

Developing a Web-enabled School Finder for WCSD

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Introduction

Families with school age children can be very concerned with identifying their child's assigned school when they move to a new area or their child graduates from their current school. Oftentimes school district personnel rely on paper maps or address lists to determine a child's designated school. Staff members may spend a lot of time reviewing and analyzing non-digitized records in order to provide a precise response, a time consuming task that can be simplified with an interactive map.

The purpose of this project was to create a school boundary map for the Whittier City School District (WCSD) using open source software, integrated geographic information system (GIS) and interactive web map technologies.

WCSD is one of four school districts within the City of Whittier and serves approximately 6,300 students from transitional kindergarten through 8th grade. The school district is composed of eight elementary schools, two middle schools, and one combination elementary/middle school (K-8).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Odd 1	Even 2	LOW	HIGH	STREET																															
1	365	499	3RD AVE.	LA PUENTE	AND	DEX																													
2	500	699	3RD AVE.	LA PUENTE	AND	DEX																													
3	701	899	3RD AVE.	LA PUENTE	AND	DEX																													
4	1701	3999	ARBEYWOOD AVE.	WHITTIER	MILL	EDW																													
5	5400	5999	ACACIA ST.	WHITTIER	LON	DEX																													
6	6000	6299	ACACIA ST.	WHITTIER	LON	DEX																													
7	12000	12999	ADLERSON DR.	WHITTIER	LON	DEX																													
8	5100	5199	ADELE AVE.	WHITTIER	MILL	DEX																													
9	5300	5399	ADELE AVE.	WHITTIER	MILL	DEX																													
10	5400	5999	ADELE AVE.	WHITTIER	OG	EDW																													
11	13700	13799	ALANWOOD RD.	LA PUENTE	AND	DEX																													
12	13600	13699	ALCADE ST.	LA PUENTE	AND	DEX																													
13	10300	10799	ALDRICH ST.	WHITTIER	WW	EDW																													
14	11000	11399	ALDRICH ST.	WHITTIER	PHE	EDW																													
15	11400	11599	ALDRICH ST.	WHITTIER	SCOR	EDW																													
16	10700	10799	ALERTON ST.	WHITTIER	PHE	EDW																													
17	11100	11299	ALERTON ST.	WHITTIER	PHE	EDW																													
18	11400	11499	ALERTON ST.	WHITTIER	PHE	EDW																													
19	5800	6099	ALTA AVE.	WHITTIER	HOO	DEX																													
20	6000	6199	ALTMARK AVE.	WHITTIER	HOO	DEX																													
21	10700	10999	AMBER HILL DR.	WHITTIER	MILL	DEX																													
22	5200	5299	ANDALUSIA CT.	WHITTIER	LON	DEX																													
23	13200	13799	ANKERTON ST.	WHITTIER	AND	DEX																													
24	600	999	ARCIERO DR.	WHITTIER	AND	DEX																													
25	8000	8999	ARMOUR DR.	WHITTIER	JAC	DEX																													
26	5400	5999	ARRAMBIDE DR.	WHITTIER	LON	DEX																													
27	12300	12399	AVALON RD.	WHITTIER	LON	DEX																													
28	9900	10999	AVONCROFT ST.	WHITTIER	MILL	EDW																													
29	12000	12999	BAILEY ST.	WHITTIER	LON	DEX																													
30	13000	13799	BAILEY ST.	WHITTIER	HOO	DEX																													
31	10700	11099	BALFOUR ST.	WHITTIER	PHE	EDW																													
32	9900	10999	BALFOUR ST.	WHITTIER	PHE	EDW																													
33	11400	11499	BALFOUR ST.	WHITTIER	PHE	EDW																													
34	9900	10999	BALMORAL ST.	WHITTIER	MILL	EDW																													
35	11500	11799	BANYON RIM DR.	WHITTIER	MILL	DEX																													
36	800	898	BARK DR.	WHITTIER	AND	DEX																													

Figure 1. Sample of data provided by WCSD

Methodology

The methodology for this approach is depicted in Figure 2 and summarized as follows:

1. Obtain data from WCSD and convert PDF to CSV format. Edit data to separate low and high range address to individual rows instead of single columns.
2. Generate Python script to create a loop function in order to match the address range with the corresponding zip code.
3. Use QGIS to create shapefile and generate basemap
4. Create new polygon shapefile for school boundaries, point shapefile for school location and QAQC geocoding results.
5. Digitize feature & edit attribute table to include school name, contact information and grade level.
6. Export static map.
7. Generate interactive web map with Qgis2web plug-in. Incorporate JSON file for address search tool functionality.

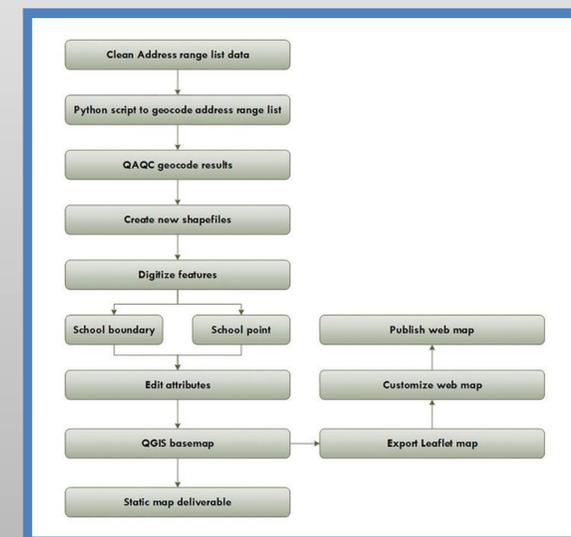


Figure 2. Provide a short caption for your spatial model

Timeline

Task	Due date
Obtain data from WCSD	April 18 – April 29
Process data and organize	May 2 – May 6
Learn QGIS and Leaflet	May 9 – Aug 12
Digitize schools and district boundaries	May 16 – June 24
Vacations	June 27 – Jul 8
Create web map	Jul 11 – Jul 28
Make necessary changes	Jul 25 – Aug 12
Submit finish product	Aug 12

