Concrete Feasibility Assessment and Implementation Plan

December 1, 2022

King County

I. Contents

II. Motion Text

Motion 16078[1]

A. The council requests that the executive submit for the council's review a feasibility assessment report and implementation plan on King County's ability to facilitate the public manufacture of concrete. The report and plan shall be developed in consultation with stakeholders such as but not limited to Sound Transit, the Washington state Department of Transportation, the Port of Seattle, the University of Washington, the city of Seattle and other interested jurisdictions around the county, representatives from organized labor who work in the concrete industry, and shall include at a minimum:

1. A feasibility assessment of the county's ability to partner with other public agencies to facilitate manufacture concrete for use in public building and construction, including:
   a. identification of the elements necessary for the county to facilitate the manufacture of concrete for use in county building and construction and projects of public partner entities;
   b. identification of property where such manufacturing could occur and what improvements to property would be necessary for the public manufacture of concrete;
   c. a survey of jurisdictions and public entities that may wish to partner with the county in facilitating the public manufacture of concrete and use of publicly manufactured concrete;
   d. a fiscal analysis of the cost and benefits of the county facilitating the public manufacture of concrete;
   e. operational, policy and legal analysis of the county's role in facilitating the public manufacture of concrete, including consideration of whether operations should be contracted to an outside entity or conducted by employees of the county or other public agency, and partnerships with public entities; and
   f. identification of any opportunities in the public manufacture of concrete that may benefit private entities in need of concrete; and

2. An implementation plan for the public manufacture of concrete, including:
   a. a process for 65 jurisdictions and public entities to partner in the public manufacturing of concrete;
   b. an estimated timeline of major milestones for implementing the public manufacturing of concrete;
   c. a financial plan that identifies estimated costs and revenues for the public manufacture of concrete; and
   d. identification of any changes needed to the King County code to enable the county to facilitate the public manufacture of concrete.

B. The executive shall file the feasibility assessment report and implementation plan on King County's ability to facilitate the manufacture of concrete by December 1, 2022, in the form of a paper original and an electronic copy with the clerk of the council. The clerk of the council shall retain the original and provide an electronic copy to all councilmembers, the council chief of staff, the policy staff director and the lead staff for committee of the whole, or their successors.

[1] Motion 16078 [LINK]

III. Executive Summary

This concrete plant study was created in response to Motion 16078, passed by the King County Council in March 2022, requesting that the County assess the feasibility of manufacturing concrete for use in County projects and projects of public partner entities. The Motion addresses a December 2021 strike by the Teamsters Union Local 174, representing 330 workers, against six concrete industry companies in the Puget Sound region. The work stoppage continued for several months in the first half of 2022 and at the writing of this report has yet to be fully resolved, creating significant delays to King County infrastructure projects.

To meet the goals of Motion 16078, the Wastewater Treatment Division (WTD) of the Department of Natural Resources and Parks (DNRP) commissioned a study with consulting firm HDR Engineering, Inc., to evaluate concrete batch plant properties that may be available for purchase and assess whether owning and operating a concrete manufacturing facility would be financially viable for King County.[2] The HDR study focused primarily on the demands for concrete specific to King County. The study identified that King County's concrete demands do not represent a substantial portion of the production capacity of a typical batch plant and, in turn, does not indicate a favorable business case.

The HDR study (Attachment A) was developed with information provided from the Port of Seattle, the King County Department of Natural Resources and Parks (DNRP), the Washington State Department of Transportation (WSDOT), Sound Transit, the City of Seattle's Department of Transportation, Seattle Public Utilities, and Seattle City Light. HDR also received information from concrete admixture suppliers, including Lehigh Hanson, Ash Grove Cement Company, Standard Industries (formerly W.R. Grace), and Sika USA, as well as concrete manufacturers Cadman, Inc., Stoneway Concrete, and CalPortland.[3]

For the purposes of this report, HDR conducted a comparison of two options for a concrete batch plant:

- **Option 1:** A batch plant for King County projects, at a site currently owned by NW Asphalt, located in Issaquah, WA, with a design capacity of 3,500 cubic yards (yd^3)/month, with a minimum production rate of 16 yd^3/hour.
- **Option 2:** A batch plant for King County projects, as well as other projects planned by other public partner entities, with a design capacity was 12,500 yd^3/month with a minimum production rate of 57 yd^3/hour.

For each of the two options, HDR conducted a feasibility assessment that analyzed the various types of equipment and materials necessary for concrete production to be purchased from off-site; third-party vendors; and operations and maintenance staff necessary to meet the needs of the County's demand for concrete in public works projects. HDR also estimated the necessary amount of material that would have to pass through the systems (throughputs) of each option to meet the County's demand for

[2] A batch plant is a production facility engaged primarily in the manufacture of ready-mix concrete using Portland cement, which is delivered to users in a plastic and unhardened state.

[3] An admixture is material other than water, aggregates, lime, or cement, used as an ingredient of concrete or mortar, and added to the batch immediately before or during its mixing. Admixtures also may include a water repellent, coloring agents, or a retarder or accelerator to modify its setting rate.

concrete. They also conducted simulations of such throughputs to estimate the vehicle quantities and frequencies and the storage capacities that would be needed to meet concrete demand.[4]

A site layout and a list of needed improvements to the Issaquah location for Option 1 were included in the study. For the hypothetical Option 2, HDR enumerated the equipment, site design needs, and suggested layouts to meet the County's demand for concrete. HDR also identified the key site characteristics that are required for the efficient construction and operation of a suitably sized batch plant. To accomplish this, a list of key site selection criteria was developed, as well as a search region that encompasses the project study area in King County and southern Snohomish County. HDR was able to locate five additional properties across King County that could meet the minimum criteria. (See Attachment A, Vicinity Map, page 14).

Capital cost estimations for Option 1 and Option 2 were generated utilizing information provided by the agencies listed above, based on a combination of in-house HDR data for similar projects and vendor quotations. Publicly available geographic information system (GIS) data were obtained for site-selection activities. Viable travel distances from each location were also estimated based on time limits required in the concrete industry for delivery to County projects, based on the unique chemical properties of wet concrete. Forecasted prices of concrete production costs were calculated using economic data from the Bureau of Labor Statistics (BLS) and the Producer Price Index, which measures specific concrete manufacturing inputs to production.[5] Other sources used in the study included the BLS Consumer Price Index data for the Seattle Metropolitan area and Seattle regional Construction Cost Index data published in *Engineering News-Record* magazine.[6]

Based on its cost-benefit analyses, HDR estimated that the one-time capital cost estimations for Option 1 would be $50,316,000. Overall one-time capital costs for Option 2 were estimated to be $81,676,000. While Option 2 would be more expensive overall, HDR found that, in this example, cost-sharing with other agencies could reduce King County's cost share to about $13.9 million, or 17 percent of the total capital costs for Option 2.

Using the results of the HDR report, King County also solicited input from public agencies about their willingness to partner with King County in the joint-ownership scenario of Option 2. The City of Seattle, Port of Seattle, WSDOT, and Sound Transit all communicated initial interest in pursuing Option 2. However, after seeing the cost-benefit results from the HDR study alongside other factors, no entities indicated interest in leading or participating in development of a publicly owned concrete plant. The reasons cited by the entities included an inability to obtain aggregate materials for the plant, risks associated with owner-provided materials, and the costs of siting and operating a concrete facility.

Based on HDR's results from both concrete-plant options and the absence of interest seen from potential partners in an Option 2 scenario, HDR did not recommend moving forward with either option one or two. HDR noted that an Option 2 plan would still be possible, given the potential cost-sharing

[4] Average throughput is the rate at which a batch plant can process material under normal operating conditions. Average throughput can be altered with design or operational changes. Peak throughput is the maximum rate at which the batch plant can process material. Peak throughput is achieved in "flooded" conditions (no pauses in feed or discharge). Peak throughput can be changed only by design and cannot be changed by operation.

[5] U.S. Bureau of Labor Statistics (bls.gov); Producer Price Index Home: U.S. Bureau of Labor Statistics (bls.gov)

[6] CPI Home: U.S. Bureau of Labor Statistics (bls.gov); City Cost Index - Seattle | 2010-12-01 | ENR | Engineering News-Record

opportunities with a jointly run concrete operation. It also added that a lack of access to a stable supply of aggregate materials would create cost increases high enough to make the project financially unfeasible.

The County Executive understands HDR's analysis and concern that the high costs of securing sufficient aggregate materials to meet the County's demand for concrete would make the project financially challenging due to the oligopoly of the local concrete industry. However, the County Executive will continue to pursue and study other opportunities to increase aggregate and continue to explore ways to secure a reliable supply of concrete for the benefit of the region's infrastructure and economy.

Because of HDR's findings about high capital costs, the Executive determined that an implementation plan would not at this time be needed until other opportunities to increase aggregate are identified to make implementation more costly feasible.

In addition, the County may still want to investigate being able to purchase adequate amounts of concrete from contractors that are hired from other agencies due to a "sole-source waiver" in its procurement rules. The County may also consider asking contractors to incorporate temporary onsite concrete batch plants as part of their bids thus making that work subject to community workforce agreements (CWAs) negotiated between the County and labor unions on public construction projects.

IV. Background

Department Overview: The Department of Natural Resources and Parks (DNRP) works in support of sustainable and livable communities and a clean and healthy natural environment. Its mission is to foster environmental stewardship and strengthen communities by providing regional parks, protecting the region's water, air, land, and natural habitats, and reducing, safely disposing of and creating resources from wastewater and solid waste.

The Wastewater Treatment Division (WTD) works to protect and improve water quality. The employees of WTD plan, design, build, and operate the County's water treatment facilities. The Division employees enforces regulations to reduce harmful waste discharged to the system and educate the public and businesses on ways to protect water quality.

Key Context: In December 2021, the Teamsters Union Local 174 , representing 330 workers in the Puget Sound region's concrete industry, began a strike involving concrete mixing truck drivers, dump truck drivers, and cement plant employees across six companies. The work stoppage continued for several months into the first half of 2022. It has yet to be fully resolved, creating significant delays to King County public infrastructure projects in Seattle, Bellevue, Issaquah, Redmond, Snoqualmie, and Kenmore. Such impacted projects include Sound Transit's Eastside light rail expansion, repairs to the West Seattle Bridge, and expansions to Interstate 405 in Bellevue and Renton.

The ongoing labor dispute between concrete manufacturers and the workers' union may also impact future County projects and could result in:

- Costly delays or cancellation of taxpayer-funded work, such as expansion of Harborview Medical Center and electrification of the Metro Transit Department's South Base, as well as road safety improvements in unincorporated areas of the County;
- Impairment of private development, including housing construction, at a time when the need for homes exceeds available housing supply; and
- Layoffs for thousands of construction workers and construction-related jobs just as the region is recovering from the COVID-19 global pandemic.

These factors contributed to exploration of the public manufacture of concrete for King County and public partner projects to ensure that the next decade of taxpayer-funded infrastructure projects can move forward with minimal delay.

Report Methodology: This report was drafted by DNRP staff. HDR Engineering, Inc., provided analytical and technical support and authored the attached study (Attachment A). King County provided HDR with a data set of potential projects that included the anticipated schedule and concrete quantities. These data were processed to establish an incremental and cumulative demand.

The HDR study was developed with information provided from the Port of Seattle, DNRP, the Washington State Department of Transportation (WSDOT), Sound Transit, the City of Seattle's Department of Transportation, Seattle Public Utilities, and Seattle City Light. HDR also received information from concrete admixture suppliers, including Lehigh Hanson, Ash Grove Cement Company, Standard Industries (formerly W.R. Grace), and Sika USA, as well as concrete manufacturers Cadman, Inc., Stoneway Concrete, and CalPortland.

Capital cost estimations in the HDR report were generated utilizing information provided by the agencies listed above based on a combination of in-house HDR data for similar projects and vendor quotations. Publicly available geographic information system (GIS) data were obtained for site-selection activities.

Forecasted prices of concrete production costs were calculated using economic data from the Bureau of Labor Statistics (BLS) and the Producer Price Index, which measures specific concrete manufacturing inputs to production. Other sources used in the study included the BLS Consumer Price Index data for the Seattle Metropolitan area and Seattle regional Construction Cost Index data published in Engineering News-Record magazine.

V. Report Requirements

This section summarizes the findings from HDR's study (Attachment A). It provides the information called for by Motion 16078, including a feasibility assessment and implementation plan. It is organized to follow the structure of the Motion and provides information based on two options identified by HDR, outlined below.

Concrete Plant Options Identified by HDR

King County conducted a due-diligence conceptual study to evaluate the feasibility of siting a new concrete operation, commonly known in the concrete industry as a "batch plant," to serve construction projects over the next five years in the County's portfolio.[7] In March 2022, commissioned a study with consulting firm HDR Engineering, Inc., to evaluate batch plant properties that may be available for purchase and determine whether owning and operating a concrete manufacturing facility would be financially viable for King County.

The HDR study first focused primarily on the demands specific to King County, which did not represent a substantial portion of the production capacity of a typical batch plant and, in turn, did not indicate a favorable business case. In a second phase, HDR's study is to build upon the March 2022 evaluation to include a more comprehensive demand for ready-mixed concrete for several generic sites, identify key parameters, and address the core objectives associated with the project.

For the purposes of this report, HDR conducted a comparison of two options for a concrete batch plant. Both options are presented in this summary report as:

- **Option 1:** A batch plant for King County projects, at a location currently owned by NW Asphalt, located at 10430 Renton Issaquah Road SE in Issaquah, WA (NW Asphalt - parcels 0623069027 and 0623069032).
- **Option 2:** A batch plant for King County projects, as well as other projects planned by other public partner entities.

The primary difference between the two options is cost-sharing. In Option 1, the batch plant would be owned and operated by the County to produce concrete for construction projects. In Option 2, the costs of operating the plant would be shared by the County and other public partner entities for a range of other public construction projects, both inside and potentially outside the County.

As part of the study, HDR developed opinions of probable construction costs (OPCCs) to estimate the expected capital costs associated with each of the batch plant options. The OPCCs are based on proprietary HDR data, recent budgetary quotations, and information together with labor and material rates for the Seattle area. This estimate uses the following methodologies for estimating:

- Budgetary vendor quotations that were solicited for major components where time permitted. These quotations are related primarily to material handling equipment.
- Material takeoffs from the conceptual sketches. [8]
- Application of unit pricing based on the RSMeans database. [9]
- Budgetary allowances based on historical data and past project experience.

When developing OPCCs for the report, HDR made the following assumptions for each Option:

[7] A batch plant is a facility with equipment that combines various ingredients to form concrete. Some of these inputs include water, air, admixtures, sand, aggregate (rocks, gravel, etc.), fly ash, silica fume, slag, and cement.
[8] A material takeoff is a list of materials needed to build a designed structure or item, along with quantities and types of the material required.
[9] RSMeans (https://www.rsmeans.com/construction/data) is a construction cost-estimation database that provides up-to-date information about the market prices of building materials. It is often used for pre-construction managers, architects, engineers, contractors, and others to estimate costs of construction and renovation projects.

Option 1:

- The batch plant design capacity was 3,500 cubic yards (yd^3)/month with a minimum production rate of 16 yd^3/hour.[10]
- Conveying equipment was sized as required to support this throughput for a material density of between 80 pounds per cubic foot (lb/ft^3) and 110 lb/ft^3.[11]
- On-site storage included a 100-ton silo for cement and fly ash each, and six aggregate bunks with 600 yd^3 of storage each.
- Major utilities were already on site and were of sufficient capacity to meet the design of the facility.
- The existing stormwater pond had adequate capacity to support the facility and no additional considerations for upgrades to the pond were included.
- No provisions for ground improvements were included.
- Bunkers were located directly on an 18-inch-thick concrete pad.
- Substantial structures, such as conveyer support bents and transfer towers, were supported on mat foundations; no piles or other deep foundations were included.[12,13]
- Union labor was used for establishing the unit prices.
- No new administration buildings, maintenance shops, or truck scales were included.

Option 2:

- The batch plant design capacity was 12,500 yd^3/month with a minimum production rate of 57 yd^3/hour.
- Conveying equipment was sized as required to support this throughput for a material density of between 75 lb/ft^3 and 110 lb/ft^3.
- On-site storage included two 1,150-BBL (150-ton) silos for cement, two 935-BBL (120-ton) silos for fly ash, and seven aggregate bunkers ranging from 400 yd^3 to 700 yd^3 of storage each.[14]
- Major utilities were available along the frontage of the property and were of sufficient capacity to meet the design of the facility.
- Bunkers were located directly on an 18-inch-thick concrete pad.
- Substantial structures, such as conveyer support bents and transfer towers, were supported on mat foundations; no piles or other deep foundations were included.
- Union labor was assumed for establishing the unit prices.

[10] Attachment A, page 16

[11] Throughput is the amount of material or items passing through a system or process.

[12] A bent is a transverse rigid frame that is used to define the overall shape and character of a structure, such as an archway or a roof line, and is commonly pre-assembled as rafters, joists, posts, and pilings made of wood, steel, or concrete framing.

[13] A transfer towers is a structure at the junction of two conveyor belts that changes the direction the material on the belt is moving.

[14] BBL is an abbreviation of the word barrel, which is used as the standard measure of volume in the U.S. oil and gas industry (42 U.S. gallons).

A.1 A feasibility assessment of the county's ability to partner with other public agencies to facilitate manufacture concrete for use in public building and construction, including:

A.1.a. Identification of the elements necessary for the county to facilitate the manufacture of concrete for use in county building and construction and projects of public partner entities

HDR conducted a feasibility assessment of Options 1 and 2, using a set of assumptions for necessary concrete production amounts, staffing and equipment needs for each option, and raw materials required to meet County concrete demand.

Concrete Production Assumptions and Data Points

- As noted above in on page 9, King County requires production of at least 3,500 yd^3/month of concrete.
- For the purposes of this study, HDR used a five-year time span to measure the concrete demand rate.[15] It clarified that some capital projects may come online in beyond the five-year span that may increase average annual concrete demand. To meet the production requirements identified above, a concrete batch plant would need to be able to produce 120 yd^3 of concrete every day, which is roughly equivalent to 10 to 20 batches per day.[16]
- While there is no agreed-upon "standard" throughput range for batch plants, most small, portable operations are capable of producing 100 yd^3/hour, while larger, fixed-position operations can handle about 300 yd^3/hour.[17]

The following elements address specific components of Motion 16078.

Operations, Staffing, and Equipment Needs

- To meet the County's demand for concrete, the operation parameters for both batch plant options include operations for 346 days per year, with seven non-working holidays and 12 non-operating maintenance days each year.[18]
- One crew shift per day, lasting a total of 8.5 hours per shift with one non-working hour per shift would be needed.[19]
- The two options outlined below could be operated by either King County employees or a vendor. Minimum facility staffing needed to operate the plant, mix the concrete, and deliver the end product in a typical day shift (excluding alternates) would include the following staff:[20]
    - Batch plant:
        - Operations: 2 staff
        - Maintenance: 1 staff
    - Ready-mix vehicle fleet: 5-15 staff (variable depending on demand)
    - Yard operations:

[15] Attachment A, page 1
[16] Attachment A, page 4
[17] Attachment A, page 19
[18] Attachment A, page 1
[19] Attachment A, page 2
[20] Attachment A, page 24

        - Front-end loader: 1 staff
        - Dust control/street sweeping: 1 staff
    - Site maintenance:
        - Fleet mechanics: 2–3 staff (variable depending on demand)
        - Water treatment system operator
        - Groundskeeper
    - Office:
        - Plant manager
        - Purchaser
        - Fleet dispatcher
        - Laboratory manager
        - Health, safety, and environment
        - Administration
- The maximum drive time for workers to drive from the batch plant to the construction location(s) was assumed as one hour, including traffic time.[21] The one-hour limit was determined based upon the typical time in which concrete delivery needs to be made for the batch of material to still be usable for placement. Notably, times in excess of one hour will cause the concrete to start setting, depending on types of admixtures.[22]
- Vehicles needed to bring in concrete raw materials for Options 1 and 2, discussed below, and deliver ready-mix cement to its end uses include three types of trucks:[23]
    - A ready-mix concrete truck with a 10 yd^3 capacity
    - A dump truck with a capacity of 14 yd^3, or 30,000 pounds
    - A pneumatic tanker with a capacity of 1,000 ft^3, or 45,000 pounds

Feedstock[24]

- The ready-mix concrete produced at the batch plant in the HDR study was assumed to consist of up to six types of aggregates (one fine aggregate and five coarse aggregates), water, Portland cement, and fly ash, as well as certain admixtures that are sometimes used to retard the time needed for the concrete to set.[25]
- Common admixtures include entrained-air, accelerators, fiber, colors, and more.[26] The assumed composition by volume and bulk densities for all components are shown in Table 1 below.

[21] Attachment A, page 2

[22] Setting refers to the chemical process that binds cement and aggregate materials, causing stiffening of the concrete admixture while it dries. This process begins immediately after water is added and lasts for a limited time before it can no longer be poured or disturbed after application. Concrete is said to be "set" when it has stiffened to the point that it supports some pressure without damage. Anything over an hour in terms of drive time begins to represent a period in which concrete is more at risk of being non-viable material for placement when it arrives onsite.

[23] Attachment A, page 21

[24] A feedstock is any raw material to supply or fuel a machine or industrial process.

[25] Aggregates are collections of granular rocky material, such as sand, gravel, crushed stone, that are mixed with cement and water to produce concrete. Aggregates are divided into two groups by size: coarse aggregate (measuring 4.75mm or higher in diameter) and fine aggregate (measuring less than 4.75mm in diameter). The aggregate of each type is further sub-divided into many other classifications based on its size.

[26] Entrained air is an admixture of tiny spherical air bubbles measuring approximately one hundredth to one thousandth of an inch in diameter, which are created to reduce the viscosity of wet concrete and lower the water-cement ratio.

Table 1: Ready-mix concrete composition and bulk density

Component	Percent composition (by volume)	Bulk density
Water	16%	62.4 lb/ft^3
Air	4%	0.0765 lb/ft^3
Portland cement	8%	90 lb/ft^3
Fine aggregate 1	30%	110 lb/ft^3
Coarse aggregate 1	10%	110 lb/ft^3
Coarse aggregate 2	10%	105 lb/ft^3
Coarse aggregate 3	10%	95 lb/ft^3
Coarse aggregate 4	10%	85 lb/ft^3
Fly ash	2%	45 lb/ft^3

- The HDR study assumed that inbound aggregates, cement, and fly ash would be purchased from an off-site third party, delivered to the site in dump trucks and pneumatic tankers, and offloaded into the appropriate bunkers and silos. Outbound ready-mix concrete is assumed to be transported from the site to its end-use destinations in County-owned and -operated ready-mix cement trucks.
- HDR found that obtaining aggregate material would be the most significant regional challenge in the manufacture of concrete, as the majority of local aggregate pits (about 90 percent) have long-term supply contracts controlling much of the existing supply of material through 2027. The larger concrete suppliers in the region (e.g., CalPortland, Stoneway, and Cadman) routinely open source between each other, so it is unlikely that such vendors would be willing to negotiate further supply sourcing agreements with a new market entrant without the inclusion of a significant premium.[27]
- HDR found that it is likely that the County would have to purchase aggregate from the above sources or identify other open-source aggregate suppliers. CalPortland and Cadman have pits in Monroe and Snoqualmie, while Stoneway sources its aggregate from Maple Valley. After conducting an industry scan to identify the viability of reopening a closed aggregate pit and to identify open-source aggregate suppliers, HDR found that there were no close open-source aggregate suppliers that had not already pre-sold much of their existing supply within a radius of several hundred miles.
- Thus, the primary mode of aggregate sourcing would likely result in paying significant premiums above traditional pricing relative to existing market participants for obtaining materials, even if

[27] Open-sourcing of materials refers to aggregate producers buying and selling materials between themselves. One producer may have a fixed-price contract for delivery of material at a specified volume at a specified time. In the event the supplier needs additional material, it may elect to buy supplies of aggregate from another producer. Similarly, if a producer has excess material in a specified time frame, relative to its production quantities, it may elect to sell material to another producer. Given that the major concrete suppliers have greater than 95 percent of the material locked up in forward contracts, the practice of buying/selling amongst one another is very common for them to smooth out demand and protect their market shares of concrete production in the region.

potentially cheaper sources of aggregate, such as reopening a pit, were sought at the same time. HDR estimated that the lack of readily available sources for aggregate could result in the County incurring additional costs in the logistical movement of materials in excess of $10/yd^3 of material when drawing from relatively regional sources. This cost could easily double, should aggregate sources begin to be drawn from outside of a 50-mile radius.

- Portland cement is locally manufactured by national companies such as Ash Grove and Lehigh Hanson, both with several nearby locations in the Puget Sound area. This material can be directly purchased and sourced directly to the plant via purchase orders for freight-on-board (FOB) delivery directly to the batch plant location. Factors for pricing would include origin/destination delivery considerations; however, this is commonly a 2-3 percent markup within a 50- to 75-mile radius of the direct source. Outside of this radius, costs for FOB delivery to the batch plant could be in excess of 5 percent in terms of a direct markup.
- Concrete admixtures are provided by national admixture producers, such as Standard Industries (formerly W.R. Grace) and Sika. The purchase of admixtures commonly involves negotiating a longer-term admixture supply contract to lock in pricing with a single vendor/supplier.
- Suppliers would install tanks and dosing equipment at the batch plant as part of the admixture supply contract, which effectively are costs that are factored into the overall price agreement negotiated between the plant operator and the supplier.[28]
- Common contractual periods range from two- to five-year cycles and longer-term pricing agreements are becoming rare, particularly without escalation clauses because of market volatility in pricing and core inputs required in the processing and development of admixtures.
- Supply agreements generally dictate a periodic delivery schedule with additional costs that may be incurred for non-periodic supply costs of the material. Admixture elements are supplied as needed and are often marked up by the batch plant facility by 20-40 percent.

A.1.b. Identification of property where such manufacturing could occur and what improvements to property would be necessary for the public manufacture of concrete

Option 1

This subsection describes concrete manufacturing operations at the Issaquah-based Option 1 batch plant for only King County projects, including consumption projections, estimate throughput demand, site layout, and throughput simulation.

King County provided HDR with a data set of potential projects that included the anticipated schedule and concrete quantities. These annual project-level projections were distributed over an S-curve for the years that each project was active.[29] The individual monthly demands were then combined to establish the throughput basis for a single plant.

[28] Dosing equipment is machinery that measures and dispenses a blend of admixture materials needed to produce a precise mixture based on project-specific applications of concrete.

[29] An S-curve is a mathematical graph used in project management to represent the corresponding cumulative data of a project or task. In this case, S-curve data from Option 1 represents the relationship between the average monthly demand for concrete and a deviation from the project's total forecasted demand, which was provided by a third party.

Geographic area to be served

Because concrete can travel a limited distance to a job site before setting takes place, a drive-time figure was produced showing bands of equal drive time from the Issaquah site. ASTM C-94 (Specification for Ready-Mixed Concrete) states that the maximum amount of time from mixture to pour is 90 minutes. Including logistics time at the batch plant and at the project site and ambient temperature variations, 30 to 45 minutes is a typical travel time from the project site. This estimate is based on concrete production without the use of set retarding admixtures that can be added to a batch. If used, admixtures can extend the set time by approximately 2 to 3 hours, though the use of set-retarding admixtures may be prohibited by the concrete specification. Refer to Figure 6-1 in Attachment A for an example specific to the Issaquah site, or Appendix E for the theoretical service area of other example parcels.[30,31]

Site Layout

Figure 2-2 (see map in Attachment A, page 6) depicts the conceptual site layout for Option 1 developed as part of the study.[32] The site layout was used by HDR as a basis for the development of the OPCC, the implementation schedule, and additional analysis. The layout includes the following elements:

- Aggregate bunkers
- Receiving hopper and transfer conveyor
- Aggregate feed bins
- Ready-mix concrete batch plant
- Ready-mix concrete truck fleet parking
- Traffic flows for inbound and outbound product vehicles

Additionally, some of the existing infrastructure on site was assumed to be reused for the batch plant operations. These elements were also identified on the site plan and include the following:

- Administration building with staff parking
- Truck scale
- Maintenance shop
- Stormwater pond

Site Improvement Needed

Major additions that would be required for the Option 1 site in Issaquah involve equipment needed for batch plant assembly, including:

- Tilt mixer
- Cement and fly ash silos
- Cement batcher[33]
- Water meter
- Transfer conveyors
- Aggregate bins
- Aggregate batcher
- Dust collectors
- Control system
- Air compressors

Other equipment improvements for Option 1 include:

- Aggregate bunkers
- Truck/wheel wash
- Concrete wash-out pit
- Wastewater treatment systems

[30] Attachment A - HDR Report, page 20

[31] Attachment A - HDR Report, Appendix E, page E-1)

[32] Attachment A, page 6

[33] A batcher is a machine that measures out and combines the ingredients of concrete into separate batches.

- Stormwater treatment systems
- Administration building
- Maintenance shop
- Truck scale and scale house

Table 2 below shows ready-mix concrete demand and aggregate consumption estimates for Option 1.

Table 2. Average demand/consumption estimates for Option 1.

Product	Yearly	Monthly	Daily	Hourly
Ready-mix concrete demand	42,000 yd^3	3,500 yd^3	120 yd^3	16 yd^3
Aggregate consumption	67,200 tons	5,600 tons	190 tons	N/A

Throughput Simulation

HDR conducted a throughput simulation to estimate vehicle quantities and frequencies, and storage capacities based on the demands for concrete manufacturing, as stipulated by the County. The vehicle frequencies were used to establish cycle times and fleet sizes. Table 3 and Table 4 below detail the anticipated vehicles' quantities and storage capacities, respectively. (Refer to Attachment A, Appendix B for the complete throughput simulation assumptions and findings.)[34]

Table 3. Vehicle traffic quantities and frequency

Parameter	Inbound Traffic Pneumatic tankers	Inbound traffic Dump Trucks	Outbound Traffic Ready-mix Concrete Trucks	Outbound Traffic Dump trucks	Total
Annual truck quantity (trucks/year)	204	2,741	4,200	1,740	8,884
Daily truck quantity (trucks/day)	2	11	13	7	33
Truck frequency (minutes)	225	40	34	64	13

Table 4. Storage volumes and capacities

Product	Storage volume	Storage capacity
Portland cement silo	160 tons	14 days
Fine aggregate 1 bunker	600 yd^3	17 days
Coarse aggregate 1 bunker	600 yd^3	52 days
Coarse aggregate 2 bunker	600 yd^3	52 days
Coarse aggregate 3 bunker	600 yd^3	52 days

[34] Attachment A, Appendix B, page B-1

Coarse aggregate 4 bunker	600 yd^3	52 days
Fly ash silo	20 tons	14 days

Production rates for batch plants can vary based on the configuration of the plant and proposed batching sequence. Although there are no "standard" production ranges, small, portable batch plants are typically capable of rates up to 100 yd^3/hour while larger-scale, fixed-position plants can produce upwards of 300 yd^3/hour. For this reason, the larger plants are generally better suited for sustained, quick-turn, high-throughput operations typical of large pours.

For the Option 1 batch plant operation, a 430 yd^3/day plant (approximately 57 yd^3/hour or 50–60 batches per day) would meet the 12,500 yd^3 average monthly demand. A plant of this size would satisfy the County's needs for 89 percent of the five-year forecast period. The remaining 11 percent of the time, the County would need to supplement from third-party sources.

Option 2

This section describes Option 2, the batch plant for King County and public partner entities, including design basis, site layout, equipment needs, operations, throughput simulation, and additional potential sites. It does not offer an identified location.

King County provided HDR with a data set of potential projects that included the anticipated schedule and concrete quantities. The list of projects represented those of King County as well as other local agencies with similar concrete demands. These data were analyzed by HDR to establish an incremental and cumulative demand. Refer to Table 5 below for a graph depicting these projections.

Table 5. Cumulative and incremental consumption projection for Option 2

Product	Yearly consumption	Monthly consumption	Daily consumption
Fine aggregates	97,500 tons/year	8,200 tons/month	300 tons/day
Coarse aggregates	129,000 tons/year	10,750 tons/month	400 tons/day
Cement	41,000 tons/year	3,400 tons/month	120 tons/day
Fly ash	5,000 tons/year	410 tons/month	15 tons/day
Water	5,500,000 gal/year	455,000 gal/month	16,000 gal/day

These annual project-level projections were distributed over an S-curve for the years that each project was active, in the same way the data was analyzed in Option 1. The individual monthly demands for Option 2 were then combined to establish the throughput basis for a single plant.

Design Basis

As part of the HDR study, a design basis was established to define key criteria to guide the subsequent design and analysis effort. The design basis was established based on information provided by King County regarding the potential project site and the forecasted ready-mix concrete consumption as well as relevant design experience and similar historical projects.

Below is the estimated ready-mix concrete demand projected by HDR for Option 2:

- Average hourly design throughput 58 yd^3/hour

- Average daily design throughput 434 yd^3/day
- Average monthly design throughput 12,500 yd^3/month
- Average annual design throughput 150,000 yd^3/year

To meet these ready-mix concrete production demands, the key consumable feedstocks required for ready-mix production also need to be brought to the site regularly. The details for the supply of these products are provided in Table 6.

Table 6. Example concrete consumables consumption rates for Option 2

Product	Yearly consumption	Monthly consumption	Daily consumption
Fine aggregates	97,500 tons/year	8,200 tons/month	300 tons/day
Coarse aggregates	129,000 tons/year	10,750 tons/month	400 tons/day
Cement	41,000 tons/year	3,400 tons/month	120 tons/day
Fly ash	5,000 tons/year	410 tons/month	15 tons/day
Water	5,500,000 gal/year	455,000 gal/month	16,000 gal/day

Site Layout

The HDR study developed a conceptual layout for Option 2. (See Attachment A, Figure 3-2, page 11)[35] The layout includes the following elements:

- Aggregate bunkers
- Receiving hoppers, aggregate bin feed, and transfer conveyors
- Aggregate feed bins and batcher[36]
- Central mix type concrete batch plant (cement and lime silos, central mixer)
- Ready-mix concrete truck fleet parking
- Traffic flows for inbound and outbound product vehicles
- Administration building with staff parking
- Truck scale
- Maintenance shop
- Stormwater pond

Equipment Needs

Truck loading rates for the Option 2 site would be about 40 yd^3/hour. To meet this demand, the following vehicles would be required, as a minimum, assuming that all inbound products are hauled by third parties:

- 15 ready-mix trucks
- 1 front-end loader (although most facilities have redundancy for these vehicles)
- 1 water truck for dust control on haul roads and in the stockyard

Other optional vehicles to be considered include:

- Vacuum truck for spill cleanup[37]
- Street sweeper
- Cement/fly ash pump trucks

[35] Attachment A, page 11

[36] A batcher is a machine that measures out and combines the ingredients of concrete into batches.

[37] A vacuum tank truck is equipped with a pump that can pneumatically suck liquids, sludges, slurries, or the like into the tank of the truck.

- Miscellaneous passenger vehicles (trucks, all-terrain vehicles, etc.)

Operations

Ready-mixed concrete is nominally 7.5 percent water by volume. At a nominal production rate of 430 yd^3/day, the Option 2 batch plant would require approximately 6,500 gallons of water per day for concrete production. In dry months, this number would increase for dust control and truck-washing activities on site. It is also common for collected stormwater to be treated and used for production. A baseline assumption for the electrical needs of a typical batch plant is 1.5 megawatts, including both the equipment loads and other ancillary systems (water treatment, dust control, lighting, buildings, etc.).

Throughput Simulation

HDR conducted a throughput simulation to estimate vehicle quantities and frequencies, and storage capacities based on the design concrete demands of Option 2. The vehicle frequencies were used to establish cycle times and fleet sizes. Table 7 and Table 8 below detail the anticipated vehicles' quantities and storage capacities, respectively. Refer to Attachment A, Appendix B, for the complete throughput simulation assumptions and findings.[38]

Table 7. Vehicle traffic quantities and frequency (round trips)

Parameter	Inbound traffic		Outbound traffic	Total
	Pneumatic tankers	**Dump trucks**	**Ready-mix concrete trucks**	
Annual truck quantity (trucks/year)	2,002	12,094	15,000	29,096
Daily truck quantity (trucks/day)	7	38	44	89
Truck frequency (minutes)	64	12	10	5

Table 8. Storage volumes and capacities

Product	Storage volume	Storage capacity
Portland cement silo required	400 tons	3 days
Fine aggregate 1 storage required	1,374 yd^3	7 days
Coarse aggregate 1 storage required	397 yd^3	7 days
Coarse aggregate 2 storage required	395 yd^3	7 days
Coarse aggregate 3 storage required	491 yd^3	7 days
Coarse aggregate 4 bunker	497 yd^3	7 days
Coarse aggregate 5 storage required	593 yd^3	7 days
Fly ash silo req.	140 tons	3 days

[38] Attachment A, Appendix B, page B-1

Additional Potential Sites

As part of the analysis, HDR was tasked with identifying the key site characteristics that are required for the efficient construction and operation of a suitably sized batch plant. To accomplish this, a list of key site selection criteria was developed, as well as a search region that encompasses the project study area in King County and southern Snohomish County.

The following criteria were used for the identification:

- Zoning: Commercial/Industrial
- Minimum Area: seven acres (terrain dependent)
- Power: Nominally a medium-voltage feed (five kilovolts [kV])
- Potable water: four-inch diameter is ideal; three-inch diameter is common; on-site well is an alternative
- Sanitary sewer: No special sizing requirements; can use on-site sewer system if required
- Road access: A site within 0.5 mile of major roadways and well-connected state routes or arterials

As a result of this search, five parcels were identified based on meeting these criteria as example sites that could serve the target projects as well as their various distributed locations throughout King County. See Attachment A, Figure 3-3, page 14, for approximate locations of the example sites.[39] Each of these sites was used as a basis for both comparable market valuation that went into the cost analysis, but also used to generate travel time heat maps.[40] Heat maps were used to identify the travel times from specific example sites to projects in unknown areas. As ready-mix concrete trucks have only a limited amount of time from when loaded to pouring, proximity of the sites to the target projects is critical to the feasibility of the project overall. See Attachment A, Appendix E, pages E-1-5, for heat maps for each of the example sites.[41]

Implementation

Should the County build a new batch plant to make concrete for public projects, lead times for equipment fulfillment are between 12 and 18 months, given current market volatility and for similar equipment in related industries.[42] Based on the developed implementation schedule, from breaking ground, construction activities are anticipated to take eight months, assuming the contractor does not need to wait for equipment to arrive on site which could extend the timeline.

