

*Report for a Constructability Review
& a Value Engineering Study
For the Issaquah School District*



ISSAQUAH
SCHOOL DISTRICT 411

For Elementary School No. 15

By: VALUE MANAGEMENT CONSULTING, INC.

In association with:

R O Day

KMB Design Group, Inc.

Summers Consulting, Inc.

May, 2009



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Executive Summary



EXECUTIVE SUMMARY

VALUE MANAGEMENT CONSULTING, INC (VMC) was engaged to facilitate a combination Constructability Review and Value Engineering Study (CR&VE) for the Issaquah School District. The Executive Summary consists of the following:

- Forward
- Disposition of VE Proposals

FORWARD

This CR&VE is rather unusual from one perspective. At the time that the CR&VE was conducted the project was out for bid. To comply with the Office of the Superintendent of Public Instruction for the State of Washington's requirements for securing state matching funds, the District engaged VMC to provide a CR&VE Team, provide facilitation services for the workshop and produce a report. It is the intent of this report to provide information to the District and the Design Team that can improve the constructability of this project and provide some ideas for potential value engineering implementation. The CR&VE Team recognize that significant changes in basic layout and building systems are not practical at this time given the schedule for occupancy of this facility in the fall of 2010 and the requisite time that would be required for any substantial redesign and bidding.

DISPOSITION OF VE PROPOSAL

Table 1—Disposition of VE Proposals		
Prop. No.	Idea No./Description	Disposition ¹
1.	Idea No. 013. Sheet C3.16 – Consider the use of conventional asphalt paving and eliminating the permeable paving section since the existing storm water is being injected into the ground on-site.	Required by the City to meet impervious area requirements even with 100% infiltration of stormwater included in project
2.	Idea No. 070. DIV 2 Delete the temporary ATB pavement	Temporary ATB used to control stormwater, removal required for installation of pervious paving
3.	Idea No. 014. Sheet L1.1 - Consider using more drought resistant plantings in order to reduce irrigation system to a	Plans call for drought resistant and native plants. Irrigation system



Table 1—Disposition of VE Proposals

Prop. No.	Idea No./Description	Disposition ¹
	temporary "two year" starter system.	to remain per City requirements but will discuss contract for watering and elimination of irrigation system after the start of construction
4.	Idea No. 73 Sheet L1.1 - Redesign the shrub beds to utilize draught tolerant plants without an installed irrigation system.	See item 2 above
5.	Idea No. 74 Sheet L1.1 - Use the same expenditure now planned for draught tolerant plants only without an installed irrigation system.	See item 2 above
6.	Idea No. 094. The current design shows a height of the CMU wainscot at 17-feet +/- . The CR&VE Team suggests that this could be reduced to 8 or 9 feet.	Exterior design, approved by the City, would be changed significantly and require additional City review. Delay to start of construction outweighs potential savings
7.	Idea No. 086. DIV 7 Suggest the specified roofing underlayment (Grace Ice & water Shield), be reduced to valleys, penetrations, eaves and use less costly high performance underlayment for field.	Benefit from second waterproofing layer outweighs cost savings.
8.	Idea No. 084. Delete Metal Roofing and Substitute Membrane Roofing with Ribs.	Membrane roofing is subject to vandalism damage as seen at other schools. Metal roof will outlast membrane roof life by 2-3 times
9.	IDEA NO. 024. Delete the specified sunshades and light shelves from the North and East Elevations.	All facades are at 45 degrees to north/south. Light shelves bounce light into spaces and provide shading of lower windows on all facades.



Table 1—Disposition of VE Proposals

Prop. No.	Idea No./Description	Disposition ¹
10.	IDEA No. 32. Construct Pre-engineered Covered Playshed (1 and 2) Structures.	Playsheds, as designed, have been approved by the City. The change would require additional permit review. Delay to start of construction outweighs cost savings potential

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Introduction



INTRODUCTION

VMC was engaged to facilitate a combination Constructability Review and Value Engineering Study (CR&VE) for the Issaquah School District for Elementary School No. 15. The workshop was held at the offices of the Issaquah School District on April 22 through April 24, 2009. Questions about this Draft Report or the CR&VE Workshop should be directed to:

*Mike Morrison at **VALUE MANAGEMENT CONSULTING, INC.**
15330 Old Redmond Road, Redmond, WA 98052-6837
425-885-2185 = telephone
425-556-9278 = facsimile
valuemike@aol.com = e-mail address*

PROJECT DESCRIPTION

The following description of this project was taken from the District web-site:

*“**Features:** The floor plan and building design is similar to Grand Ridge and reflects an increased emphasis on day lighting and natural ventilation strategies to reduce energy consumption. The exterior design and colors provide the new school with an individual identity. The 2-story building includes 28 classrooms, a computer lab, music room, multi-purpose room, gym and resource room with OT/PT room for special services. The classroom wings are organized around a central Library. There will be two covered play areas in addition to a typical elementary sand playfield.”*



CR&VE TEAM PARTICIPANTS

The CR&VE Team Members are listed in the table below alphabetically by last name.

