-3.32382
Ysgol Gyfun Rhydywaun	Rhodfa Lawrence, Penywaun	CF44 9E5	Yellow	01685 813500	http://www.rhydywaun.org/	51.734276	-3.493394

Figure 2: RCT Comprehensive School Excel Worksheet

Retrieving Data for RCT County

The MSOA, maps, and data was retrieved from the UK Data Service [7] website. This data was used to build the map using the MapInfo software.

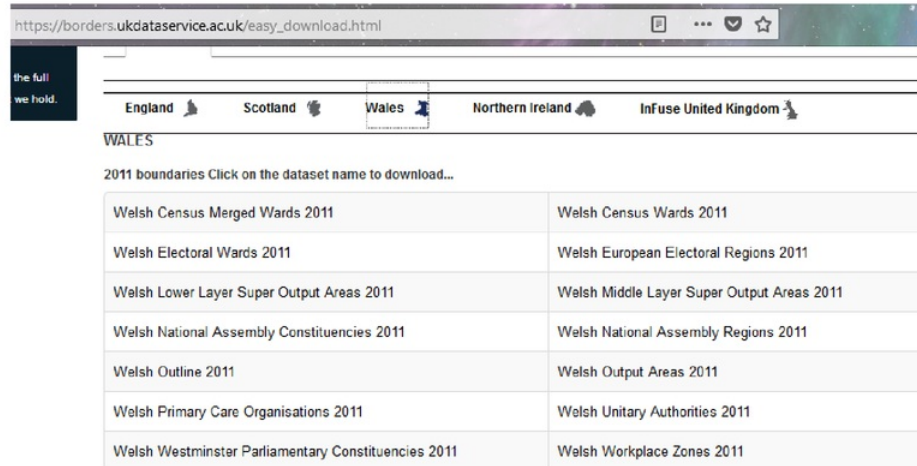


Figure 3: Getting the Maps & Data Using the UK Data Service

Creating the Townsend Index for RCT Areas

The Townsend Index was created using some of the collected data from the UK Data Service website, as part of the research gathered. The index was created using the same method as was used during Assignment 1 for each of the 31 MSOA regions within the county.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	GEO. C	GEO. Li	16 to 74	16 to 74	16 to 74	16 to 74	16 to 74	Total	No car	Total	One per	Total	Owned	%Depr	%Unem	%NoHc	%NoCw	Log%De	Log%Un	Log%N	Log%N	%Depr	%Unem	%NoHc	%NoCw	Zscore	
2	W000000	RCT001	795	203	183	394	320	3742	1063	3742	1006	3742	1285	118	27.606	8.4188	35.783	28.407	1.4577	0.974	1.5555	1.4585	-0.61	0.381	0.9073	0.235	0.9337
3	W000000	RCT002	641	151	137	338	253	2722	660	2722	1059	2722	1059	682	31.534	8.3273	28.632	27.684	1.3337	0.9366	1.4725	1.4607	0.182	0.5844	0.6646	0.1855	1.2428
4	W000000	RCT003	795	2165	144	331	270	3555	888	3555	1046	3555	1322	1153	31.768	5.7610	25.358	25.884	1.5074	0.83	1.4203	1.4232	0.323	-0.301	-0.42	-0.074	-1.023
5	W000000	RCT004	584	151	110	308	217	2718	723	2718	888	2718	1029	870	31.935	7.8058	29.765	28.8	1.5177	0.9448	1.4881	1.4409	0.5079	0.1206	0.1559	0.0803	0.8787
6	W000000	RCT005	1001	2307	148	337	445	4323	1441	4323	1450	4323	1650	1247	33.435	10.287	33.073	33.287	1.5370	1.0526	1.5325	1.5351	0.1743	1.0005	0.6033	0.6581	3.2166
7	W000000	RCT006	676	1770	134	343	244	3282	1056	3282	1112	3282	1230	953	33.882	7.7045	33.181	33.394	1.5426	0.9387	1.5338	1.5355	0.364	0.0759	0.6152	0.6566	2.3217
8	W000000	RCT007	498	1252	72	240	290	2573	560	2573	515	2573	1071	550	25.562	12.32	32.559	37.318	1.593	1.1246	1.5259	1.5333	1.3425	1.7247	0.5433	0.9539	4.5742
9	W000000	RCT008	586	1277	81	202	253	2427	515	2427	776	2427	910	636	29.501	10.635	36.3	37.858	1.4843	1.0858	1.5177	1.5238	-0.116	1.1984	0.9423	1.0034	3.0489
10	W000000	RCT009	583	1257	84	207	258	2640	573	2640	905	2640	1082	644	34.28	10.908	34.821	38.858	1.5475	1.0785	1.5517	1.5781	1.0354	1.2841	0.7788	0.9309	4.06
11	W000000	RCT010	727	1815	113	334	261	3362	1005	3362	1007	3362	1537	1030	32.629	7.6378	23.647	23.933	1.5267	0.9463	1.5319	1.4503	0.6588	0.1347	-0.687	0.3735	0.431
12	W000000	RCT011	486	1385	82	227	181	2332	655	2332	773	2332	953	777	33.29	7.5823	25.055	28.639	1.5352	0.9341	1.4161	1.4719	0.6264	0.0257	-0.484	0.2557	0.6445
13	W000000	RCT012	671	1730	110	239	240	2894	781	2894	788	2894	985	804	29.176	9.6288	30.624	28.39	1.4797	0.9555	1.3	1.477	-0.202	0.2785	0.3658	0.2391	0.889