The projected schedule also includes major engineering, permitting, procurement, construction, and commissioning activities. Durations identified in the HDR study and below are based on relevant experience for the type of project and location proposed. Activities are shown to be completed concurrently to the extent practical. The approximate total durations for the major activities as shown in the schedule are the following:

- Engineering 10 months
- Permitting 13 months

[39] Attachment A, page 14

[40] A heat map it a data visualization technique that shows the magnitude of a phenomenon as color in two dimensions. The variation in color may be by hue or intensity, giving obvious visual cues to the reader about how the phenomenon is clustered or varies over space.

[41] Attachment A, Appendix E, page E-1

[42] Fulfillment refers to the entirety of business transactions required for equipment purchasing, including ordering, preparation for delivery, shipping, tracking, and final delivery.

- Procurement 18 months
- Construction 10 months
- Commissioning three months

Based on the activities and durations assumed, the entire project would take two years and nine months to complete, from project initiation to startup. Refer to Attachment A, Appendix C, for the implementation schedule.[43] This schedule would be approximately the same for both Option 1 and Option 2.

A.1.c. A survey of jurisdictions and public entities that may wish to partner with the county in facilitating the public manufacture of concrete and use of publicly manufactured concrete

As part of the feasibility study, King County solicited interest from other public agencies. Four of these agencies (City of Seattle, Port of Seattle, WSDOT, and Sound Transit) opted to provide information on potential concrete quantities relative to Option 2. Representatives from each of these agencies were provided with a copy of HDR's feasibility report, a briefing about the results, and an opportunity to ask questions of the consultant team. Following the briefing, all agencies were asked about their opinions and interest in participating in the next step, which would build upon information from the feasibility study and develop a more detailed conceptual design, financing plan, and project-delivery approach. At the time of the writing of this report, the agency representatives stated that they did not believe the project was feasible.

Although each agency contacted by the County expressed a willingness to continue a dialog, none stated an interested in leading or participating in development of a publicly owned concrete plant. The primary reasons for their positions included:

- **An inability to obtain aggregate:** Feedback stated that the open-source aggregate sites are too far away and the ones that are close enough are already fully subscribed and not available. WSDOT noted that it does have some closed aggregate sites in the region, but the amount remaining in them is too small to meet the anticipated quantities. Opening closed sites could also take many years.

- **Risks associated with owner provided materials:** Feedback stated that in most public projects, contractors are responsible for the timing, delivery, quantity and quality of the concrete provided to construct the project. If there is anything wrong with the delivery and/or quality of the concrete, it is the contractor's responsibility to fix it. If the owner provides the product and there is a problem, then the claims will go to the owners which could be expensive and complicated to resolve. None of the agencies believed this was an acceptable risk for public owners to undertake.

- **Siting a facility and capacity:** Given the dispersed project locations and the amount of drive times associated with getting the product from the concrete plant to the project locations, most agencies stated that it would not be feasible to locate a central facility that could meet the drive

[43] Attachment A, Appendix C, page C-1

times for delivery. In addition, right sizing a facility and the related trucking capacity needed may be extremely challenging given the wide range of quantities needed. If sized for the bigger projects, then the facility would have excess capacity that would be a sunk cost without enough revenue to support it.

- **Authorizing environment:** A least one agency (WSDOT) stated that it would not be able to participate in a jointly owned facility without legislative changes.

- **Cost:** Each agencies noted concerns about the cost of owner provided concrete, and given the cost pressures on capital projects, the representatives did not think the additional costs mitigated the potential impacts of future strikes. Each expressed an interest in project specific alternatives which included requiring contractors to have an on-site concrete batch plant which may be more cost competitive while mitigating potential future strike impacts. One agency (Sound Transit) intends to further study having its own concrete batch plant for its projects.

A.1.d. Fiscal Analysis of the cost and benefits of the county facilitating the public manufacture of concrete

A financial plan for the public manufacture of concrete requires consideration of the financial breakdown of costs relative to the volume of concrete to be produced. Under the two options outlined in HDR's study, King County could develop and construct a concrete batch plant to scale to its individual needs (Option 1) or it could develop and construct a batch plant to scale to more regional needs with partner agencies (Option 2).

Option 1 and Option 2 do not provide for the possibility of revenue generation outside of satisfying core demand (e.g., selling concrete on the open market to contractors, commercial enterprises, etc.) as King County cannot legally operate as a commercial enterprise because it does not currently have the authority to do so under state or local law. As a result of this limitation, HDR's analysis primarily focused on the expenditure profile of costs incurred by year to plan, design, build, operate, and maintain a concrete batch plant over a 10-year time horizon, based on HDR's life-cycle analysis methods. Annual expenditures following the initial construction include full-time equivalent staff for operations and maintenance (O&M) personnel, maintenance of the fleet, raw materials (aggregate, Portland cement, concrete admixtures, etc.), water, and electrical utilities.

Under Option 1, the costs of project development and implementation of the concrete batch plant are solely King County's, are represented by the OPCC, and consist of the total project costs. The subsequent annualized O&M costs are estimated to be $9.5 million per year in 2022 dollars, based on the O&M assumptions presented in the HDR study.[44] The rehabilitation of the concrete batch plant in the fifth year of operation (or year seven) is anticipated to incur a cost of approximately $2.9 million in 2022 dollars. These costs would need to be planned for and budgeted accordingly moving forward into the future over the life of beneficial use of the facility. See Attachment A for an illustration of the financial plan and conceptual cash flows of Option 1 under the assumptions for King County pursuing concrete manufacturing as a sole entity.[45]

[44] Attachment A, page 24
[45] Attachment A, Figure 6-2, page 28

From the OPCC, HDR projects that it would cost approximately $22 million to design and develop the representative Issaquah site for Option 1 to produce concrete from an assumed greenfield site.[46] HDR assumes that King County would need to perform every step in the development process before the batch plant would be ready to produce concrete. However, because of the early nature of the study and uncertainty surrounding the project, HDR projects that this price could range anywhere from $11 million to close to $45 million. Despite the seemingly large gap between these estimates, HDR still considers this a conservative range.

Market Value

Much of the costs to complete the projects in Option 1 and Option 2 are dependent upon the market value of the concrete itself. Employing market sounding techniques, several local concrete suppliers (Cadman, CalPortland, and Stoneway) were contacted by HDR to identify current material pricing for concrete as a basis of current cost.

The findings indicated an average price in current market conditions of $158/yd^3. Additionally, a high-level escalation and market condition forecast of concrete material pricing was developed to inform how concrete pricing in the marketplace may change in the future. Table 9 below illustrates possible average annual pricing of concrete in future years.

Table 9. Price forecast (in $/yd^3)

Year	Average annualized price
Current	$158
2023	$170
2024	$179
2025	$185
2026	$192
2027	$199

Ownership vs. Open Market

A comparison of costs between owning and operating a batch plant and purchasing concrete on the open market cannot be fully answered within the scope of this study, due to many variables inherent in the data. However, the major cost components provided form the basis for such analysis. For example:

1. Capital costs are estimated by the OPCC. The County would need to estimate indirect costs such as financing and County expenses outside of plant operations.
2. Operating costs can fluctuate, depending on the fleet, staffing, and utility demands of the operation. For labor specifically, rates would need to be generated based on hiring staff with batch plant operations experience.
3. Maintenance costs for capital equipment (trucks, batch plant, water treatment systems, etc.) can be estimated as a percentage of capital. For fleet equipment costs, this may also include cost of maintenance of leased equipment.

[46] Greenfield refers to land, especially land designated as a potential industrial site, that has not been previously developed or polluted.

4. Raw material costs are the most difficult to establish, as they are market driven and would be wholly dependent on the County's commercial agreements with suppliers for cement, aggregates, admixtures, etc.

Table 10 below compares these conceptual costs to current market prices for concrete production.

Table 10. Estimated batch plant conceptual costs per cubic yard

Batch Plant Option	Conceptual Costs (in 2022 dollars)	% Above Concrete Market Clearing Price
Option 1	$362/yd^3	129 percent
Option 2	$192/yd^3	21 percent

Life-Cycle Cost Analysis

Initial capital costs, annual operating costs, and subsequent replacement and salvage costs for Option 2 were conceptually developed for the life-cycle cost analysis (LCCA). The LCCA serves to compare potential costs based on all project costs anticipated throughout the indicated usable life of the facility. The analysis was prepared to reflect the HDR estimating team's understanding of the project scope as was known and defined at the time of the analysis. The results were normalized and calculated over a 10-year period of evaluation.[47]

Based on a forecasted 10-year average for Seattle infrastructure construction escalation, HDR anticipated that there will be continued material shortages and productivity losses, in addition to construction volume that drives demand and continues to escalate costs.

Operating costs were developed based on the fleet, staffing, and utility demands estimated for the size of the batch plant. Maintenance costs for capital equipment (trucks, batch plant, water treatment systems, etc.) were estimated as a percentage of capital. Fleet equipment costs were included based on the assumption of leased equipment. Raw material costs (e.g., aggregate and cement) were based on current pricing information. However, as they are market driven and would be wholly dependent on the County's commercial agreements with suppliers for the raw materials, a 25 percent contingency was applied.

Regional Partner Cost Sharing

Under Option 2, the costs of project development and implementation of the concrete batch plant could be allocated based on agency participation in terms of aggregate demand of concrete and relative usages by each party in terms of a cost-share.

The increase in size of the facility in Option 2 would correspondingly increase costs in terms of the OPCC and total project costs relative to production capacity and demand; however, in this example King County's capital investment commitment would be reduced by approximately 73 percent. The larger batch plant facility would incur subsequent annualized O&M costs, estimated to be $21.7 million per year in 2022 dollars, based on the O&M assumptions for an increased facility size to accommodate peer agency participation.

[47] Normalization is a statistical term meaning an adjustment of values measured on different scales to a notionally common scale, often prior to averaging.

Field Indirect Costs
Other WTD direct construction costs (e.g., construction change order allowance of 10 percent markup to OPCC) were estimated with a cost-estimating tool that uses historical WTD cost information based on project type, complexity, and size. The following contractor indirect costs have been considered for the overall OPCC:

- Mobilization (1 percent of total directs)[48]
- Demobilization (1 percent of total directs)
- Commissioning (1 percent of total directs)

An allowance for indeterminates (AFI) of 20 percent has been applied to the direct estimated field costs of the OPCC.

Additional Indirect Project Costs
WTD indirect project costs and non-construction indirect costs (e.g., WTD staff labor) were estimated using the WTD cost estimating tool using historical WTD cost information based on project type, complexity, and size. The following indirect costs have been considered for the overall total project cost:

- Engineering:
  - Survey ($35,000)
  - Geotechnical investigation and engineering ($100,000)
  - 30 percent design (2 percent of total directs)
  - 60 percent design (2 percent of total directs)
  - 90 percent design (1 percent of total directs)
- Permitting:
  - Permit application development (1 percent of total directs)
  - Permitting fees (1 percent of total directs)
- Procurement support (1 percent of total directs)
- Construction management (3 percent of total directs)

Results
Based on their cost-benefit analyses, HDR estimated that the total project costs of Option 1 would be $50,316,000, with about $10.3 million being used for direct construction costs and about $40 million in total non-construction costs. Costs estimates for Option 2 totaled out $81,676,000 in overall costs, with about $27.3 million being used for direct construction costs and $54.4 million in total non-construction costs. While Option 2 would be more expensive overall, HDR found that cost-sharing with other agencies could reduce King County's total cost share to about $13.9 million, or just 17 percent of the total anticipated concrete demand project costs for Option 2. This represents an approximate 73 percent reduction in the $50.3 million initial capital investment figure from Option 1. Option 2 is an example of how the costs could be distributed. If the project were to proceed more detailed projections would be needed over a longer time frame and the percentage distribution of costs could change.

Table 11 below summarizes the total project costs estimated in the OPPCs within the specified accuracy range. Refer to Attachment A, Appendix D, for a detailed breakdown of the estimated project costs.[49]

[48] Total directs is an accounting term for costs incurred in manufacturing a product and typically includes the direct production cost of goods, raw material, and direct labor costs.
[49] Attachment A, Appendix D, page D-1

Table 11. Estimated total project costs

Cost component	OPCC Option 1	OPCC Option 2
Total direct construction costs	$10,293,000	$27,266,000
Total indirect non-construction costs	$40,023,000	$54,410,000
Total project cost	$50,316,000	$81,676,000
King County cost share (based on ratio of concrete production)	100%: $50,316,000	17%: $13,880,000

A.1.e. Operational, Policy, and Legal Analysis of the County's Role in Facilitating the Public manufacture of concrete including consideration of whether operations should be contracted to an outside entity or conducted by employees of the county or other public agency, and partnerships with public entities

King County has the authority to build and operate a concrete plant and produce concrete for its own use.

As with other similar projects, the County would need to procure design and construction services as it does for other public works projects. All equipment, supplies, and materials needed to operate the concrete facility would need to go through a competitive procurement process. Similarly, if the County were to partner with other public agencies, those agencies would need to enter into an agreement consistent with each agencies' authorities to participate in financing and operating the facility.

The County also has the authority to acquire a concrete production facility under a lease/sublease or property sale. As provided by King County Code (KCC) 4.56.152, when purchasing and leasing real property for their own purposes, King County departments are authorized to acquire real property, or interests in real property, provided they comply with requirements as may be established by the Council and with applicable state and federal laws and regulations. KCC 4.56.186 authorizes the Executive to lease real property for use by the County consistent with the applicable provisions of the King County Charter and KCC 4A.100.070, and as may be authorized within appropriations approved by the County.[50,51]

If the County were to own and operate its concrete production facility, it may need to acquire insurance similar to what contractors obtain now to cover potential claims that could be attributed to a product that did not meet specifications. This is currently a risk that contractors have when providing concrete so and this would shift that risk to the public entity operating the concrete plant.

[50] KCC 4.56.152
[51] KCC 4A.100.070

A.1.f Identification of Opportunities in the Public Manufacture of Concrete That May Benefit Private Entities in Need of Concrete

At noted in the Fiscal Analysis section on page 21, KCC or RCW does not grant the County or a consortium of agencies authority to function as a commercial operation and sell this product.[52] All of the concrete produced would need to be used by the public agencies.

A.2. An Implementation plan for the public manufacture of concrete

In February/March of 2022 King County issued a Request for Qualifications (RFQ) to solicit submittals from interested and qualified firms to supply concrete products to meet the needs of King County projects. The purpose of the RFQ was to establish a roster of one or more qualified contractors to be King County's exclusive supplier of concrete for public projects. The initial term would be for three years with the option to extend for three additional one-year terms. The County also intended to make the pricing and terms and conditions available to other regional public entities. The County received no proposals from the solicitation. See Appendix F for the RFQ.

Due to the lack of interest to the RFQ, the HDR feasibility study did not specify private or public operation of the facility. Consequently, at the time of the writing of this report, it is unlikely a qualified private entity would compete to operate a public concrete production facility in this region. This option could be further explored if King County or other entities continue studying public owned and operated concrete batch plants in the future.

As a result of the findings from the HDR study and the lack of response to the County's RFQ solicitations, the Executive does not recommend that the County proceed with developing the capacity to provide its own concrete until a steady source of aggregates is able to be identified.

A.2.a. A process for 65 jurisdictions and public entities to partner in the public manufacturing of concrete

Due to the findings in the HDR study, the Executive determined that an implementation plan would not be needed. Consequently, this report does not include a process for jurisdictions and public entities to partner in the public manufacturing of concrete. As noted above in section A.2., the County Executive recommended that the County should not yet move forward operating a concrete plant to supply concrete for County projects, or to partner with other entities for joint operation of such a project, as described in Option 2 of the HDR report. As a result of this decision, the County did not develop a process to partner with 65 jurisdictions and public entities in a project to manufacture concrete for County projects.

A.2.b. An estimated timeline of major milestones for implementing the public manufacturing of concrete

Because it was determined that the County will not pursue the manufacture of concrete for County projects until a supply of aggregates can be identified, this report does not provide an estimated

[52] To act in a proprietary capacity and sell the product commercially, the County would need specific authority to do so and lacks that authority.

timeline for the proposed project and did not develop any potential milestones for implementing the proposed concrete manufacturing operation.

A.2.c. A financial plan that identifies estimated costs and revenues for the public manufacture of concrete

At this time, the County has determined that there are no other agencies interested in using a public facility and it is not financially viable for King County to finance one entirely on its own. Consequently, a financial plan is not provided in this report.

A.2.d. Identification of any changes needed to the King County code to enable the county to facilitate the public manufacture of concrete

No King County Code changes are identified at this time.

VI. Conclusion

The HDR Engineering, Inc. study, that is Attachment A, included the development of a conceptual layout, a project implementation schedule, and associated opinions of probable construction costs (OPCC). In addition, the study incorporated analysis and considerations of the probable costs to operate and maintain a concrete batch plant facility over its usable life for the Issaquah site and other representative sites, including considerations of peer agency participation.

Based on the evaluation, HDR determined that the batch plant project would be technically and operationally possible but did not recommend moving forward due to the high potential unit costs associated with securing a supply of raw materials, primarily aggregates, for concrete production. The availability of locally sourced aggregates in the region that are contractually limited by commercial concrete manufacturers raises the probable price of concrete production substantially, thereby challenging the project's financial and economic feasibility.

If the County were able to purchase aggregates for at or near the market pricing, similar to the prices with which commercial concrete manufacturers in the region do business, the project economics would be more financially viable. HDR's analysis estimated that the cost of producing premium concrete would be 129 percent higher than the forecasted cubic-yard market price under Option 1 and 21 percent higher under Option 2, which would not make them financially viable.

The County Executive understands HDR's analysis and concern that the high costs of securing sufficient aggregate materials to meet the County's demand for concrete would make the project financially challenging due to the oligopoly of the local concrete industry. However, the County Executive will continue to pursue and study other opportunities to increase aggregate and will continue to explore ways to secure a reliable supply of concrete for the benefit of the region's infrastructure and economy.

The County may also wish to consider requiring contractors, as part of their bids, to provide an on-site concrete batch plant that would be subject to community workforce agreements (CWA). CWAs are comprehensive pre-hire collective bargaining agreements between King County and labor unions that set the basic terms and conditions of employment for public works construction projects.

The use of on-site concrete batch plants may be an efficient method for some projects and beneficial for a variety of reasons, such as mitigating labor disputes through CWAs, providing greater control over how much and when the concrete gets used, and reducing truck traffic in the community. Future projects with a large concrete need may consider the labor conditions as part of any decision to use an on-site concrete batch plant as part of the project.

VIII. Attachments

The following appendices can be found in Attachment A:

Attachment A

HDR

Parametrix

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Final Summary Report

King County Wastewater Treatment Division

WO5 Concrete Batch Plant Feasibility Study

In reference to King County Council Motion 16078

October 25, 2022

Contents

Tables

Figures

Abbreviations

AACE	Association for the Advancement of Cost Engineering
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFI	allowance for indeterminates
ASTM	American Society of Testing and Materials
County	King County
FOB	freight-on-board
ft^3	cubic foot/feet
gal	gallon(s)
GIS	geographic information system
HDR	HDR Engineering, Inc.
HVAC	heating, ventilation, and air conditioning
kV	kilovolt(s)
lb	pound(s)
LCCA	life-cycle cost analysis
MCC	motor control center
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OMB	Office of Management and Budget
OPCC	opinion of probable construction cost
PSCAA	Puget Sound Clean Air Agency
SEPA	State Environmental Policy Act
WTD	(King County) Wastewater Treatment Division
yd^3	cubic yard(s)

Appendices

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1 Introduction

King County (County) is conducting a due-diligence conceptual study to evaluate the feasibility of siting a new concrete batch plant to serve the variety of construction projects in the County's portfolio in the coming 5 years. In March 2022, the King County Wastewater Treatment Division (WTD) commissioned a study for a property that was currently for sale and could be purchased and operated by King County for batch plant purposes. The property, which was owned by Northwest Asphalt, is located at 10430 Renton Issaquah Road SE in Issaquah, Washington (parcels 0623069027 and 0623069032). The study focused primarily on the demands specific to King County, which did not represent a substantial portion of the production capacity of a typical batch plant and, in turn, did not indicate a favorable business case.

Subsequently, the King County Council issued motion 16078 requesting the County to establish the feasibility of manufacturing concrete for use in County projects and projects of public partner entities. This study represents an update to the original to include the broadened scope indicated in King County Council motion 16078.

The purpose of this study is to build upon the March 2022 evaluation to include a more comprehensive demand for ready-mixed concrete for several generic sites, identify key parameters, and address the core objectives associated with the project.

Both options are presented in this summary report:

- **Option 1:** batch plant for King County projects
- **Option 2:** batch plant for King County projects and projects of public partner entities

2 Option 1: Batch Plant for King County Projects

This section describes Option 1, batch plant for King County projects, including operations, material properties, vehicle criteria, batch plant criteria, throughputs, site layout, and throughput simulation.

2.1 Operations

Below are operations parameters for Option 1:

- **Operating days:**
  - Days per year 365
  - Non-working holidays per year 7
  - Non-operating maintenance days per year 12
  - Total operating days per year 346
- **Crew shifts:**

- Shifts per day 1
- Contractual hours per shift 8.5
- Non-productive working hours per shift 1
- Productive working hours per day 7.5

- **Service area:**
  - Maximum drive time from batch plant (hours) 1 (including traffic)

Inbound aggregates are assumed to be purchased from an off-site third party, delivered to the site in dump trucks, and offloaded into the aggregate bunkers. A surplus of aggregates is assumed to be purchased such that in addition to the aggregates used in the ready-mix concrete, the County has aggregates available for use elsewhere.

Inbound cement and fly ash are also assumed to be purchased from an off-site third party, delivered to the site in pneumatic tankers, and pneumatically offloaded into silos.

Outbound ready-mix cement is assumed to be transported from the site to its end-use destination in County-owned and -operated ready-mix cement trucks.

2.2 Material Properties

The ready-mix concrete to be produced at the batch plant was assumed to consist of up to six types of aggregates (one fine aggregate and five coarse aggregates), water, air, Portland cement, and fly ash. The assumed composition by volume and bulk densities for all components are shown in Table 2-1. Based on American Society of Testing and Materials (ASTM) C-94 (Specification for Ready-Mixed Concrete) the maximum amount of time from mixture to pour was established as 90 minutes.

Table 2-1. Ready-mix concrete composition and bulk density

Component	Percent composition (by volume)	Bulk density
Water	16%	62.4 lb/ft^3
Air	4%	0.0765 lb/ft^3
Portland cement	8%	90 lb/ft^3
Fine aggregate 1	30%	110 lb/ft^3
Coarse aggregate 1	10%	110 lb/ft^3
Coarse aggregate 2	10%	105 lb/ft^3
Coarse aggregate 3	10%	95 lb/ft^3
Coarse aggregate 4	10%	85 lb/ft^3
Fly ash	2%	45 lb/ft^3

2.3 Vehicle Criteria

Below are vehicle criteria for Option 1:

- **Vehicle capacities:**
  - Ready-mix concrete truck — 10 cubic yards (yd^3)
  - Dump truck — 14 yd^3 or 30,000 pounds (lb)
  - Pneumatic tanker — 1,000 cubic feet (ft^3) or 45,000 lb
- **Vehicle design rates:**
  - Ready-mix truck pumping rate — 80 yd^3/hour

2.4 Batch Plant Criteria

Below are batch plant criteria for Option 1:

- **Design rates:**
  - Truck loading rate — 80 yd^3/hour

2.5 Throughputs

King County provided a data set of potential projects that included the anticipated schedule and concrete quantities. These data were processed to establish an incremental and cumulative demand. Refer to Figure 2-1 for a graph depicting these projections.

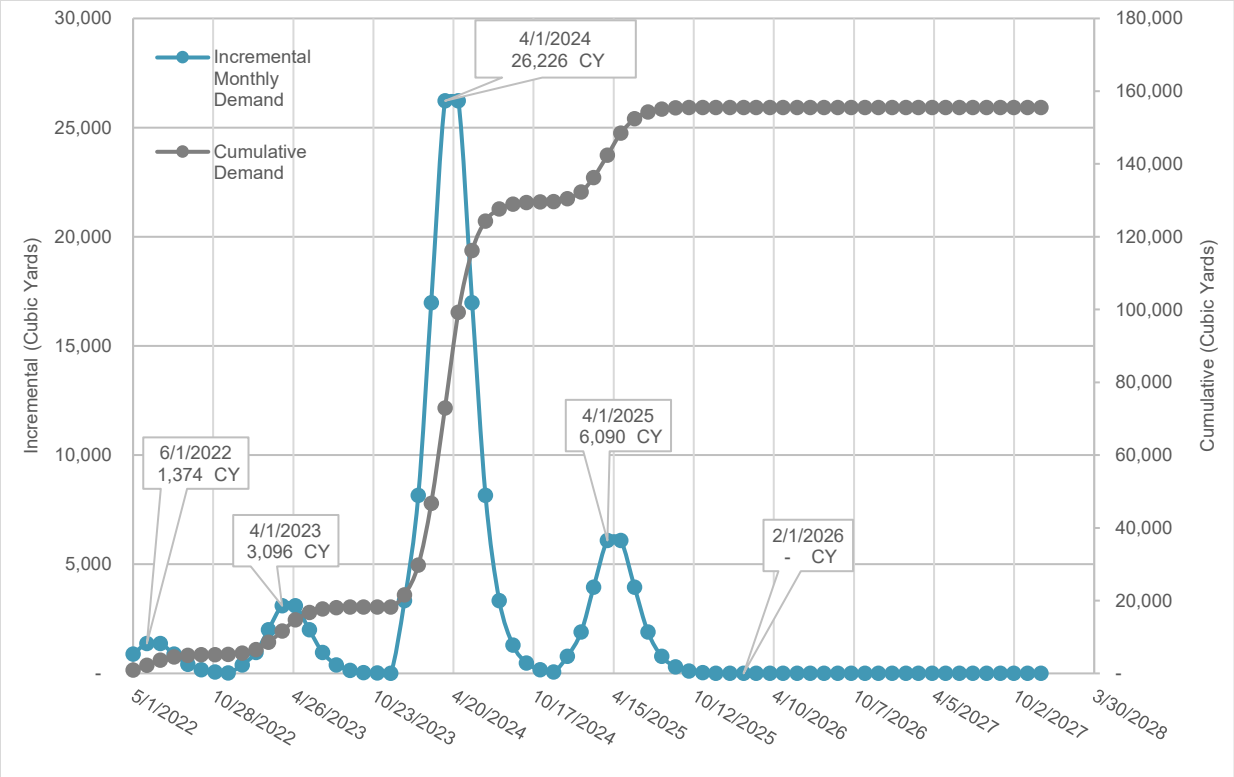


Figure 2-1. Cumulative and incremental consumption projection

These projections were used to establish an average monthly demand and a deviation for the total forecasted demand from the average monthly demand. The deviation was assumed to be provided by a third party as required and the average monthly demand was assumed to be the monthly design throughput. This throughput was extrapolated to a daily and annual design throughput and was used to define the size of batch plant required.

Throughputs are defined by the following:

- Average throughput is the rate at which the batch plant can process material under normal operating conditions (including pauses in feed and discharge under typical operation). Average throughput can be altered with design or operational changes.
- Peak throughput is the maximum rate at which the batch plant can process material. Peak throughput is achieved in “flooded” conditions (no pauses in feed or discharge). Peak throughput can be changed only by design and cannot be changed by operation.

Below are ready-mix concrete demand and aggregate consumption for Option 1:

- **Ready-mix concrete demand:**
  - Average hourly design throughput — 16 yd^3/hour
  - Average daily design throughput — 120 yd^3/day
  - Average monthly design throughput — 3,500 yd^3/month

- Average annual design throughput 42,000 yd^3/year

- **Aggregate consumption:**
  - Average daily aggregate consumption 190 tons/month
  - Average monthly aggregate consumption 5,600 tons/month
  - Average annual aggregate consumption 67,200 tons/year

2.6 Site Layout

Figure 2-2 below depicts the conceptual site layout developed as part of this study. The layout includes the following elements:

- Aggregate bunkers
- Receiving hopper and transfer conveyor
- Aggregate feed bins
- Ready-mix concrete batch plant
- Ready-mix concrete truck fleet parking
- Traffic flows for inbound and outbound product vehicles

Additionally, some of the existing infrastructure on site was assumed to be reused for the batch plant operations. These elements were also identified on the site plan and include the following:

- Administration building with staff parking
- Truck scale
- Maintenance shop
- Stormwater pond

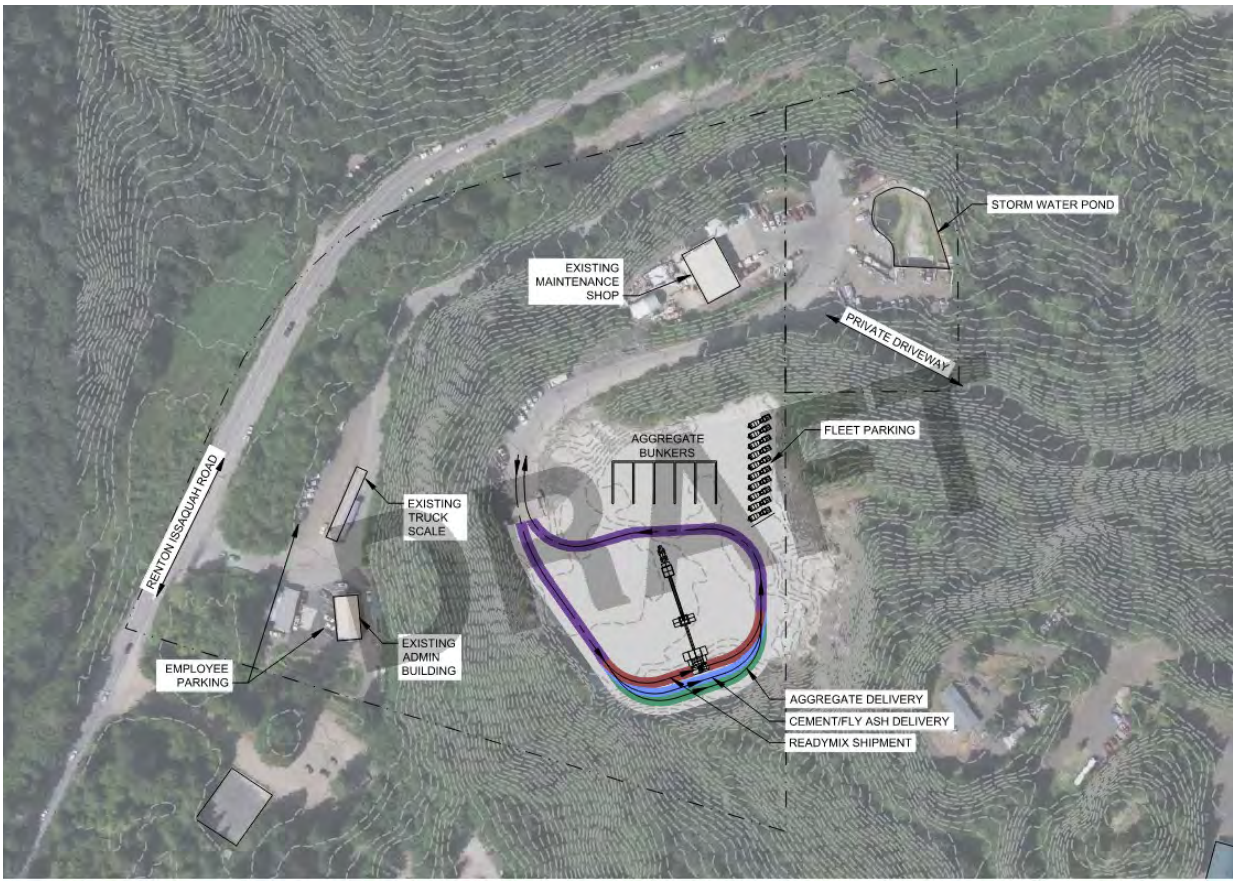


Figure 2-2. Conceptual site plan: Option 1

The conceptual site plan used as a basis for the development of the opinion of probable construction cost (OPCC), the implementation schedule, and additional analysis. Refer to Appendix A for the conceptual site plan.

2.7 Throughput Simulation

A throughput simulation was conducted to estimate vehicle quantities and frequencies, and storage capacities based on the design concrete demands. The vehicle frequencies were used to establish cycle times and fleet sizes. Table 2-2 and Table 2-3 detail the anticipated vehicles' quantities and storage capacities, respectively. Refer to Appendix B for the complete throughput simulation assumptions and findings.

Table 2-2. Vehicle traffic quantities and frequency

Parameter	Inbound traffic		Outbound traffic		Total
	Pneumatic tankers	Dump trucks	Ready-mix concrete trucks	Dump trucks	
Annual truck quantity (trucks/year)	204	2,741	4,200	1,740	8,884
Daily truck quantity (trucks/day)	2	11	13	7	33
Truck frequency (minutes)	225	40	34	64	13

Table 2-3. Storage volumes and capacities

Product	Storage volume	Storage capacity
Portland cement silo	160 tons	14 days
Fine aggregate 1 bunker	600 yd^3	17 days
Coarse aggregate 1 bunker	600 yd^3	52 days
Coarse aggregate 2 bunker	600 yd^3	52 days
Coarse aggregate 3 bunker	600 yd^3	52 days
Coarse aggregate 4 bunker	600 yd^3	52 days
Fly ash silo	20 tons	14 days

3 Option 2: Batch Plant for King County and Public Partner Entities

This section describes Option 2, batch plant for King County and public partner entities, including design basis, operations, material properties, vehicle criteria, batch plant criteria, throughputs, site layout, throughput simulation, and additional potential sites.

3.1 Design Basis

As part of the study a design basis was established to define key criteria to guide the subsequent design and analysis effort. The design basis was established based on information provided by King County regarding the potential project site and the forecasted ready-mix concrete consumption as well as relevant design experience and similar historical projects.

The following sections outline the key assumptions and criteria established to develop a design basis.

3.2 Operations

Below are operations parameters for Option 2:

- **Operating days:**
  - Days per year 365
  - Non-working holidays per year 7
  - Non-operating maintenance days per year 12
  - Total operating days per year 346
- **Crew shifts:**
  - Shifts per day 1
  - Contractual hours per shift 8.5
  - Non-productive working hours per shift 1
  - Productive working hours per day 7.5
- **Service area:**
  - Maximum drive time from batch plant (hours) 1 (including traffic)

Inbound aggregates are assumed to be purchased from an off-site third party, delivered to the site in dump trucks, and offloaded into the aggregate bunkers. A surplus of aggregates is assumed to be purchased such that in addition to the aggregates used in the ready-mix concrete, the County has aggregates available for use elsewhere.

Inbound cement and fly ash are also assumed to be purchased from an off-site third party, delivered to the site in pneumatic tankers, and pneumatically offloaded into silos.

Outbound ready-mix cement is assumed to be transported from the site to its end-use destination in County-owned and -operated ready-mix cement trucks.

3.3 Material Properties

The material properties for Option 2 do not change. See section 2.2 for details.

3.4 Vehicle Criteria

The vehicle criteria for Option 2 do not change. See section 2.3 for details.

3.5 Batch Plant Criteria

Below are batch plant criteria for Option 2:

- **Design rates:**
  - Truck loading rate 40 yd^3/hour

3.6 Throughputs

King County provided a data set of potential projects that included the anticipated schedule and concrete quantities. The list of projects represented those of King County as well as other local agencies with similar concrete demands. These data were processed to establish an incremental and cumulative demand. Refer to Figure 3-1 for a graph depicting these projections.

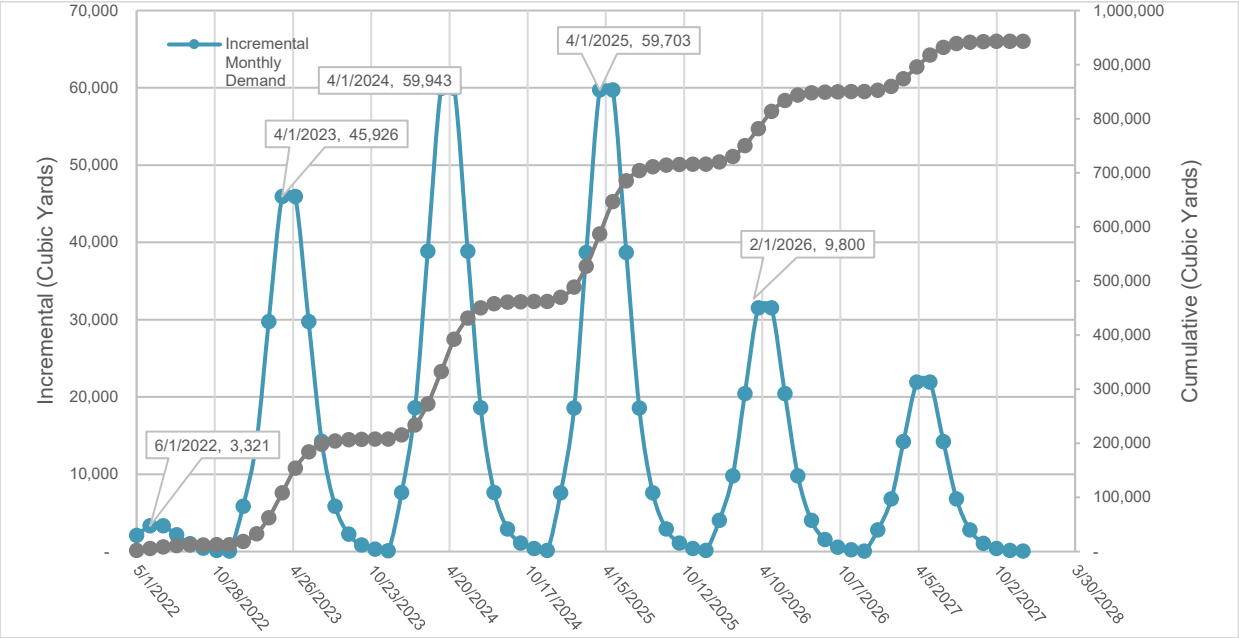


Figure 3-1. Cumulative and incremental consumption projection

These projections were used to establish an average monthly demand and a deviation for the total forecasted demand from the average monthly demand. The deviation was assumed to be provided by a third party as required and the average monthly demand was assumed to be the monthly design throughput. This throughput was extrapolated to a daily and annual design throughput and was used to define the size of batch plant required.