TABLE 2—CR&VE TEAM PARTICIPANTS			
Name	Role ⁽¹⁾	Organization	Telephone No./E-Mail
1. Mark A. Beardemphl, AIA	Architect	KMB Design Groups, Inc. 828 7 th Avenue S. E. Olympia, WA 98501	mark@KMBdesign.com 360-352-8883
2. Richard O. Day, PE	Civil Engineer, Constructability Reviewer	R. O. Day 3529 239 th Avenue SE Issaquah, WA 98029	roday@msn.com 425-392-9649
3. Mike Summers, CCE	Cost Estimator, Constructability Reviewer	Summers Consulting, Inc. 5313 NE 190 th Lake Forest Park, WA 98155	msummers41@comcast.com 206-517-7808
4. Mike Morrison, CCC	Facilitator	Value Management Consulting, Inc.	valuemike@aol.com 425-885-2185
⁽¹⁾ This role represents the primary role this individual played on this study, which may not be their day-to-day role, or position title in their respective organization.			

The Design Team was represented at the Orientation and Presentation meeting by the following individuals who are listed alphabetically by last name.

TABLE 3—DESIGN TEAM PARTICIPANTS			
Name	Organization	Team Role	Contact Information
Andersen, Pete	Cornerstone Architectural Group	Architect	pandersen@cornerstonearch.com 206-682-5000
Barnes, Steve	Cornerstone Architectural Group	Architect	sbarnes@cornerstonearch.com 206-682-5000



The Owner's Team was represented at the Orientation and Presentation meeting by the following individuals who are listed alphabetically by last name.

TABLE 4—OWNER TEAM PARTICIPANTS			
Name	Organization	Team Role	Contact Information
Archer, Mike	Issaquah School District	Construction Coordinator	archerm@issaquah.wednet.edu 425-837-7040
Crawford, Steve	Issaquah School District	Capital Projects Director	crawfords@issaquah.wednet.edu 425-837-7040

COMBINED CONSTRUCTABILITY REVIEW & VALUE ENGINEERING METHODOLOGY

Constructability Reviews and Value Engineering Workshops are conducted separately more often than in one workshop. The following synopsis is provided for the benefit of any readers of this report that are not familiar with value analysis and value engineering. **VMC** has facilitated combined workshops previously.

To produce this report the plan followed for a typical value engineering workshop is used to organize the ideas. Value engineering originated during World War II. The CR&VE Team brainstormed ideas and then organized them into categories for further development.

The pre-study work involves reviewing information provided by the Design Team and the Owner Team about the project. Bid sets of the plans and specifications were distributed to the CR&VE Team prior to the workshop.

This VE study itself consists of five elements, and they are:

Information, Creative, Analysis, Development, and Presentation.

Information

The Owner Team and the Design Team presented the information about the project to the CR&VE Team during an Orientation Meeting.

Creative

The CR&VE Team then developed many ideas that could possibly improve the constructability for the project. The CR&VE Team also examined alternatives that could add value to the project and which may have capital or life-cycle cost savings.



Analysis

Alternatives were ranked and some are eliminated from further consideration. The remaining alternatives were examined for potential. The Team evaluated ideas for reality and potential for implementation.

Development

The ideas that were analyzed and successfully passed the scrutiny of that review were then developed with narrative, advantages and disadvantages, calculations, and cost estimates. Some alternatives have sketches to more clearly convey the CR&VE Team's intention. One of the ideas that was initially passed by the CR&VE Team subsequently failed during the Development Phase of the workshop.

The post-study element is the delivery of a preliminary report, with the complete calculations from the CR&VE study. The Issaquah School District in conjunction with input from their Design Team will determine which of the VE proposals will be pursued. Then a final report is published which includes the disposition of the various VE proposals with the reasons for the acceptance, acceptance with modification, or rejection.

Presentation

The last day of the workshop the CR&VE Team presents the various proposals developed during the workshop at a Presentation Meeting. This presentation allows the Design Team and the Owner Team to ask any questions about the various proposals. This meeting is similar to the Information Meeting conducted on the first day of the workshop, but with the roles reversed.

ADDITIONAL COMMENTS ABOUT VALUE ENGINEERING (VE)

One of the unheralded benefits that owner's receive from CR&VE studies is the opportunity to have increased communication about key stakeholder decisions that can impact the project. By examining the project from the standpoint of the values of the owner, decisions that have non-quantifiable VALUE aspects can be reviewed in the light of other options, trade-offs, and the cost impacts of such decisions.

The proposals and notes, as well as the entire CR&VE process, are respectfully presented herein for the ultimate benefit of the current and future stakeholders in the Issaquah School District.

It should also be noted that the CR&VE Team has tried to present proposals that are independent and not combinations of several ideas, such that if one idea has a fatal flaw, the entire proposal must fail. Therefore, you can combine some of the ideas presented to increase the cost savings or value added aspects of the sum of the accepted proposals. However, some proposals are mutually exclusive, and cannot be combined.