14	W000000	RCT013	568	1302	113	286	282	2657	598	2657	596	2657	1012	671	34.475	11.388	38.653	37.488	1.5439	1.0522	1.5753	1.5853	1.0397	1.4344	1.001	0.3764	4.5714
15	W000000	RCT014	947	2177	162	374	343	3944	1311	3944	1250	3944	1525	1211	31.694	8.5686	30.527	33.24	1.5145	0.9006	1.4957	1.5345	0.4427	0.4421	0.2834	0.6543	1.0325
16	W000000	RCT015	739	1581	131	355	313	3183	850	3183	325	3183	1004	1216	25.186	8.7211	30.254	27.581	1.4730	0.9877	1.4945	1.4819	-0.188	0.5032	0.2588	0.1523	0.7555
17	W000000	RCT016	646	1814	129	300	254	2884	870	2884	862	2884	1165	852	30.742	8.8386	28.498	31.027	1.5096	0.9857	1.4393	1.5055	0.2349	0.4671	-0.251	0.4702	0.891
18	W000000	RCT017	939	2403	179	377	326	4030	1240	4030	1233	4030	1628	1475	33.077	7.7142	24.487	30.789	1.5325	0.9402	1.408	1.502	0.7761	0.0802	-0.557	0.4475	0.7475
19	W000000	RCT018	675	2038	188	400	258	3558	1050	3558	1104	3558	1338	1126	30.604	7.8442	23.65	23.183	1.5000	0.9467	1.4833	1.4738	0.1302	0.1375	0.2653	0.3067	0.9433
20	W000000	RCT019	711	1905	123	376	180	2688	650	2688	683	2688	1117	1136	30.321	5.4628	21.888	23.892	1.5041	0.8904	1.3615	1.3551	0.2502	-1.076	-0.584	-0.224	-2.085
21	W000000	RCT020	534	1282	112	235	285	2487	500	2487	621	2487	843	684	33.012	11.183	38.188	36.188	1.5316	1.0647	1.5333	1.5704	0.7607	1.3671	1.808	0.8816	4.7803
22	W000000	RCT021	1073	2818	238	457	300	4294	1103	4294	1236	4294	1647	1287	33.188	8.115	24.688	25.827	1.5035	0.9522	1.4237	1.4288	0.2399	-0.704	-0.523	-0.078	-1.005
23	W000000	RCT022	734	1849	1217	394	357	3732	1484	3732	1116	3732	1478	885	29.904	7.8275	33.644	38.228	1.49	0.9607	1.7378	1.6045	-0.01	0.1728	2.4834	1.0884	3.7481
24	W000000	RCT023	325	2576	130	455	357	3821	976	3821	1013	3821	1245	1527	25.835	6.0275	25.202	24.892	1.4287	0.9556	1.48	1.4132	-1.146	0.217	0.1224	-0.115	-0.323
25	W000000	RCT024	544	1555	94	274	152	2501	625	2501	689	2501	1170	844	27.549	7.181	31.145	25.03	1.4556	0.9132	1.5071	1.4155	-0.848	-0.159	0.371	-0.101	-0.539
26	W000000	RCT025	588	1625	134	292	189	2518	511	2518	636	2518	1195	941	27.841	8.4882	19.539	20.234	1.451	0.8728	1.3128	1.3283	-0.822	-0.521	-1.419	-0.859	-3.211
27	W000000	RCT026	709	2073	158	379	232	3098	700	3098	988	3098	950	1174	32.274	6.5077	31.44	22.535	1.5213	0.8755	1.5111	1.3728	0.5898	-0.436	0.407	-0.372	0.988
28	W000000	RCT027	665	3277	208	638	173	3623	232	3623	689	3623	1165	2011	18.293	3.294	11.675	6.4035	1.3074	0.6325	1.103	0.8894	-3.395	-2.660	-3.355	-3.566	-12.95
29	W000000	RCT028	844	2331	155	393	252	3165	582	3165	620	3165	951	1423	25.9	6.3174	24.7	18.383	1.4290	0.8644	1.4059	1.2874	-1.127	-0.596	-0.52	-0.914	-3.157
30	W000000	RCT029	731	2889	155	496	278	3286	444	3286	602	3286	993	1480	24.536	5.0721	23.374	13.555	1.4075	0.7853	1.3575	1.5842	-1.339	-1.310	-0.634	-1.855	-5.867
31	W000000	RCT030	888	2229	157	472	194	3233	591	3233	561	3233	1189	1288	29.183	4.9842	24.478	17.347	1.4786	0.7745	1.4681	1.2775	-0.2	-1.398	-0.588	-0.978	-3.128
32	W000000	RCT031	1137	3510	165	708	243	4483	542	4483	1063	4483	1402	2059	24.104	4.3124	22.073	12.053	1.3897	0.7253	1.3632	1.115	-1.583	-1.834	-0.549	-2.001	-6.467