Throughputs are defined by the following:

- Average throughput is the rate at which the batch plant can process material under normal operating conditions (including pauses in feed and discharge under typical operation). Average throughput can be altered with design or operational changes.
- Peak throughput is the maximum rate at which the batch plant can process material. Peak throughput is achieved in “flooded” conditions (no pauses in feed or discharge). Peak throughput can be changed only by design and cannot be changed by operation.

Below is ready-mix concrete demand for Option 2:

- **Ready-mix concrete demand:**
  - Average hourly design throughput 58 yd^3/hour

- Average daily design throughput 434 yd^3/day
- Average monthly design throughput 12,500 yd^3/month
- Average annual design throughput 150,000 yd^3/year

To meet these ready-mix concrete production demands, the key consumable feedstocks required for ready-mix production also need to be brought to the site regularly. The details for the supply of these products are provided in Table 3-1.

Table 3-1. Example concrete consumables consumption rates

Product	Yearly consumption	Monthly consumption	Daily consumption
Fine aggregates	97,500 tons/year	8,200 tons/month	300 tons/day
Coarse aggregates	129,000 tons/year	10,750 tons/month	400 tons/day
Cement	41,000 tons/year	3,400 tons/month	120 tons/day
Fly ash	5,000 tons/year	410 tons/month	15 tons/day
Water	5,500,000 gal/year	455,000 gal/month	16,000 gal/day

3.7 Site Layout

Figure 3-2 below depicts the conceptual site layout developed as part of this study. The layout includes the following elements:

- Aggregate bunkers
- Receiving hoppers, aggregate bin feed, and transfer conveyors
- Aggregate feed bins and batcher
- Central mix type concrete batch plant (cement and lime silos, central mixer)
- Ready-mix concrete truck fleet parking
- Traffic flows for inbound and outbound product vehicles
- Administration building with staff parking
- Truck scale
- Maintenance shop
- Stormwater pond

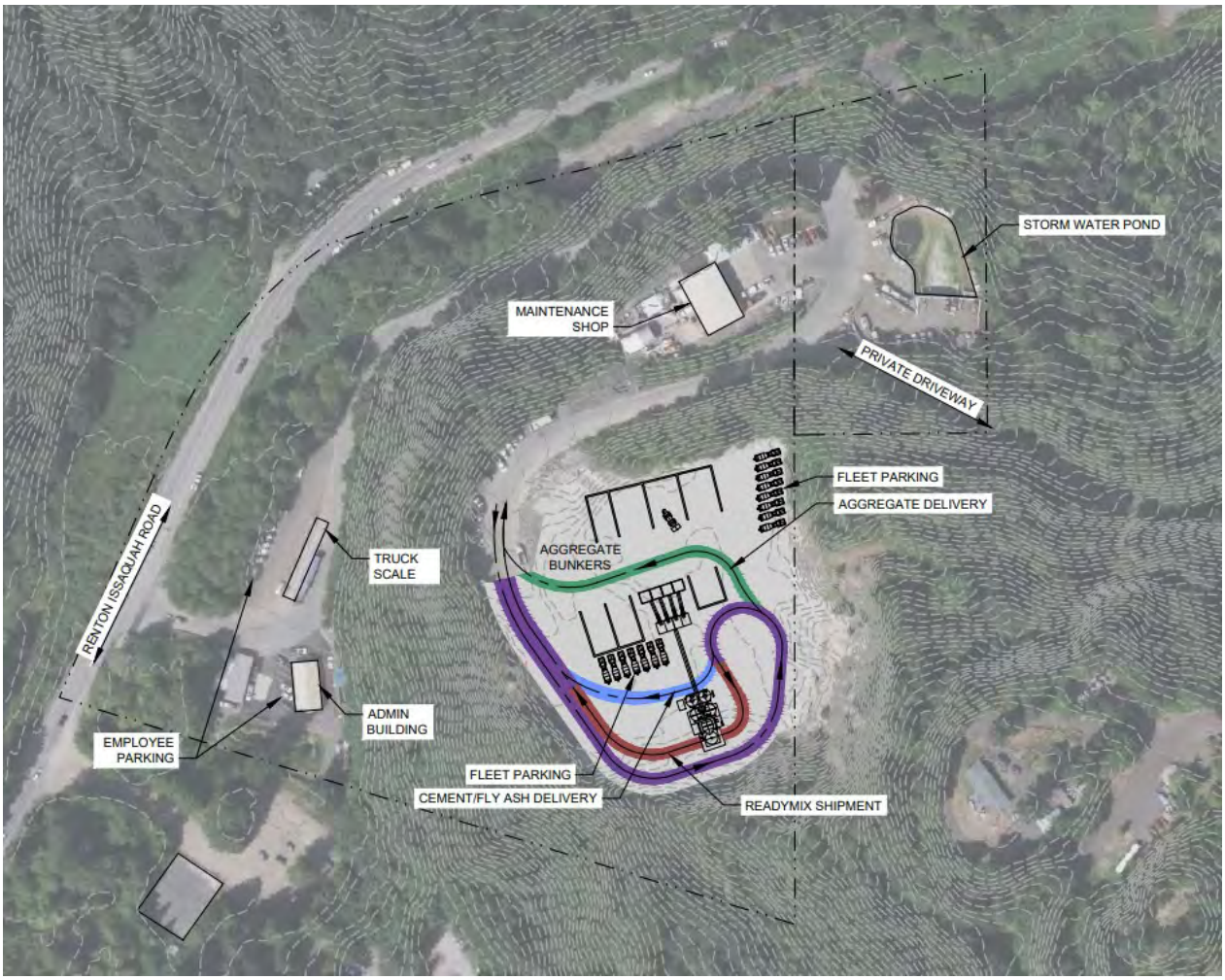


Figure 3-2. Conceptual site plan

The conceptual site plan was used as a basis for the development of the OPCC, the implementation schedule, and additional analysis. Refer to Appendix A for the conceptual site plan.

3.8 Throughput Simulation

A throughput simulation was conducted to estimate vehicle quantities and frequencies, and storage capacities based on the design concrete demands. The vehicle frequencies were used to establish cycle times and fleet sizes. Table 3-2 and Table 3-3 detail the anticipated vehicles' quantities and storage capacities, respectively. Refer to Appendix B for the complete throughput simulation assumptions and findings.

Table 3-2. Vehicle traffic quantities and frequency (round trips)

Parameter	Inbound traffic		Outbound traffic	Total
	Pneumatic tankers	Dump trucks	Ready-mix concrete trucks	
Annual truck quantity (trucks/year)	2,002	12,094	15,000	29,096
Daily truck quantity (trucks/day)	7	38	44	89
Truck frequency (minutes)	64	12	10	5

Table 3-3. Storage volumes and capacities

Product	Storage volume	Storage capacity
Portland cement silo required	400 tons	3 days
Fine aggregate 1 storage required	1,374 yd^3	7 days
Coarse aggregate 1 storage required	397 yd^3	7 days
Coarse aggregate 2 storage required	395 yd^3	7 days
Coarse aggregate 3 storage required	491 yd^3	7 days
Coarse aggregate 4 bunker	497 yd^3	7 days
Coarse aggregate 5 storage required	593 yd^3	7 days
Fly ash silo req.	140 tons	3 days

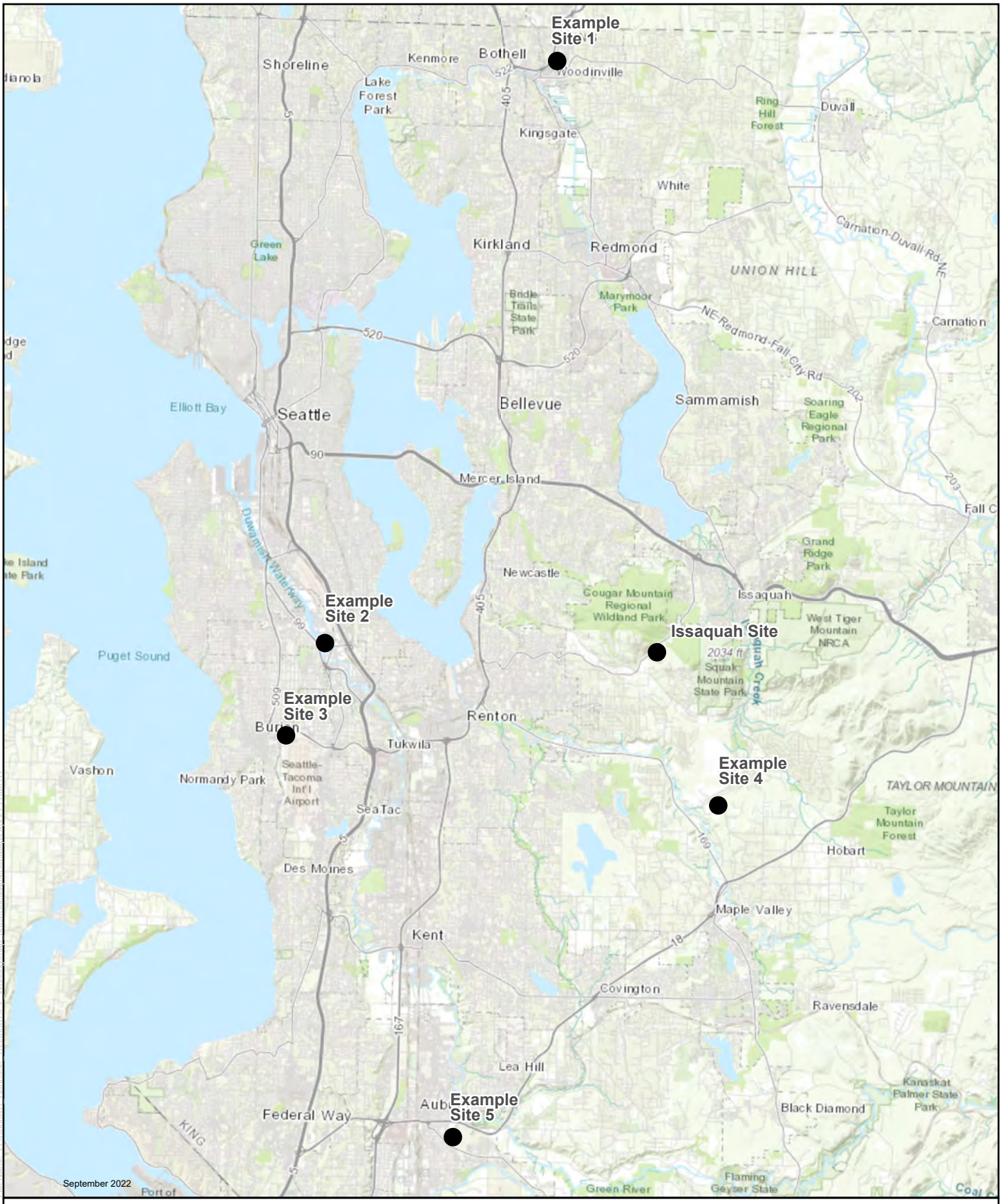
3.9 Additional Potential Sites

As part of the analysis, HDR Engineering, Inc. (HDR) was tasked with identifying the key site characteristics that are required for the efficient construction and operation of a suitably sized batch plant. To accomplish this, a list of key site selection criteria was developed as well as a search region that encompasses the project study area in King County and southern Snohomish County. The site identification exercise was facilitated by the use of geographic information system (GIS) and publicly available data for refinement and filtering search results. The following criteria were used for the identification:

- Zoning:
  - Commercial/Industrial “I”
  - Resource “F” or “M” are also possibilities with conditional use
- Area:
  - Minimum 7 acres (terrain dependent)
- Utilities:
  - Power

        - Nominally a medium-voltage feed (5 kilovolts [kV]).
    - Potable water:
        - 4-inch diameter is ideal; 3-inch diameter is common
        - On-site well is an alternative
    - Sanitary sewer:
        - No special sizing requirements
        - Can use on-site sewer system if required
- Road access:
    - Site within 0.5 mile of major roadways (well-connected state routes or arterials)

As a result of this search, five parcels were identified based on their meeting these criteria as example sites that could serve the target projects as well as their various distributed locations throughout King County. See Figure 3-3 for approximate locations of the example sites. Each of these sites was used as a basis for both comparable market valuation that went into the cost analysis, but also used to generate travel time heat maps. The heat maps were used to identify the travel times from specific example sites to projects in unknown areas. As ready-mix concrete trucks have only a limited amount of time from when loaded to pouring, proximity of the sites to the target projects is critical to the feasibility of the project overall. See Appendix E for heat maps for each of the example sites.



September 2022

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

N

0 2 4
Miles

Data Source: King County

Vicinity Map

KC WO5 Concrete Plant Feasibility Study

4 Schedule

An implementation schedule was also developed as part of the study. The schedule is considered a level 2, meaning that it depicts the overall project divided into its major components (work breakdown structure) and is intended to be used to confirm feasibility and allow for coordination with project stakeholders.

The schedule includes major engineering, permitting, procurement, construction, and commissioning activities. Durations are based on relevant experience for the type of project and location proposed. Activities are linked based on what is required to support the subsequent work and availability to complete the work. Activities are shown to be completed concurrently to the extent practical. The approximate total durations for the major activities as shown in the schedule are the following:

- Engineering 10 months
- Permitting 13 months
- Procurement 18 months
- Construction 10 months
- Commissioning 3 months

Based on the activities and durations assumed, the project would take 2 years and 3 months to complete from notice to proceed for preliminary engineering to startup. Refer to Appendix C for the implementation schedule. This schedule would be approximately the same for either option.

5 Opinion of Probable Construction Cost

As part of the study, HDR developed OPCCs to estimate the capital costs associated with each of the batch plant options. The following sections define the means and methodologies used to develop the OPCCs as well as the key assumptions and exclusions.

5.1 Basis of Estimate

The OPCCs are based on proprietary HDR data, recent budgetary quotations, and information together with labor and material rates for the Seattle area. This estimate uses the following methodologies for estimating:

- Budgetary vendor quotations that were solicited for major components where time permitted. These quotations are related primarily to material handling equipment.
- Material takeoffs from the conceptual sketches.
- Application of unit pricing based on the RSMeans database.
- Budgetary allowances based on historical data and past project experience.

The estimates are considered similar to a Class 10 as defined by the Association for the Advancement of Cost Engineering (AACE). The level of definition required for this class of estimate is for long-range planning effort and is used as part of a concept of feasibility level of effort. Per AACE guidelines, long-range planning estimates are prepared for potential facilities within a 10-year to more than 50-year strategic asset planning time frame. Given the uncertainty associated with a distant outlook, the long-range planning estimate is unlikely to be accurate and the original scope may not be representative of the final solution and associated costs.

5.1.1 Assumptions: Option 1

The following assumptions were made to develop the OPCC for Option 1:

- The batch plant design capacity is 3,500 yd^3/month with a minimum production rate of 16 yd^3/hour.
- Conveying equipment was sized as required to support this throughput for a material density of 80 lb/ft^3 to 110 lb/ft^3.
- On-site storage assumed a 100-ton silo for cement and fly ash each, and six aggregate bunks with 600 yd^3 of storage each.
- Major utilities are assumed to be already on site and are of sufficient capacity to meet the design of the facility.
- The existing stormwater pond was assumed to be of adequate capacity to support the facility. A $200,000 allowance for stormwater management was assumed but no additional considerations for upgrades to stormwater pond were included.
- No provisions for ground improvements were included.
- Bunkers are located directly on an 18-inch-thick concrete pad.
- Substantial structures, such as conveyer support bents and transfer towers, are supported on mat foundations. No piles or other deep foundations were included. Additional design efforts are required to determine the foundation type most suited to the project site, based on applicable building codes and anticipated loads.
- Union labor was assumed for establishing the unit prices.
- No new administration building was included. It was assumed that the existing administration building on the site could be used.
- No new maintenance shop was included. It was assumed that the existing maintenance shop on the site could be used.
- No new truck scale was included. It was assumed that the existing truck scale on the site could be used.

5.1.2 Assumptions: Option 2

The following assumptions were made to develop the OPCC for Option 2:

- The batch plant design capacity is 12,500 yd^3/month with a minimum production rate of 57 yd^3/hour.

- Conveying equipment was sized as required to support this throughput for a material density of 75 lb/ft^3 to 110 lb/ft^3.
- On-site storage assumed two 1,150- BBL (150-ton) silos for cement, two 935 BBL (120-ton) silos for fly ash, and seven aggregate bunkers ranging from 400 yd^3 to 700 yd^3 of storage each.
- Major utilities are assumed to be available along the frontage of the property and are of sufficient capacity to meet the design of the facility.
- Bunkers are located directly on an 18-inch-thick concrete pad.
- Substantial structures such as conveyer support bents and transfer towers are supported on mat foundations. No piles or other deep foundations were included. Additional design efforts are required to determine the foundation type most suited to the project site, based on applicable building codes and anticipated loads.
- Union labor was assumed for establishing the unit prices.

5.1.3 Budgetary Quotes

The following items have been estimated based on an adaptation from a budgetary quote or historical projects:

- Standard troughed belt conveyors have been estimated on a per unit length basis, inclusive of all typical conveyor components such as belting, idlers, stringer tables, drive units, take-ups, and walkways. The unit costs for conveying equipment have been adapted from vendor budgetary quotations. Conveyor support structures (“bents”) were estimated as separate items based on assumed steel quantities.
- The concrete batch plant was estimated based on a recent budgetary vendor quote.
- The packaged motor control center (MCC) building inclusive of heating, ventilation, and air conditioning (HVAC) and fire protection was adapted from a recent vendor proposal for a packaged MCC of comparable size.

5.1.4 Specific Direct Line-Item Allowances

The following line-item allowances have been estimated on a percentage basis and incorporated into the direct field construction costs:

- Electrical allowance (8 percent of process equipment costs)
- Controls and integration allowance (6 percent of process equipment costs)

5.1.5 Field Indirect Costs

Other WTD direct construction costs (e.g., construction change order allowance of 10 percent markup to OPCC) were estimated using the WTD cost estimating tool using historical WTD cost information based on project type, complexity, and size. The following contractor indirect costs have been considered for the overall OPCC:

- Mobilization (1 percent of total directs)
- Demobilization (1 percent of total directs)

- Commissioning (1 percent of total directs)

5.1.6 Allowance for Indeterminates

An allowance for indeterminates (AFI) of 20 percent has been applied to the direct estimated field costs of the OPCC.

5.1.7 Additional Indirect Project Costs

WTD indirect project costs and non-construction indirect costs (e.g., WTD staff labor) were estimated using the WTD cost estimating tool using historical WTD cost information based on project type, complexity, and size. The following indirect costs have been considered for the overall total project cost:

- Engineering:
  - Survey ($35,000)
  - Geotechnical investigation and engineering ($100,000)
  - 30 percent design (2 percent of total directs)
  - 60 percent design (2 percent of total directs)
  - 90 percent design (1 percent of total directs)
- Permitting:
  - Permit application development (1 percent of total directs)
  - Permitting fees (1 percent of total directs)
- Procurement support (1 percent of total directs)
- Construction management (3 percent of total directs)

5.1.8 Exclusions

The following items have been excluded from the overall OPCC:

- Owner’s team costs
- Right-of-way or other land acquisition activities
- On-site water treatment facilities
- Spares
- Major utility tie-ins and associated fees
- Any costs for undefined scope of work
- Undocumented/buried conditions
- License and inspections
- Escalation (assumes 2022 U.S. dollars)
- Environmental evaluation or remediation

- Federal or local taxes

5.2 Results

Table 5-1 summarizes the total project costs estimated in the OPPCs within the specified accuracy range. Refer to Appendix D for a detailed breakdown of the estimated project costs.

Table 5-1. Estimated total project costs

Cost component	OPCC Option 1	OPCC Option 2
Total direct construction costs	$10,293,000	$27,266,000
Total indirect non-construction costs	$40,023,000	$54,410,000
Total project cost	$50,316,000	$81,676,000
King County cost share (based on ratio of concrete production)	100%: $50,316,000	17%: $13,880,000

6 Frequently Asked Questions

This section presents frequently asked questions and their answers regarding the proposed batch plant options presented in this report.

6.1 Plant on Issaquah Site

What size of concrete batch plant (tons/hour) could be accommodated on the Issaquah site to service King County and other agencies' needs?

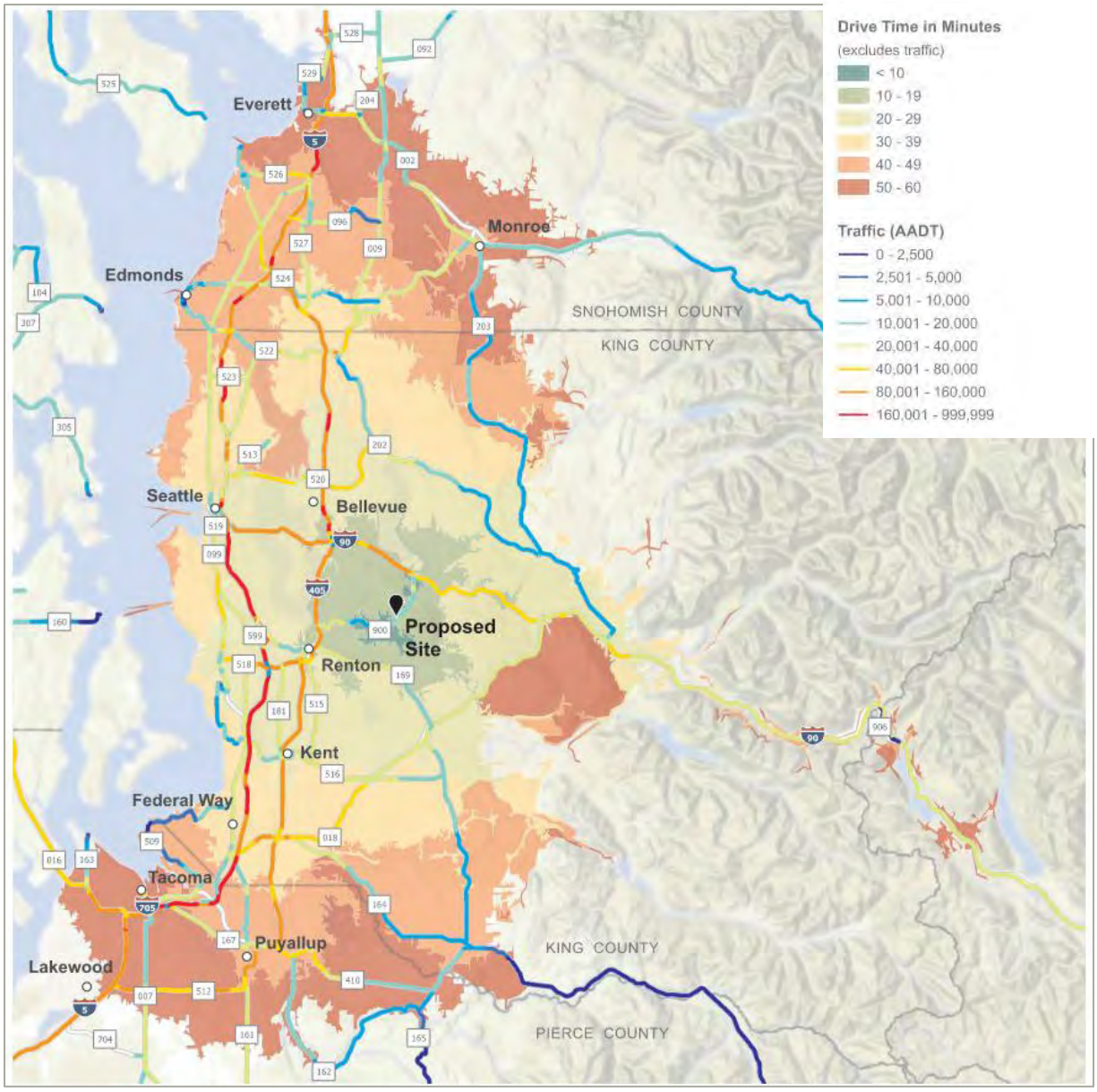
A 430 yd^3/day plant (approximately 57 yd^3/hour or 50–60 batches per day) would meet the 12,500 yd^3 average monthly demand. A 12,500 yd^3/month plant would satisfy the County's needs 89 percent of the forecast period. The remaining 11 percent of the time the County would need to supplement from third-party sources.

Production rates for batch plants can vary wildly based on the configuration of the plant and proposed batching sequence. Because batches are all approximately the same size, larger plants are generally better suited for sustained quick-turn, high-throughput operations typical of large pours. Although there are no "standard" throughput ranges, small, portable batch plants are typically capable of rates up to 100 yd^3/hour while larger-scale, fixed plants can produce upwards of 300 yd^3/hour.

What area geographically, could the plant serve?

A drive time figure has been produced that shows bands of equal drive time from the Issaquah site. ASTM C-94 (Specification for Ready-Mixed Concrete) states that the maximum amount of time from mixture to pour is 90 minutes. Including logistics time at the batch plant and at the project site and ambient temperature variations, 30 to 45 minutes is a typical travel time from the project site. This estimate is without the use of set retarding admixtures that can be added to a batch. If used, they can extend the set

time by approximately 2 to 3 hours, though the use of set-retarding admixtures may be prohibited by the concrete specification. Refer to Figure 6-1 below for an example specific to the Issaquah site or Appendix E for the theoretical service area of other example parcels.



Note: A navigable web-based version of this figure can be found here:
https://hdr.maps.arcgis.com/apps/webappviewer/index.html?id=375f19c597b8468c982e38c0f5e77863

Figure 6-1. Theoretical service area for Issaquah site

What site development would be needed to build a batch plant and deliver concrete?

The major additions that would be required for the Issaquah site are:

- Batch plant assembly, including:
  - Tilt mixer

  - Cement and fly ash silos
  - Cement batcher
  - Water meter
  - Transfer conveyors
  - Aggregate bins
  - Aggregate batcher
  - Dust collectors
  - Control system
  - Air compressors
- Aggregate bunkers
- Truck/wheel wash
- Concrete wash-out pit
- Wastewater treatment systems
- Stormwater treatment systems
- Administration building
- Maintenance shop
- Truck scale and scale house

What additional equipment would be needed on site for Option 2 (loaders, etc.)?

The following mobile equipment would be required, assuming that all inbound products are hauled by third parties:

- Minimum:
  - Ready-mix trucks (approximately 15 based on the current throughput simulation)
  - Front-end loader (one is required, though most facilities have redundancy)
  - Water truck (dust control on haul roads and in stockyard)
- Optional:
  - Vac truck (spill cleanup)
  - Street sweeper (track-out management)
  - Cement/fly ash PD trucks (cement and fly ash deliveries)
  - Miscellaneous passenger vehicles (trucks, all-terrain vehicles, etc.)

How many mixer trucks could be used to serve projects in the potential supply area for Option 2?

Fifteen, based on current throughput assumptions.

What is the water demand and supply on the site for concrete operations for Option 2?

Ready-mixed concrete is nominally 7.5 percent water by volume. At a nominal production rate of 430 yd^3/day, that would be approximately 6,500 gallons per day for concrete production. In dry months, this number would increase for dust control and truck washing activities on site. It is also common for contact stormwater to be treated and used for production.

What would the electrical demands be for the concrete plant for Option 2?

1.5 megawatts is a baseline assumption for a typical batch plant, including both the equipment loads and other ancillary systems (water treatment, dust control, lighting, buildings, etc.).

6.2 Implementation

What is the lead time to build a plant?

For similar equipment in related industries, lead times are between 12 and 18 months given current market volatility. Based on the developed implementation schedule, from breaking ground, construction activities are anticipated to take 8 months assuming that the contractor does not need to wait for equipment to arrive on site.

6.3 Materials

Where and how would the materials be obtained?

Obtaining materials necessary for concrete production involves core inputs to production consisting primarily of aggregate, Portland cement, and various concrete admixtures according to specifications of the projects that the batch plant would serve. This would require stockpiling of such core inputs and obtaining them from regional sources, ideally. Aggregate products would be delivered by standard over-the-road dump trucks with trailers and would unload directly to the stockyard, where they would be managed by the front-end loader. Pneumatically conveyed products (cement and fly ash) would be delivered by pneumatic tank trailers and blown directly into the cement silos via the delivery truck's onboard PTO-powered blowers. Concrete admixtures would be delivered via tanker trucks and offloaded into on-site tanks and dosing equipment.

Obtaining aggregate would be the most significant regional challenge, as the vast majority of local aggregate pits have long-term supply contracts controlling much of the existing supply of material. Based on market sounding, approximately 90 percent or more of the existing operational aggregate pits in the region are already locked into forward price agreements through 2027. This creates a supply challenge that would introduce premiums into the obtaining of materials from these sources, as local concrete suppliers (e.g., CalPortland, Stoneway, and Cadman) either have this material locked up or source from their own facilities. Further, these larger concrete suppliers routinely open-source between each other and it is unlikely that such vendors would be willing to negotiate further supply sourcing agreements with a new market entrant without the inclusion of a significant premium.

It is likely that the County would have to purchase aggregate from these sources or identify other open-source aggregate suppliers. An industry scan was conducted to identify the viability of reopening a closed aggregate pit and to identify open-source

aggregate suppliers. There were no close open-source aggregate suppliers that had not already pre-sold much of their existing supply within a radius of several hundred miles. Further compounding the supply-side challenges are the environmental hurdles in permitting associated with reopening existing aggregate pits that have been previously closed. The primary risks to a new batch plant are the timelines in permitting, which could be up to several years to go entirely through the permitting process, thereby impacting the overarching feasibility of establishing a new concrete batch plant. The primary mode of aggregate sourcing would likely be to pay significant premiums above traditional input pricing relative to existing market participants for obtaining of materials either through sourcing from local concrete suppliers and their pre-purchase agreements or long-haul delivery of materials, even if potentially cheaper sources of aggregate, such as reopening a pit, were sought in parallel.

Portland cement is locally manufactured by national companies such as Ash Grove and Lehigh Hanson. This material can be directly purchased and sourced directly to the plant via purchase orders for freight-on-board (FOB) delivery directly to the batch plant location. Factors for pricing would include origin/destination delivery considerations; however, this is commonly a 2 to 3 percent markup within a 50- to 75-mile radius of the direct source. Outside of this radius and costs for FOB delivery to the batch plant could be in excess of 5 percent in terms of a direct markup.

Concrete admixtures are provided by national admixture producers such as Standard Industries (formerly W.R. Grace) and Sika. This commonly involves negotiating a longer-term admixture supply contract, thereby commonly locking in pricing with a single vendor/supplier. Suppliers would install tanks and dosing equipment at the batch plant as part of the admixture supply contract, which effectively are costs that are factored into the overall price agreement negotiated between the plant operator and the supplier. Common contractual periods range from 2- to 5-year cycles and longer-term pricing agreements are becoming rare, particularly without escalation clauses because of market volatility in pricing and core inputs required in the processing and development of admixtures. Supply agreements generally dictate a periodic delivery schedule with additional costs that may be incurred for non-periodic supply costs of the material.

What are the acceptable sources of aggregate?

Local concrete suppliers (e.g., CalPortland, Cadman, and Stoneway) obtain aggregate from their own facilities and routinely open-source between each other. CalPortland and Cadman have pits in Monroe and Snoqualmie, while Stoneway sources its aggregate from Maple Valley. It is likely that the County would have to purchase aggregate from these sources or identify other open-source aggregate suppliers. Further, each of these suppliers currently possesses multi-year purchase agreements for the permissible levels of aggregate extraction that nears full capacity of the closest sources of aggregate in the region, resulting in supply-side constraints for a new market entrant.

The cost differential for transport of aggregate is the key pricing differential relative to the production site of the concrete. Considering the lack of readily available sources for aggregate because of supply-side constraints and on-market agreements, this key component of concrete mix design could incur the County additional costs in the logistical movement of materials in excess of $\$10/yd^3$ of material when drawing from

relatively regional sources. This cost could easily double, should aggregate sources begin to be drawn from outside of a 50-mile radius.

What are the sources for Portland cement and additives (including air entraining, retardants, etc.)?

Portland cement is locally manufactured by national companies such as Ash Grove and Lehigh Hanson. Ash Grove supplies cement locally, and Lehigh Hanson has both ready-mix concrete and cement available in Seattle and Everett. This makes each of these sources readily available for the base mixing elements of concrete.

Concrete admixtures are provided by national admixture producers such as Standard Industries (formerly W.R. Grace) and Sika. These producers install their own tanks and dosing equipment at the batch plants as part of the admixture supply contract. The equipment typically consists of five or six tanks and skids but is dependent on the type of concrete being supplied. Admixture representatives assist the batch plant operators in the programming of the dosing equipment using systems such as Command Batch or Keystone Batch. Admixture elements are supplied as needed and are often marked up by the batch plant facility by 20 to 40 percent. Common admixtures include entrained air, accelerators, fiber, colors, and more.

Where can a gradation lab be acquired?

The primary option as a regional vendor for a gradation lab is Grainger. Motorized stacked sieves can be purchased through Grainger (or other common industry providers).

Products must meet standards and be certified to meet specifications; how can they be certified and what is needed to maintain the standard?

Some tests could be performed at the batch plant, but most tests are performed upon delivery to the site. The batch plant would need to include space for a small laboratory run by an American Concrete Institute (ACI)-certified lab technician for on-site tests. Off-site tests could be completed by the installation contractor in most cases, but also third-party testing contractors.

American Association of State Highway and Transportation Officials (AASHTO) T27 and ASTM C136 (Sieve Analysis of Fine and Coarse Aggregates) are tests that are commonly performed to determine particle size distribution for aggregate products. These tests are relatively quick and simple to perform and require only a sieve set, sieve shaker, and scales to determine particle size distribution. These tests could be completed easily on site or by a third-party laboratory.

6.4 Operations and Maintenance

Assuming that the plant is operated by King County employees, what is an estimate of the number of employees needed to operate the plant and deliver and mix the concrete?

Minimum facility staffing would be as follows for a typical day shift (excluding alternates):

- Batch plant:
    - Operations: 2 staff

  - Maintenance: 1 staff
- Ready-mix fleet: 5–15 staff (variable depending on demand)
- Yard operations:
  - Front-end loader: 1 staff
  - Dust control/street sweeping: 1 staff
- Site maintenance:
  - Fleet mechanics: 2–3 staff (variable depending on demand)
  - Water treatment system operator
  - Groundskeeper
- Office:
  - Plant manager
  - Purchaser
  - Fleet dispatcher
  - Laboratory manager
  - Health, safety, and environment
  - Administration

Products must meet standards and be certified to meet specifications; how can they be certified and what is needed to maintain the standard?

Some tests could be performed at the batch plant, but most tests would be performed upon delivery to the site. The batch plant would need to include space for a small laboratory run by an ACI-certified lab technician for on-site tests. Off-site tests could be completed by the installation contractor in most cases, but also third-party testing contractors.

AASHTO T27 and ASTM C136 (Sieve Analysis of Fine and Coarse Aggregates) are tests that are commonly performed to determine particle size distribution for aggregate products. These tests are relatively quick and simple to perform and require only a sieve set, sieve shaker, and scales to determine particle size distribution. These tests could be completed easily on site or by a third-party laboratory.

How many employees are needed to maintain the equipment and vehicles?

With roughly 10 to 15 vehicles in the fleet, a full-time crew of approximately two to three staff would be required for fleet maintenance (variable depending on demand).

6.5 Financial

What would be the cost to design and develop the Issaquah site to produce concrete for Option 2?

From the OPCC, HDR projects that it would cost approximately $22 million to design and develop the representative Issaquah site to produce concrete from an assumed

greenfield state. HDR assumes that it would need to perform every step in the development process before the batch plant is ready to produce concrete. However, because of the early nature of the study and uncertainty surrounding the project, HDR projects that this price could range anywhere from $11 million to close to $45 million. Despite the seemingly large gap between these estimates, HDR thinks this is still a conservative range.

What are the existing costs for concrete and how might they change in the future?

Employing market sounding techniques, several local concrete suppliers (Cadman, CalPortland, and Stoneway) were contacted to identify current material pricing for concrete as a basis of current cost. Current market pricing is a weighted average of production of the supply costs as quoted by market participants, factoring in differentials in volumes, aggregate size, tensile strength, and concrete admixtures. The findings indicated an average price in current market conditions of $158/yd^3. Additionally, a high-level escalation and market condition forecast of concrete material pricing was developed to inform how concrete pricing in the marketplace may change in the future. Table 6-1 illustrates possible average annual pricing of concrete in future years.

Table 6-1. Price forecast (in $/yd^3)

Year	Average annualized price
Current	$158
2023	$170
2024	$179
2025	$185
2026	$192
2027	$199

How do the costs for the County to own and operate its own facility compare to pricing in the open market?

This question cannot be fully answered with the scope of this study; however, the major cost components provided form the basis for such analysis. For example:

- Capital costs are estimated by the OPCC. The County would need to estimate indirect costs such as financing and County team expenses.
- Operating costs can be built up given the fleet, staffing, and utility demands indicated above. For labor specifically, rates would need to be generated based on hiring staff with batch plant operations experience.
- Maintenance costs for capital equipment (trucks, batch plant, water treatment systems, etc.) can all be estimated as a percentage of capital. For fleet equipment, this may also include maintenance of leased equipment.
- Raw material costs are the most difficult to establish, as they are market driven and would be wholly dependent on the County's commercial agreements with suppliers for cement, aggregates, admixtures, etc.

To support the feasibility study, an evaluation of conceptual costs for the County to own and operate a facility located in Issaquah under two scenarios was developed. **Option 1** was sized for 3,500 yd^3/month production capacity. **Option 2** assumes that the County would partner with other agencies in the development of a batch plant and was sized for 17,688 yd^3/month capacity based on forecasted average monthly concrete requirements. Initial capital costs, annual operating costs, and subsequent replacement and salvage costs were conceptually developed for the life-cycle cost analysis (LCCA).

- The cost for the County to produce concrete under **Option 1** would be approximately \$362/yd^3 in 2022 dollars, or \$204/yd^3 more (approximately 129 percent more) than the current market clearing price for concrete delivered to the jobsite.
- The cost for the County and other partner agencies to produce concrete under **Option 2** would be approximately \$192/yd^3 in 2022 dollars, or \$34/yd^3 more (approximately 21 percent more) than the current market clearing price for concrete delivered to the jobsite.

The LCCA serves to compare potential costs based on all project costs anticipated throughout the indicated usable life of the facility. The analysis was prepared to reflect the estimating team's best understanding of the project scope as was known and defined at the time of the analysis. The results were normalized and calculated over a 10-year period of evaluation.