PROPOSAL FORMAT

Note: The following information is provided for the benefit of the readers of this report. Each proposal has several sheets that are organized sequentially as follows:

Advantages and Disadvantages (First section for every proposal)

This section was developed by the CR&VE Team, and lists the advantages and disadvantages of the proposal developed.

Description of Design Element Selected for Study

(Second section for every proposal)

This section includes the description of the design element that the CR&VE Team selected.

Sketch of Design Element Selected for Study

(Third item for most proposals; sometimes combined with the description)

This section shows the design element that the CR&VE Team selected to study.

Description of CR&VE Proposal (Next item in every proposal)

This section describes the CR&VE Team's proposal to replace the design concept that the CR&VE Team selected to study.

Sketch of CR&VE Proposal

(Fifth item for most proposals; sometimes combined with the description)

This section shows the CR&VE Team's proposal to replace the design concept that the CR&VE Team selected to study.

Vendor Information Sheet

(Optional sheet(s) included for any proposals where vendor information was obtained)

This section shows the actual copies of any vendor information that was used for the basis of a proposal.

Calculations (included, if necessary)

This section of the proposal contains any calculations for computation of quantities.

Capital Cost Estimate (included with every proposal, where practical)

This section contains the cost estimate calculations comparing the design element to the CR&VE Team's proposal.

Life-Cycle Cost Estimate (included with every proposal, where practical)

This section contains the life-cycle cost estimate calculations comparing the design element to the CR&VE Team's proposal.

Conclusion (last section included with every proposal)

This section lists the conclusion of the CR&VE Team.



BRAINSTORMING LIST

The following list contains all of the brainstorming ideas identified during the workshop. After the ideas are generated, they are discussed in some detail. All ideas are judged with regard to potential impact, implementability, and opportunity to ADD value to the project. Ideas are given a disposition of one of the following groups:

- VE IDEA (which means it will be developed during this workshop as a potential VE Idea. However, during the Development Phase of the workshop, some of the proposals change categories to FAIL, DUPLICATE, or COMBINE.
- FAIL (which eliminates that idea from further consideration)
- NOTES (which are ideas that the CR&VE Team wishes to share with the District and the Design Tem for their consideration). Notes are ideas that the CR&VE Team believes have merit but either did not have the time or sufficient information to develop into proposals. Some Notes are things that would be captured by the Design Team during the evolution of the project.
- CONSTRUCTABILITY REVIEW TOPIC (which are ideas that we recommend for consideration by the District and/or the Design Team for potential constructability issues.
- COST ESTIMATE COMMENTS. The CR&VE Team also provided some comments about the cost estimate, which are shown in the report.

TABLE 5—BRAINSTORMING LIST	
<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 001. The drawings should be checked for cross referencing between and within disciplines.	FAIL
Idea No. 002. The directional orientation of the drawings varies between and within disciplines. North is found up, left, right, and skewed, which adds to confusion. Standardizing the orientation will help to minimize misunderstandings and mistakes.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 003. The spec bindings are too tight, making it difficult to read some of the text.	DO NOT INCLUDE
Idea No. 004. Specifications prohibit bidder’s questions in the 10 days just prior to bid. The CR&VE Team believes that communications between the Design Team and the bidders should be encouraged. Let the design professional focus on proper response(s) without providing bidder advantage.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 005. The East part of the site exploration plan in the Geotechnical Report is missing.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 006. DIV 1 Section 01110 Summary should indicate ‘UIC’ rather than ‘UIB’ wells.	CONSTRUCTABILITY REVIEW TOPIC



TABLE 5—BRAINSTORMING LIST	
<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 007. Is it realistic to indicate and expect NTP/start of construction only 2 weeks after bid with the requirement for Board approval, etc?	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 008. Only use proprietary specs when absolutely necessary. It has been indicated for metal roofing and siding, modular retaining walls, elevator, vinyl wall coverings, and several other materials and systems. Costs will be higher where competition is restricted or eliminated altogether.	NOTE
Idea No. 009. Some additional additive alternate bids could be used as a hedge in case of higher than expected bids including landscaping, vinyl wall covering (in part or in total) and some nonessential specialties or items readily purchased or contracted by the school district directly. More attention could be given to this by the CR&VE Team if it is desired.	NOTE
Idea No. 010. Construction cost estimate and schedule comments could be provided by the CR&VE Team if that is desired and a current estimate and schedule are provided.	See COST ESTIMATE COMMENTS
Idea No. 011. Sheet AC3 - Studs are indicated to be at 12 or 16 inches on center throughout the drawings. Some walls in low impact areas could be at 24 inches on center.	NOTE
Idea No. 012. Sheet AC3 - Soffit framing is indicated to be at 24 inches on center, which is too widely spaced to keep ½" GWB from sagging. Upon further examination the CR&VE Team believes that the soffits are Hardi Panels.	FAIL
Idea No. 013. Sheet C3.16 – Consider the use of conventional asphalt paving and eliminating the permeable paving section since the existing storm water is being injected into the ground on-site.	See VE IDEA No. 1
Idea No. 014. Sheet L1.1 - Consider using drought resistant plantings without irrigation in the garden areas in order to reduce irrigation system to a temporary "two year" starter system and only permanently irrigate the lawn areas.	See VE IDEA No. 3
Idea No. 015. Sheet L1.1 - Consider moving some landscaping and irrigation to an additive alternate in the event that bids come in higher than expected.	FAIL
Idea No. 016. Sheet A1.1 - Should the notation for 'E. Access Drive' instead be 'W. Access Drive'?	NOTE



