

Tech 1 Executive Summary

Technical Report 1

Thesis Project: Twin Rivers Elementary/Intermediate School

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This is a summary of the technical report details the construction of the Twin Rivers Elementary/Intermediate School. The project is located along the west side of the 1600 block of Cornell Street, in McKeesport, PA. The owner of the project is the McKeesport Area School District. The school is built to replace the former Cornell Elementary School. The construction of this project is part of the plan to consolidate district’s five elementary facilities into three. The school district believes the Twin Rivers Elementary/Intermediate School is of an innovative design that will thrust the old steel town of McKeesport into the future. The new school will accommodate approximately 750 students and will serve as the Mathematics and Science Academy for the McKeesport Area School District.

The project delivery method of the Twin Rivers Elementary/Intermediate School construction project is design-bid-build. This is a traditional and common approach for a public construction projects. Under this kind of project delivery method, the best interests of the owners would be ensured. A reasonable price will be established and the quality and efficiency of the project delivery would be maximized for owner given the competition brought by the contractual relationship of bidders and subcontractors.

Due to this project is entirely funded by the school district; the owner has direct contractual relationship with the major players including: JC Pierce, the architect and engineer firm; PJ Dick, the construction management firm; American Geosciences, the environmental engineer and Garin Boward Beitko (GBB), the geotechnical engineer firm. The general contractor here is Gurtner Construction. The contract types here between the parties are all lump sum. There has been a few change-of-orders on the project. According to the project manager, Joe Brennan, no major change-of-scope or change-of-design has occurred. Other than Gurtner, the construction manager PJ Dick also hired a civil engineering consultant Phillips & Associates and a structural & MEP engineering consultant Loftus Engineer.

The project organizational is fairly straight-forward. For the general contractor, Gurtner Construction, the president William Gurtner oversees the project; Pete Szymanski is the project manager and Rayn Mangan is the superintendent on-site. There is no assistant project manager or project engineer on-site from Gurtner. For the construction manager, PJ Dick, Roberto Fratangelo is the senior project executive; John Taormina is the project executive and Joe Brennan is the project manager. Only two people from this management organization chart are on-site: the project manager from PJ Dick and the superintendent from Gurtner.

The project site takes up an entire block as shown in Appendix I. There are no neighboring buildings which would affect the day lighting of this building. The pedestrian ways are shown on the plan. Fire

hydrants are located to the north-east corner and the southwest corner of the block. Vehicular access to the site will occur from Cornell Street, and will include a paved access road encircling the entire building. Student bus drop-off will occur along the east/front side, while vehicular student drop-off will take place along the north and south side of the building. The site logistics plan is attached in Appendix I, too.

This project will achieve a minimum of LEED Silver Certificate and has a goal of achieving Gold Certificate by USGBC. As a team, JC Pierce and National Geosciences worked to get the project up to LEED standards. A mix of geothermal central loop system and hot water boiler will be utilized. The building will have a featuring glass-framed mechanical room that includes portions of the geothermal heating and cooling system for both function and educational experience.

The building will also include a grey water capture system for sustainability reason. This system will not only help this project achieve LEED points in the short-run but also help the school to lower the utility cost for the long-run. Curtain wall system will be utilized to maximize the day-lighting. In the meantime, several ways of solar shading will be implemented. Louvers are to be placed above southern windows. Portions of the large curtain wall in the courtyard are to have metal mesh coverings to maintain desired solar gain. Two educational vertical wind turbines will be installed along east side of the building. However, the wind turbines will primarily serve as an educational tool and generate enough electricity to provide minimal assistance in powering the facility.

Other than the LEED features, the system of the building meets the common intermediate school building system standard. Foundation system of this building will be shallow spread footings down to the frost line. Ground level slabs will be 4" deep concrete slabs-on-grade. For the roofing system, at the flat roof areas the roof framing will be comprised of structural steel columns and beams in-filled with open-web steel joists spaced 4'-0" to 5'-0" on center and a 1-1/2" deep, wide-ribbed, galvanized metal roof deck. Mechanical roof top units will be located on the flat roof areas and supported directly on the open-web roof joists. At the classroom wings rigid bents will be used to frame the sloped roofs over the classrooms. At the classroom wing corridors light gage metal or metal-plated wood trusses spaced 2'-0" on center will be used to frame the high corridor roofs. For the mechanical system, Ventilation air will provide by a Dedicated Outdoor Air System (DOAS) which will be ducted to spaces throughout the building. The DOAS unit shall be roof mounted, dual-stage, water-to-air, total enthalpy heat exchanger with outside air supply and exhaust fans, supply air filters, motorized desiccant heat wheels with pre-purge, heat wheel bypass dampers, DX cooling coil, and VFD motor controllers on supply and exhaust fans.