The following are the general economic assumptions for the LCCA:

- Life-cycle period: 10 years
- Office of Management and Budget (OMB) nominal discount rate (10-year): 2.1 percent
- Seattle core inflation (average since 2020): 4.2 percent
- Construction cost escalation: 5.2 percent
    - Based on forecasted 10-year average for Seattle infrastructure construction escalation. It is anticipated that there will be continued material shortages and productivity losses, in addition to construction volume that drives demand and continues to escalate costs.
- Full-time employee direct labor rate: \$52.44

Operating costs were developed based on the fleet, staffing, and utility demands estimated for the size of the batch plant. Maintenance costs for capital equipment (trucks, batch plant, water treatment systems, etc.) were estimated as a percentage of capital. Fleet equipment costs were included based on the assumption of leased equipment. Raw material costs (e.g., aggregate and cement) were based on current pricing information. However, as they are market driven and would be wholly dependent on the County's commercial agreements with suppliers for the raw materials, a 25 percent contingency was applied.

What is a financial plan of the identified costs for the public manufacture of concrete?

The financial plan for the public manufacture of concrete requires consideration of the financial breakdown of costs relative to the volume of concrete to be produced. Under

the two options outlined above, either King County could develop and construct a concrete batch plant to scale to its individual needs (i.e., Option 1) or it could develop and construct a batch plant to scale to more regional needs with partner agencies (i.e., Option 2). Under either Option 1 or 2, there is not a possibility for revenue generation outside of satisfying core demand (e.g., selling concrete on the open market to contractors, commercial enterprises, etc.), as King County cannot legally operate as a commercial enterprise. As a result, the analysis focuses primarily on the expenditure profile of costs incurred by year to plan, design, build, operate, and maintain a concrete batch plant over a 10-year horizon. Annual expenditures following the initial construction include full-time equivalent staff for operations and maintenance (O&M) personnel, maintenance of the fleet, raw materials (aggregate, Portland cement, concrete admixtures, etc.), water, and electrical utilities.

Under **Option 1**, the costs of project development and implementation of the concrete batch plant are solely King County's, are represented by the OPCC, and consist of the total project costs. The subsequent annualized O&M costs are estimated to be $9.5 million per year in 2022 dollars, based on the O&M assumptions presented above in Section 6.4. The rehabilitation of the concrete batch plant in the fifth year of operation (or year 7) is anticipated to incur a cost of approximately $2.9 million in 2022 dollars. These costs would need to be planned for and budgeted accordingly moving forward into the future over the life of beneficial use of the facility. Figure 6-2 illustrates the financial plan and conceptual cash flows of **Option 1** under the assumptions for King County pursuing concrete manufacturing as a sole entity.

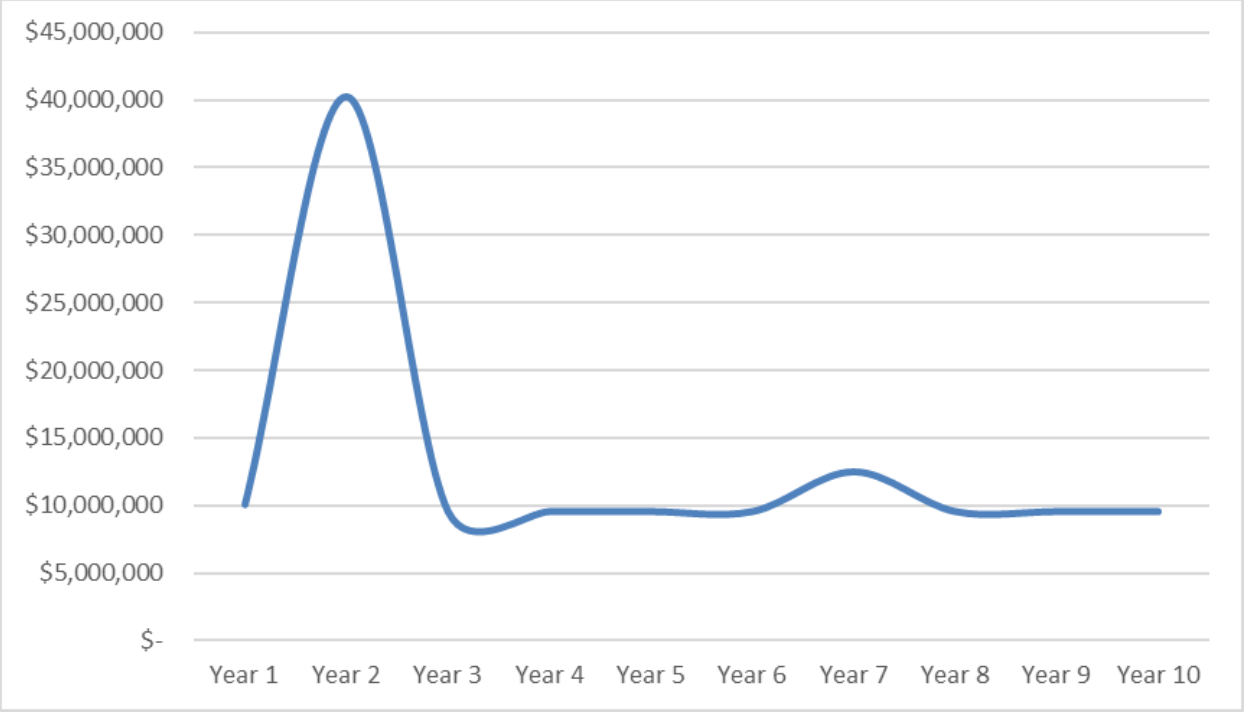


Figure 6-2. Financial plan and conceptual cash flows of Option 1

When considering Option 2, a cost-sharing agreement could be developed in consideration of the forecasted aggregate demand and utilization of the concrete batch

plant facility of partner agencies. This could include considerations whereby King County and each partner agency contribute their relative percentage of the planning, design, and implementation costs of the plant relative to their utilization. Similarly, ongoing concrete batch plant O&M costs could be allocated using a demand-driven cost-sharing agreement. To determine prospective regional cost-sharing allocations, an industry scan was conducted in terms of potential capital projects and prospective partner agencies that could use the facility to estimate a forecasted aggregate concrete demand. Figure 6-3 illustrates various prospective regional partner agencies that could theoretically participate in a concrete batch plant facility and what their relative cost-sharing contribution could be, should they participate, in terms of initial capital costs and ongoing O&M costs.

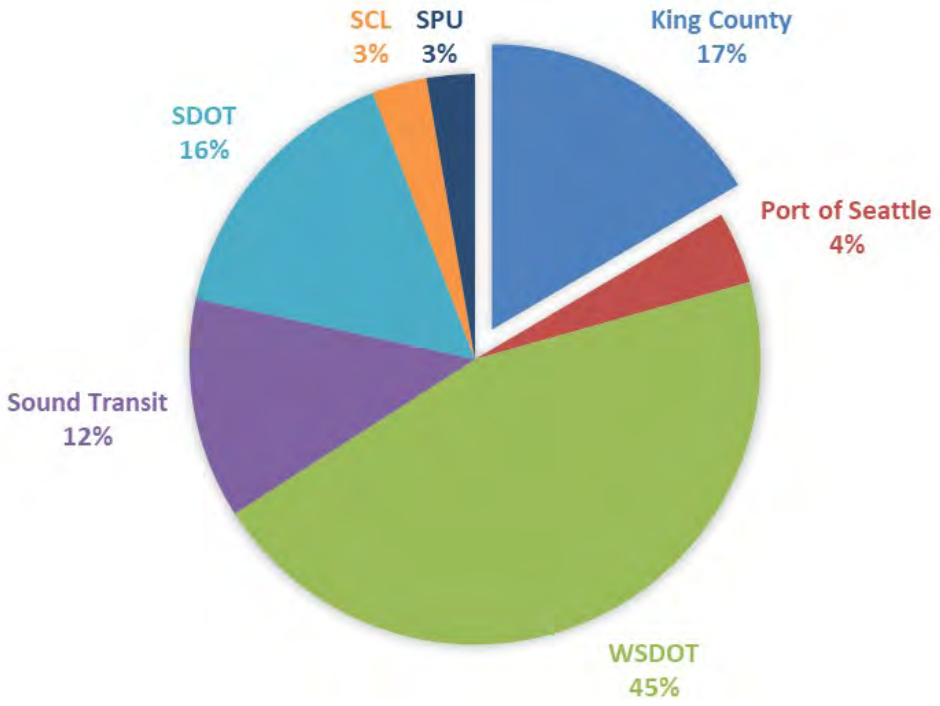


Figure 6-3. Prospective regional partner agencies relative cost-sharing contribution

Under Option 2, the costs of project development and implementation of the concrete batch plant could be allocated based on agency participation in terms of aggregate demand of concrete and relative usages by each party in terms of a cost-share, as illustrated above. The increase in size of the facility would correspondingly increase costs in terms of the OPCC and total project costs relative to production capacity and demand; however, King County's capital investment commitment would be reduced by approximately 73 percent. The larger batch plant facility would incur subsequent annualized O&M costs, estimated to be $21.7 million per year in 2022 dollars, based on the O&M assumptions for an increased facility size to accommodate peer agency participation. The rehabilitation of the concrete batch plant in the fifth year of operation (or year 7) is anticipated to incur a cost of approximately $6.1 million in 2022 dollars. While the aggregate total costs are higher, King County's annualized O&M costs would be reduced by approximately 62 percent considering the aggregate annualized demand of concrete that would be used by King County and the relative cost-sharing contribution.

Figure 6-4 illustrates the financial plan and conceptual cash flows of Option 2 under the assumption that there is peer agency participation.

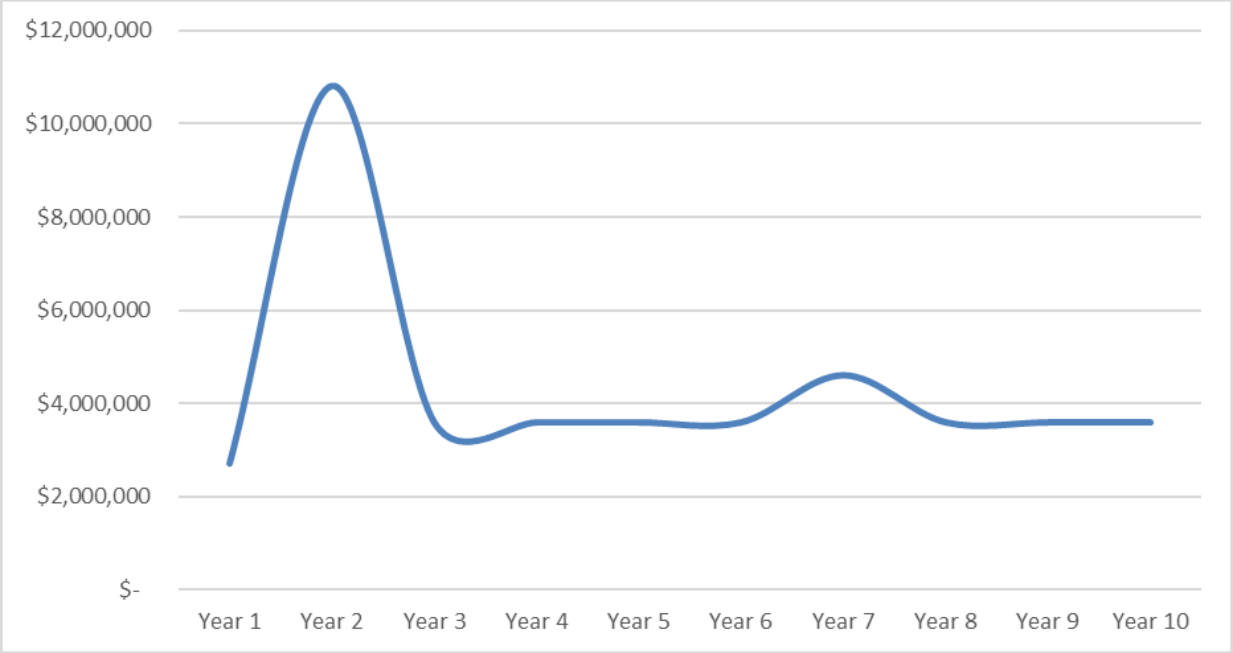


Figure 6-4. Financial plan and conceptual cash flows of Option 2 with peer agency participation

6.6 Property

Are there used plants available on the market now?

Generally, the batch plant and the site are not sold as a package (the equipment is separate). Used batch plant equipment is available on the market—but the cost savings of purchasing used plant equipment typically does not offset the costs to decommission the existing equipment, move it to the new site, reconstruct the equipment, repair any damaged components, and bring structures up to current building code for the region.

Are the available used plants of sufficient quality to produce structural concrete?

Yes, used structural concrete plants are available to produce structural concrete. Please see the caveats in the previous question about the cost feasibility of reusing existing plants.

What sites could be used for a batch plant?

All of the representative sites investigated as part of this study are suitable for batch plant operations, but require various levels of cost, permitting, and site development effort. See example sites in Figure 3-3.

6.7 Permitting

Permitting for a concrete batch plant would trigger both state and local permits. For the purposes of this initial review, it is anticipated that there would not be a federal nexus such as federal funds or a federal permit requirement (such as wetland fill).

The State Environmental Policy Act (SEPA) requires state and local agencies to conduct an environmental review and directs agencies to identify possible environmental impacts that could result from government agencies' decisions, such as constructing public facilities. For this project, King County would act as the SEPA lead agency and would be responsible for identifying and evaluating potential adverse impacts, likely through a SEPA Environmental Checklist.

Concrete batch plants are regulated by the Puget Sound Clean Air Agency (PSCAA) and would require an Order of Approval from PSCAA. This process can take several months and may also trigger tribal consultation and public notice/comment, which can add additional processing time. A National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit is required from the Washington State Department of Ecology whenever 1 acre or more of ground will be disturbed as a result of a project.

Local (i.e., County or City) permits would include both land use permits and construction permits. Land use review would likely be done through a Conditional Use Permit, unless the property is zoned to specifically allow a concrete batch plant. Conditional Use Permits may require public hearings and public notification process and are typically the longest-lead permits (can take upwards of a year to obtain, depending on the jurisdiction). Construction permits would likely include clearing/grading (including drainage review and tree removal) and building permits.

7 Conclusion

In summary, HDR conducted a feasibility study to evaluate the viability of constructing a ready-mix concrete batch plant on a property in Issaquah to be owned and operated by King County. HDR also investigated other representative sites that could serve the target projects in the region, inclusive of peer agency partner participation. The study aimed to identify key parameters and included developing a conceptual layout, a project implementation schedule, and an associated OPCC. In addition, the study incorporated analysis and considerations of the probable costs to operate and maintain a concrete batch plant facility over its usable life for the Issaquah site and other representative sites, including considerations of peer agency participation.

Based on the evaluation completed, HDR thinks that while the project would be technically and operationally possible for the County to proceed, and the addition of concrete demand from third parties improves the financial feasibility of the project, the existing supply of key inputs to production (i.e., primarily aggregates) in the region are a limiting factor and key risk to consider that strongly influences the unit cost of concrete production. The availability of locally sourced aggregates in the region that are contractually limited by commercial concrete manufacturers raises the probable price of concrete production substantially, thereby challenging the justification of the project's financial and economic feasibility. If the County were able to purchase aggregates for at or near the market pricing similar to commercial concrete manufacturers in the region, the project economics would be more financially viable. The County may elect to produce its own concrete at an above-market price (i.e., 129 percent and 21 percent forecasted premium in cubic yard concrete pricing for Options 1 and 2, respectively) only if the

surety of concrete supply to the County's (and peer partner agency) projects provides a risk-adjusted justification that financially exceeds the present-value forecasted economic costs presented in the analysis that exceeds the current and future forecasted economic clearing price of concrete on a cubic-yard basis.

Appendix A. Conceptual Site Plan for Issaquah

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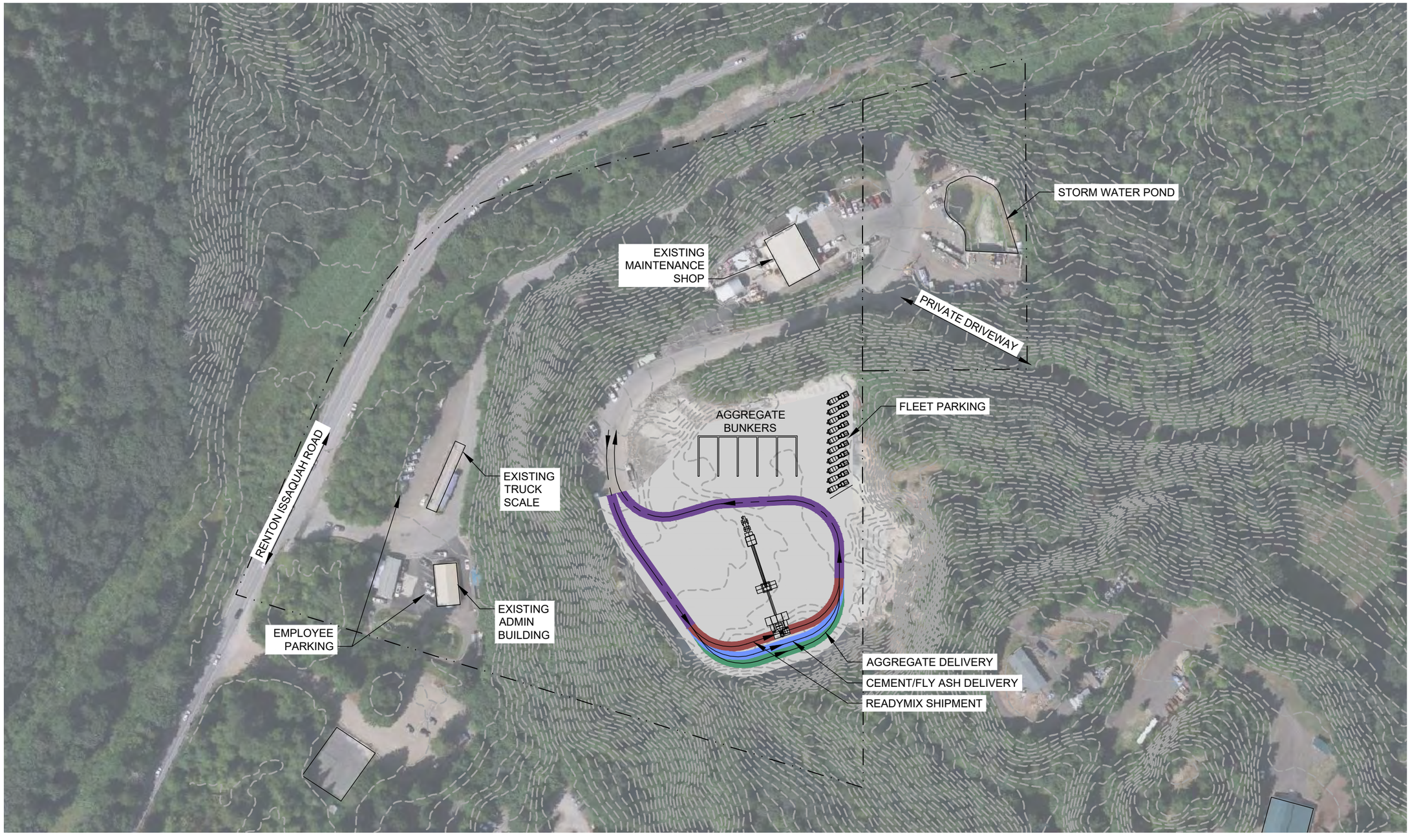

SITE PLAN
1"=150'

0 150
SCALE IN FEET

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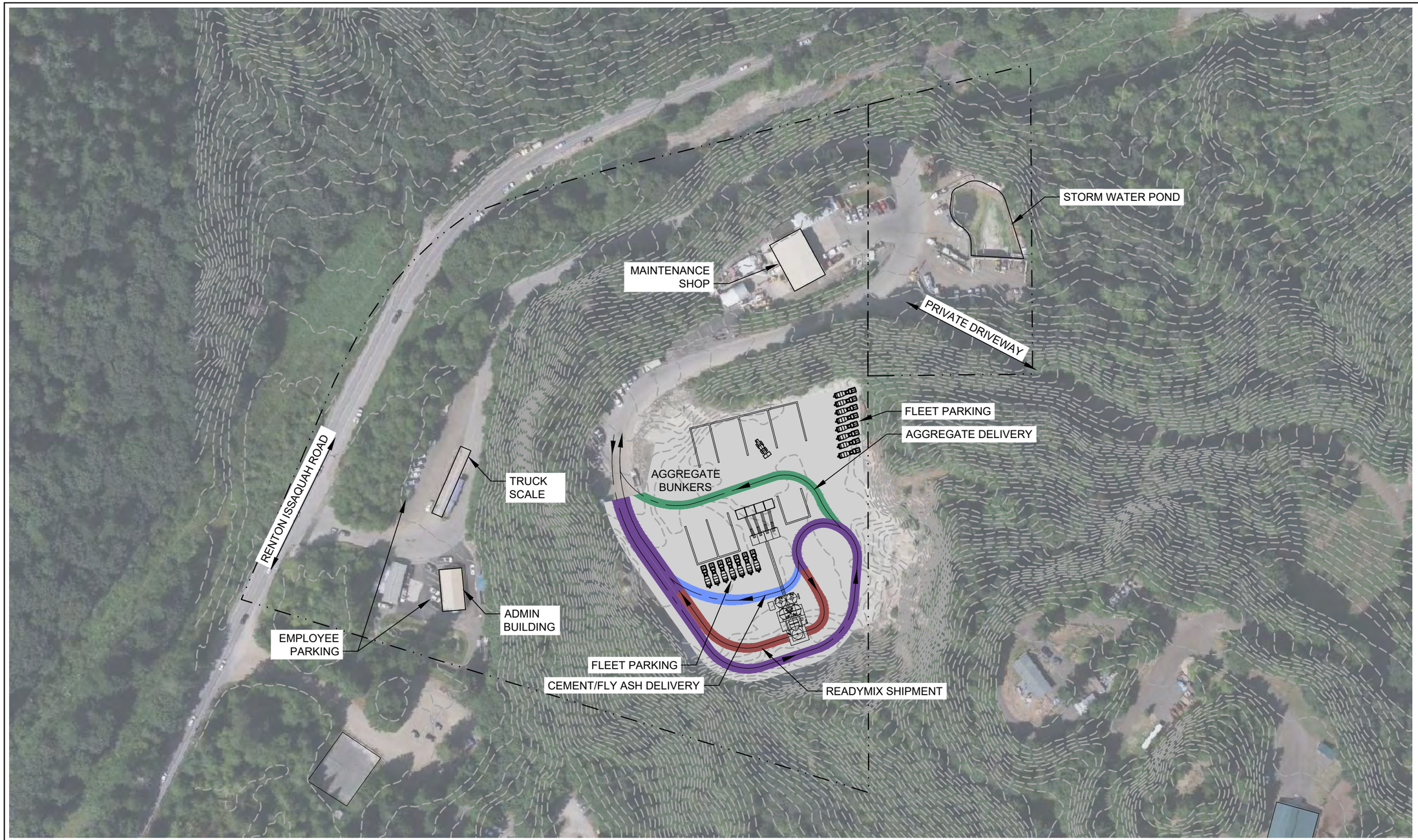
OPTION 1- KING COUNTY READYMIX BATCH PLANT SITE PLAN

KC WO5 CONCRETE PLANT FEASIBILITY STUDY

DATE
03/2022

FIGURE
GA-001



SITE PLAN

1"=150'

0 150

SCALE IN FEET

OPTION 2- KING COUNTY READYMIX BATCH PLANT SITE PLAN

KC WO5 CONCRETE PLANT FEASIBILITY STUDY

DATE 08/2022

FIGURE GA-002

Appendix B. Throughput Simulation

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Throughput Simulation

King County
Option 1 - WO5 Concrete
Plant Feasibility Study

Description	Value	Units	Comments
Assumptions			
Operations			
Operating Days			
Days Per Year	365	days/year	
Non-Working Holidays Days per Year	7	days/year	
Non-Operating Maintenance Days per Year	12	days/year	
Operating Days per Year	346	days/year	
Crew Shifts			
Shifts per Day	1	shifts/day	
Contractual Hours per Shift	8.5	hours/shift	
Non-Productive Working hours	1	hours/shift	
Productive Working Hours	7.5	hours/shift	
Service Area			
Max Drive Time from Batch Plant to Usage Site	1	hours	
Material Properties			
Bulk Densities			
Water	62.4	lb/ft3	
Air	0.0765	lb/ft3	
Portland Cement	90	lb/ft3	
Fine Aggregate 1	110	lb/ft3	
Coarse Aggregate 1	110	lb/ft3	
Coarse Aggregate 2	105	lb/ft3	
Coarse Aggregate 3	95	lb/ft3	
Coarse Aggregate 4	85	lb/ft3	
Coarse Aggregate 5	75	lb/ft3	
Fly Ash	45	lb/ft3	
Ready-Mix Concrete	145	lb/ft3	
Ready-Mix Concrete Composition			
RMC Composition_Water	16%		by Volume
RMC Composition_Air	4%		by Volume
RMC Composition_Portland Cement	8%		by Volume
RMC Composition_Fine Aggregate 1	30%		by Volume
RMC Composition_Coarse Aggregate 1	8%		by Volume
RMC Composition_Coarse Aggregate 2	8%		by Volume
RMC Composition_Coarse Aggregate 3	8%		by Volume
RMC Composition_Coarse Aggregate 4	8%		by Volume
RMC Composition_Coarse Aggregate 5	8%		by Volume
RMC Composition_Fly Ash	2%		by Volume
Reaady-Mix Concrete Residence Time			
Max Residence Time from Mixing to Placement	1.50	hours	
Truck Criteria			
Truck Capacities			
Ready-Mix Concrete Truck Capacity	10	yd3/truck	
Dump Truck Capacity_Weight	30,000	lbs	
Dump Truck Capacity_Volume	14	yd3/truck	
Pneumatic Tanker Capacity_Weight	45,000	lbs	
Pneumatic Tanker Capacity_Volume	1,000	ft3	
Truck Design Rate			
Max Ready Mix Truck Pumping Rate	40	yd3/hr	
Batch Plant Criteria			
Production Rate			
Max Batch Plant Truck Loading Rate	40	yd3/hr	
Throughputs			
Monthly Ready-Mix Concrete Demand	3500	yd3/month	
Annual Ready-Mix Concrete Demand	42000	yd3/year	
Monthly Aggregate Production	5600	tons/month	
Annual Aggregate Production	67200	tons/year	

Throughput Simulation

Description	Value	Units	Comments
Calculations			
Throughputs			
Inbound Annual Product Volumes			
Portland Cement	4,082	tons/year	
Fine Aggregate 1	18,711	tons/year	
Coarse Aggregate 1	4,990	tons/year	
Coarse Aggregate 2	4,763	tons/year	
Coarse Aggregate 3	4,309	tons/year	
Coarse Aggregate 4	3,856	tons/year	
Coarse Aggregate 5	3,402	tons/year	
Fly Ash	510	tons/year	
Outbound Annual Product Volumes			
Ready-Mix Concrete	42,000	yd^3/year	
Fine Aggregate 1	12,700	tons/year	Sold as aggregates
Coarse Aggregate 1	3,387	tons/year	Sold as aggregates
Coarse Aggregate 2	3,233	tons/year	Sold as aggregates
Coarse Aggregate 3	2,925	tons/year	Sold as aggregates
Coarse Aggregate 4	2,617	tons/year	Sold as aggregates
Coarse Aggregate 5	2,309	tons/year	Sold as aggregates
Truck Quantities and Frequency			
Inbound Annual Truck Quantities			
Portland Cement	181	trucks/year	
Fine Aggregate 1	1,247	trucks/year	
Coarse Aggregate 1	333	trucks/year	
Coarse Aggregate 2	318	trucks/year	
Coarse Aggregate 3	287	trucks/year	
Coarse Aggregate 4	257	trucks/year	
Coarse Aggregate 5	240	trucks/year	
Inbound Fly Ash	23	trucks/year	
Inbound Daily Truck Quantities			
Portland Cement	1	trucks/day	
Fine Aggregate 1	4	trucks/day	
Coarse Aggregate 1	1	trucks/day	
Coarse Aggregate 2	1	trucks/day	
Coarse Aggregate 3	1	trucks/day	
Coarse Aggregate 4	1	trucks/day	
Coarse Aggregate 5	1	trucks/day	
Fly Ash	1	trucks/day	
Outbound Annual Truck Quantities			
Ready-Mix Concrete per Year	4,200	trucks/year	
Fine Aggregate 1 per Year	847	trucks/year	
Coarse Aggregate 1 per Year	226	trucks/year	
Coarse Aggregate 2 per Year	216	trucks/year	
Coarse Aggregate 3 per Year	195	trucks/year	
Coarse Aggregate 4 per Year	174	trucks/year	
Coarse Aggregate 5 per Year	163	trucks/year	
Outbound Daily Truck Quantities			
Ready-Mix Concrete	13	trucks/day	
Fine Aggregate 1	3	trucks/day	
Coarse Aggregate 1	1	trucks/day	
Coarse Aggregate 2	1	trucks/day	
Coarse Aggregate 3	1	trucks/day	
Coarse Aggregate 4	1	trucks/day	
Coarse Aggregate 5	1	trucks/day	
Total Annual Truck Quantities			
Total Annual Inbound Dump Trucks	2,682	trucks/year	
Total Annual Inbound Pneumatic Trucks	204	trucks/year	
Total Annual Outbound Ready-Mix Concrete Trucks	4,200	trucks/year	
Total Annual Outbound Dump Trucks	1,820	trucks/year	
Total Annual Truck Traffic	8,906	trucks/year	
Total Daily Truck Quantities			
Total Inbound Dump Trucks per Day	9	trucks/day	
Total Inbound Pneumatic Trucks per Day	2	trucks/day	
Total Outbound Ready Mix Concrete Trucks per Day	13	trucks/day	
Total Outbound Dump Trucks per Day	8	trucks/day	
Total Dail Truck Traffic	32	trucks/day	

Throughput Simulation

Description	Value	Units	Comments
Total Truck Frequencies			
Total Inbound Dump Truck Frequncy	50.0	minutes/truck	
Total Inbound Pneumatic Truck Frequency	225.0	minutes/truck	
Total Outbound Ready Mix Concrete Truck Frequency	34.6	minutes/truck	
Total Outbound Dump Truck Frequency	56.3	minutes/truck	
Total Truck Frequency	14.1	minutes/truck	
Cycle Time and Fleet Size			
Ready-Mix Concrete Trucks			
Max Cycle Time per Truck	2.5	hours/cycle	
Number of Daily Cycles per Truck	3	cycles/day	
Ready-Mix Truck Fleet Size	5	trucks/fleet	
Design Rates			
Ready-Mix Concrete Production Rate			
Daily Ready Mix Concrete Production	121.39	yd^3/day	
Average Ready Mix Concrete Production Rate	16.18	yd^3/hr	
Cement, Aggregate and Fly Ash Consumption Rates			
Portland Cement Consumption Rate	0.58	ft3/min	
Fine Aggregate 1 Consumption Rate	7.21	tons/hr	
Coarse Aggregate 1 Consumption Rate	1.92	tons/hr	
Coarse Aggregate 2 Consumption Rate	1.84	tons/hr	
Coarse Aggregate 3 Consumption Rate	1.66	tons/hr	
Coarse Aggregate 4 Consumption Rate	1.49	tons/hr	
Coarse Aggregate 5 Consumption Rate	1.31	tons/hr	
Fly Ash Consumption Rate	0.15	ft3/min	
Storage			
Storage Capacities			
Minimum Days of Storage_Portland Cement	3	days	Assumption
Minimum Days of Storage_Fine Aggregate 1	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 1	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 2	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 3	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 4	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 5	7	days	Assumption
Minimum Days of Storage_Fly Ash	3	days	Assumption
Storage Volumes			
Portland Cement	68	tons	
Fine Aggregate 1	420	tons	
Coarse Aggregate 1	110	tons	
Coarse Aggregate 2	110	tons	
Coarse Aggregate 3	110	tons	
Coarse Aggregate 4	110	tons	
Coarse Aggregate 5	100	tons	
Fly Ash	68	tons	

Throughput Simulation

Description	Value	Units	Comments
Assumptions			
Operations			
Operating Days			
Days Per Year	365	days/year	
Non-Working Holidays Days per Year	7	days/year	
Non-Operating Maintenance Days per Year	12	days/year	
Operating Days per Year	346	days/year	
Crew Shifts			
Shifts per Day	1	shift/day	
Contractual Hours per Shift	8.5	hours/shift	
Non-Productive Working hours	1	hours/shift	
Productive Working Hours	7.5	hours/shift	
Service Area			
Max Drive Time from Batch Plant to Usage Site	1	hours	
Material Properties			
Bulk Densities			
Water	62.4	lb/ft3	
Air	0.0765	lb/ft3	
Portland Cement	90	lb/ft3	
Fine Aggregate 1	110	lb/ft3	
Coarse Aggregate 1	110	lb/ft3	
Coarse Aggregate 2	105	lb/ft3	
Coarse Aggregate 3	95	lb/ft3	
Coarse Aggregate 4	85	lb/ft3	
Coarse Aggregate 5	75	lb/ft3	
Fly Ash	45	lb/ft3	
Ready-Mix Concrete	145	lb/ft3	
Portland Cement Aerated	75	lb/ft3	
Fly Ash Aerated	37	lb/ft3	
Ready-Mix Concrete Composition			
RMC Composition_Water	7.5%		by Volume
RMC Composition_Portland Cement	13.6%		by Volume
RMC Composition_Fine Aggregate 1	33.2%		by Volume
RMC Composition_Coarse Aggregate 1	8.8%		by Volume
RMC Composition_Coarse Aggregate 2	8.8%		by Volume
RMC Composition_Coarse Aggregate 3	8.8%		by Volume
RMC Composition_Coarse Aggregate 4	8.8%		by Volume
RMC Composition_Coarse Aggregate 5	8.8%		by Volume
RMC Composition_Fly Ash	1.7%		by Volume
Reaady-Mix Concrete Residence Time			
Max Residence Time from Mixing to Placement	1.50	hours	
Truck Criteria			
Truck Capacities			
Ready-Mix Concrete Truck Capacity	10	yd3/truck	
Dump Truck Capacity_Weight	54,000	lbs/truck	
Dump Truck Capacity_Volume	14	yd3/truck	
Pneumatic Tanker Capacity_Weight	45,000	lbs/truck	
Pneumatic Tanker Capacity_Volume	1,000	ft3/truck	
Truck Design Rate			
Max Ready Mix Truck Pumping Rate	40	yd3/hour	
Batch Plant Criteria			
Production Rate			
Max Batch Plant Truck Loading Rate	40	yd3/hour	
Throughputs			
Monthly Ready-Mix Concrete Demand	12,500	yd3/month	
Annual Ready-Mix Concrete Demand	150,000	yd3/year	

Description	Value	Units	Comments
Calculations			
Throughputs			
Inbound Annual Product Volumes			
Portland Cement	40,050	tons/year	
Fine Aggregate 1	97,500	tons/year	
Coarse Aggregate 1	25,800	tons/year	
Coarse Aggregate 2	25,800	tons/year	
Coarse Aggregate 3	25,800	tons/year	
Coarse Aggregate 4	25,800	tons/year	
Coarse Aggregate 5	25,800	tons/year	
Fly Ash	4,995	tons/year	
Outbound Annual Product Volumes			
Ready-Mix Concrete	150,000	yd^3/year	
Truck Quantities and Frequency			
Inbound Annual Truck Quantities			
Portland Cement	1,780	trucks/year	
Fine Aggregate 1	4,690	trucks/year	
Coarse Aggregate 1	1,241	trucks/year	
Coarse Aggregate 2	1,300	trucks/year	
Coarse Aggregate 3	1,437	trucks/year	
Coarse Aggregate 4	1,606	trucks/year	
Coarse Aggregate 5	1,820	trucks/year	
Inbound Fly Ash	222	trucks/year	
Portland Cement Aerated	921	trucks/year	
Fly Ash Aerated	110	trucks/year	
Inbound Daily Truck Quantities			
Portland Cement	6	trucks/day	
Fine Aggregate 1	14	trucks/day	
Coarse Aggregate 1	4	trucks/day	
Coarse Aggregate 2	4	trucks/day	
Coarse Aggregate 3	5	trucks/day	
Coarse Aggregate 4	5	trucks/day	
Coarse Aggregate 5	6	trucks/day	
Fly Ash	1	trucks/day	
Portland Cement Aerated	3	trucks/day	
Fly Ash Aerated	1	trucks/day	
Outbound Annual Truck Quantities			
Ready-Mix Concrete per Year	15,000	trucks/year	
Outbound Daily Truck Quantities			
Ready-Mix Concrete	44	trucks/day	
Total Annual Truck Quantities			
Total Annual Inbound Dump Trucks	12,094	trucks/year	
Total Annual Inbound Pneumatic Trucks	2,002	trucks/year	
Total Annual Outbound Ready-Mix Concrete Trucks	15,000	trucks/year	
Total Daily Truck Quantities			
Total Inbound Dump Trucks per Day	38	trucks/day	
Total Inbound Pneumatic Trucks per Day	7	trucks/day	
Total Outbound Ready Mix Concrete Trucks per Day	44	trucks/day	
Total Truck Frequencies			
Total Inbound Dump Truck Frequncy	11.8	minutes/truck	
Total Inbound Pneumatic Truck Frequency	64.3	minutes/truck	
Total Outbound Ready Mix Concrete Truck Frequency	10.2	minutes/truck	
Cycle Time and Fleet Size			
Ready-Mix Concrete Trucks			
Max Cycle Time per Truck	2.5	hours/cycle	
Number of Daily Cycles per Truck	3	cycles/day	
Ready-Mix Truck Fleet Size	15	trucks/fleet	
Design Rates			
Ready-Mix Concrete Production Rate			
Daily Ready Mix Concrete Production	433.53	yd^3/day	
Average Ready Mix Concrete Production Rate	57.80	yd^3/hr	