TABLE 5—BRAINSTORMING LIST

<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 017. Sheet A1.1 - If the existing barn is to be retained, it should be checked for structural stability and safe use. Otherwise, it could be a dangerous, attractive nuisance. [One of the CR&VE Team Members visited the site and observed that the barn is in good condition.]	FAIL
Idea No. 018. Sheet A1.1 - The bus loop appears to be tight. Is there available space to enlarge it somewhat without sacrificing other needs on site?	NOTE
IDEA No. 019. Sheet A1.6 - Less expensive materials and/or methods could be used for the sound walls in lieu of plant pre-cast concrete.	VE IDEA NOT PROPOSED
Idea No. 020. Sheet A1.5 - The special guardrail detail is very attractive, but may be costly. [The CR&VE Team learned that the laser cut guardrail is cost effective.]	FAIL
Idea No. 021. Sheet A1.7 - Retain the ATB in the final paving sections wherever possible.	FAIL
Idea No. 022. Sheet A2.41 - The drawing numbering system could be confusing, for example with A2.41 coming before A2.6. Suggest using 2 decimal places for all numbers, for example A2.60 which would logically come after A2.41.	NOTE
Idea No. 023. Sheet A3.1 - Are concrete base walls needed at all exterior stairs?	FAIL
IDEA NO. 024. Delete the specified sunshades and light shelves from the North and East Elevations.	See VE IDEA No. 9
Idea No. 025. Sheet A4.1 - Is the furred wall note to use '2x9 flat' correct?	NOTE
Idea No. 026. Sheet A5.2 - Could the insulation above the exterior walls in the truss spaces be draped with fastenings at top and bottom only in order to eliminate most or all of this extensive extra framing here and elsewhere?	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 027. Sheet A5.3 - Could the exposed exterior steel I beams be just painted or covered with a less expensive material/method than CMU facing here and elsewhere? Cracking potential is also a concern if CMU is used here. Are the expansion joints that are shown detailed?	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 028. Sheet A5.3 - Backing/infill at steel beams could probably be done more economically with wood rather than metal studs here and	CONSTRUCTABILITY REVIEW TOPIC



TABLE 5—BRAINSTORMING LIST

<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
elsewhere.	
Idea No. 029. Sheet A5.3 - What is the finish material at the inside face of parapet walls? (See A8.4)	FAIL
Idea No. 030. Sheet A5.3 - Why are parapet walls shown to be insulated? (TO COMPLETE THE INSULATION FOR THE ENVELOPE)	FAIL
Idea No. 031. Sheet A5.4 – Wood framed steps at music platform and story pit could be concrete for greater durability.	FAIL
Idea No. 32. Construct Pre-engineered Covered Playshed (1 and 2) Structures.	See VE IDEA No. 10
Idea No. 033. Sheet A5.12 - What is the purpose of the insulation at mezzanine floors? In some places it is shown full thickness of joists and in others it is shown less than full thickness. The insulation is specified as 3 5/8 inch sound batts, but the drawing shows thicker insulation.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 034. A5.24 – An aluminium storefront system may be more cost effective than the hollow metal system shown.	NOTE
Idea No. 035. Sheet A5.25 – Section 1 is labelled Interior but shows and exterior wall.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 036. Sheet A5.28 – Section 4 shows the top of the wall at the elevation of '0'-0", which is incorrect.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 037. Sheet A6.2 – The height for wainscot WF-2 through WF-4 are dimensioned, but the height for wainscot WF-1 is not shown clearly. The thickness for WF-1 medium density fiberboard is not specified in Section 06200.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 038. Sheet A6.3 - Are steel channels to remain exposed?	FAIL
Idea No. 039. Sheet A8.1 - Poche for membrane roofing does not match legend.	NOTE
Idea No. 040. Sheet A8.1 - Why use ACT in the mechanical mezzanine?	FAIL
Idea No. 041. Sheet S2.1 - Masonry screen wall footings are not shown the same as on Sheet A1.5. Section 17.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 042. Sheet S2.1A – This and other A suffix structural sheets should be indicated as dimensional (and other?) supplements for clarification of their use.	NOTE