Figure 4: Townsend Index for the 31 Rhondda Cynon Taf MSOA Regions

Geocode the MSOA Data

The data and maps gathered was used to create the map below using the MapInfo software. The tables were geocoded to display the map below, with each of the 31 MSOA regions within RCT:



Figure 5: Geocoding the MSOA Data

Plotting the School Data

The school data was imported from the excel file, and using the 'Create Points' button on the ribbon, the schools were plotted onto the map in the correct locations. These are displayed as black squares below:



Figure 6: Plotting the Schools on the Map

Adding Colour to the Mid Super Output Areas

The colour was added by the addition of a thematic map, which was created in MapInfo, based on the Townsend score to give the map some colour. This was tricky to implement, as the colour was failing to cover the region, and was instead displayed as points. This was resolved by taking a completely different approach, and fully insuring the tables are geocoded correctly.

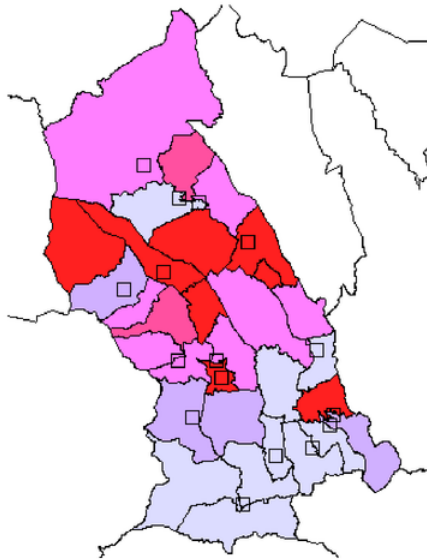


Figure 7: Creating the Thematic Map in MapInfo

The county border lines were increased in their thickness as to differentiate between the MSOA and the county borders. This can be seen below:

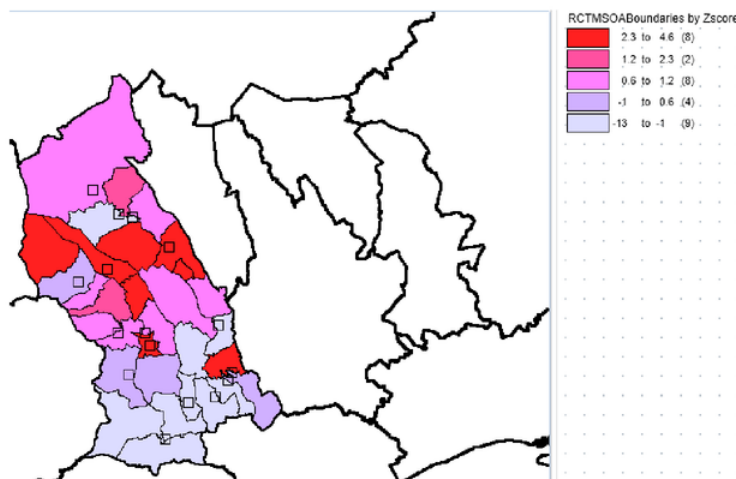


Figure 8: Differentiating Between County & MSOA Borders

Using the MapInfo2Leaflet Tool to Export Map to a HTML Page

The MapInfo2Leaflet tool was used to export the MapInfo map into an interactive map on a HTML page. The process to create the final page is below:

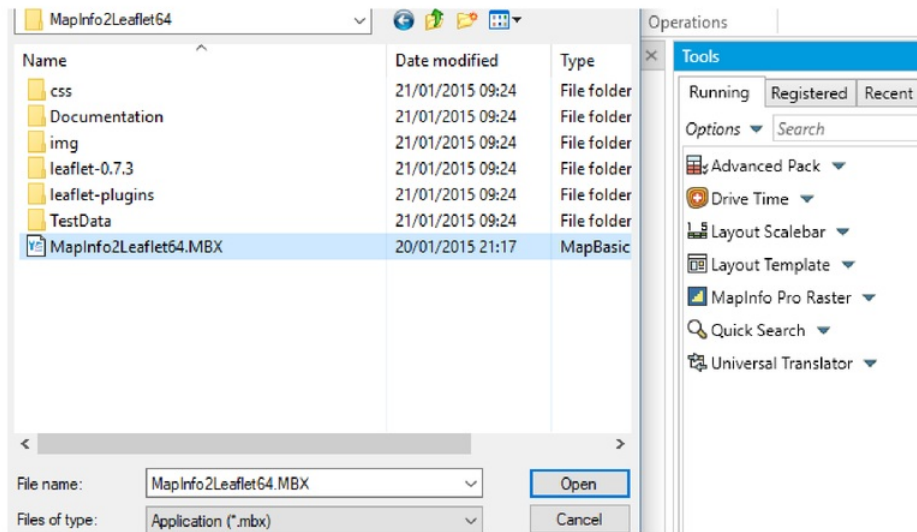


Figure 9: Loading the MapInfo2Leaflet Tool Application

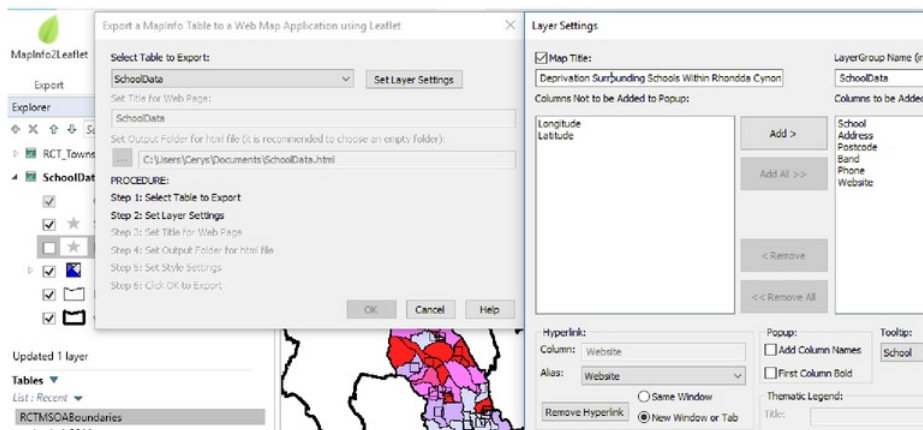


Figure 10: Setting the MapInfo2Leaflet Layer Settings for the Map

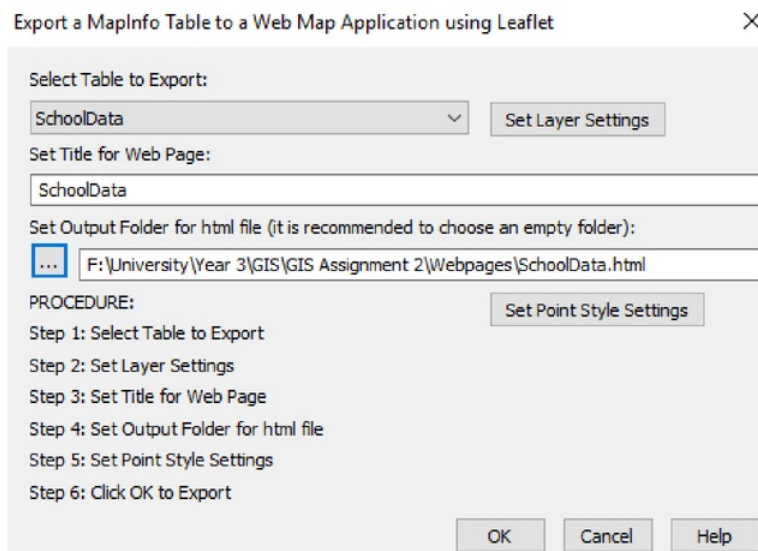


Figure 11: Setting the Destination by the Creation of a New Folder & Ensuring Settings

Below are the final steps to create the web page. The next image displays the unchanged result of this tool, whilst the final one has been edited using Notepad++ to edit the HTML to change the title, and remove any unnecessary information, such as its date of creation.