Cement, Aggregate and Fly Ash Consumption Rates			
Portland Cement Consumption Rate	15.43	tons/hr	
Fine Aggregate 1 Consumption Rate	37.57	tons/hr	
Coarse Aggregate 1 Consumption Rate	9.94	tons/hr	
Coarse Aggregate 2 Consumption Rate	9.94	tons/hr	
Coarse Aggregate 3 Consumption Rate	9.94	tons/hr	
Coarse Aggregate 4 Consumption Rate	9.94	tons/hr	
Coarse Aggregate 5 Consumption Rate	9.94	tons/hr	
Fly Ash Consumption Rate	1.92	tons/hr	
Storage			
Storage Capacities			
Minimum Days of Storage_Portland Cement	3	days	Assumption
Minimum Days of Storage_Fine Aggregate 1	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 1	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 2	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 3	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 4	7	days	Assumption
Minimum Days of Storage_Coarse Aggregate 5	7	days	Assumption
Minimum Days of Storage_Fly Ash	3	days	Assumption
Storage Volumes			
Portland Cement	400	tons	
Fine Aggregate 1	2,040	tons	
Coarse Aggregate 1	590	tons	
Coarse Aggregate 2	560	tons	
Coarse Aggregate 3	630	tons	
Coarse Aggregate 4	570	tons	
Coarse Aggregate 5	600	tons	
Fly Ash	140	tons	

Appendix C. Implementation Schedule

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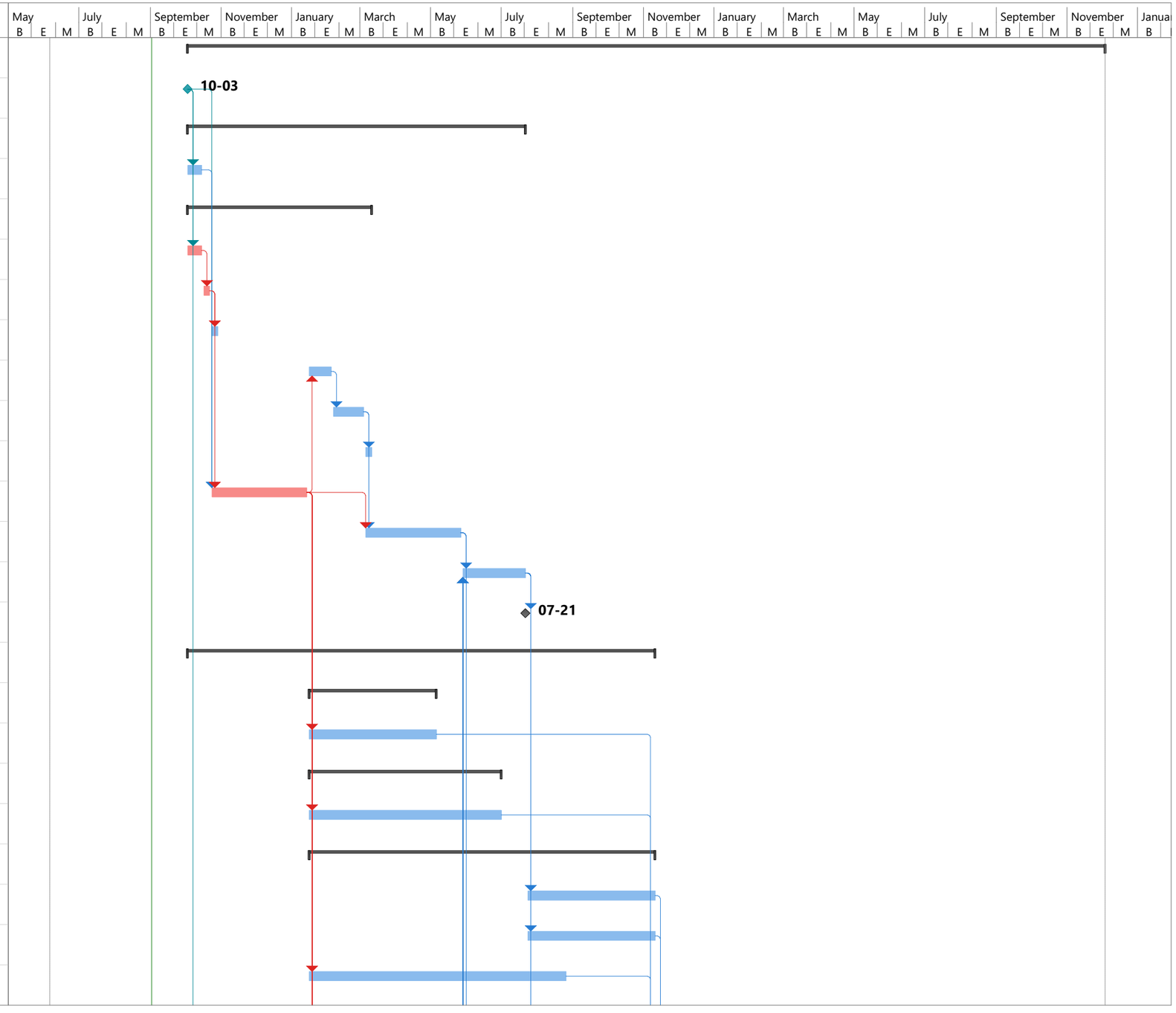
Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

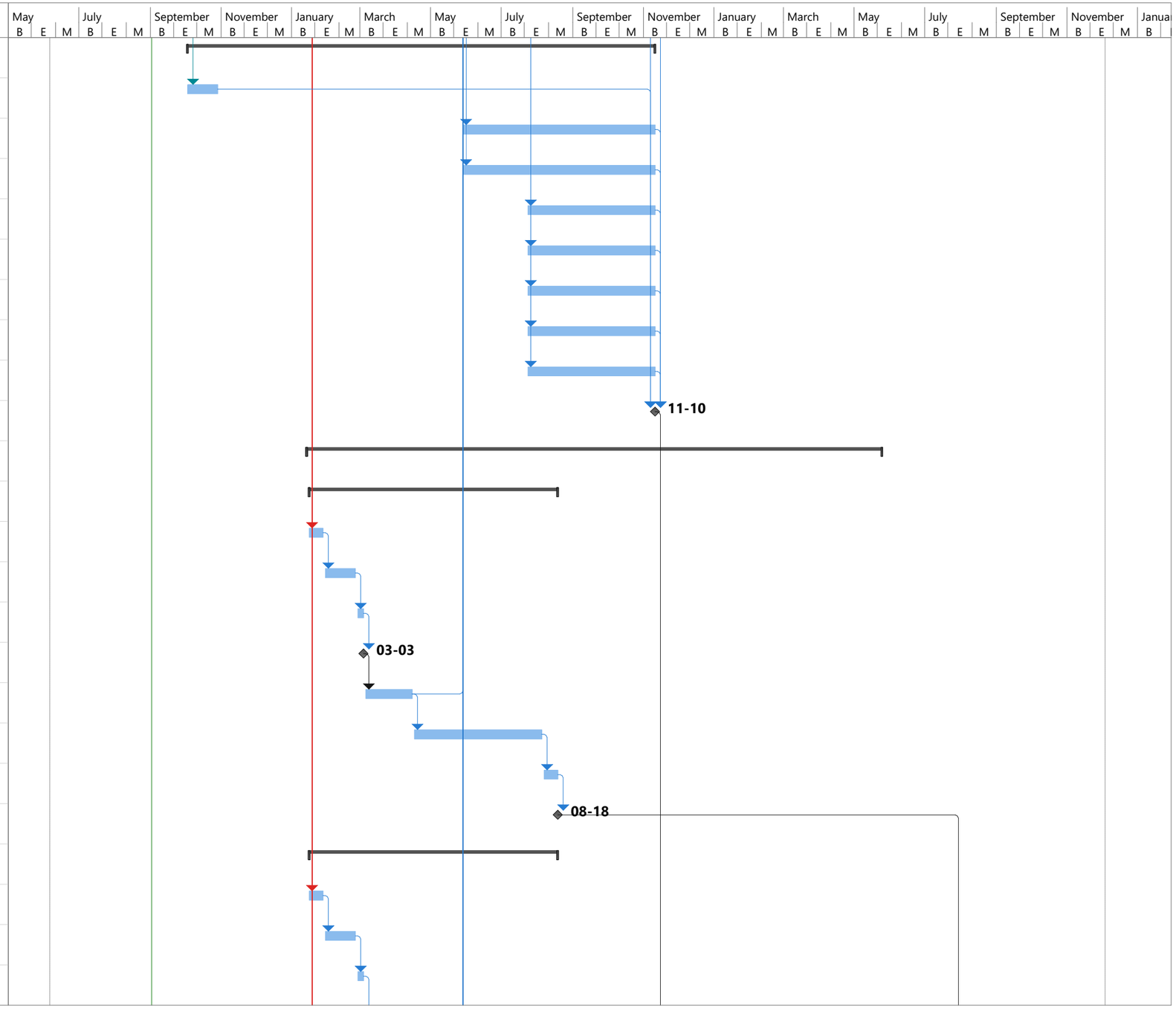
ID	Task Name	Duration	Start	Finish
1	**Project Schedule**	**113.4 wks**	**2022-10-03**	**2024-12-03**
2	Notice to Proceed	0 wks	2022-10-03	2022-10-03
3	**Engineering**	**42 wks**	**2022-10-03**	**2023-07-21**
4	Survey	2 wks	2022-10-03	2022-10-14
5	**Geotechnical Engineering**	**23 wks**	**2022-10-03**	**2023-03-10**
6	Preliminary Field Work	2 wks	2022-10-03	2022-10-14
7	Draft Preliminary Report	1 wk	2022-10-17	2022-10-21
8	Final Preliminary Report	1 wk	2022-10-24	2022-10-28
9	Detailed Field Work	3 wks	2023-01-16	2023-02-03
10	Draft Detailed Report	4 wks	2023-02-06	2023-03-03
11	Final Detailed Report	1 wk	2023-03-06	2023-03-10
12	30% Design	12 wks	2022-10-24	2023-01-13
13	60% Design	12 wks	2023-03-06	2023-05-26
14	90% Design	8 wks	2023-05-29	2023-07-21
15	Engineering Complete	0 wks	2023-07-21	2023-07-21
16	**Permitting**	**58 wks**	**2022-10-03**	**2023-11-10**
17	**USFWS**	**16 wks**	**2023-01-16**	**2023-05-05**
18	Federal ESA Section 7	4 mons	2023-01-16	2023-05-05
19	**DAHP**	**24 wks**	**2023-01-16**	**2023-06-30**
20	WAC 25-48-060	6 mons	2023-01-16	2023-06-30
21	**Ecology**	**43 wks**	**2023-01-16**	**2023-11-10**
22	NPDES Construction Stormwater Permit	4 mons	2023-07-24	2023-11-10
23	NPDES Industrial Stormwater Permit	4 mons	2023-07-24	2023-11-10
24	Operational Air Emissions	8 mons	2023-01-16	2023-08-25



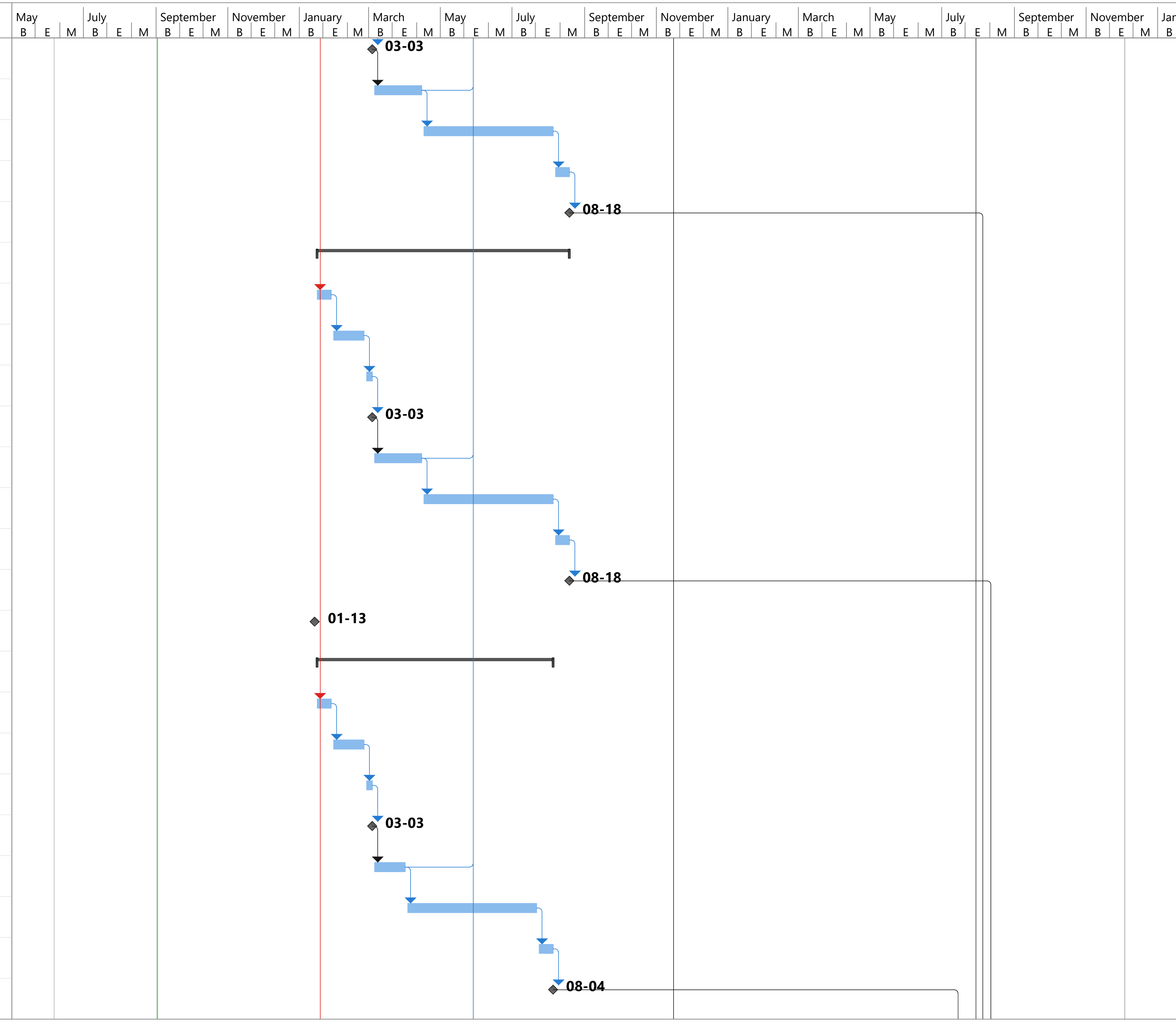
Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

ID	Task Name	Duration	Start	Finish
25	**City of Issaquah**	**58 wks**	**2022-10-03**	**2023-11-10**
26	Pre-Application Meeting	1 mon	2022-10-03	2022-10-28
27	Development Permit	6 mons	2023-05-29	2023-11-10
28	Conditional Use Permit	6 mons	2023-05-29	2023-11-10
29	Building Permit - Grading Permit	4 mons	2023-07-24	2023-11-10
30	Building Permit - Commercial Building Permit	4 mons	2023-07-24	2023-11-10
31	Building Permit - Engineering Plan Review	4 mons	2023-07-24	2023-11-10
32	Building Permit - Fire Plan Review	4 mons	2023-07-24	2023-11-10
33	Building Permit - Electrical, Plumbing, Mechanical Permit	4 mons	2023-07-24	2023-11-10
34	Permits Received	0 days	2023-11-10	2023-11-10
35	**Procurement**	**71 wks**	**2023-01-13**	**2024-05-24**
36	**Administration Building**	**31 wks**	**2023-01-16**	**2023-08-18**
37	Procurement Package Development	2 wks	2023-01-16	2023-01-27
38	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
39	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
40	Bid Award	0 days	2023-03-03	2023-03-03
41	Engineering	6 wks	2023-03-06	2023-04-14
42	Fabrication	16 wks	2023-04-17	2023-08-04
43	Shipping	2 wks	2023-08-07	2023-08-18
44	Arrival on Site	0 days	2023-08-18	2023-08-18
45	**Control Room**	**31 wks**	**2023-01-16**	**2023-08-18**
46	Procurement Package Development	2 wks	2023-01-16	2023-01-27
47	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
48	Vendor Bid Review	1 wk	2023-02-27	2023-03-03



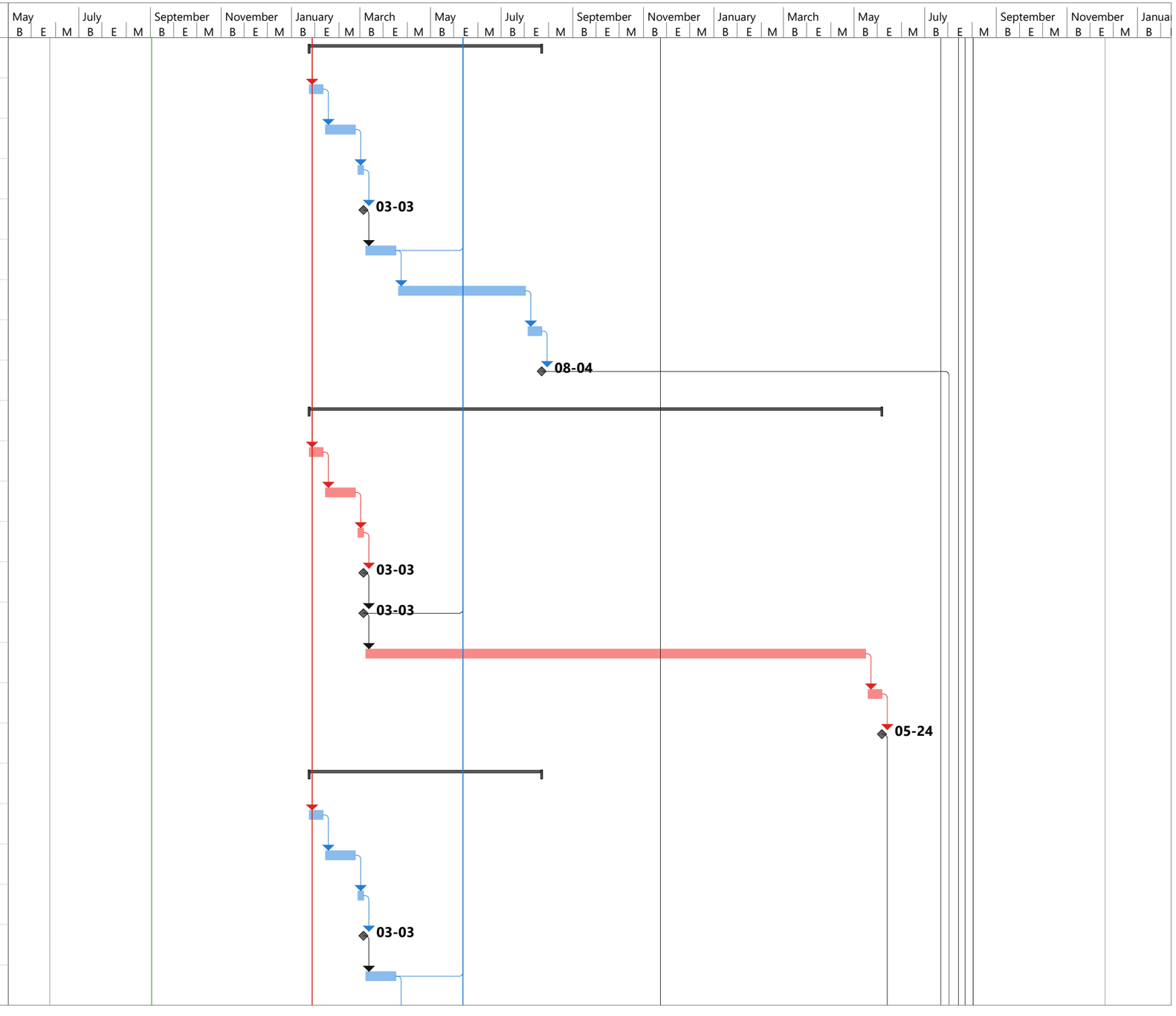
ID	Task Name	Duration	Start	Finish
49	Bid Award	0 days	2023-03-03	2023-03-03
50	Engineering	6 wks	2023-03-06	2023-04-14
51	Fabrication	16 wks	2023-04-17	2023-08-04
52	Shipping	2 wks	2023-08-07	2023-08-18
53	Arrival on Site	0 days	2023-08-18	2023-08-18
54	**MCC Building**	**31 wks**	**2023-01-16**	**2023-08-18**
55	Procurement Package Development	2 wks	2023-01-16	2023-01-27
56	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
57	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
58	Bid Award	0 days	2023-03-03	2023-03-03
59	Engineering	6 wks	2023-03-06	2023-04-14
60	Fabrication	16 wks	2023-04-17	2023-08-04
61	Shipping	2 wks	2023-08-07	2023-08-18
62	Arrival on Site	0 days	2023-08-18	2023-08-18
63	**Maintenance Shop**	**0 wks**	**2023-01-13**	**2023-01-13**
72	**Truck Wash**	**29 wks**	**2023-01-16**	**2023-08-04**
73	Procurement Package Development	2 wks	2023-01-16	2023-01-27
74	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
75	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
76	Bid Award	0 days	2023-03-03	2023-03-03
77	Engineering	4 wks	2023-03-06	2023-03-31
78	Fabrication	16 wks	2023-04-03	2023-07-21
79	Shipping	2 wks	2023-07-24	2023-08-04
80	Arrival on Site	0 days	2023-08-04	2023-08-04



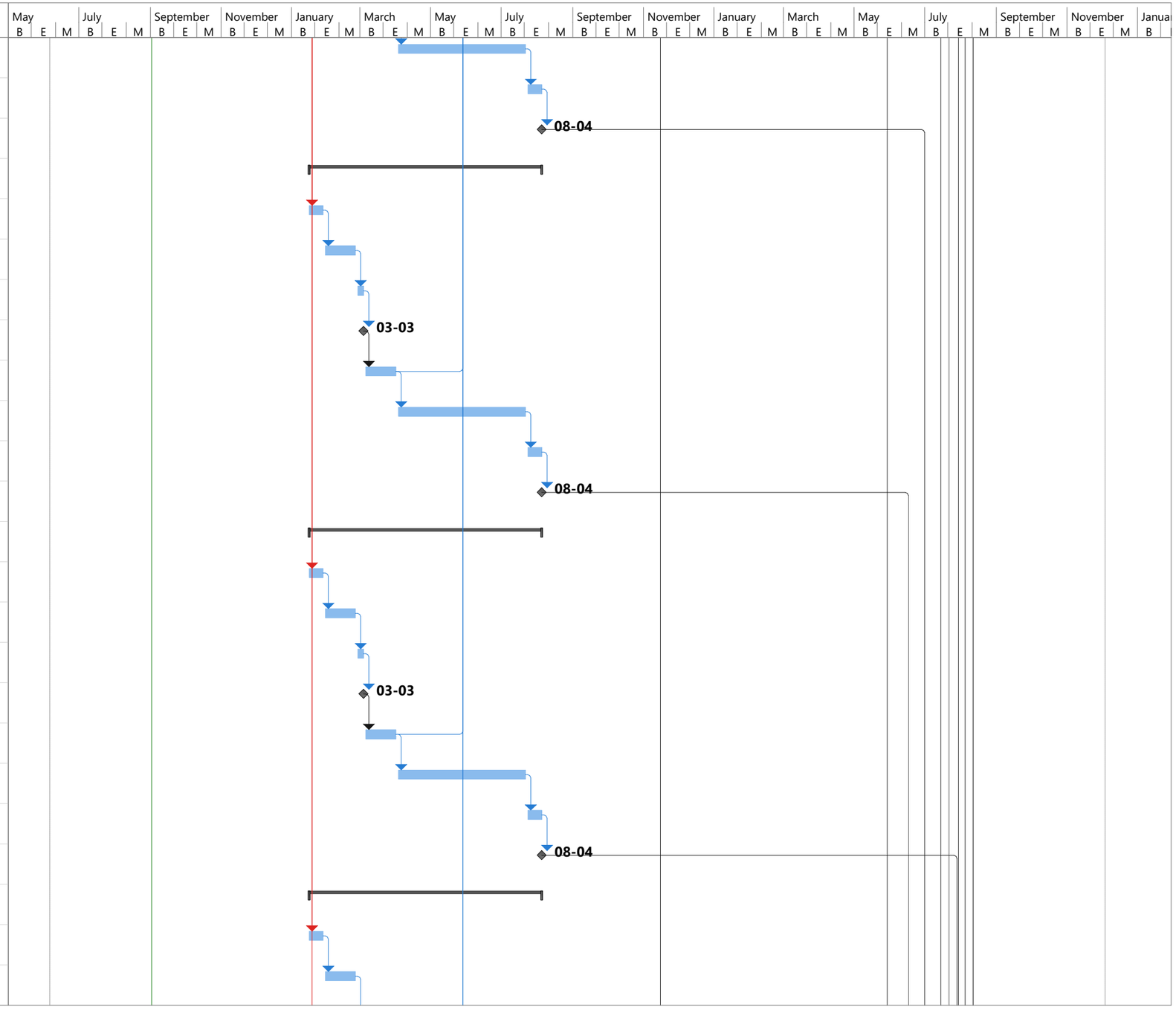
Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

ID	Task Name	Duration	Start	Finish
81	**Water Treamtent Plant**	**29 wks**	**2023-01-16**	**2023-08-04**
82	Procurement Package Development	2 wks	2023-01-16	2023-01-27
83	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
84	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
85	Bid Award	0 days	2023-03-03	2023-03-03
86	Engineering	4 wks	2023-03-06	2023-03-31
87	Fabrication	16 wks	2023-04-03	2023-07-21
88	Shipping	2 wks	2023-07-24	2023-08-04
89	Arrival on Site	0 days	2023-08-04	2023-08-04
90	**Ready-Mix Batch Plant**	**71 wks**	**2023-01-16**	**2024-05-24**
91	Procurement Package Development	2 wks	2023-01-16	2023-01-27
92	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
93	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
94	Bid Award	0 days	2023-03-03	2023-03-03
95	Engineering	0 wks	2023-03-03	2023-03-03
96	Fabrication	62 wks	2023-03-06	2024-05-10
97	Shipping	2 wks	2024-05-13	2024-05-24
98	Arrival on Site	0 days	2024-05-24	2024-05-24
99	**Cement and Fly Ash Silos**	**29 wks**	**2023-01-16**	**2023-08-04**
100	Procurement Package Development	2 wks	2023-01-16	2023-01-27
101	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
102	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
103	Bid Award	0 days	2023-03-03	2023-03-03
104	Engineering	4 wks	2023-03-06	2023-03-31



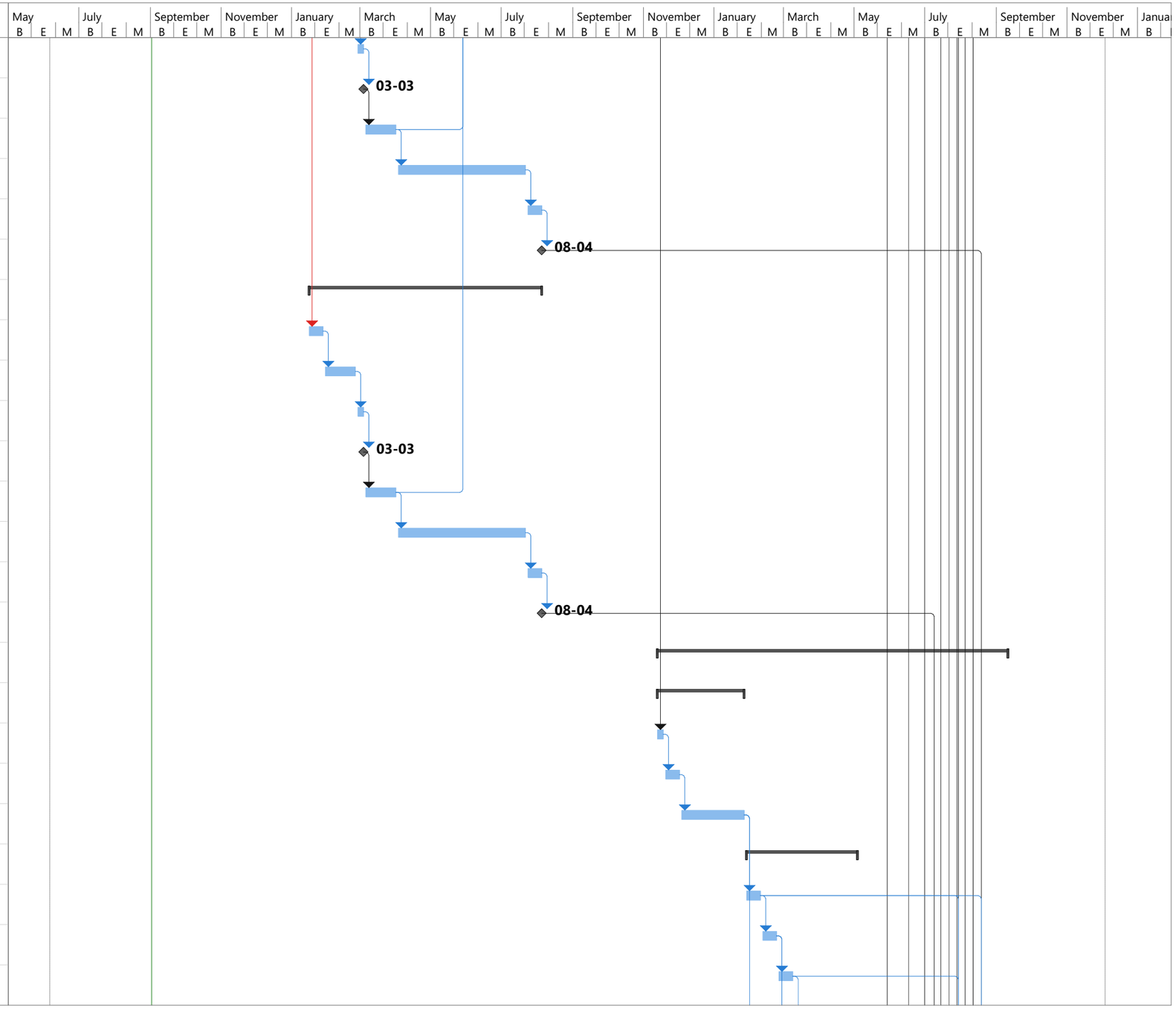
ID	Task Name	Duration	Start	Finish
105	Fabrication	16 wks	2023-04-03	2023-07-21
106	Shipping	2 wks	2023-07-24	2023-08-04
107	Arrival on Site	0 days	2023-08-04	2023-08-04
108	**Aggregate Feed Conveyor & Hopper**	**29 wks**	**2023-01-16**	**2023-08-04**
109	Procurement Package Development	2 wks	2023-01-16	2023-01-27
110	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
111	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
112	Bid Award	0 days	2023-03-03	2023-03-03
113	Engineering	4 wks	2023-03-06	2023-03-31
114	Fabrication	16 wks	2023-04-03	2023-07-21
115	Shipping	2 wks	2023-07-24	2023-08-04
116	Arrival on Site	0 days	2023-08-04	2023-08-04
117	**Packaged Compressed Air System**	**29 wks**	**2023-01-16**	**2023-08-04**
118	Procurement Package Development	2 wks	2023-01-16	2023-01-27
119	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
120	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
121	Bid Award	0 days	2023-03-03	2023-03-03
122	Engineering	4 wks	2023-03-06	2023-03-31
123	Fabrication	16 wks	2023-04-03	2023-07-21
124	Shipping	2 wks	2023-07-24	2023-08-04
125	Arrival on Site	0 days	2023-08-04	2023-08-04
126	**Dust Suppression System**	**29 wks**	**2023-01-16**	**2023-08-04**
127	Procurement Package Development	2 wks	2023-01-16	2023-01-27
128	Vendor Bid Development	4 wks	2023-01-30	2023-02-24



Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

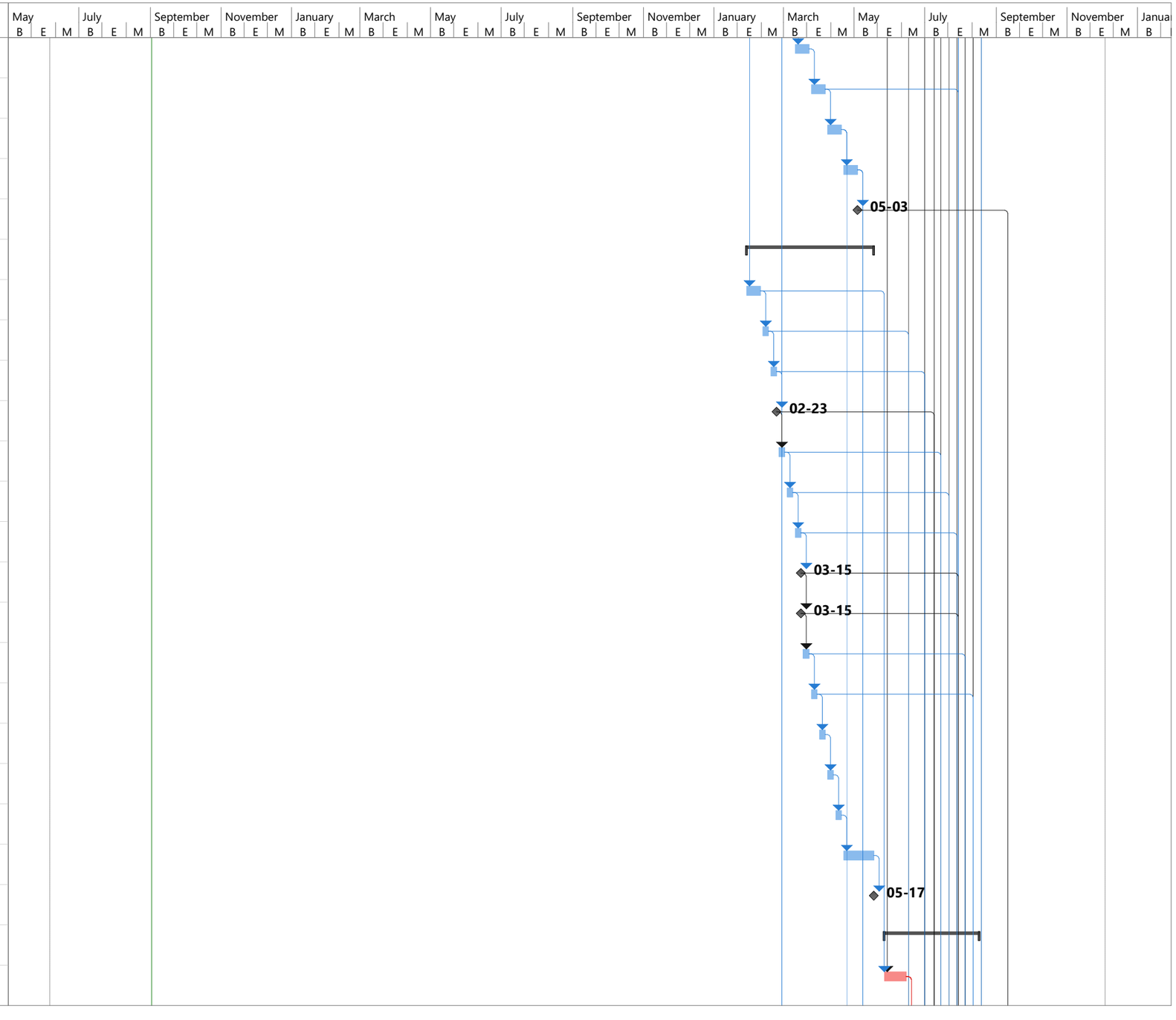
ID	Task Name	Duration	Start	Finish
129	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
130	Bid Award	0 days	2023-03-03	2023-03-03
131	Engineering	4 wks	2023-03-06	2023-03-31
132	Fabrication	16 wks	2023-04-03	2023-07-21
133	Shipping	2 wks	2023-07-24	2023-08-04
134	Arrival on Site	0 days	2023-08-04	2023-08-04
135	**Truck Scale**	**29 wks**	**2023-01-16**	**2023-08-04**
136	Procurement Package Development	2 wks	2023-01-16	2023-01-27
137	Vendor Bid Development	4 wks	2023-01-30	2023-02-24
138	Vendor Bid Review	1 wk	2023-02-27	2023-03-03
139	Bid Award	0 days	2023-03-03	2023-03-03
140	Engineering	4 wks	2023-03-06	2023-03-31
141	Fabrication	16 wks	2023-04-03	2023-07-21
142	Shipping	2 wks	2023-07-24	2023-08-04
143	Arrival on Site	0 days	2023-08-04	2023-08-04
144	**Construction**	**43.4 wks**	**2023-11-13**	**2024-09-10**
145	**Site Prep**	**11 wks**	**2023-11-13**	**2024-01-26**
146	Demolition	1 wk	2023-11-13	2023-11-17
147	Clearing and Grubbing	2 wks	2023-11-20	2023-12-01
148	Mass Grading	8 wks	2023-12-04	2024-01-26
149	**Utility Connections and Site Distribution**	**14 wks**	**2024-01-29**	**2024-05-03**
150	Potable Water	2 wks	2024-01-29	2024-02-09
151	Fire Water	2 wks	2024-02-12	2024-02-23
152	Sanitary Sewer	2 wks	2024-02-26	2024-03-08