TABLE 5—BRAINSTORMING LIST	
<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 043. Sheet S2.2 – Some spread footing are so close together that they should be joined.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 044. Sheet S2.3 – Do the footings really need to be notched for downspouts, rather than routing downspouts around the footings?	FAIL
Idea No. 045. Sheet S2.4 – Wood should be held above the sidewalk, rather than in contact with this concrete.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 046. Sheet S9.1 – The table headings need to be completed.	NOTE
Idea No. 047. Sheet C2.01 – Existing house is still on the site. Verify whether or not contractor is to remove or district will remove it.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 048. C2.02 – Use the permanent pond for an on-site sediment pond during construction.	NOTE
Idea No. 049. Sheet C2.02 – Contractor should not be told where to locate the stockpile.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 050. Sheets C3.05, C4.04 through C4.08 – These sheets should be labelled clearly as off-site work.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 051. Sheet C3.10 – The CR&VE Team believes that there should be a way to completely drain the pond.	NOTE
Idea No. 052. Sheet A1.6 – Wall Elevation No. 7 shows Section 11/A1.6 and it should be Section 13/A1.6.	NOTE
Idea No. 053. The CR&VE Team suggests that the school district request that a registered civil engineer check the capacity and distribution of the proposed additional water pipeline to assist in an economical size for the on-site pipeline.	NOTE
Idea No. 054. Consider reuse of the existing on-site asphalt paving for sacrificial construction ATB. [The CR&VE Team learned that the elevations preclude the use of this concept.	FAIL
Idea No. 055. Sheet S9.1 – There are some missing headings in the table shown on this sheet. These are necessary for correlation with the sketch.	Duplicate—See Idea No. 46
Idea No. 056. Sheet M1.3 – Shows the chiller schedule as an alternate bid and this is not shown in the bid form as an alternate.	CONSTRUCTABILITY REVIEW TOPIC



TABLE 5—BRAINSTORMING LIST	
<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 057. GENERAL Define on-site and off-site work.	Duplicate—See Idea No. 50
Idea No. 058. DIV 0/1 There is no explanation of the bid evaluation and bidder criteria/qualifications “control”.	FAIL
Idea No. 059. DIV 0/1 Special Conditions Section 00800 does not exist.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 060. DIV 0/1 Schedule in Section 01100 SUMMARY WORK—It is not possible to get a May 15 NTP date. Drop interim milestone schedule and let the general contractor control the schedule. The phasing language is not consistent, not tied to the drawings or written scope and not clearly defined.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 061. DIV 0/1 Form of Proposal	FAIL
Idea No. 062. DIV 0 Section 00200 Paragraph 1.16 should reference Part 2 and not Part 1 of the Bid Form.	NOTE
Idea No. 063. DIV 0 Section 00410 Form of Proposal Part 2 of 2 requires general contractor to list base bid subcontractors and alternate subcontractors. The phrase “Add name of subcontractor here if they will become low bidder based on acceptance of an alternate”. The format and the amount of space provided for the contractor to list the subcontractors for alternates is not sufficient and is unclear with regard to proper completion during the bid preparation.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 064. DIV 1 Section 01100 Summary of Work. There is a risk in having the floors “by others” with regard to the preparation of the slab. This responsibility for the general contractor could result in a change order—Summary Work 01100.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 065. DIV 00410-Part 2 – This proposal form should reference the following plans: C3.05, C4.04 through C4.08	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 066. DIV 2 Cut/fill and the use of imported material. There was some discussion about the use of on-site excavated material being prohibited.	FAIL
Idea No. 067. DIV 2 Retaining wall design	FAIL
Idea No. 068. DIV 2 Acoustic wall design is expensive—uses WSDOT standards	Duplicate—See Idea No. 19



TABLE 5—BRAINSTORMING LIST

<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
Idea No. 069. DIV 2 Eliminate the pervious pavement	Duplicate—See Idea No. 13
Idea No. 070. DIV 2 Delete the temporary ATB pavement	FAIL
Idea No. 071. DIV 2 Delete the sediment trap	Combine with Idea No. 48
Idea No. 072. DIV 2 Use the pond instead of the UIC wells	FAIL
Idea No. 73. Sheet L1.1 - Redesign the shrub beds to utilize draught tolerant plants without an installed irrigation system.	See VE IDEA No. 4
Idea No. 74 Sheet L1.1 - Use the same expenditure now planned for draught tolerant plants only without an installed irrigation system.	See VE IDEA No. 5
Idea No. 075. DIV 2 Use collected storm water to irrigate the play field.	FAIL
Idea No. 076. DIV 3 Examine fiber reinforced concrete slabs versus welded wire fabric.	FAIL
Idea No. 077. DIV 3 Does the exterior concrete sealer specified include horizontal concrete? This is a conflict with Spec. 07190—which one applies? Where is the anti-graffiti 8'-0"-minus specified?	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 078. DIV 3 The anti-graffiti coating will likely change the color of the CMU which may cause a change order when the contractor want to extend the coating further up the wall.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 079. DIV 3 There is no reference for cold weather concreting per ACI in the project manual.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 080. DIV 4 Where is cast stone included on the project, as specified in Section 04720?	NOTE
Idea No. 081. DIV 6 Section 06100 says plywood should be used for roof/wall sheathing. The structural notes allow plywood or OSB for both applications. The CR&VE Team recommends plywood for the roof sheathing.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 082. DIV 7 Section 07555 requires a UL Class A roof system. However, Sheet A8.1 indicates that a Class C minimum is required by code. Potential to remove "Densdeck" and replace with an alternative more moisture resistant product.	CONSTRUCTABILITY REVIEW TOPIC