Compared to other educational facility construction project, the construction phase of this project is relatively short while the planning phase of the project is much longer. This is due to the project started due to an incentive of consolidate its five elementary facilities into three. The architect engineering firm, JC Pirece was hired to help with the development of such plan. In late 2010, the plan of renovating two existing schools and the construction of the Twin Rivers Elementary/Intermediate School was made. The demolishing of the previous Cornell Elementary School was separately bided and executed prior to the construction of the Twin Rivers Elementary/Intermediate School. So the construction project of the Twin Rivers Elementary/Intermediate School started early 2011. Detailed schedule can be referenced at Appendix II.

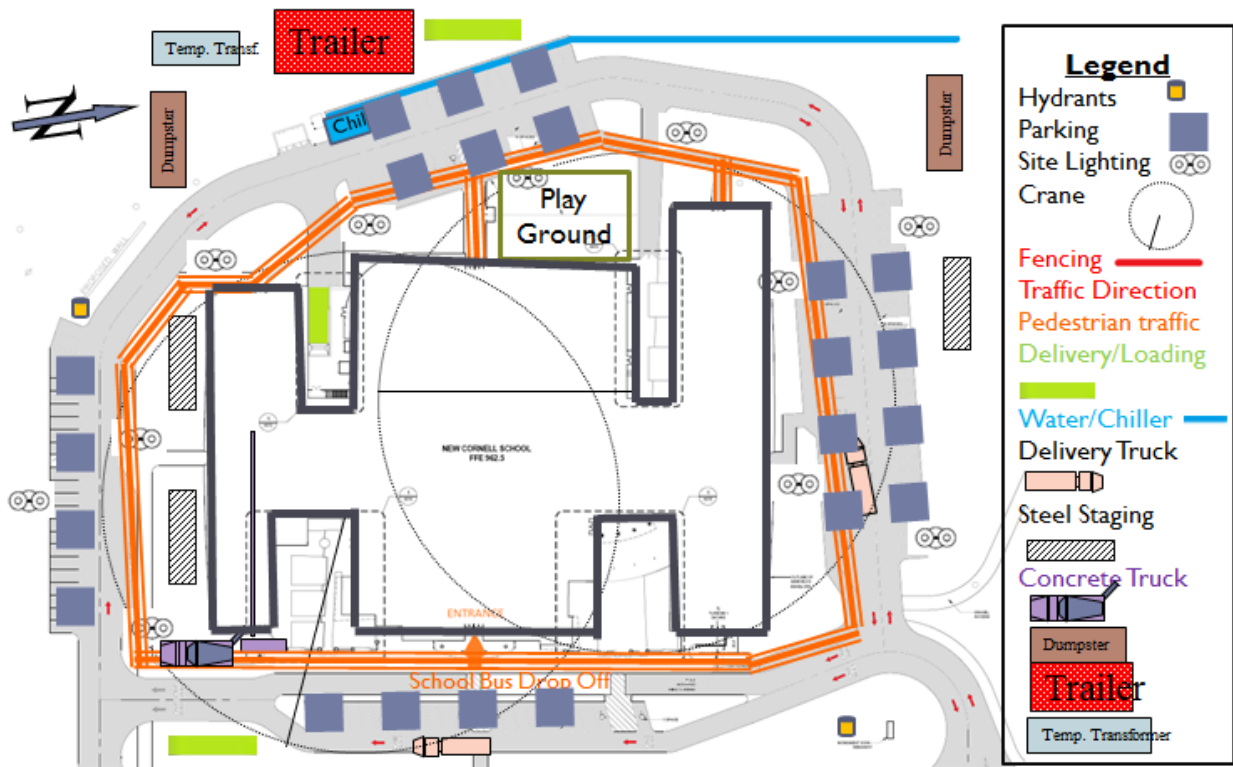
The project financial data are included in Appendix III. The breakdown costs of the trades are calculated with the adjustment of the combination of elementary and intermediate school facility based on RS Means. The adjustments are made based on the square footage of the two function area, elementary school and intermediate school 1-2 stories. Common area is assumed to be at the standard of intermediate school facilities. The detailed breakdown costs weren't provided from the owner; so all the cost data are based on RSMeans estimate.

The rendering of the project can be found in Appendix IX.