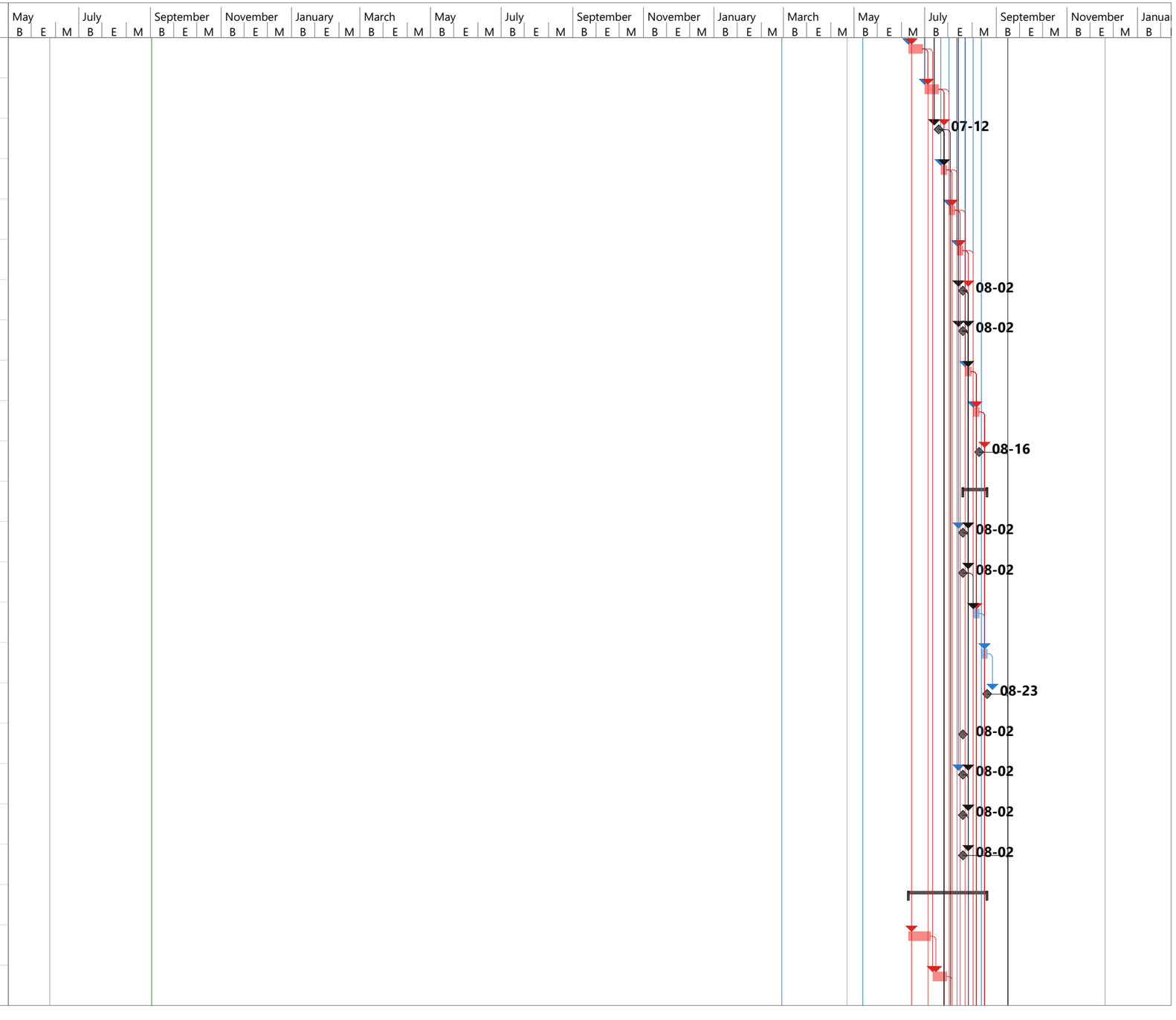
Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

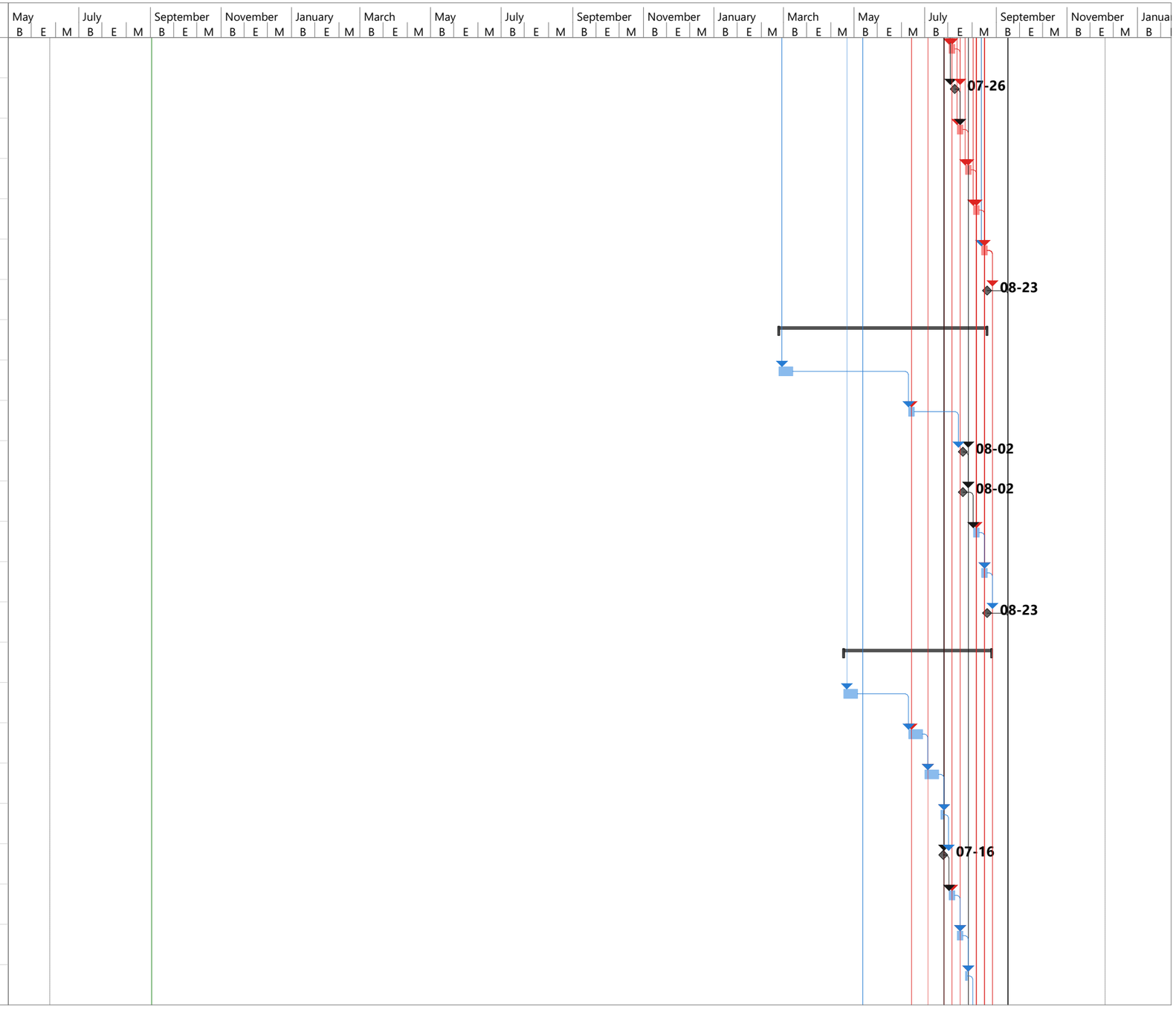
ID	Task Name	Duration	Start	Finish
153	Stormwater	2 wks	2024-03-11	2024-03-22
154	Natural Gas	2 wks	2024-03-25	2024-04-05
155	Power	2 wks	2024-04-08	2024-04-19
156	Communications	2 wks	2024-04-22	2024-05-03
157	Civil Construction Complete	0 days	2024-05-03	2024-05-03
158	**Foundations**	**16 wks**	**2024-01-29**	**2024-05-17**
159	Ready-Mix Batch Plant	2 wks	2024-01-29	2024-02-09
160	Aggregate Feed Conveyor & Hopper	1 wk	2024-02-12	2024-02-16
161	Cement and Fly Ash Silos	1 wk	2024-02-19	2024-02-23
162	Truck Scale	0 wks	2024-02-23	2024-02-23
163	Truck Wash	1 wk	2024-02-26	2024-03-01
164	Water Treamtent Plant	1 wk	2024-03-04	2024-03-08
165	Packaged Compressed Air System	1 wk	2024-03-11	2024-03-15
166	Administration Building	0 wks	2024-03-15	2024-03-15
167	Maintenance Shop	0 wks	2024-03-15	2024-03-15
168	Control Room	1 wk	2024-03-18	2024-03-22
169	MCC Building	1 wk	2024-03-25	2024-03-29
170	Aggregate Bunkers	1 wk	2024-04-01	2024-04-05
171	Miscellaneous Foundations	1 wk	2024-04-08	2024-04-12
172	Stormwater Pond Lining	1 wk	2024-04-15	2024-04-19
173	Retaining Wall	4 wks	2024-04-22	2024-05-17
174	Concrete Work Complete	0 days	2024-05-17	2024-05-17
175	**Structural Installation / Erection**	**12 wks**	**2024-05-27**	**2024-08-16**
176	Ready-Mix Batch Plant	3 wks	2024-05-27	2024-06-14



ID	Task Name	Duration	Start	Finish
177	Aggregate Feed Conveyor & Hopper	2 wks	2024-06-17	2024-06-28
178	Cement and Fly Ash Silos	2 wks	2024-07-01	2024-07-12
179	Truck Scale	0 wks	2024-07-12	2024-07-12
180	Truck Wash	1 wk	2024-07-15	2024-07-19
181	Water Treamtent Plant	1 wk	2024-07-22	2024-07-26
182	Packaged Compressed Air System	1 wk	2024-07-29	2024-08-02
183	Administration Building	0 wks	2024-08-02	2024-08-02
184	Maintenance Shop	0 wks	2024-08-02	2024-08-02
185	Control Room	1 wk	2024-08-05	2024-08-09
186	MCC Building	1 wk	2024-08-12	2024-08-16
187	Structural Installation / Erection Complete	0 days	2024-08-16	2024-08-16
188	**HVAC Installation**	**3 wks**	**2024-08-02**	**2024-08-23**
189	Administration Building	0 wks	2024-08-02	2024-08-02
190	Maintenance Shop	0 wks	2024-08-02	2024-08-02
191	Control Room	1 wk	2024-08-12	2024-08-16
192	MCC Building	1 wk	2024-08-19	2024-08-23
193	HVAC Installation Complete	0 days	2024-08-23	2024-08-23
194	**Plumbing Installation**	**0 wks**	**2024-08-02**	**2024-08-02**
195	Administration Building	0 wks	2024-08-02	2024-08-02
196	Maintenance Shop	0 wks	2024-08-02	2024-08-02
197	Plumbing Installation Complete	0 days	2024-08-02	2024-08-02
198	**Process Mechanical Installation**	**10 wks**	**2024-06-17**	**2024-08-23**
199	Ready-Mix Batch Plant	3 wks	2024-06-17	2024-07-05
200	Aggregate Feed Conveyor & Hopper	2 wks	2024-07-08	2024-07-19



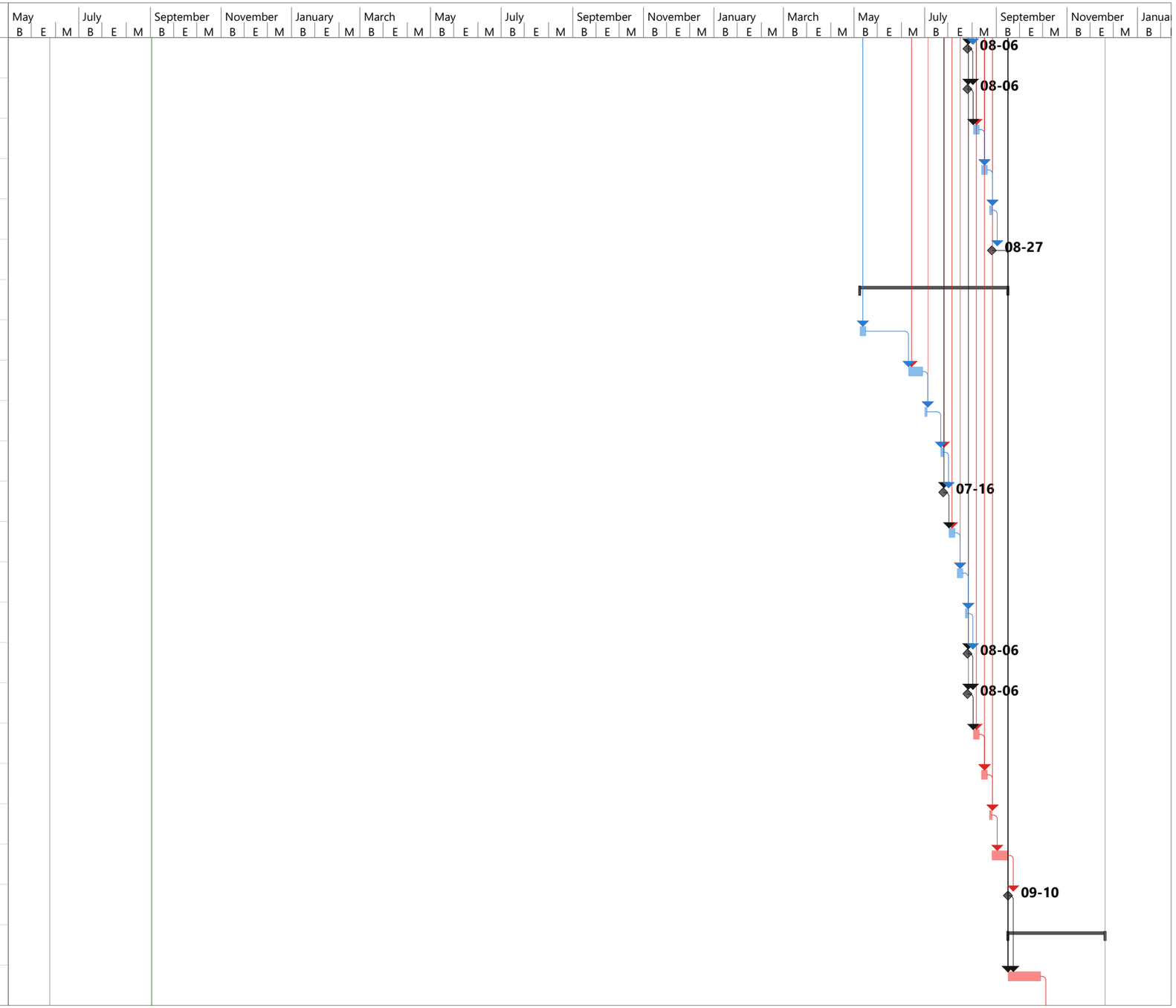
ID	Task Name	Duration	Start	Finish
201	Cement and Fly Ash Silos	1 wk	2024-07-22	2024-07-26
202	Truck Scale	0 wks	2024-07-26	2024-07-26
203	Truck Wash	1 wk	2024-07-29	2024-08-02
204	Water Treamtent Plant	1 wk	2024-08-05	2024-08-09
205	Packaged Compressed Air System	1 wk	2024-08-12	2024-08-16
206	Dust Suppression System	1 wk	2024-08-19	2024-08-23
207	Process Mechanical Installation Complete	0 days	2024-08-23	2024-08-23
208	**Fire Protection Installation**	**26 wks**	**2024-02-26**	**2024-08-23**
209	General Site	2 wks	2024-02-26	2024-03-08
210	Ready-Mix Batch Plant	1 wk	2024-06-17	2024-06-21
211	Administration Building	0 wks	2024-08-02	2024-08-02
212	Maintenance Shop	0 wks	2024-08-02	2024-08-02
213	Control Room	1 wk	2024-08-12	2024-08-16
214	MCC Building	1 wk	2024-08-19	2024-08-23
215	Fire Protection Installation Complete	0 wks	2024-08-23	2024-08-23
216	**Electrical Installation**	**18.4 wks**	**2024-04-22**	**2024-08-27**
217	Site Lighting	2 wks	2024-04-22	2024-05-03
218	Ready-Mix Batch Plant	2 wks	2024-06-17	2024-06-28
219	Aggregate Feed Conveyor & Hopper	2 wks	2024-07-01	2024-07-12
220	Cement and Fly Ash Silos	2 days	2024-07-15	2024-07-16
221	Truck scale	0 days	2024-07-16	2024-07-16
222	Truck Wash	1 wk	2024-07-22	2024-07-26
223	Water Treamtent Plant	1 wk	2024-07-29	2024-08-02
224	Packaged Compressed Air System	2 days	2024-08-05	2024-08-06



Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

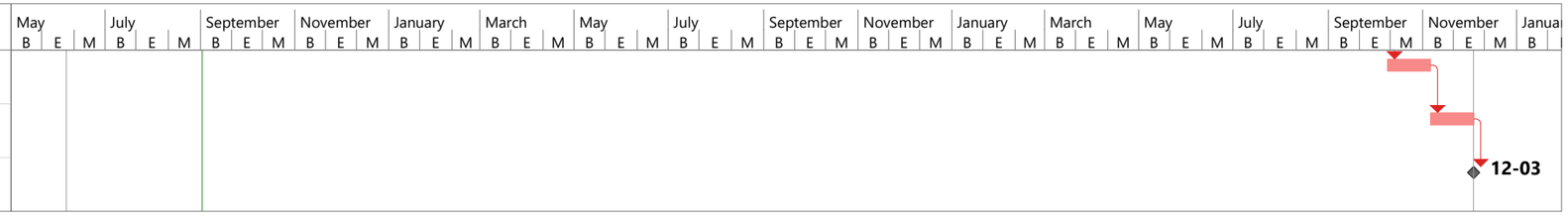
ID	Task Name	Duration	Start	Finish
225	Administration Building	0 wks	2024-08-06	2024-08-06
226	Maintenance Shop	0 wks	2024-08-06	2024-08-06
227	Control Room	1 wk	2024-08-12	2024-08-16
228	MCC Building	1 wk	2024-08-19	2024-08-23
229	Dust Suppression System	2 days	2024-08-26	2024-08-27
230	Electrical Installation Complete	0 days	2024-08-27	2024-08-27
231	**Communication and Controls Integration**	**18.4 wks**	**2024-05-06**	**2024-09-10**
232	Site Wifi	1 wk	2024-05-06	2024-05-10
233	Ready-Mix Batch Plant	2 wks	2024-06-17	2024-06-28
234	Aggregate Feed Conveyor & Hopper	2 days	2024-07-01	2024-07-02
235	Cement and Fly Ash Silos	2 days	2024-07-15	2024-07-16
236	Truck Scale	0 days	2024-07-16	2024-07-16
237	Truck Wash	1 wk	2024-07-22	2024-07-26
238	Water Treamtent Plant	1 wk	2024-07-29	2024-08-02
239	Packaged Compressed Air System	2 days	2024-08-05	2024-08-06
240	Administration Building	0 wks	2024-08-06	2024-08-06
241	Maintenance Shop	0 days	2024-08-06	2024-08-06
242	Control Room	1 wk	2024-08-12	2024-08-16
243	MCC Building	1 wk	2024-08-19	2024-08-23
244	Dust Suppression System	2 days	2024-08-26	2024-08-27
245	Site Control System	2 wks	2024-08-28	2024-09-10
246	Communcation and Controls Integration Complete	0 days	2024-09-10	2024-09-10
247	**Commissioning**	**12 wks**	**2024-09-11**	**2024-12-03**
248	Pre-Commissioning	1 mon	2024-09-11	2024-10-08



Project Implementation Schedule

KC WO5 Concrete Plant Feasibility Study

ID	Task Name	Duration	Start	Finish
249	Dry Commissioning	1 mon	2024-10-09	2024-11-05
250	Wet Commissioning	1 mon	2024-11-06	2024-12-03
251	Start Up	0 wks	2024-12-03	2024-12-03



Appendix D. Opinion of Probable Construction Cost

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Estimate - AACEI Class 5					
Project Name:	Proposed KC Concrete Batch Plant Feasibility Study - Option 1			**Date:**	3/21/2022
Location:	10430 Renton Issaquah Road, SE, Issaquah, WA			**Estimator:**	Chad Merrill
Description:	Applied PRISM cost model to HDR estimated construction costs			**Version:**	1
DIRECT: SUBTOTAL CONSTRUCTION COSTS					
Item No.	**Item Description**	**Quantity**	**Units**	**Unit Cost**	**Item Cost**
1	Site Prep (inc mob/demob)				$ 322,096
2	Civil/Structural				$ 1,013,160
3	Process Mechanical				$ 1,964,325
4	Building Mechanical				$ -
5	Electrical				$ 541,123
6	Instrumentation and Controls				$ 382,344
7	Commissioning				$ 51,402
8	Mobile Equipment				$ 2,150,000
9					$ -
10					$ -
11					$ -
12					$ -
13					$ -
14					
15					$ -
16					$ -
17					$ -
18					$ -
19					$ -
20					$ -
21					$ -
22					$ -
23					$ -
24					$ -
25					$ -
				Subtotal Construction Costs	***$ 6,424,000***
				Allowance for Indeterminates (Design Allowance)	$ 1,631,000
				Street Use Permit	$ -
				ESTIMATED PROBABLE COST OF CONSTRUCTION BID	***$ 8,055,000***
DIRECT: SUBTOTAL ADDITIONAL CONSTRUCTION COSTS					
				Mitigation Construction Contracts	$ 100,000
				Construction Change Order Allowance	$ 815,500
				Material Pricing Uncertainty Allowance	$ 385,440
				Subtotal Primary Construction Amount	***$ 9,355,940***
				Construction Sales Tax	$ 919,476
				Owner Furnished Equipment	$ -
				Outside Agency Construction	$ -
				Subtotal KC Contribution to Construction	***$ 10,275,416***
DIRECT: SUBTOTAL OTHER CAPITAL CHARGES					
				KC/WTD Direct Implementation	$ -
				Misc. Capital Costs	$ 17,941
				TOTAL DIRECT CONSTRUCTION COSTS	***$ 10,293,000***
INDIRECT: NON-CONSTRUCTION COSTS					
				Design and Construction Consulting	$ 3,085,630
				Other Consulting Services	$ -
				Permitting & Other Agency Support	$ 134,558
				Right-of-Way	$ 23,000,000
				Misc. Service & Materials	$ 71,764
				Non-WTD Support	$ 76,249
				WTD Staff Labor	$ 1,942,981
				Subtotal Non-Construction Costs	***$ 28,311,182***
				Project Contingency	$ 11,505,293
				Initiatives	$ 206,186
				TOTAL INDIRECT NON-CONSTRUCTION COSTS	***$ 40,023,000***
				TOTAL PROJECT COST	***$ 50,316,000***

Estimate - AACEI Class 5					
Project Name:	Proposed KC Concrete Batch Plant Feasibility Study - Option 2			**Date:**	8/25/2022
Location:	10430 Renton Issaquah Road, SE, Issaquah, WA			**Estimator:**	Edith Hadler
Description:	Applied PRISM cost model to HDR estimated construction costs			**Version:**	1
DIRECT: SUBTOTAL CONSTRUCTION COSTS					
Item No.	**Item Description**	**Quantity**	**Units**	**Unit Cost**	**Item Cost**
1	Site Prep (inc mob/demob)				$ 1,963,143
2	Civil/Structural				$ 2,449,365
3	Process Mechanical				$ 5,413,677
4	Building Mechanical				$ 594,731
5	Electrical				$ 871,773
6	Instrumentation and Controls				$ 606,127
7	Commissioning				$ 126,655
8	Mobile Equipment				$ 5,150,000
					$ -
				Subtotal Construction Costs	***$ 17,175,000***
				Allowance for Indeterminates (Design Allowance)	$ 4,318,750
				Street Use Permit	$ -
				ESTIMATED PROBABLE COST OF CONSTRUCTION BID	***$ 21,493,750***
DIRECT: SUBTOTAL ADDITIONAL CONSTRUCTION COSTS					
				Mitigation Construction Contracts	$ 100,000
				Construction Change Order Allowance	$ 2,159,375
				Material Pricing Uncertainty Allowance	$ 1,030,500
				Subtotal Primary Construction Amount	***$ 24,783,625***
				Construction Sales Tax	$ 2,434,695
				Owner Furnished Equipment	$ -
				Outside Agency Construction	$ -
				Subtotal KC Contribution to Construction	***$ 27,218,320***
DIRECT: SUBTOTAL OTHER CAPITAL CHARGES					
				KC/WTD Direct Implementation	$ -
				Misc. Capital Costs	$ 47,506
				TOTAL DIRECT CONSTRUCTION COSTS	***$ 27,266,000***
INDIRECT: NON-CONSTRUCTION COSTS					
				Design and Construction Consulting	$ 7,090,015
				Other Consulting Services	$ -
				Permitting & Other Agency Support	$ 356,297
				Right-of-Way	$ 23,000,000
				Misc. Service & Materials	$ 190,025
				Non-WTD Support	$ 201,902
				WTD Staff Labor	$ 4,528,901
				Subtotal Non-Construction Costs	***$ 35,367,139***
				Project Contingency	$ 18,565,135
				Initiatives	$ 478,084
				TOTAL INDIRECT NON-CONSTRUCTION COSTS	***$ 54,410,000***
				TOTAL PROJECT COST	***$ 81,676,000***

Index	WBS_1	WBS_2	WBS_3	WBS_4	Description	Quantity	Unit	Unit Price	Subtotal_WBS 4	Subtotal_WBS 3	Subtotal_WBS 2	Subtotal_WBS 1
1.	**Indirects**											**$ 673,232**
1.1.		**Owner's Team**									**$ -**	
1.1.1.			**Internal Staff**							**$ -**		
1.1.2.			**Start-Up, Operations and Maintenance**							**$ -**		
1.1.3.			**Land Acquisition**							**$ -**		
1.2.		**Professional Services**									**$ 590,427**	
1.2.1.			**Engineering**							**$ 342,012**		
1.2.1.1.					Survey	1	LS	$ 35,000	$ 35,000			
1.2.1.2.					Geotechnical Evaluation	1	LS	$ 100,000	$ 100,000			
1.2.1.3.					30% Design (2% of directs)	2%		$ 4,140,244	$ 82,805			
1.2.1.4.					60% Design (2% of directs)	2%		$ 4,140,244	$ 82,805			
1.2.1.5.					90% Design (1% of directs)	1%		$ 4,140,244	$ 41,402			
1.2.2.			**Permitting**							**$ 82,805**		
1.2.2.1.					Permit Application Development (1% of directs)	1%		$ 4,140,244	$ 41,402			
1.2.2.2.					Permit Fees (1% of directs)	1%		$ 4,140,244	$ 41,402			
1.2.3.			**Procurement**							**$ 41,402**		
1.2.3.1.					Procurement Support (1% of directs)	1%		$ 4,140,244	$ 41,402			
1.2.4.			**Construction**							**$ 124,207**		
1.2.4.1.					Construction Management (3% of directs)	3%		$ 4,140,244	$ 124,207			
1.3.		**Mobilization and Demobilization**									**$ 82,805**	
1.3.1.			**Mobilization**							**$ 41,402**		
1.3.1.1.					Mobilization (1% of directs)	1%		$ 4,140,244	$ 41,402			
1.3.2.			**Demobilization**							**$ 41,402**		
1.3.2.1.					Demobilization (1% of directs)	1%		$ 4,140,244	$ 41,402			
2.	**General Site Work**											**$ 239,291**
2.1.		**Site Prep**									**$ 1,938**	
2.1.1.			**Demolition**							**$ 1,938**		
2.1.1.1.					Concrete, plain, 6" thick	100	SY	$ 19.38	$ 1,938			
2.1.2.			**Clearing and Grubbing (None expected)**							**$ -**		
2.1.2.1.					Site Clearing and Grubbing	-	AC	$ 10,180	$ -			
2.1.3.			**Grading (None expected)**							**$ -**		
2.1.3.1.					Rough Grading, 100,000 SF	-	EA	$ 5,925	$ -			
2.2.		**Erosion Control**									**$ 5,600**	
2.2.1.			**Silt Fencing**							**$ 5,600**		
2.2.1.1.					Install and Remove	1,400	LF	$ 4.00	$ 5,600			
2.3.		**Fencing and Security**									**$ -**	
2.3.1.			**Site Fencing (None expected)**							**$ -**		
2.3.1.1.					Fence, 8' H, 6 ga. Wire, 2-1/2" line post, galv. Steel, in concrete	-	LF	$ 57.20	$ -			
2.3.1.2.					Gate Operator	-	EA	$ 6,321	$ -			
2.4.		**Access Roads and Parking**									**$ 992**	
2.4.1.			**Paving, Surfacing and Curbing (Existing)**							**$ -**		
2.4.1.1.					Access Road Paving, plant-mix asphalt paving, 4" thick	-	SY	$ 48.56	$ -			
2.4.1.2.					Scale House Parking Area Paving, Asphaltic Concrete, 6" stone base, 2" binder course, 2" topping	-	SF	$ 4.00	$ -			
2.4.1.3.					Concrete Curbs, Cast-in-place, 6" x 18"	-	LF	$ 19.69	$ -			
2.4.2.			**Roadway Striping (Existing)**							**$ -**		

2.4.2.1.	Paintend markings, Acyclic waterborne, white or yellow 4" wide	-	LF	$ 0.40	$ -		
2.4.3.	**Signage**					**$ 992**	
2.4.3.1.	Wayfinding Signange, Custom, weather resistant, 16" x 32"	10	EA	$ 82.70	$ 827		
2.4.3.2.	Installation	1	LS	$ 165.40	$ 165		
2.5.	**Site Drainage**						**$ 200,000**
2.5.1.	**Stormwater Management**					**$ 200,000**	
2.5.1.1.	Drainage Management Allowance	1	LS	$ 200,000	$ 200,000		
2.5.1.2.	Retention Pond Excavation, 80 HP Dozer, 50' haul, common earth	-	CY	$ 8.01	$ -		
2.5.1.3.	Retention Pond Concrete Lining, cast-in-place, slab on grade, 6" thick, 3500 psi	-	SF	$ 5.74	$ -		
2.5.1.4.	Retention Pond Concrete Lining, cast-in-place, walls, 8", 8' high	-	CY	$ 740.34	$ -		
2.6.	**Site Lighting**						**$ 27,701**
2.6.1.	**Site Lighting**					**$ 27,701**	
2.6.1.1.	Exterior Light Poles, concrete, 30' above 5' below, 13.5" base, 5.5" tip	12	EA	$ 2,308	$ 27,701		
2.7.	**Final Site Work**						**$ 3,060**
2.7.1.	**Grading**					**$ 3,060**	
2.7.1.1.	Final Grading	1,500	SY	$ 2.04	$ 3,060		
3.	**Civil/Structural**						**$ 1,013,160**
3.1.	**General**						**$ 378,292**
3.1.1.	**Power**					**$ 29,553**	
3.1.1.1.	Transformer Foundation Concrete	44	CY	$ 664.94	$ 29,553		
3.1.2.	**Wastewater Treatment Plant**					**$ 29,553**	
3.1.2.1.	Packaged Water Treatment Skid Foundation Concrete	44	CY	$ 664.94	$ 29,553		
3.1.3.	**Packaged Compressed Air System**					**$ 29,553**	
3.1.3.1.	Packaged Compressed Air System Foundation Concrete	44	CY	$ 664.94	$ 29,553		
3.1.4.	**Emergency Power**					**$ 29,553**	
3.1.4.1.	Generator Foundation Concrete	44	CY	$ 664.94	$ 29,553		
3.1.5.	**Utility Piping**					**$ 110,664**	
3.1.5.1.	Potable Water - 4" PVC Pipe	2,400	LF	$ 10.13	$ 24,312		
3.1.5.2.	Fire Water - 2" Plastic Pipe	2,400	LF	$ 19.52	$ 46,848		
3.1.5.3.	Sanitary Sewer - 4" PVC Pipe	2,400	LF	$ 7.95	$ 19,080		
3.1.5.4.	Stormwater - 6" corrugated HDPE Type S pipe	2,400	LF	$ 8.51	$ 20,424		
3.1.6.	**Container Batch Office**					**$ 22,165**	
3.1.6.1.	Container Batch Office Foundation Concrete	33	CY	$ 664.94	$ 22,165		
3.1.6.2.	Superstructure (Includes electrical, HVAC, I&C) (Incl. w/ Batch Plant)	-	LS	$ 192,000	$ -		
3.1.7.	**Administration Building (Existing)**					**$ -**	
3.1.7.1.	Administration Building Foundation Concrete	-	CY	$ 664.94	$ -		
3.1.7.2.	Superstructure	-	SF	$ 53.93	$ -		
3.1.8.	**Maintenance Shop (Existing)**					**$ -**	
3.1.8.1.	Maintenance Shop Foundation Concrete	-	CY	$ 664.94	$ -		
3.1.8.2.	Superstructure	-	SF	$ 53.93	$ -		
3.1.9.	**Truck Wash**					**$ 102,252**	
3.1.9.1.	Truck Wash Foundation Concrete	89	CY	$ 664.94	$ 59,106		
3.1.9.2.	Superstructure	800	SF	$ 53.93	$ 43,146		
3.1.10.	**Fire Suppression**					**$ 25,000**	
3.1.10.1.	Fire Hydrants	5	EA	$ 5,000	$ 25,000		
3.2.	**Packaged Batch Plants**						**$ 484,148**

3.2.1.	**Ready-Mix Concrete Batch Plant**					**$ 62,061**		
3.2.1.1.	Foundations	93	CY	$ 664.94	$ 62,061			
3.2.1.2.	Structural and Misc. Steel				$ -			
3.2.2.	**Aggregate Bunkers**					**$ 415,419**		
3.2.2.1.	Foundation Concrete	524	CY	$ 664.94	$ 348,170			
3.2.2.2.	Bunker Walls Concrete	101	CY	$ 664.94	$ 67,249			
3.2.3.	**Auxiliary Cement Silo**					**$ 6,668**		
3.2.3.1.	Foundation Concrete	10	CY	$ 664.94	$ 6,668			
3.3.	**Aggregate Feed Conveyor and Hopper**						**$ 150,720**	
3.3.1.	**Receiving Hoppers**					**$ 26,598**		
3.3.1.1.	Feed Hopper Foundation	40	CY	$ 664.94	$ 26,598			
3.3.1.2.	Structural and Misc. Steel				$ -			
3.3.2.	**Belt Conveyor**					**$ 124,122**		
3.3.2.1.	Bin Charging Conveyor Support 01 Footing	47	CY	$ 664.94	$ 31,031			
3.3.2.2.	Bin Charging Conveyor Support 02 Footing	47	CY	$ 664.94	$ 31,031			
3.3.2.3.	Bin Charging Conveyor Support 03 Footing	47	CY	$ 664.94	$ 31,031			
3.3.2.4.	Bin Charging Conveyor Support 04 Footing	47	CY	$ 664.94	$ 31,031			
3.4.	**Shipping & Receiving**						**$ -**	
3.4.1.	**Truck Scale**					**$ -**		
3.4.1.1.	Truck Scale Foundation	-	CY	$ 664.94	$ -			
4.	**Process Mechanical**							**$ 1,964,325**
4.1.	**General**						**$ 225,579**	
4.1.1.	**Wastewater Treatment Plant**					**$ 120,252**		
4.1.1.1.	Packaged Water Treatment Skid, 1,000 gal	1	LS	$ 6,599.22	$ 6,599			
4.1.1.2.	Oil Water Separator, 0.5 CF/sec	1	LS	$ 25,140.53	$ 25,141			
4.1.1.3.	Piping, 2" Schedule 40, steel pipe	2,400	LF	$ 36.88	$ 88,512			
4.1.2.	**Truck Wash**					**$ 105,327**		
4.1.2.1.	Pumps, 200 GMP, 10 HP, 2" discharge	2	EA	$ 8,407.65	$ 16,815			
4.1.2.2.	Piping, 2" Schedule 40, steel pipe	2,400	LF	$ 36.88	$ 88,512			
4.2.	**Packaged Batch Plants**						**$ 1,637,740**	
4.2.1.	**Ready-Mix Concrete Batch Plant**					**$ 1,387,740**		

	Packaged Ready-Mix Batch Plant							
	Aggregate Travel Frame							
	Aggregate Bins							
	Aggregate Batcher							
	Batch Transfer Conveyor							
	Cement Travel Frame							
	Cement Silo (Incl. Option C 1150 bbl Cement Silo)							
	Cement Batcher							
	Truck Charging Chute							
	Water Meter							
	Air Compressor							
	Aeration Blower							
	Motor Control Panel							
	Central Dust Collection System							
	Masaba Portable 4-Bin Plant							
	Aggregate Feed Hoppers (4)							
4.2.1.1.	Aggregate Charge Conveyors (4)	1	LS	$ 1,067,492.00	$ 1,067,492			
4.2.1.2.	Shipping (10% of Direct Cost)	1	LS	$ 106,749.20	$ 106,749			
4.2.1.3.	Erection and Installation (20% of Direct Cost)	1	LS	$ 213,498.40	$ 213,498			
4.2.2.	**Auxiliary Cement Silo**					**$ 250,000**		
4.2.2.1.	Silo, 100 ton	1	LS	$ 250,000	$ 250,000			
4.3.	**Stockyard Dust Control**						**$ 101,007**	
4.3.1.	**Dust Suppression System**					**$ 101,007**		
4.3.1.1.	Sprinklers	4	EA	$ 15,000.00	$ 60,000			
4.3.1.2.	Piping, 2" Schedule 40, steel pipe	200	LF	$ 36.88	$ 7,376			
4.3.1.3.	Pumps, 200 GPM, 10 HP, 100' head	4	EA	$ 8,407.65	$ 33,631			
4.4.	**Shipping & Receiving**						**$ -**	
4.4.1.	**Truck Scale (Existing)**					**$ -**		
4.4.1.1.	Truck Scale	-	LS	$ 24,116	$ -			
5.	**Building Mechanical**							**$ -**
5.1.	**General**						**$ -**	
5.1.1.	**Container Batch Office (Incl. in Batch Plant Price Above)**					**$ -**		
5.1.1.1.	Heating System, Terminal Unit Heaters - Included with Building	-	SF	$ 43.28	$ -			
5.1.1.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit - Included with Building	-	SF	$ 24.07	$ -			
5.1.1.3.	Fire Protection, Dry Pipe Sprinklet System - Included with Building	-	SF	$ 26.09	$ -			
5.1.2.	**MCC Building (Incl. in Batch Plant Price Above)**					**$ -**		
5.1.2.1.	Heating System, Terminal Unit Heaters - Included with Building	-	SF	$ 43.28	$ -			
5.1.2.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit - Included with Building	-	SF	$ 24.07	$ -			
5.1.2.3.	Fire Protection, Dry Pipe Sprinklet System - Included with Building	-	SF	$ 26.09	$ -			
5.1.3.	**Administration Building (Existing)**					**$ -**		
5.1.3.1.	Heating System, Terminal Unit Heaters	-	SF	$ 43.28	$ -			
5.1.3.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit	-	SF	$ 24.07	$ -			
5.1.3.3.	Fire Protection, Dry Pipe Sprinklet System	-	SF	$ 26.09	$ -			
5.1.3.4.	2 Fixture Bathroom, Two Wall Plumbing	-	EA	$ 5,243	$ -			
5.1.3.5.	Water Heater, electric, 50 gallon tank, 9 KW, 37 GPH	-	EA	$ 9,646	$ -			
5.1.3.6.	Plumbing Piping, 2" Cast Iron	-	LF	$ 47.94	$ -			