TABLE 5—BRAINSTORMING LIST

Brainstorming Idea Number/Description	Disposition
Idea No. 083. DIV 7 Sheet A5.27 has only approximately 6 inches of flashing height to the window frame. This is problematic for snow leaks.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 084. Delete Metal Roofing and Substitute Membrane Roofing with Ribs.	See VE IDEA No. 8
Idea No. 085. DIV 7 Require the manufacturer's representative to provide inspection of the roof before and after the installation.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 086. DIV 7 Suggest the specified roofing underlayment (Grace Ice & water Shield), be reduced to valleys, penetrations, eaves and use less costly high performance underlayment for field	See VE IDEA No. 7
Idea No. 087. DIV 7 Add fall protection anchors to the specification for maintenance compliance. They are specified as one product and shown as another product on the drawings.	NOTE
Idea No. 088. DIV 7 Add ice and snow rakes to keep ice and snow from sliding off the roof.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 090. DIV 7 Is the engineering for the connection for the fall protection the responsibility of the contractor?	FAIL
Idea No. 091. DIV 7 Elevation notes and roof plans on the drawings say "membrane" roof and the specifications say built-up roofing.	FAIL
Idea No. 092. DIV 7 Verify that the working height between the gymnasium and the cafeteria roof is adequate to install the roofing flashing.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 093. The CR&VE Team noted differences in heights of the overhang as shown on the following: Section 1 on Sheet A3.2 scales 5'-5" which is not code compliant; Detail 3 on Sheet 5.25 shows 7' height from the surface of the plaza deck; Section 3 on Sheet A4.2 shows a different dimension. This is inconsistent. What is the correct height?	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 094. The current design shows a height of the CMU wainscot at 17-feet +/- . The CR&VE Team suggests that this could be reduced to 8 or 9 feet.	See VE IDEA No. 6
Idea No. 095. Delete the upside down bow trusses and space the wood beams to take the load without the trusses.	FAIL
Idea No. 096. WAC 2-308-12-081 requires the architect to "seal", stamp and sign the cover, title page and all pages of the table of contents of	NOTE



TABLE 5—BRAINSTORMING LIST	
<i>Brainstorming Idea Number/Description</i>	<i>Disposition</i>
the project manual. The CR&VE Team did not receive project manuals that meet this requirement.	
Idea No. 097. Sheet A2.8 Detail 4 Soft Covered Play Building rubber matting called out on the drawing is not found in the specifications. What is it?	FAIL
Idea No. 098. Section 01230 1.4 B Alternate No. A-2 Amplified Sound System refers to Section 13376 which is not included in the Project Manual.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 099. The CR&VE Team suggests that the specifications be reviewed to make the selection of the contractor based on the bids	FAIL
Idea No. 100. There are dimensions needed to locate the structures on this project.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 101. C3.03 Note 4 should reference C3.14 and not C3.13 for the acceptable pipe materials.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 102. A8.3 Detail 4 Flashing at Entry Canopy PSL outrigger beams end cap flashings should have drip edges to prevent rain water from running down the underside of the beam.	CONSTRUCTABILITY REVIEW TOPIC
Idea No. 103. C3.03, 12" SD piping is shown running through middle of Large Grease Interceptor at Loading Dock Area.	FAIL
Idea No. 104. Sheet M2.1 Grease interceptor waste connection to civil not shown.	FAIL
Idea No. 105. Sheet C3.04 – UIC Wells 6, 7 and 8 and the outflow control structure need invert elevations.	CONSTRUCTABILITY REVIEW TOPIC



SUMMARY OF VE PROPOSALS

The proposals are organized by groups as shown in the table below. The details about each proposal are included in the following section of this report.

TABLE 6—VALUE ENGINEERING PROPOSALS			
PROPOSAL No.	BRAINSTORMING IDEA NUMBER/DESCRIPTION	POTENTIAL SAVINGS (\$ 1,000's) ⁽¹⁾	
		CAPITAL	LIFE-CYCLE ⁽²⁾
1.	Idea No. 013. Sheet C3.16 – Consider the use of conventional asphalt paving and eliminating the permeable paving section since the existing storm water is being injected into the ground on-site.	\$100k	\$100k
2.	Idea No. 070. DIV 2 Delete the temporary ATB pavement	\$ 96k	\$ 96k
3.	Idea No. 014. Sheet L1.1 - Consider using more drought resistant plantings in order to reduce irrigation system to a temporary “two year” starter system.	\$76k	\$512k
4.	Idea No. 73 Sheet L1.1 - Redesign the shrub beds to utilize draught tolerant plants without an installed irrigation system.	\$152k	\$588k
5.	Idea No. 74 Sheet L1.1 - Use the same expenditure now planned for draught tolerant plants only without an installed irrigation system.	\$106k	\$542k
6.	Idea No. 094. The current design shows a height of the CMU wainscot at 17-feet +/- . The CR&VE Team suggests that this could be reduced to 8 or 9 feet.	\$29k	\$29k
7.	IDEA NO. 086. DIV 7 Suggest the specified roofing underlayment (Grace Ice & water Shield), be reduced to valleys, penetrations, eaves and use less costly high performance underlayment for field.	\$32k	\$32k
8.	Idea No. 084. Delete Metal Roofing and Substitute Membrane Roofing with Ribs.	\$465k	\$465k
9.	IDEA NO. 024. Delete the specified sunshades and light shelves from the North and East Elevations.	\$85k	\$85k
10.	IDEA NO. 32. Construct Pre-engineered Covered Play shed (1 and 2) Structures.	\$230k	\$230k