Appendix I. Site Logistics & Layout Plan

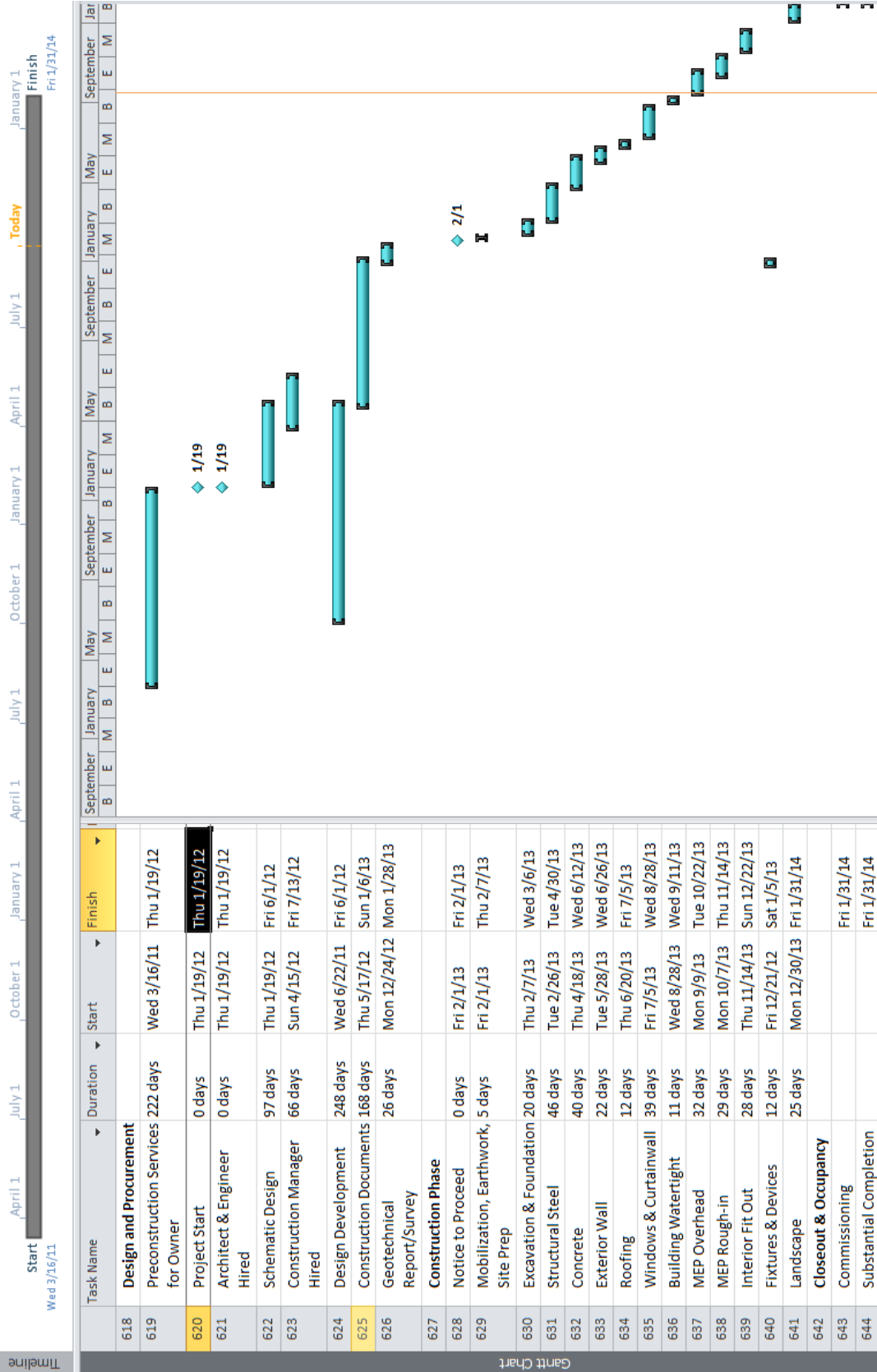


Site Map & Property Line



Site Logistics & Layout Plan

Appendix II. Project Schedule Summary



Appendix III. Project Financial Data

Project Financial Data			
Construction Cost	\$23,450,000	Total Cost	\$ 28,000,000.00
Construction Cost/Sq Ft	\$184.65	Total Cost/Sq Ft	\$ 220.47

Major Building System Cost		
Trade	Value	Value/Sq Ft
Concrete	\$7,035,000.0	\$55.39
Earthwork	\$2,814,000.00	\$22.16
Electrical	\$4,924,500.00	\$38.78
Mechanical & Plumbing	\$3,986,500.00	\$31.39
Equipments	\$2,814,000.00	\$22.16
Others	\$1,876,000.00	\$14.77

Appendix IX. Renderings & Current Conditions