5.1.4.	**Maintenance Shop (Existing)**					**$ -**		
5.1.4.1.	Heating System, Terminal Unit Heaters	-	SF	$ 43.28	$ -			
5.1.4.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit	-	SF	$ 24.07	$ -			
5.1.4.3.	Fire Protection, Dry Pipe Sprinklet System	-	SF	$ 26.09	$ -			
6.	**Electrical**							**$ 541,123**
6.1.	**General**						**$ 541,123**	
6.1.1.	**Power**					**$ 433,301**		
6.1.1.1.	Service Entrance Panel	1	EA	$ 22,350	$ 22,350			
6.1.1.2.	Transformer, Medium voltage, Pad mounted, oil-filled	1	EA	$ 91,294	$ 91,294			
6.1.1.3.	Switchgear	1	EA	$ 21,295	$ 21,295			
6.1.1.4.	Feeders, includes conduit and wire, 200 A	2,400	LF	$ 58.84	$ 141,216			
6.1.1.5.	Electrical Allowance (8% of process mechanical)	8%		$ 1,964,325	$ 157,146			
6.1.2.	**Emergency Power**					**$ 76,214**		
6.1.2.1.	Generator, Diesel engine with fuel tank, 200 kW	200	kW	$ 381.07	$ 76,214			
6.1.3.	**Container Batch Office (Incl. in Batch Plant Price Above)**					**$ 5,804**		
6.1.3.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.84	$ -			
6.1.3.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,804	$ 5,804			
6.1.3.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.64	$ -			
6.1.3.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.66	$ -			
6.1.3.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.21	$ -			
6.1.4.	**MCC Building (Incl. in Batch Plant Price Above)**					**$ 5,804**		
6.1.4.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.84	$ -			
6.1.4.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,804	$ 5,804			
6.1.4.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.64	$ -			
6.1.4.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.66	$ -			
6.1.4.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.21	$ -			
6.1.5.	**Administration Building (Existing)**					**$ -**		
6.1.5.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.84	$ -			
6.1.5.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	-	EA	$ 5,804	$ -			
6.1.5.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.64	$ -			
6.1.5.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.66	$ -			
6.1.5.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.21	$ -			
6.1.6.	**Maintenance Shop (Existing)**					**$ -**		
6.1.6.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.84	$ -			
6.1.6.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	-	EA	$ 5,804	$ -			
6.1.6.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.64	$ -			
6.1.6.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.66	$ -			
6.1.6.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.21	$ -			
6.1.7.	**Ready-Mix Concrete Batch Plant**					**$ 20,000**		
6.1.7.1.	Portable to Fixed Plant Conversion for Code Compliance	1	LS	$ 20,000.00	$ 20,000			
7.	**Instrumentation and Controls**							**$ 382,344**
7.1.	**General**						**$ 382,344**	
7.1.1.	**Telecommunications**					**$ 372,344**		
7.1.1.1.	Fiber Optic Cable, 4 strand, multi-mode	2,400	LF	$ 1.87	$ 4,485			
7.1.1.2.	PLC and PLC programming	1.00	LS	$ 250,000	$ 250,000			
7.1.1.3.	Controls and Integration Allowance (8% of process mechanical)	6%		$ 1,964,325	$ 117,860			

7.1.2.	**Container Batch Office**					**$ -**		
7.1.2.1.	Data Communication, 4 data/voice outlets per 1000 SF - Included with Building	-	SF	$ 1.68	$ -			
7.1.2.2.	Telephone Wiring - Included with Building	-	SF	$ 3.04	$ -			
7.1.3.	**MCC Building**					**$ -**		
7.1.3.1.	Data Communication, 4 data/voice outlets per 1000 SF - Included with Building	-	SF	$ 1.68	$ -			
7.1.3.2.	Telephone Wiring - Included with Building	-	SF	$ 3.04	$ -			
7.1.4.	**Administration Building**					**$ -**		
7.1.4.1.	Data Communication, 4 data/voice outlets per 1000 SF	-	SF	$ 1.68	$ -			
7.1.4.2.	Telephone Wiring - Included with Building	-	SF	$ 3.04	$ -			
7.1.5.	**Maintenance Shop**					**$ -**		
7.1.5.1.	Data Communication, 4 data/voice outlets per 1000 SF	-	SF	$ 1.68	$ -			
7.1.5.2.	Telephone Wiring - Included with Building	-	SF	$ 3.04	$ -			
7.1.6.	**Ready-Mix Concrete Batch Plant**					**$ 10,000**		
7.1.6.1.	Portable to Fixed Plant Conversion for Code Compliance	1	LS	$ 10,000.00	$ 10,000			
8.	**Commissioning**							**$ 51,402**
8.1.	**Commissioning**						**$ 51,402**	
8.1.1.	**Commissioning**					**$ 51,402**		
8.1.1.1.	Commissioning (1% of directs)	1%		$ 4,140,244	$ 41,402			
8.1.1.2.	3rd Party Batch Plant Scale Balancing, Calibration and Certification	1	LS	$ 10,000.00	$ 10,000			
9.	**Mobile Equipment**							**$ 2,150,000**
9.1.	**Mobile Equipment**						**$ 2,150,000**	
9.1.1.	**Ready-Mix Trucks**					**$ 1,500,000**		
9.1.1.1.	Ready-Mix Truck, 12CY Capacity, Peterbilt 567 or Similar	5	EA	$ 300,000.00	$ 1,500,000			
9.1.2.	**Front End Loaders**					**$ 500,000**		
9.1.2.1.	Front End Loader, CAT 980 or Similar	1	EA	$ 500,000.00	$ 500,000			
9.1.3.	**Water Truck**					**$ 150,000**		
9.1.3.1.	Water Truck, Kenworth T370 or Similar	1	EA	$ 150,000.00	$ 150,000			
Total								**$ 7,014,878**

Project Total	
Baseline Project Cost	$ 7,014,878
Contingency 20%	$ 1,402,976
Total Baseline Project Cost	$ 8,417,853

OPCC Estimate Range	
Low Low End (-50%):	**$ 4,208,927**
Low End (-20%):	**$ 6,734,283**
High End (+30%):	**$ 12,626,780**
High High End (+100%):	**$ 16,835,707**

Opinion of Probable Construction Costs

WO5 Concrete Batch Plant

Index	WBS_1	WBS_2	WBS_3	WBS_4	Description	Quantity	Unit	Unit Price	Subtotal_WBS 4	Subtotal_WBS 3	Subtotal_WBS 2	Subtotal_WBS 1
1.	**Indirects**											**$ 1,651,516**
1.1.		**Owner's Team**									**$ -**	
1.1.1.			**Internal Staff**							**$ -**		
1.1.2.			**Start-Up, Operations and Maintenance**							**$ -**		
1.1.3.			**Land Acquisition**							**$ -**		
1.2.		**Professional Services**									**$ 1,418,206**	
1.2.1.			**Engineering**							**$ 718,275**		
1.2.1.1.					Survey	1	LS	$ 35,000	$ 35,000			
1.2.1.2.					Geotechnical Evaluation	1	LS	$ 100,000	$ 100,000			
1.2.1.3.					30% Design (2% of directs)	2%		$ 11,665,506	$ 233,310			
1.2.1.4.					60% Design (2% of directs)	2%		$ 11,665,506	$ 233,310			
1.2.1.5.					90% Design (1% of directs)	1%		$ 11,665,506	$ 116,655			
1.2.2.			**Permitting**							**$ 233,310**		
1.2.2.1.					Permit Application Development (1% of directs)	1%		$ 11,665,506	$ 116,655			
1.2.2.2.					Permit Fees (1% of directs)	1%		$ 11,665,506	$ 116,655			
1.2.3.			**Procurement**							**$ 116,655**		
1.2.3.1.					Procurement Support (1% of directs)	1%		$ 11,665,506	$ 116,655			
1.2.4.			**Construction**							**$ 349,965**		
1.2.4.1.					Construction Management (3% of directs)	3%		$ 11,665,506	$ 349,965			
1.3.		**Mobilization and Demobilization**									**$ 233,310**	
1.3.1.			**Mobilization**							**$ 116,655**		
1.3.1.1.					Mobilization (1% of directs)	1%		$ 11,665,506	$ 116,655			
1.3.2.			**Demobilization**							**$ 116,655**		
1.3.2.1.					Demobilization (1% of directs)	1%		$ 11,665,506	$ 116,655			
2.	**General Site Work**											**$ 1,729,833**
2.1.		**Site Prep**									**$ 98,364**	
2.1.1.			**Demolition**							**$ -**		
2.1.1.1.					Concrete, plain, 6" thick	-	SY	$ 19.38	$ -			
2.1.2.			**Clearing and Grubbing**							**$ 78,514**		
2.1.2.1.					Site Clearing and Grubbing	7.18	AC	$ 10,935	$ 78,514			
2.1.3.			**Grading (None expected)**							**$ 19,849**		
2.1.3.1.					Rough Grading, 100,000 SF	3	EA	$ 6,347	$ 19,849			
2.2.		**Erosion Control**									**$ 16,686**	
2.2.1.			**Silt Fencing**							**$ 16,686**		
2.2.1.1.					Install and Remove	3,954	LF	$ 4.22	$ 16,686			
2.3.		**Fencing and Security**									**$ 314,911**	
2.3.1.			**Site Fencing (None expected)**							**$ 314,911**		
2.3.1.1.					Fence, 8' H, 6 ga. Wire, 2-1/2" line post, galv. Steel, in concrete	3,954	LF	$ 73.80	$ 291,805			
2.3.1.2.					Gate Operator	3	EA	$ 7,702	$ 23,106			
2.4.		**Access Roads and Parking**									**$ 909,011**	
2.4.1.			**Paving, Surfacing and Curbing (Existing)**							**$ 904,121**		
2.4.1.1.					Access Road Paving, plant-mix asphalt paving, 4" thick	10,351	SY	$ 51.48	$ 532,852			
2.4.1.2.					Scale House Parking Area Paving, Asphaltic Concrete, 6" stone base, 2" binder course, 2" topping	77,740	SF	$ 4.24	$ 329,618			
2.4.1.3.					Concrete Curbs, Cast-in-place, 6" x 18"	1,990	LF	$ 20.93	$ 41,651			
2.4.2.			**Roadway Striping (Existing)**							**$ 3,761**		

2.4.2.1.	Paintend markings, Acyclic waterborne, white or yellow 4" wide	8,955	LF	$ 0.42	$ 3,761			
2.4.3.	**Signage**					**$ 1,129**		
2.4.3.1.	Wayfinding Signange, Custom, weather resistant, 16" x 32"	10	EA	$ 94.10	$ 941			
2.4.3.2.	Installation	1	LS	$ 188.20	$ 188			
2.5.	**Site Drainage**						**$ 286,640**	
2.5.1.	**Stormwater Management**					**$ 286,640**		
2.5.1.1.	Drainage Management Allowance	1	LS	$ 200,000	$ 200,000			
2.5.1.2.	Retention Pond Excavation, 80 HP Dozer, 50' haul, common earth	977	CY	$ 8.58	$ 8,383			
2.5.1.3.	Retention Pond Concrete Lining, cast-in-place, slab on grade, 6" thick, 3500 psi	8,793	SF	$ 5.74	$ 50,472			
2.5.1.4.	Retention Pond Concrete Lining, cast-in-place, walls, 8", 4' high	38	CY	$ 740.34	$ 27,786			
2.6.	**Site Lighting**						**$ 30,207**	
2.6.1.	**Site Lighting**					**$ 30,207**		
2.6.1.1.	Exterior Light Poles, concrete, 30' above 5' below, 13.5" base, 5.5" tip	12	EA	$ 2,517	$ 30,207			
2.7.	**Final Site Work**						**$ 74,014**	
2.7.1.	**Grading**					**$ 74,014**		
2.7.1.1.	Final Grading	34,748	SY	$ 2.13	$ 74,014			
3.	**Civil/Structural**							**$ 2,449,365**
3.1.	**General**						**$ 995,513**	
3.1.1.	**Power**					**$ 32,477**		
3.1.1.1.	Transformer Foundation Concrete	44	CY	$ 730.74	$ 32,477			
3.1.2.	**Wastewater Treatment Plant**					**$ 32,477**		
3.1.2.1.	Packaged Water Treatment Skid Foundation Concrete	44	CY	$ 730.74	$ 32,477			
3.1.3.	**Packaged Compressed Air System**					**$ 32,477**		
3.1.3.1.	Packaged Compressed Air System Foundation Concrete	44	CY	$ 730.74	$ 32,477			
3.1.4.	**Emergency Power**					**$ 32,477**		
3.1.4.1.	Generator Foundation Concrete	44	CY	$ 730.74	$ 32,477			
3.1.5.	**Utility Piping**					**$ 146,043**		
3.1.5.1.	Potable Water - 4" PVC Pipe	2,700	LF	$ 13.70	$ 36,990			
3.1.5.2.	Fire Water - 2" Plastic Pipe	2,700	LF	$ 19.22	$ 51,894			
3.1.5.3.	Sanitary Sewer - 4" PVC Pipe	2,700	LF	$ 9.99	$ 26,973			
3.1.5.4.	Stormwater - 6" corrugated HDPE Type S pipe	2,700	LF	$ 11.18	$ 30,186			
3.1.6.	**Container Batch Office**					**$ 24,358**		
3.1.6.1.	Container Batch Office Foundation Concrete	33	CY	$ 730.74	$ 24,358			
3.1.6.2.	Superstructure (Includes electrical, HVAC, I&C) (Incl. w/ Batch Plant)	-	LS	$ 192,000	$ -			
3.1.7.	**Administration Building**					**$ 192,886**		
3.1.7.1.	Administration Building Foundation Concrete	84	CY	$ 730.74	$ 61,247			
3.1.7.2.	Superstructure	2,263	SF	$ 58.17	$ 131,639			
3.1.8.	**Maintenance Shop**					**$ 365,826**		
3.1.8.1.	Maintenance Shop Foundation Concrete	159	CY	$ 730.74	$ 116,161			
3.1.8.2.	Superstructure	4,292	SF	$ 58.17	$ 249,666			
3.1.9.	**Truck Wash**					**$ 111,491**		
3.1.9.1.	Truck Wash Foundation Concrete	89	CY	$ 730.74	$ 64,955			
3.1.9.2.	Superstructure	800	SF	$ 58.17	$ 46,536			
3.1.10.	**Fire Suppression**					**$ 25,000**		
3.1.10.1.	Fire Hydrants	5	EA	$ 5,000	$ 25,000			
3.2.	**Packaged Batch Plants**						**$ 1,135,696**	

3.2.1.	**Ready-Mix Concrete Batch Plant**					**$ 392,895**		
3.2.1.1.	Foundations	538	CY	$ 730.74	$ 392,895			
3.2.1.2.	Structural and Misc. Steel				$ -			
3.2.2.	**Aggregate Bunkers**					**$ 742,802**		
3.2.2.1.	Foundation Concrete	849	CY	$ 730.74	$ 620,398			
3.2.2.2.	Bunker Walls Concrete	168	CY	$ 730.74	$ 122,403			
3.3.	**Aggregate Feed Conveyor and Hopper**						**$ 241,347**	
3.3.1.	**Receiving Hoppers**					**$ 36,253**		
3.3.1.1.	Feed Hopper Foundation	50	CY	$ 730.74	$ 36,253			
3.3.1.2.	Structural and Misc. Steel (Incl. w/ Batch Plant)		LF	$ 211.82	$ -			
3.3.2.	**Belt Conveyor**					**$ 205,094**		
3.3.2.1.	Bin Charging Conveyor Support 01 Footing	47	CY	$ 730.74	$ 34,101			
3.3.2.2.	Bin Charging Conveyor Support 02 Footing	47	CY	$ 730.74	$ 34,101			
3.3.2.3.	Bin Charging Conveyor Support 03 Footing	47	CY	$ 730.74	$ 34,101			
3.3.2.4.	Bin Charging Conveyor Support 04 Footing	47	CY	$ 730.74	$ 34,101			
3.3.2.5.	Mixer Charging Conveyor Support 01 Footing	47		$ 730.74	$ 34,345			
3.3.2.6.	Mixer Charging Conveyor Support 01 Footing	47		$ 730.74	$ 34,345			
3.4.	**Shipping & Receiving**						**$ 76,809**	
3.4.1.	**Truck Scale**					**$ 76,809**		
3.4.1.1.	Truck Scale Foundation	105	CY	$ 730.74	$ 76,809			
4.	**Process Mechanical**							**$ 5,413,677**
4.1.	**General**						**$ 273,354**	
4.1.1.	**Wastewater Treatment Plant**					**$ 160,800**		
4.1.1.1.	Packaged Water Treatment Skid, 1,000 gal	1	LS	$ 7,677.38	$ 7,677			
4.1.1.2.	Oil Water Separator, 0.5 CF/sec	1	LS	$ 58,994.16	$ 58,994			
4.1.1.3.	Piping, 2" Schedule 40, steel pipe	2,400	LF	$ 39.22	$ 94,128			
4.1.2.	**Truck Wash**					**$ 112,555**		
4.1.2.1.	Pumps, 200 GMP, 10 HP, 2" discharge	2	EA	$ 9,213.35	$ 18,427			
4.1.2.2.	Piping, 2" Schedule 40, steel pipe	2,400	LF	$ 39.22	$ 94,128			
4.2.	**Packaged Batch Plants**						**$ 4,940,000**	
4.2.1.	**Ready-Mix Concrete Batch Plant**					**$ 4,940,000**		

	Packaged Ready-Mix Batch Plant							
	Aggregate Bins							
	Aggregate Batcher							
	Batch Transfer Conveyor							
	Cement Silo (2 Req'd, 1150 BBL)							
	Auxillary Silo (2 Req'd, 935 BBL)							
	Cement Batcher							
	Truck Charging Chute							
	Water Meter							
	Air Compressor							
	Aeration Blower							
	Motor Control Panel							
	Central Dust Collection System							
	Aggregate Feed Hoppers (4)							
	Aggregate Charge Conveyors (4)							
	Aggregate Support Frame							
	Air Loading Piping							
	Tilt Mixer							
	Concrete Directional Chute							
	Cement and Aggregate Two-Way Chuting							
4.2.1.1.	12 CY Concrete Holding Hopper with Supports	1	LS	$ 3,800,000.00	$ 3,800,000			
4.2.1.2.	Shipping (10% of Direct Cost)	1	LS	$ 380,000.00	$ 380,000			
4.2.1.3.	Erection and Installation (20% of Direct Cost)	1	LS	$ 760,000.00	$ 760,000			
4.3.	**Stockyard Dust Control**						**$ 172,541**	
4.3.1.	**Dust Suppression System**					**$ 172,541**		
4.3.1.1.	Sprinklers	8	EA	$ 15,000.00	$ 120,000			
4.3.1.2.	Piping, 2" Schedule 40, steel pipe	400	LF	$ 39.22	$ 15,688			
4.3.1.3.	Pumps, 200 GPM, 10 HP, 100' head	4	EA	$ 9,213.35	$ 36,853			
4.4.	**Shipping & Receiving**						**$ 27,782**	
4.4.1.	**Truck Scale**					**$ 27,782**		
4.4.1.1.	Truck Scale (w/ Installation)	1	LS	$ 27,782	$ 27,782			
5.	**Building Mechanical**							**$ 594,731**
5.1.	**General**						**$ 594,731**	
5.1.1.	**Container Batch Office (Incl. in Batch Plant Price Above)**					**$ -**		
5.1.1.1.	Heating System, Terminal Unit Heaters - Included with Building	-	SF	$ 40.19	$ -			
5.1.1.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit - Included with Building	-	SF	$ 21.88	$ -			
5.1.1.3.	Fire Protection, Dry Pipe Sprinklet System - Included with Building	-	SF	$ 25.08	$ -			
5.1.2.	**MCC Building (Incl. in Batch Plant Price Above)**					**$ -**		
5.1.2.1.	Heating System, Terminal Unit Heaters - Included with Building	-	SF	$ 40.19	$ -			
5.1.2.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit - Included with Building	-	SF	$ 21.88	$ -			
5.1.2.3.	Fire Protection, Dry Pipe Sprinklet System - Included with Building	-	SF	$ 25.08	$ -			
5.1.3.	**Administration Building**					**$ 220,683**		
5.1.3.1.	Heating System, Terminal Unit Heaters	2,263	SF	$ 40.19	$ 90,950			
5.1.3.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit	2,263	SF	$ 21.88	$ 49,514			
5.1.3.3.	Fire Protection, Dry Pipe Sprinklet System	2,263	SF	$ 25.08	$ 56,756			
5.1.3.4.	2 Fixture Bathroom, Two Wall Plumbing	1	EA	$ 5,243	$ 5,243			

5.1.3.5.	Water Heater, electric, 50 gallon tank, 9 KW, 37 GPH	1	EA	$ 9,760	$ 9,760			
5.1.3.6.	Plumbing Piping, 2" Cast Iron	200	LF	$ 42.30	$ 8,460			
5.1.4.	**Maintenance Shop**					**$ 374,048**		
5.1.4.1.	Heating System, Terminal Unit Heaters	4,292	SF	$ 40.19	$ 172,495			
5.1.4.2.	Cooling System, Packaged chiller, air cooled, with fan coil unit	4,292	SF	$ 21.88	$ 93,909			
5.1.4.3.	Fire Protection, Dry Pipe Sprinklet System	4,292	SF	$ 25.08	$ 107,643			
6.	**Electrical**							**$ 871,773**
6.1.	**General**						**$ 871,773**	
6.1.1.	**Power**					**$ 709,250**		
6.1.1.1.	Service Entrance Panel	1	EA	$ 22,350	$ 22,350			
6.1.1.2.	Transformer, Medium voltage, Pad mounted, oil-filled	1	EA	$ 91,294	$ 91,294			
6.1.1.3.	Switchgear	1	EA	$ 21,295	$ 21,295			
6.1.1.4.	Feeders, includes conduit and wire, 200 A	2,400	LF	$ 58.84	$ 141,216			
6.1.1.5.	Electrical Allowance (8% of process mechanical)	8%		$ 5,413,677	$ 433,094			
6.1.2.	**Emergency Power**					**$ 76,214**		
6.1.2.1.	Generator, Diesel engine with fuel tank, 200 kW	200	kW	$ 381.07	$ 76,214			
6.1.3.	**Container Batch Office (Incl. in Batch Plant Price Above)**					**$ 5,631**		
6.1.3.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.58	$ -			
6.1.3.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,631	$ 5,631			
6.1.3.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.57	$ -			
6.1.3.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.34	$ -			
6.1.3.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.19	$ -			
6.1.4.	**MCC Building (Incl. in Batch Plant Price Above)**					**$ 5,631**		
6.1.4.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	-	SF	$ 2.58	$ -			
6.1.4.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,631	$ 5,631			
6.1.4.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	-	SF	$ 0.57	$ -			
6.1.4.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	-	SF	$ 3.34	$ -			
6.1.4.5.	Miscellaneous Power, 3 watts - Included with Building	-	SF	$ 0.19	$ -			
6.1.5.	**Administration Building**					**$ 20,747**		
6.1.5.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	2,263	SF	$ 2.58	$ 5,839			
6.1.5.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,631	$ 5,631			
6.1.5.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	2,263	SF	$ 0.57	$ 1,290			
6.1.5.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	2,263	SF	$ 3.34	$ 7,558			
6.1.5.5.	Miscellaneous Power, 3 watts - Included with Building	2,263	SF	$ 0.19	$ 430			
6.1.6.	**Maintenance Shop**					**$ 34,301**		
6.1.6.1.	Power, Receptacles, 2.5 per 1000 SF - Included with Building	4,292	SF	$ 2.58	$ 11,073			
6.1.6.2.	Service Installation, 3-ph, 4 wire, 200 A w/ circuit breaker	1	EA	$ 5,631	$ 5,631			
6.1.6.3.	Lighting, 2 wall switches per 1000 SF - Included with Building	4,292	SF	$ 0.57	$ 2,446			
6.1.6.4.	Lighting and Branch Wiring, Fluorescent Fixtures - Included with Building	4,292	SF	$ 3.34	$ 14,335			
6.1.6.5.	Miscellaneous Power, 3 watts - Included with Building	4,292	SF	$ 0.19	$ 815			
6.1.7.	**Ready-Mix Concrete Batch Plant**					**$ 20,000**		
6.1.7.1.	Portable to Fixed Plant Conversion for Code Compliance	1	LS	$ 20,000.00	$ 20,000			
7.	**Instrumentation and Controls**							**$ 606,127**
7.1.	**General**						**$ 606,127**	
7.1.1.	**Telecommunications**					**$ 578,494**		
7.1.1.1.	Fiber Optic Cable, 4 strand, multi-mode	2,400	LF	$ 1.53	$ 3,673			

7.1.1.2.	PLC and PLC programming	1	LS	$ 250,000	$ 250,000			
7.1.1.3.	Controls and Integration Allowance (8% of process mechanical)	6%		$ 5,413,677	$ 324,821			
7.1.2.	**Container Batch Office (Incl. in Batch Plant Price Above)**					**$ -**		
7.1.2.1.	Data Communication, 4 data/voice outlets per 1000 SF - Included with Building	-	SF	$ 1.53	$ -			
7.1.2.2.	Telephone Wiring - Included with Building	-	SF	$ 2.69	$ -			
7.1.3.	**MCC Building (Incl. in Batch Plant Price Above)**					**$ -**		
7.1.3.1.	Data Communication, 4 data/voice outlets per 1000 SF - Included with Building	-	SF	$ -	$ -			
7.1.3.2.	Telephone Wiring - Included with Building	-	SF	$ 2.69	$ -			
7.1.4.	**Administration Building**					**$ 6,087**		
7.1.4.1.	Data Communication, 4 data/voice outlets per 1000 SF	2,263	SF	$ -	$ -			
7.1.4.2.	Telephone Wiring - Included with Building	2,263	SF	$ 2.69	$ 6,087			
7.1.5.	**Maintenance Shop**					**$ 11,545**		
7.1.5.1.	Data Communication, 4 data/voice outlets per 1000 SF	4,292	SF	$ -	$ -			
7.1.5.2.	Telephone Wiring - Included with Building	4,292	SF	$ 2.69	$ 11,545			
7.1.6.	**Ready-Mix Concrete Batch Plant**					**$ 10,000**		
7.1.6.1.	Portable to Fixed Plant Conversion for Code Compliance	1	LS	$ 10,000.00	$ 10,000			
8.	**Commissioning**							**$ 126,655**
8.1.	**Commissioning**						**$ 126,655**	
8.1.1.	**Commissioning**					**$ 126,655**		
8.1.1.1.	Commissioning (1% of directs)	1%		$ 11,665,506	$ 116,655			
8.1.1.2.	3rd Party Batch Plant Scale Balancing, Calibration and Certification	1	LS	$ 10,000.00	$ 10,000			
9.	**Mobile Equipment**							**$ 5,150,000**
9.1.	**Mobile Equipment**						**$ 5,150,000**	
9.1.1.	**Ready-Mix Trucks**					**$ 4,500,000**		
9.1.1.1.	Ready-Mix Truck, 12CY Capacity, Peterbilt 567 or Similar	15	EA	$ 300,000.00	$ 4,500,000			
9.1.2.	**Front End Loaders**					**$ 500,000**		
9.1.2.1.	Front End Loader, CAT 980 or Similar	1	EA	$ 500,000.00	$ 500,000			
9.1.3.	**Water Truck**					**$ 150,000**		
9.1.3.1.	Water Truck, Kenworth T370 or Similar	1	EA	$ 150,000.00	$ 150,000			
Total								**$ 18,593,677**

Project Total	
Baseline Project Cost	$ 18,593,677
Contingency 20%	$ 3,718,735
Total Baseline Project Cost	$ 22,312,412

OPCC Estimate Range	
Low Low End (-50%):	**$ 11,156,206**
Low End (-20%):	**$ 17,849,930**
High End (+30%):	**$ 33,468,618**
High High End (+100%):	**$ 44,624,824**

Appendix E. Theoretical Service Area Figures

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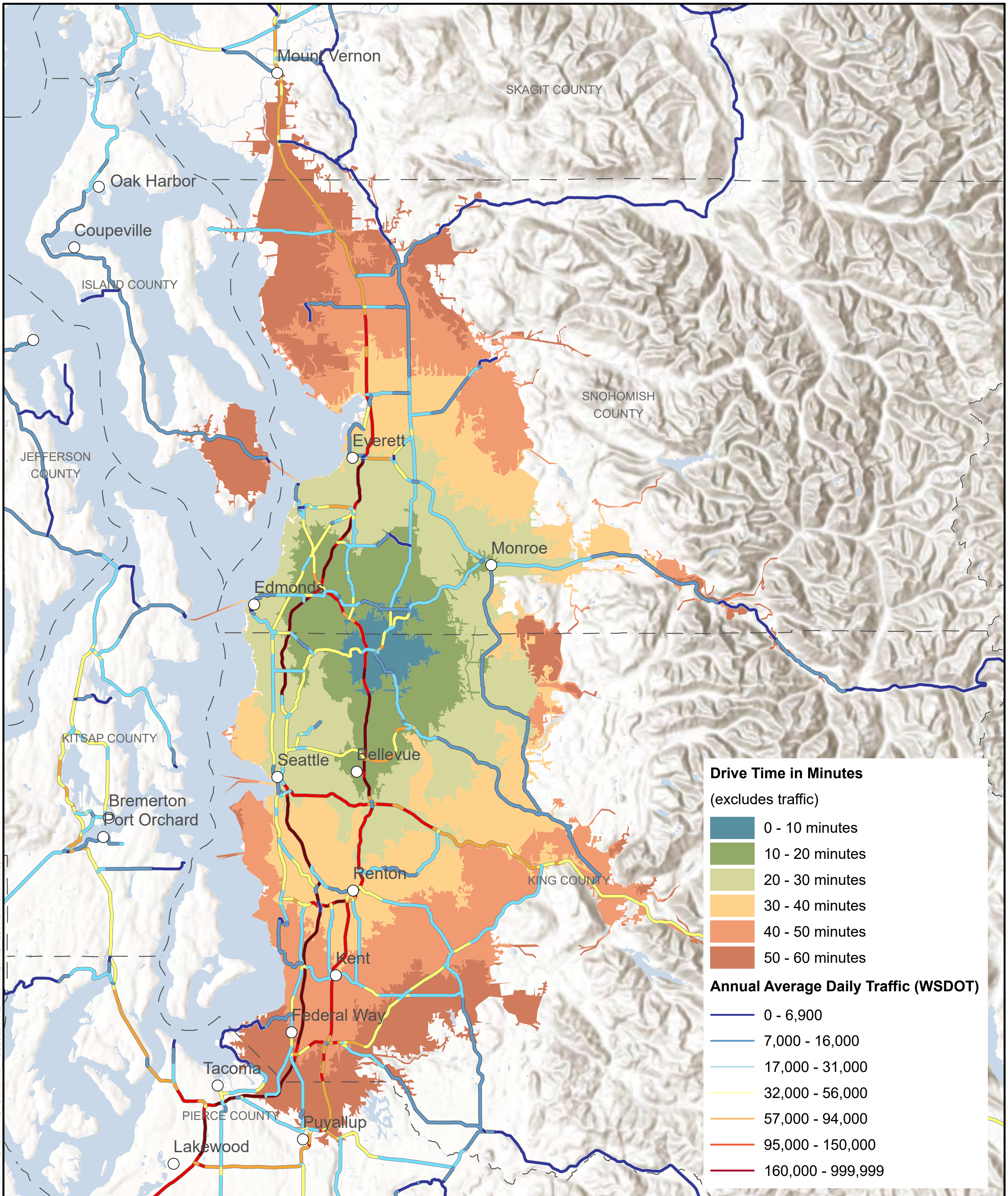

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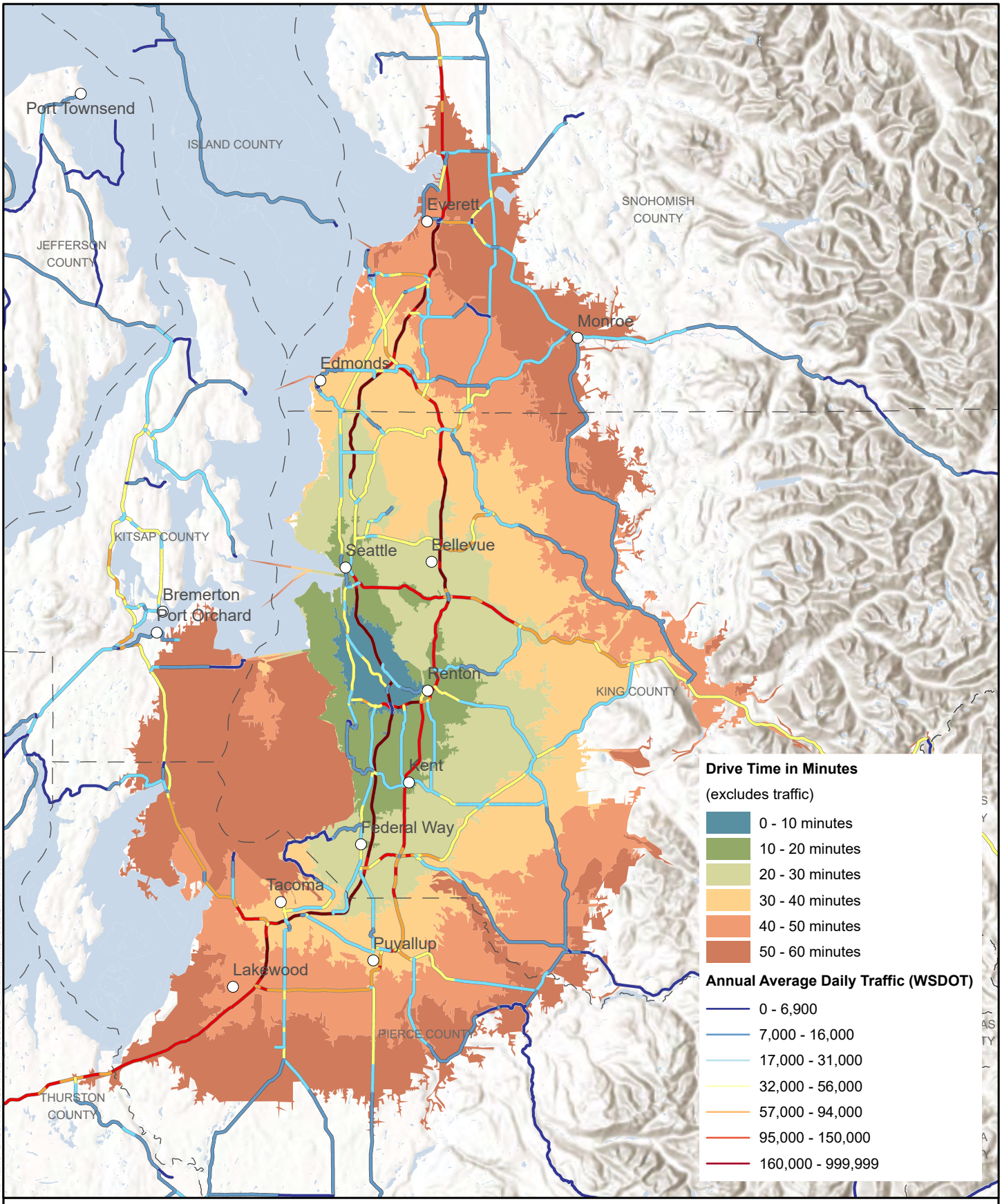
King County
Department of
Natural Resources and Parks
Wastewater Treatment
Division

N
0 3 6 12
Miles

Data Source: King County

Example Site 1

KC WO5 Concrete Plant Feasibility Study



King County
Department of Natural Resources and Parks
Wastewater Treatment Division

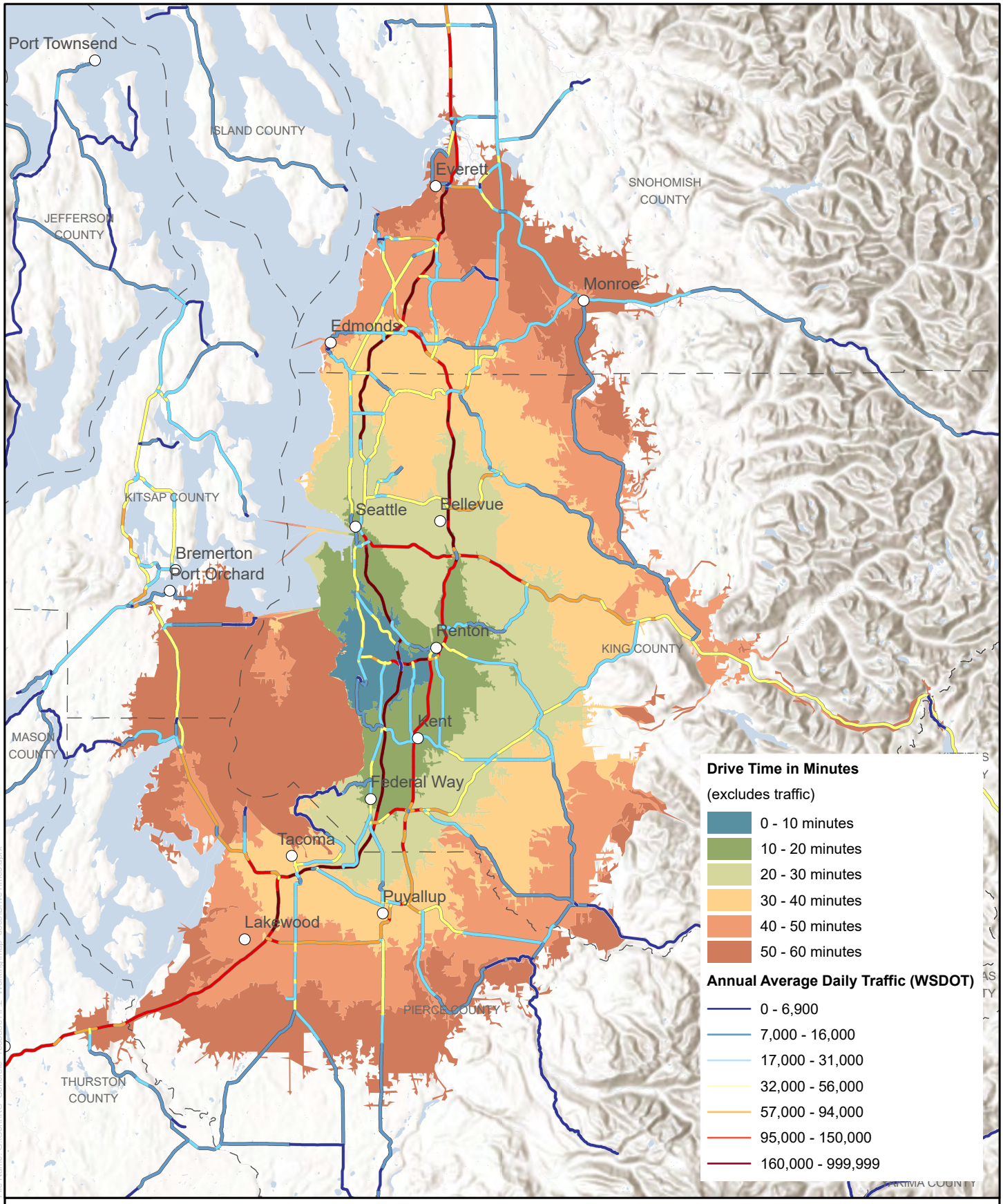
N

0 3 6 12
Miles

Data Source: King County

Example Site 2

KC WO5 Concrete Plant Feasibility Study



King County
Department of Natural Resources and Parks
Wastewater Treatment Division