TABLE 6—VALUE ENGINEERING PROPOSALS			
PROPOSAL No.	BRAINSTORMING IDEA NUMBER/DESCRIPTION	POTENTIAL SAVINGS (\$ 1,000's) ⁽¹⁾	
		CAPITAL	LIFE- CYCLE ⁽²⁾
DNP- 1	IDEA No. 019. Sheet A1.6 - Less expensive materials and/or methods could be used for the sound walls in lieu of plant pre-cast concrete.	DEVELOPED BUT NOT PROPOSED	
⁽¹⁾ It is not possible to summarize all of the proposals for a maximum amount of savings, since some of the proposals are mutually exclusive. However, some of the proposals can be accepted and combined to achieve greater savings than possible with any individual proposal.			
⁽²⁾ Life-cycle costs are based on 20 years with a 5 percent present worth factor. Life-cycle costs are calculated for the proposals where it is possible to calculate a life-cycle cost difference. If there is no life-cycle cost savings, the capital cost savings are shown.			

*Report for a Constructability Review
& a Value Engineering Study
For the Issaquah School District*



ISSAQUAH
SCHOOL DISTRICT 411

For Elementary School No. 15

Value Engineering Proposals

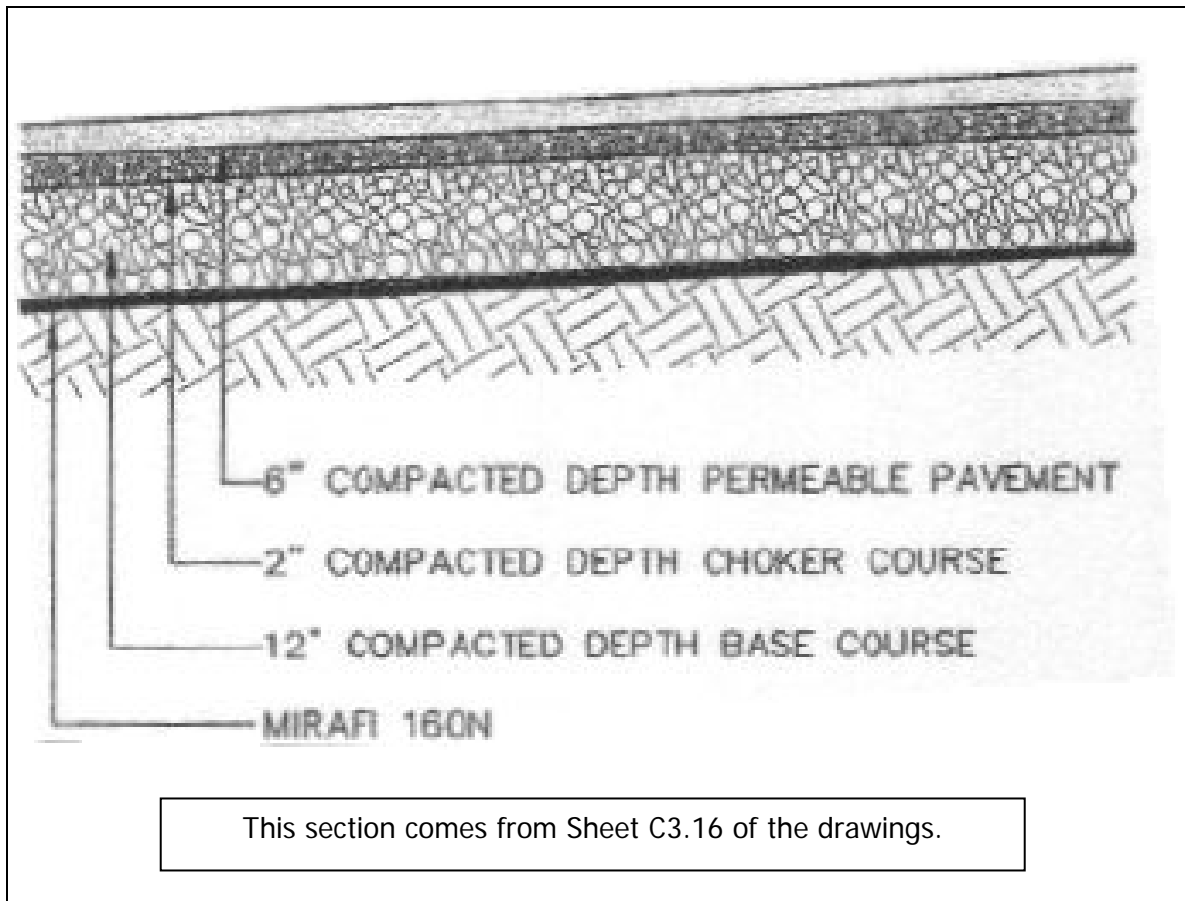
VE PROPOSAL No. 1: IDEA No. 13 Consider the use of conventional asphalt paving and eliminating the permeable paving section since all of the existing storm water is being injected into the ground on-site.