Results

The map deliverables delineate the individual school boundaries within the WCSD, based on the address range list provided by the district. Figure 3 and figure 4 represent the two deliverables for WCSD.

The static map identifies the coverage area of each individual school along with spatial location of the facility. While the web map is user friendly and provides important school and district information. Users can easily obtain school information within the WCSD. The search tool allows for users find their designated school by typing in their home address. The WCSD web map also provides hyperlinks that directs users to the official school websites.

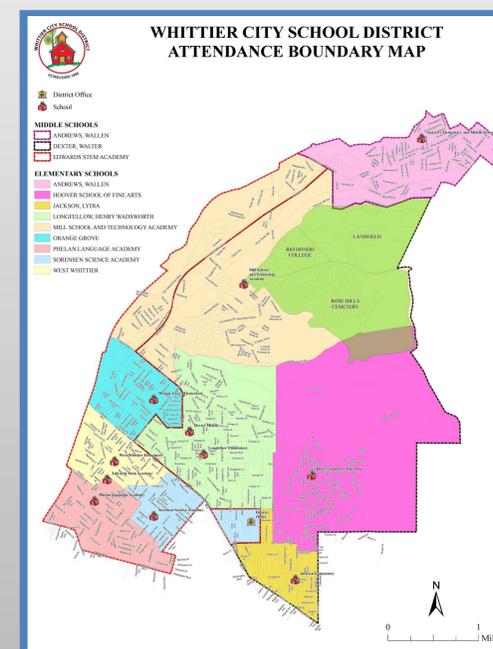


Figure 3. WCSD Attendance Boundary static map.

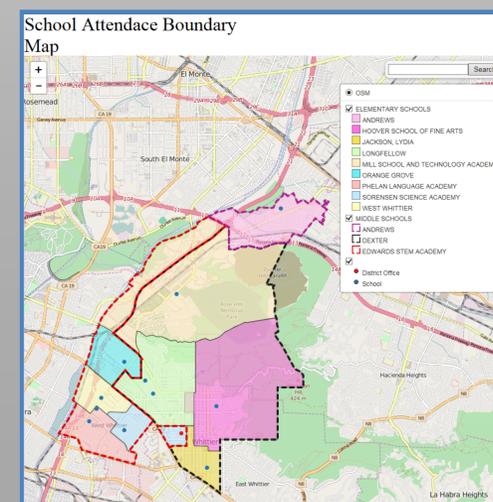


Figure 4. WCSD Attendance Boundary interactive web map

Discussion

The initial intended deliverable for this project was a static map with some light JavaScript programming that would provide information to WCSD residents. Although static maps can provide significant information and are a great option, their limitations are significant. Interactive web maps on the other hand make better use of spatial and physical data, while providing visuals, as well as making it possible to add information like hyperlinks to external websites. Therefore, it was more productive to create an interactive web map.

The interactive web map would be more efficient in providing answers to current and future residences within the WCSD as well as district staff in regards to identifying a child's designated school. The easy interaction, would diminish the incoming calls district and school personnel receive on a daily basis regarding inquires about school designations.

One of the current limitations of the web map, deal with the address search tool. Although it semi properly works, the address needs to be type exactly as the search query.

Conclusion

This project focused on the development of an interactive web map to assist WCSD staff and residences identify a child's designated school by typing in their home address. Even though the final outcome functions somewhat properly, there are some areas in which the design layout can be improve.

There are many aspects that could be improved if future work was to be performed. One important goal would be to add autocomplete functionality to the address search which would save users time and help them avoid typographic errors that prevent correct address matching and school information retrieval. The autocomplete would work by providing address suggestions based on the street number as the user begins to type. Safety and security is a second aspect for future work that would consist of creating statistical analyses focusing on crime rate near school vicinities and incorporating Megan's Law data which parents would likely be interested in learning more about.

The results of this project will simplify the current practices performed by WCSD staff. By using the project results, district personnel can spend their time more efficiently addressing other tasks as less time would be spent answering calls concerning school placement. At the same time by using free open source software rather than proprietary software, funds can be allocated for other sources such as extracurricular activities, staff training, and school supplies.

Data and Data Sources

The primary dataset for this project were provided by WCSD in PDF format, which identified school boundaries and school contact information (Figure 1). Secondary data consisted of street centerlines, addresses, and blocks and were downloaded from the Los Angeles County GIS Data Portal. The final dataset which consisted of aerial imagery was obtained from the CSULB Geography Department (Table 1).

Table 1. List of data and data sources used in the project

Dataset	Source
Aerial imagery	CSULB
School contact information	WCSD
School address range list	WCSD
District boundary	WCSD
Street centerlines	Los Angeles County GIS Data Portal
Addresses	Los Angeles County GIS Data Portal
Blocks	Los Angeles GIS Data Portal

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