N

0 3 6 12
Miles

Data Source: King County

Example Site 3

KC WO5 Concrete Plant Feasibility Study

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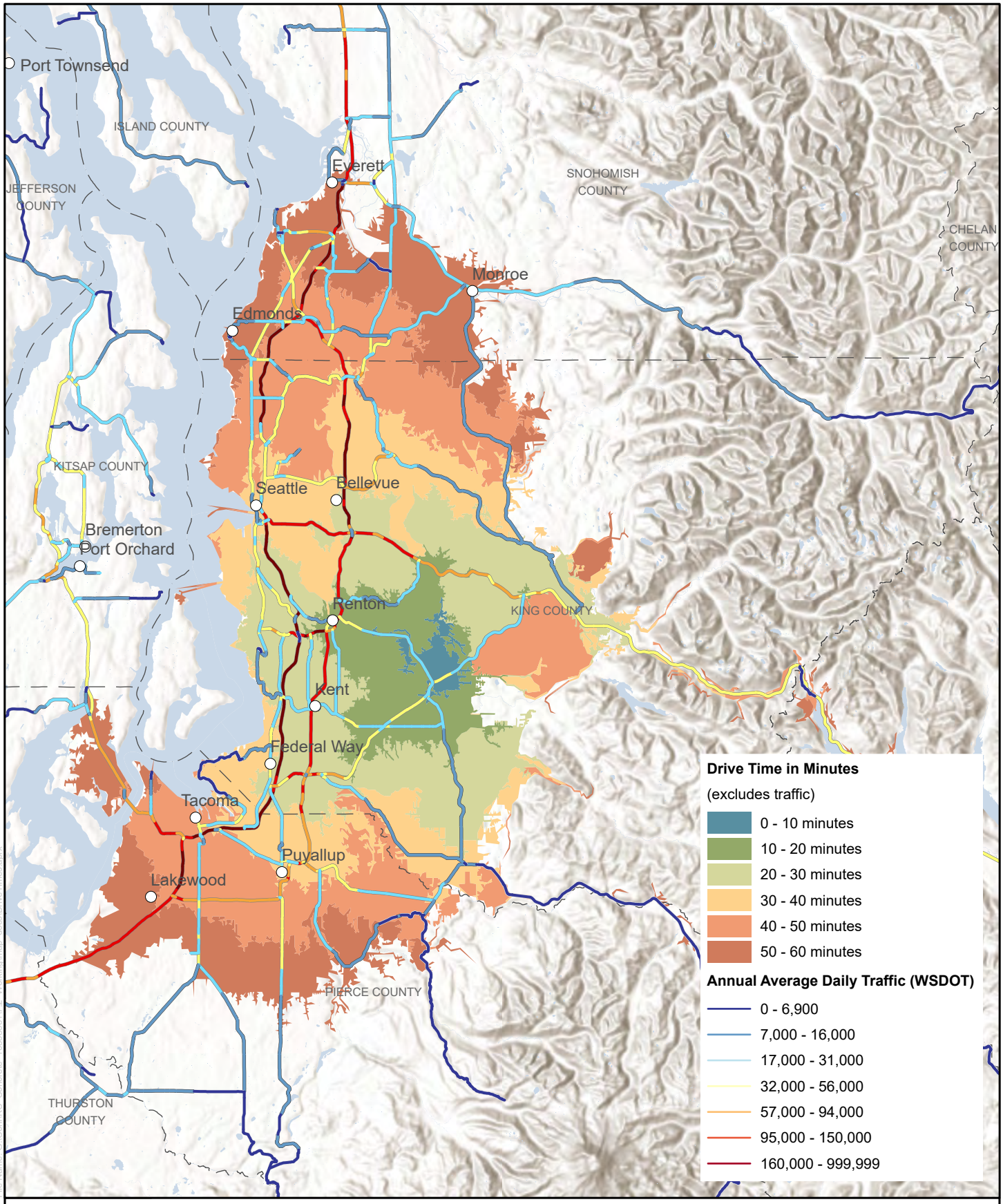

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King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

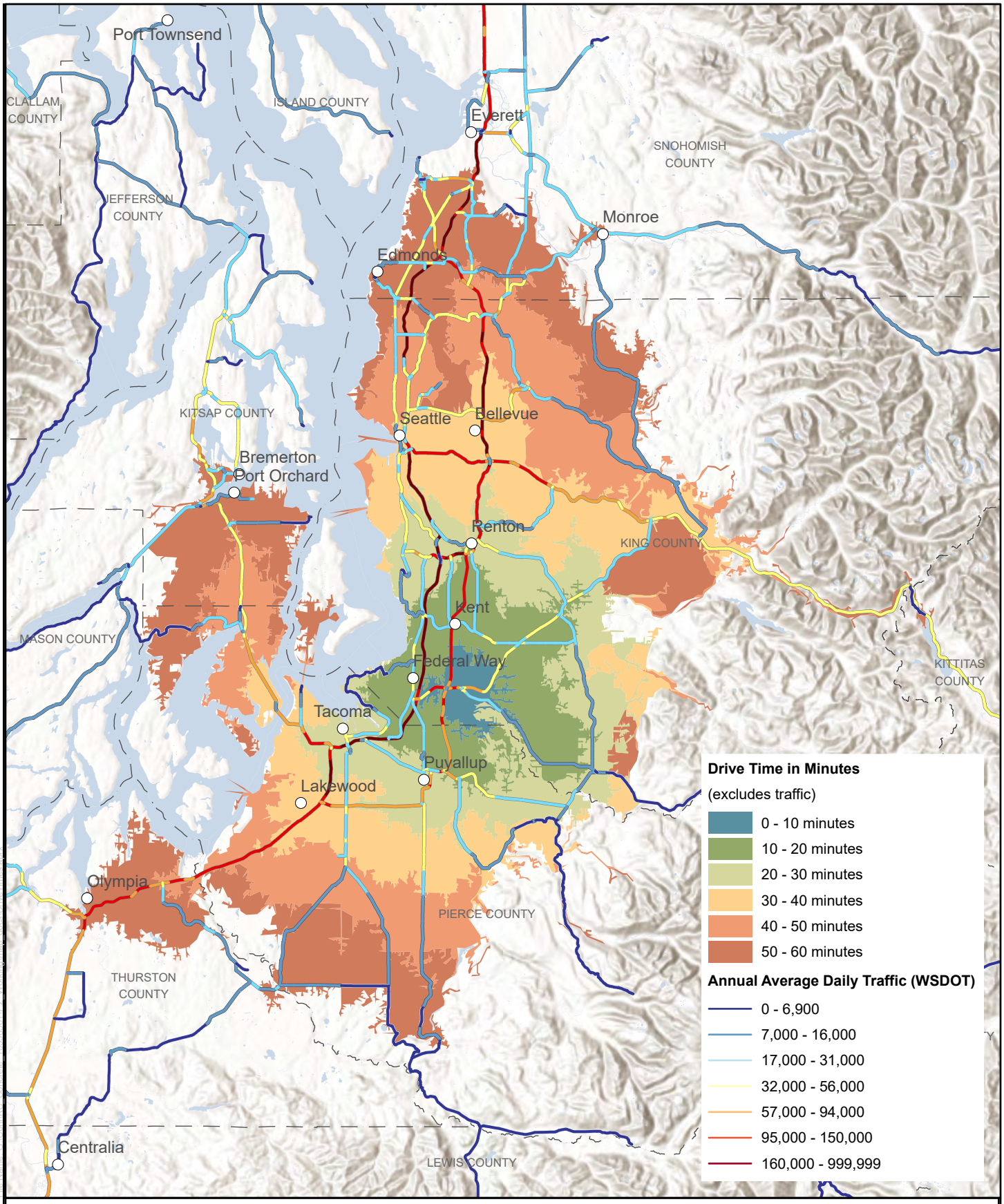
N

0 3 6 12
Miles

Data Source: King County

Example Site 4

KC WO5 Concrete Plant Feasibility Study



King County
Department of Natural Resources and Parks
Wastewater Treatment Division

N

0 3 6 12
Miles

Data Source: King County

Example Site 5

KC WO5 Concrete Plant Feasibility Study

King County

REQUEST FOR QUALIFICATIONS (RFQ)

KC000461 - Concrete, Supply and Delivery

***

ATTENTION SUBMITTERS:

***

A Guide to Respond to E-Procurement Solicitation can be found by following the link below:
https://www.kingcounty.gov/~/media/depts/finance/procurement/Documents/eprocurement-supplier-guide-solicitation.ashx?la=en

SECTION 1 INSTRUCTION TO SUBMITTERS, SUBMITTAL EVALUATION AND CONTRACT AWARD FOR CONCRETE SUPPLIERS

1.1 Introduction

King County is soliciting submittals from interested and qualified firms to supply concrete products that meet the needs of County construction projects per the Scope of Work/Requirements in this Request for Qualifications (RFQ). The purpose of this RFQ is to establish a roster of one or more qualified contractors to be King County's exclusive supplier of these goods and/or services.

The initial term of the subsequent Contract(s) resulting from this RFQ will be three (3) years with the option to extend for three (3) additional one-year periods, subject to the termination clauses contained herein. King County reserves the right to extend the Contract term if determined to be in the best interest of the County. King County will also make the pricing and terms and conditions of subsequent contracts with qualified contractors available to other regional public entities via "piggyback" contract provisions consistent with State law.

1.2 Communications

Upon release of this RFQ, no oral interpretations of the RFQ will be made to any Submitters. Oral explanations or instructions will be considered unofficial and are not binding. Any information modifying a solicitation will be furnished to all Submitters by addendum. Communications concerning this solicitation, with other than the listed Contract Specialist or Alternate Contract Specialist may cause the Submitter to be disqualified.

To view all bidding opportunities, Supplier shall go to https://fa-epvh-saasfaprod1.fa.ocs.oraclecloud.com/fscmUI/faces/NegotiationAbstracts?prcBuId=300000001727151 page.

1.3 Deadline for Questions

All questions and any explanations must be requested in writing and directed to the Contract Specialist and Alternate Contract Specialist no later than seven (7) Days prior to the close date specified in the solicitation Questions about this RFQ may by submitted on or before the deadline through the Message function within the solicitation.

Submitter shall log in to the E-Supplier Portal at https://kingcounty.gov/procurement/supplierportal. King County will respond via an addendum and/or clarification via email notification which will be available for viewing in the E-Procurement Supplier Portal.

1.4 Addenda and Clarifications

If at any time, the County changes, revises, deletes, increases, and/or otherwise modifies the RFQ, the County will issue a written Addendum to the RFQ. Submitter must acknowledge all Addenda to the solicitation and resubmit your response before submitting a submittal in the E-Procurement portal. Clarifications are for informational purposes only.

Submitters that indicate they will participate will receive an automatic notification of any Addenda/Clarification via email from the E-Procurement System.

1.5 Late Submittals

The County's E-Procurement Portal will not allow late Submittals or modifications of submission after the close date and time specified for receipt. Submitters shall assume full responsibility for ensuring electronic delivery of Submittals on or before the close date and time as specified.

1.6 Document Holders

The Document Holders list can be viewed at the following website:
https://kingcounty.gov/depts/finance-business-operations/procurement/for-business/solicitation-resources.aspx

1.7 Submittal Procedure

King County registered Suppliers interested in bidding on current solicitations must log in to their Supplier Portal to view any current bid opportunities, express interest, communicate with the Contract Specialist via Message app and/or successfully submit a submittal through the E-Procurement system prior to the close date and time indicated in the solicitation.

King County will ONLY accept electronic submittals through the E-Procurement system in response to this RFQ. Submittals that do not conform to the requirements specified herein may be rejected.

Instructions on how to submit a bid electronically are provided
https://kingcounty.gov/~/media/depts/finance/procurement/Documents/eprocurement-supplier-guide-solicitation.ashx?la=en

1.8 Pre-Submittal Conference

A Pre-submittal conference will be conducted on the date and time listed on the Solicitation Abstract page. All prospective Submitters are strongly encouraged to attend. The intent of the pre-submittal conference is to assist the Submitters to more fully understand the requirements of this RFQ. Submitters are encouraged to submit questions in advance to enable the County to prepare responses; these questions should be E-mailed to the Contract Specialist. Questions will be encouraged during the pre-submittal conference also. Submitters shall not rely upon any oral statements or conversations at this meeting, rather only on any addenda/clarification documents issued by the County.

A sign in sheet will provide evidence of attendance. It is the Supplier's responsibility to ensure that they report their attendance to the Contract Specialist, as requested during the meeting. An attendees lists will be posted on King County's website at
https://www.kingcounty.gov/depts/finance-business-operations/procurement/for-business/solicitation-resources.aspx

1.9 Cancellation of RFQ or Postponement of RFQ Closing

The County reserves the right to cancel the RFQ at any time. The County may change the date and time for submitting Submittals prior to the date and time established for submittal via an Addenda.

1.10 Examination of RFQ Documents

The submission of a submittal shall constitute an acknowledgement upon which the County may rely that the Submitter has thoroughly examined and is familiar with the RFQ, including any work site identified in the RFQ, and has reviewed and inspected all applicable statutes, regulations, ordinances and resolutions addressing or relating to the goods or services to be provided hereunder.

The failure of a Submitter to comply with above requirement shall in no way relieve the Submitter from any obligations with respect to its submittal or to any Contract awarded pursuant to this RFQ. No claim for additional compensation shall be allowed which is based upon a lack of knowledge or misunderstanding of this RFQ.

1.11 Modifications of Submittal or Withdrawal of Submittal Prior to Submittal Close Date

Modifications or withdrawal of Submittals already received will be considered only if the requested modification or withdrawal is made prior to the scheduled closing time for the receipt of the Submittals.

1.12 Submittal Withdrawal After Submittal Close Date

No Submitter may withdraw a submittal after the date and time established for submitting submittals or before the award and execution of a Contract pursuant to this RFQ unless a.) the award has been delayed past the period for exceeding the period of submittal effectiveness or b.) when a claim of error has been granted by the County.

Requests to withdraw a submittal due to error must be submitted in writing by email along with supporting evidence for such claim for review by the County. Evidence must be sent via the Message feature to the Contract Specialist(s) listed in the solicitation within two (2) business Days after request to withdraw. The County reserves the right to require additional records or information to evaluate the request. Any review by the County of a submittal and/or any review of such a claim of error, including supporting evidence, creates no duty or liability on the County to discover any other submittal error or mistake, and the sole liability for any submittal error or mistake rests with the Submitter.

1.13 Error and Administrative Corrections

The County shall not be responsible for any errors in submittals. Submitters shall only be allowed to alter submittals after the submittal deadline in response to requests for clarifications and/or Best and Final Offers by the County.

The County reserves the rights to allow corrections or amendments to be made that are due to minor administrative errors or irregularities, such as errors in typing, transposition or similar administrative errors.

1.14 Submittal Format Instructions

A. Submitters shall address the each aspect of the written evalution criteria. Submittals need to be specific, detailed and straight forward using clear, concise, easily understood language and speaks to the submitter’s approach, commitment and ability to perform the services described in the RFQ.

B. Submitters answering the RFQ questions shall examine the entire Request for Qualifications document including the instructions, terms and conditions, specifications

applicable standards and regulations. Responses should stay within the page limit and focus on similar experience your company has previously provided. Submitter may include active, informative and up-to-date web links in their submittal, but web content should not substitute full and complete responses to the questionnaire. Failure to do so shall be at the submitter's risk.

1.15 Submittal Content

A. Submit an electronic submittal and attachments as required via the E-Procurement Portal as required in the Requirement sections of the RFQ.

B. The submittal shall contain the following items and follow the sequence outlined below:

1. Equal Benefit Compliance Worksheet, if requesting alternative compliance
2. Letter of Interest - An introductory letter of interest signed by the submitter may contain relevant information about the firm and an executive summary or overview of submittal. The letter should be no more than two (2) pages and must include the firm's legal name, State of Incorporation, UBI number (if applicable), Federal Tax ID number, and Dun and Bradstreet number (DUNS number), if available. The letter should also identify a single point of contact and their contact information for all communications related to the submittal.
3. **Statement of Qualifications** - SOQ's will be evaluated to assess the depth of experience, relevant qualifications and overall ability of the applicant to meet or exceed the selection criteria. Statements of Qualifications must be completed by the prime submitter and should be detailed while concise. Sub-contractors are not permissible for this pool. Statements of Qualifications will be evaluated based upon the following:
   - I. Submitter's preliminary pricing estimates based on specifications set forth in **Exhibit 1 - Preliminary Pricing Estimates**.
   - II. Submitter's qualifications, experience, reputation, and financial stability
   - III. Submitter's ability to deliver the scope of services and the County's estimated demand for product
   - IV. Submitter's ability to meet County's environmental sustainability goals
   - V. Submitter's compliance with County's terms and conditions
4. **Exhibit 2 – Draft Contract Agreement:** Identify any exceptions to terms and conditions and attachments in the Contract Terms section of the RFQ

1.16 Evaluation Criteria and Submittal Scoring

A. The selection and contract award process will be based on a determination of how responsive the written submittals are to the criteria below. Applications presented under this RFQ will be graded according to the criteria listed and weighted below.

No	Evaluation Criteria	Description	Max. Points
1	**Pricing**	• Preliminary pricing estimates for varying amounts of concrete in cubic yards (refer to Exhibit 1 - Preliminary Pricing Estimates)	20
2	**Experience**	• Qualifications	25

No	Evaluation Criteria	Description	Max. Points
		• Relevant experience, skills, and knowledge providing similar services, including experience with the County, if any • References • Financial stability • Site Visits (if needed)	
3	**Delivery Capabilities**	• Proposed streamlined order process and delivery capabilities, including but not limited to delivery lead-time, dedicated resource on account management and contract management, and transition process (as applicable) • Has product and service quality assurance program that can meet the County's specifications and/or current industry standards, including warranty coverage. • Capacity to meet County's estimated demand for product on a variety of construction projects • Ideas for reducing cost and maintaining quality of the product	25
4	**Environmental Sustainability**	Ability to support the County's sustainability goals and initiatives (Refer to Subsection 2.6)	15
5	**Terms and Conditions**	Compliance with Contract Terms and Conditions (refer to Exhibit 2 – Draft Contract)	15
		Total Evaluation	**100**

B. With the exception of Terms and Conditions, each criteria listed above will be given a weighted score from 0 to 5 based on the points listed above to determine their overall value. The 0 to 5 scores represent the following:

0 = 0% Did not provide a response to the requirement.

1 = 20% Far below expectations, a poor response that minimally meets the requirements.

2 = 40% Below expectations, a fair response that meets the requirements in an adequate manner. Demonstrates an ability to comply with guidelines, parameters, and requirements with no additional information put forth by the submitter.

3 = 60% Meets expectations, a good response that meets all the requirements and has demonstrated in a clear and concise manner a thorough knowledge and understanding of the subject matter. An average or slightly above average performance with no apparent deficiencies noted.

4 = 80% Exceeds expectations, a very good response that provides useful information, while showing experience and knowledge within the category. Submittal is well thought out and addresses all requirements set forth. The

submitter provides insight into their expertise, knowledge, and understanding of the subject matter

5 = 100% Far exceeds expectations, a superior response that is highly comprehensive, excellent reply that meets all requirements of the areas within that category. Considered to be an excellent standard, demonstrating the submitter's authoritative knowledge and understanding of the project.

C. Terms and Conditions will be scored on an all-or-nothing basis. The maximum number of points will be awarded to Submitters taking no exceptions to the terms and conditions in Exhibit 2 - Draft Contract. Zero points will be awarded to Submitters taking any exceptions.

1.17 Compliance with RFQ, Terms, Attachments and Addenda

A. The County intends to award Master Contract based on the terms, conditions, attachments and addenda contained in this RFQ. Submitters shall submit submittals, which respond to the requirements of the RFQ.

B. The County reserves the right to reject any submittal for any reason including, but not limited to, the following –

- Any submittal, which is incomplete, obscure, irregular or lacking necessary detail and specificity;
- Any submittal that has any qualification, limitation, exception or provision attached to the submittal;
- Any submittal from Submitters who (in the sole judgment of the County) lack the qualifications or responsibility necessary to perform the Work;
- Any submittal submitted by a Submitter which is not registered or licensed as may be required by the laws of the state of Washington or local government agencies;
- Any submittal, from Submitters who are not approved as being compliant with the requirements for equal employment opportunity; and
- Any submittal for which a Submitter fails or neglects to complete and submit any qualifications information within the time specified by the County.

C. In consideration for the County's review and evaluation of its submittal, the Submitter waives and releases any claims against the County arising from any rejection of any or all submittals, including any claim for costs incurred by Submitters in the preparation and presentation of submittals submitted in response to this RFQ.

D. Submitters shall address all requirements identified in this RFQ. In addition, the County may consider submittal alternatives submitted by Submitters that provide cost savings or enhancements beyond the RFQ requirements. Submittal alternatives may be considered if deemed to be in the County's best interests. Submittal alternatives shall be clearly identified.

1.18 Acceptance of Contracts and Attachments

Submitter shall review Exhibit 2 – Draft Contract, and all its attachments. If there are exceptions taken to the terms and conditions, the Submitter shall include it as an attachment to the submittal, identifying the exceptions and proposed changes. All proposed changes shall be tracked using the tracking changes feature in Microsoft Word®.

1.19 Forms Required with Submittal

The Submitter shall include as part of its submittal, the following documents:

- Exhibit 3 - Buy America Certificate
- Exhibit 4 - Certificate of Lobbying Activities

1.20 Forms Required before Contract Execution

The top ranked Submitter shall submit, within five (5) Days of notification from the County, the applicable documents, insurance, bonds, sworn statements, and other requirements prior to award.

- Certificate of Insurance and Endorsement – Have Insurance Agent e-mail to the Contract Specialist evidence of insurance from insurer(s) satisfactory to the county certifying to the coverage of insurance set forth in this RFQ.
- Responsibility Attestation and Detail Form – If determined to be the highest ranked proposer will complete the form and return it to the County.
- Covid-19 Vaccination Attestation Form (if applicable)

1.21 Cost of Submittals and Samples

The County is not liable for any costs incurred by Submitter in the preparation and evaluation of Submittals submitted. If applicable, samples of items required must be submitted to the location and by the date and time specified. Unless otherwise specified, samples shall be submitted with no expense to the County. If not destroyed by testing, samples may be returned at the Submitter's request and expense unless otherwise specified.

1.22 Collusion

By submitting this submittal electronically, the Submitter certifies that they have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding. If the County determines that collusion has occurred among Submitters, none of the Submitters from the participants of such collusion will be considered. The County's determination will be final.

1.23 Submittal Evaluation and Contract Award

A. The County will evaluate submittals using the criteria set forth in this RFQ. If deemed necessary, written and/or oral discussions, site visits or any other type of clarification of submittal information may be conducted with those Submitters whose submittals are found to be potentially acceptable. Identified deficiencies, technical requirements, terms and conditions of the RFQ, costs, and clarifications may be included among the items for discussion. The discussions are intended to give Submitters a reasonable opportunity to resolve deficiencies, uncertainties and clarifications as requested by the County and to

make the cost, pricing or technical revisions required by the resulting changes. In addition, the County may request additional business and administrative information.

B. The County may find that a Submitter appears fully qualified to perform the Contract or it may require additional information or actions from a Submitter. In the event the County determines that the submittal is not within the Competitive Range the County shall eliminate the submittal from further consideration.

C. The evaluation of Submitters' submittals and additional information may result in successive reductions of the number of submittals that remain in the Competitive Range. If applicable to the procurement, the firms remaining in the Competitive Range may be invited to continue in the submittal evaluation process, and negotiations.

D. The County may enter negotiations with one or more Submitters to finalize Contract terms and conditions. Negotiation of a Contract shall be in conformance with applicable federal, state and local laws, regulations and procedures. The objective of the negotiations shall be to reach agreement on all provisions of the proposed Contract. In the event negotiations are not successful, the County may reject submittals.

E. The County reserves the right to make a Contract award without written and/or oral discussions with the Submitters and without an opportunity to submit Best and Final Offers when deemed to be in the County's best interests. Contract award, if any, shall be made by the County to the responsible Submitter whose submittal best meets the requirements of the RFQ, and is most advantageous to the County, taking established evaluation factors into consideration. The County shall have no obligations until a Contract is signed between the Submitter and the County. The County reserves the right to award one or more contracts as it determines to be in its best interest.

1.24 Responsive and Responsible

The County will consider all the material submitted by the Submitter, and other evidence it may obtain otherwise, to determine whether the Submitter is in compliance with the terms and conditions set forth in this RFQ.

A. Responsible

In determining the responsibility of the Submitter, the County may consider:

- the ability, capacity and skill to perform the Contract and provide the service required;
- the character, integrity, reputation, judgment and efficiency;
- financial resources to perform the Contract properly and within the times proposed;
- the quality and timeliness of performance on previous contracts with the County and other agencies, including, but not limited to, the effort necessarily expended by the County and other agencies in securing satisfactory performance and resolving claims;
- compliance with federal, state and local laws and ordinances relating to public contracts;
- other information having a bearing on the decision to award the Contract.

- For all contracts with a value of $100,000 or more, the selected Submitter must meet the requirements set forth in King County Code 2.93.120 regarding historic compliance with environmental, worker safety, and labor and human trafficking laws. Historic compliance is defined as a minimum of three (3) years preceding the submittal date for the solicitation.
- The County shall conduct a review in order to determine the selected Submitter's responsibility related to these areas. Failure to fully answer any responsibility question, or otherwise be out of compliance with the requirements of the code as determined by the County, shall eliminate the Submitter from consideration of award

Failure of a Submitter to be deemed responsible or responsive may result in the rejection of a submittal.

1.24 Financial Resources and Auditing

If requested by the County, prior to the award of a contract, the Submitter shall submit proof of adequate financial resources available to carry out the execution and completion of Work required by the contract.

King County reserves the right to audit the Contractor throughout the term of the contract to assure the Contractor's financial fitness to perform and comply with all terms and conditions contained within the contract. King County will be the sole judge in determining the Contractor's financial fitness in carrying out the terms of the contract.

1.25 Sustainable Purchasing Policy

Submitters able to supply sustainable goods and services that meet design and performance requirements are encouraged to offer them in Submittals when not otherwise prohibited. Sustainable goods and services provide environmental, social, and economic benefits while protecting human health and the environment over the entire life cycle of the good or service, from the extraction of raw materials through final disposal.

To ensure that products and services meet sustainability criteria, the Sustainable Purchasing Policy authorizes King County purchasers to prioritize the use of ecolabels, and environmental standards and certifications recommended by the U.S. Environmental Protection Agency (EPA) and those accredited by third-party organizations. (Reference: KCC 18.20).

1.26 Equal Benefits

In accordance with the County Ordinance 14823, as a condition of award of a contract valued at $25,000 or more, the Contractor agrees that it shall not discriminate in the provision of employee benefits between employees with spouses and employees with domestic partners during the performance of this Contract. Absent authorization for delayed or alternative compliance as referenced below, failure to comply with this provision shall be considered a material breach of this Contract and may subject the Contractor to administrative sanctions and remedies for breach.

1.27 Single Submittal Receipt

If the County receives a single responsive, responsible submittal, the County may request an extension of the submittal acceptance period and/or conduct an analysis on such submittal.

The Submitter shall promptly provide all cost or pricing data, documentation and explanation requested by the County to assist in such analysis. By conducting such analysis, the County shall not be obligated to accept the single submittal; the County reserves the right to reject such submittal or any portion thereof.

1.28 News Releases

News releases pertaining to this RFQ, the services, or the project to which it relates, shall not be made without prior approval by and then only in coordination with King County.

1.29 Public Disclosure of Submittals

This procurement is subject to the Public Records Act, Chapter 42.56 RCW. https://apps.leg.wa.gov/rcw/default.aspx?cite=42.56 Submitters submitted under this RFQ shall be considered public documents unless the documents are exempt under the public disclosure laws. If a Submitter considers any portion of its submittal to be protected under the law, the Submitter shall clearly mark each section as “CONFIDENTIAL” or “PROPRIETARY”. If any materials are marked “CONFIDENTIAL” or “PROPRIETARY”, Submitters have ten (10) calendar days from the receipt of the Notice of Selection/Non-Award to obtain a court order enjoining release pursuant to RCW 42.56.
If a Submitter does not take such action within said period, the County will post the materials to https://procurement.kingcounty.gov/procurement_ovr/default.aspx after contract execution. By submitting a submittal, the Submitter assents to this procedure and shall have no claim against the County.

1.30 Protest Procedures

King County has a process in place for receiving protests based upon Request for Qualifications or contract awards. The protest procedures are available at http://www.kingcounty.gov/depts/finance-business-operations/procurement/for-business/do-business/protest.aspx

SECTION 2 SCOPE OF WORK/TECHNICAL REQUIREMENTS

2.1 Introduction

A. King County is seeking a contract with one or more qualifying concrete suppliers to service the concrete needs of County construction projects over the next three years. The intent of this RFQ is to select one or more concrete suppliers that will have exclusive rights to address the County's project needs, while meeting the County's terms and conditions for predictable and reliable service.

B. The County will also allow other government jurisdictions in the Seattle/King County region the opportunity to utilize contracts resulting from this RFQ via a "piggyback" arrangement so that these jurisdictions can ensure the supply of concrete for their respective public infrastructure projects.

2.2 Background

A. About 300 concrete mixer truck drivers (hereinafter "truck drivers") represented by Teamsters Local 174 are striking against the following concrete suppliers: Gary Merlino Construction DBA Stoneway Concrete; Cadman Material Inc.; Glacier Northwest DBA Cal Portland; and Salmon Bay Sand & Gravel Company. The strike began on December 3, 2021 and remains ongoing. The concrete suppliers are all private companies that have signed a prior collective bargaining agreement with the Teamster truck drivers. The labor representatives of the truck drivers are seeking a new collective bargaining agreement with the suppliers that addresses wage disparities and medical benefits. The parties are currently in a labor dispute.

B. The labor dispute over the new collective bargaining agreement is adversely impacting the schedule for County construction projects. For example, the Georgetown Wet Weather Station project—which is designed to control overflows of sewage mixed with stormwater during heavy rains—now has the risk of not complying with a judge-ordered construction schedule. The County is also aware that the impasse is having a major adverse impact on other public infrastructure projects such as Sound Transit's light rail expansion. This has resulted in unexpected workarounds with some construction stopped altogether. The longer the labor dispute continues, the more risk this poses for delays and cost increases for these critically needed infrastructure projects.

C. To avoid the ongoing impact of the labor dispute, King County is interested in securing one or more exclusive suppliers for concrete that can meet the County's needs for concrete and avoid labor disruptions. The supplier(s) would be expected to meet the labor-related requirement described in this scope of work document (see section 6.0 below).

2.3 Scope of Services

The successful Submitter (or Submitters) shall be able to provide the following services, including but not limited to:

A. Account and Contract Management

Assign representative(s) as point of contact and managing the relationship between the County and the successful Submitter, including specific roles but not limited to:

1. facilitate contract implementation, ensure a smooth transition, on-going efficient operations, and contract management;

2. accessible for service escalation and issue resolution;
3. provide day-to-day service, technical support including knowledge of all products and services available;
4. ensure the objectives outlined in the RFQ and the subsequent contract are met;
5. the County reserves the right to review and accept the successful Submitter's assignment of the representative for the contract management.

B. Proposed Key Performance Indicators

1. The successful Submitter's overall performance and the quality of its work will be evaluated by the County, on such factors as service levels including the frequency of product quality issues, on-time delivery, time of responses, billing and documentation accuracy and other issues that the County shall establish as key performance indicators (KPI's) and/or service level agreements with the successful Submitter.
2. The following KPI's will be monitored and jointly reviewed by the County and the successful Submitter to ensure that service levels continually meet or exceed the County's operational requirements:

Measure	KPI	Description	Commitment
Reliability	1	On time completion of scheduled delivery	≥99%
	2	Meeting wait time for pickup at Proponent's location	≥98%
	3	Product Delivery Error	≤1%
	4	Product Quality meeting Specification	100%
	5	Invoice Discrepancies	≤ 2%
Responsiveness	6	Inquiry Response	≤ 2 Hours
	7	Order Processing	≤ 2 Hours
	8	Order Confirmation	≤ 2 Hours
	9	Completion of Delivery	≤ 12 Hours
Flexibility	10	Urgent Order - Response	≤ 2 Hours
	11	Urgent delivery - Completion	≤ 2 Hours

3. The specific KPI's will be mutually agreed upon by King County and the Submitter prior to contract execution.

C. Quality Assurance

1. All Products supplied shall be subject to inspection and testing. In the event that any Products are defective or otherwise not in conformity with the specifications, the

County shall have the right to reject same or require their immediate replacement at no additional cost to the County. All additional costs resulting from the rejected Products shall be the responsibility of the successful Submitter.

2. Acceptance or rejection of Products shall be made as promptly as practically possible after delivery, but failure to inspect and accept or reject Products shall not relieve the successful Submitter from the responsibility for such Products which are noncompliant to the specifications.

3. The successful Submitter's quality control personnel will be expected to attend County pour sites on a regular basis to conduct quality control testing.

4. On an emergent basis, County staff may request the successful Submitter's quality control personnel at the Delivery Location within two (2) hours of request.

5. The County may also carry out random quality assurance testing for verification purposes.

6. Acceptance of goods delivered to the County will be subject to the terms of the Agreement.

7. An electronic quarterly quality control summary for all County purchased Product shall be made available to the County for information and record purposes.

D. Warranty

The Submitter should, in its Submittal, represent and warrant that:

1. the Products and Services supplied by the Submitter shall satisfy all requirements and specifications set forth in the RFQ;

2. all Products will be free from defects in materials and workmanship; and

3. the Submitter shall comply with all applicable federal, state, and local laws and regulations and shall obtain all applicable permits and licenses.

E. Disaster Response Support

1. Concrete is considered a critical item in the County's emergency preparedness plan for disaster recovery. Depending on the nature of the emergency and subsequent infrastructure damage, a large demand may exist for Products. The demand of the same Products may also exist from other customers in these circumstances; however, Submitters should consider that the County's needs may be a priority in limiting the economic impacts to the community and ensuring public health and safety by restoring infrastructure as soon as possible.

2.4 Product Specifications, Estimated Demand, and Pricing

A. The materials shall conform to the applicable requirements in the latest edition of the "Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction" (WSDOT), (https://wsdot.wa.gov/Publications/Manuals/M41-10.htm) unless otherwise stated.

B. Refer to **Exhibit 5** - **Three-Year Capital Concrete Projections** for King County's estimated quantities of concrete needed by department/divison and construction projects over the term of the Contract.

C. The ordering process of concrete for specific construction projects shall be determined at a later time as part of subsequent contract negotiations with one or more qualifying Submitters.

D. For this RFQ, the preliminary pricing estimated will be based on the specifications included in Exhibit 1 - Preliminary Pricing Estimates.

E. A specific methodology and process for determining the pricing of concrete products for specific construction projects will be determined as part of subsequent contract negotiatons with one or more qualifying Submitters.

F. King County encourages ideas from Submitters to reduce cost and maintain quality of products.

2.5 Environmental Sustainability

A. King County's Strategic Climate Action Plan (SCAP) requires contractors and consultants to use recycled, low carbon, and other sustainable products whenever practicable. The County intends to specify low-embodied carbon building materials in County construction projects. To reduce embodied emissions, the County will be developing requirements for the specification and use of low emission alternatives for concrete. Speficially, the County shall:

1. By 2022, the County shall create standard specifications for concrete and begin requesting environmental product declarations (EPDs) for this material in construction bids.

2. By 2023, the County will require the use of EPDs for concrete.

3. By 2024, the County will require a maximum global warming potential for concrete products, which it will enforce for all construction projects starting in 2025.

B. Sustainability Definitions

1. Environmental Product Declarations (EPD's) are third party verified documents that provide transparency by outlining the environmental impact, including the global warming potential, of the material. EPD's are comparative within a materials category.

2. Specifically, product specific EPD's will be required for all concrete mixes in these categories: Readymix (03 30 00 Cast in Place concrete), Shotcrete (03 37 13) and Flowable Fill (31 23 23 fill), as they are readily available.

3. The Embodied Carbon in Construction Calculator (EC3) Tool (https://buildingtransparency.org/ec3) is a database that has digital EPD's available and is an approved repository for EPD's. This tool will allow King County and others to directly measure, compare and reduce the embodied carbon in specific building materials, including concrete.

2.6 Labor-related Requirements of Submitters

A. The selected Submitter must have a fully executed collective bargaining agreement with a labor organization that represents 100 or more truck drivers regularly employed in King County; that is compliant with the requirements of the Labor Management Disclosure Act of 1959 and its implementing regulations, covering its truck drivers; the agreement must be for at least three years; the agreement must contain a no strike clause sufficient to

prevent the truck drivers and their exclusive bargaining representative from engaging in any form of lockout, work stoppage or strike for the duration of the agreement; and similarly prohibits any lockout by the employer for that period of time.

B. This labor-related requirement is a mandatory requirement of each Submittal and therefore is not rated as part of the compliance with the County's other Terms and Conditions in the Evaluation Criteria and Submittal Scoring.

2.7 Reservation of Rights

A. Should there be no qualifying Submitter, the County reserves the right to self-perform the scope of work described in this RFQ.