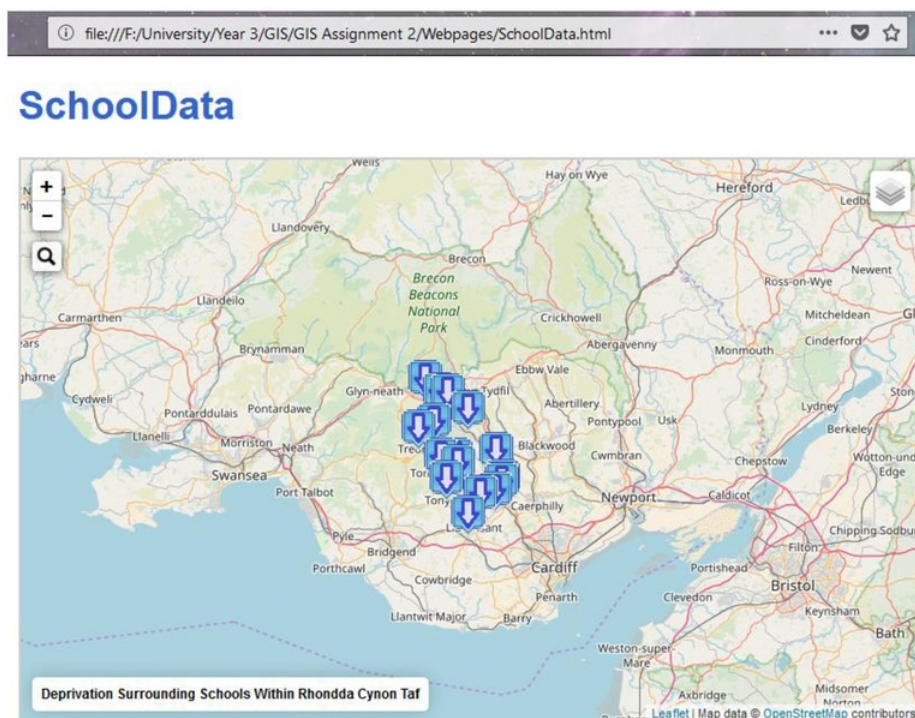


Figure 12: The Web Page Created Using the MapInfo2Leaflet Tool

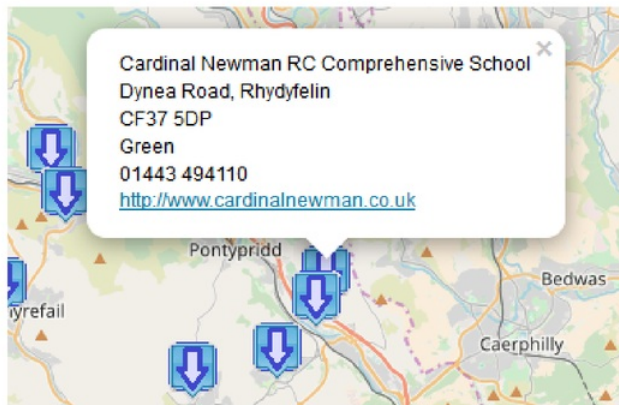


Figure 13: The Information Displayed Upon Clicking on a Point

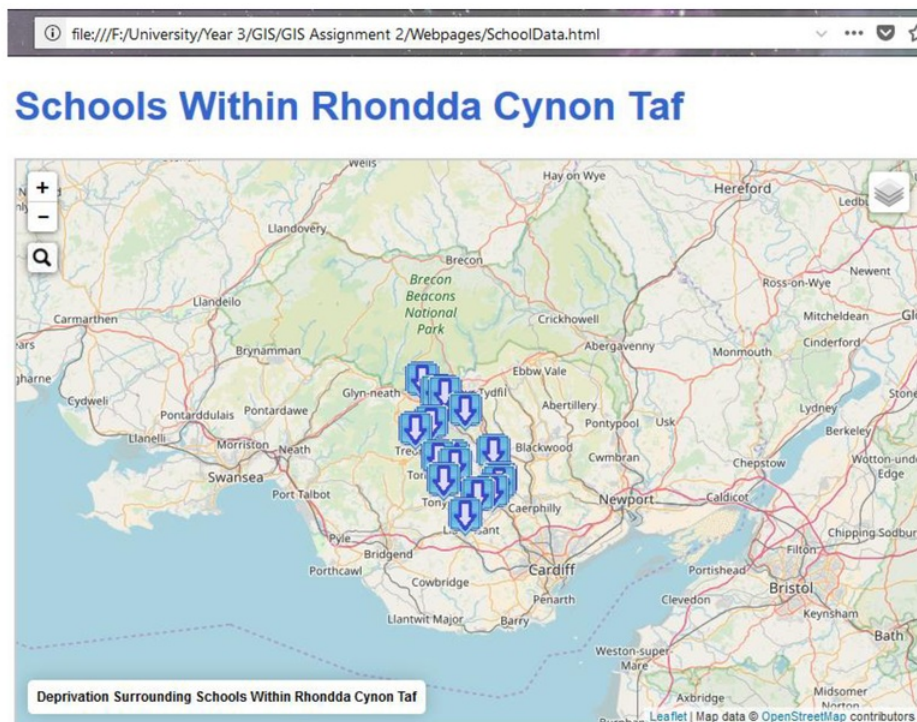


Figure 14: The Final Page Edited Using Notepad++

References

- [1] A. Küpper, *Location-Based Services: Fundamentals and Operation*. New York: John Wiley & Sons, Inc, 2005.
- [2] European Global Navigation Satellite Systems Agency, 'Location Based Services (LBS)', *European Global Navigation Satellite Systems Agency*, 2018. [Online]. Available: <https://www.gsa.europa.eu/segment/location-based-services-lbs>. [Accessed: 20-Feb-2018].
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- [4] Rhondda Cynon Taf County Borough Council, 'Schools in Rhondda Cynon Taf - Search for a school', *Rhondda Cynon Taf County Borough Council*, 2018. [Online]. Available: <https://www.rctcbc.gov.uk/EN/Resident/SchoolsandLearning/Findaschool/SearchforschoolsinRhonddaCynonTaf.aspx?SchoolFinderType=Secondary&SchoolFinderLetter=All>. [Accessed: 18-May-2018].
- [5] A. Wightwick, 'Wales schools colour codes 2018: Find out how your school rated', *Wales Online*, 01-Feb-2018.
- [6] Google, 'Google Maps', *Google*, 2018. [Online]. Available: <https://www.google.co.uk/maps/@51.621545,-3.9755207,15z>. [Accessed: 18-May-2018].
- [7] UK Data Service, 'UK Data Service - Infuse', *UK Data Service*, 2017. [Online]. Available: <http://infusecp.mimas.ac.uk/>. [Accessed: 15-Dec-2017].

FINAL GRADE

62/100

GENERAL COMMENTS

Instructor

Discussion / Brief report on LBS in relation to the assignment brief guides (CA 1) 20

Suitably well-presented discussion on LBS good referencing of facts and uses of LBS.

Data collection and entry to the system (CA2)20

what have you included in your data that will enhance that users experience with the GIS/LBS

Clear visuals display the excel data base structures and you have gathered school information as an additional layer. However the overall workspace is limited and you could have added GP locations to enhance the system.

Description of the spatial data sets (CA3)20

A well-presented description of your data collection. Though you could have added several more layers to full demonstrate LBS

How you developed the layers within the system (CA 4)35

Again because of the limited number of layers within the workspace your overall system is somewhat limited.

Functionality of system GIS and Website (CA 4)

The website works correctly with eth information that you have gathered within MapInfo.

Documentation / Report including: (CA5)5

Report has been presented to a good standard with suitable referencing.

14/13/12/20/4 62%

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