ADVANTAGES	DISADVANTAGES
1. Saves money	Increases sediment load in storm runoff
2. Reduces excavation	
3. Shortens construction duration	
4. May have a longer life expectancy.	

Description of Design Element Selected for Study

The current design specifies placement of a pervious asphalt mat on the surface of the play area behind the school building.

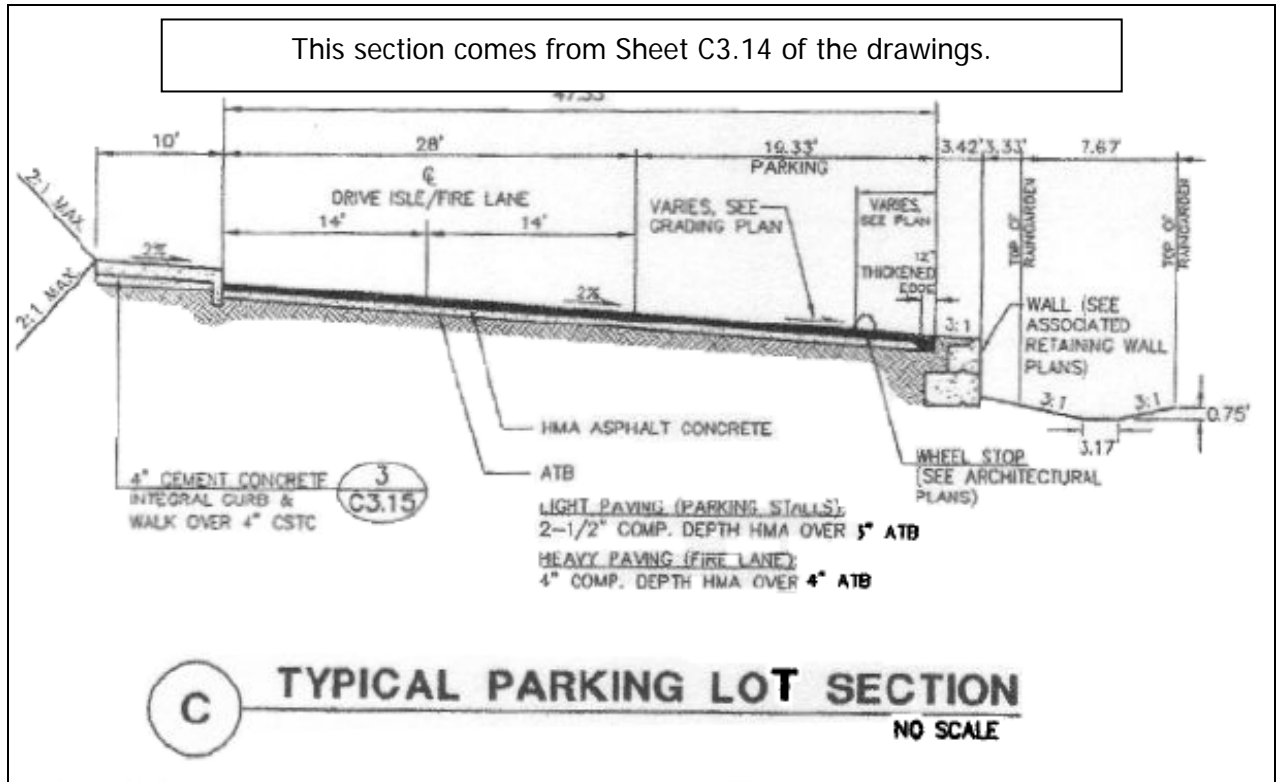
Sketch of Design Element Selected for Study



Description of VE Proposal Element Selected for Study

This proposal suggests replacement of the pervious asphalt mat on with conventional asphalt concrete. For analysis of the proposal, the pavement cross section selected is the same section proposed in the contract documents for the parking area in front of the school building. The area selected for this VE Proposal is shown on Sheet 3.01, which is not included in this report.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Pervious paving	SF	\$ 3.50	50,623	\$ 177,181	0	\$ 0
ACP	SF	\$ 2.00	0	\$ 0	50,623	\$ 101,246
Excavation	CY	\$10.00	3,125	\$ 31,249	1,172	\$ 11,718
Subtotal of Concepts with Designer's Unit Costs				\$ 208,429		\$ 112,964
Overhead & Profit		4.50%		\$ 9,379		\$ 5,083
TOTALS				\$ 217,809		\$ 118,048
TOTALS (Rounded)				\$ 218,000		\$ 118,000
NET SAVINGS						\$ 100,000

Life Cycle Cost Calculations

No life cycle cost calculations were made, but the life expectancy for the permeable asphalt pavement may be less than conventional asphalt pavement.

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a cost savings of \$ 100,000.



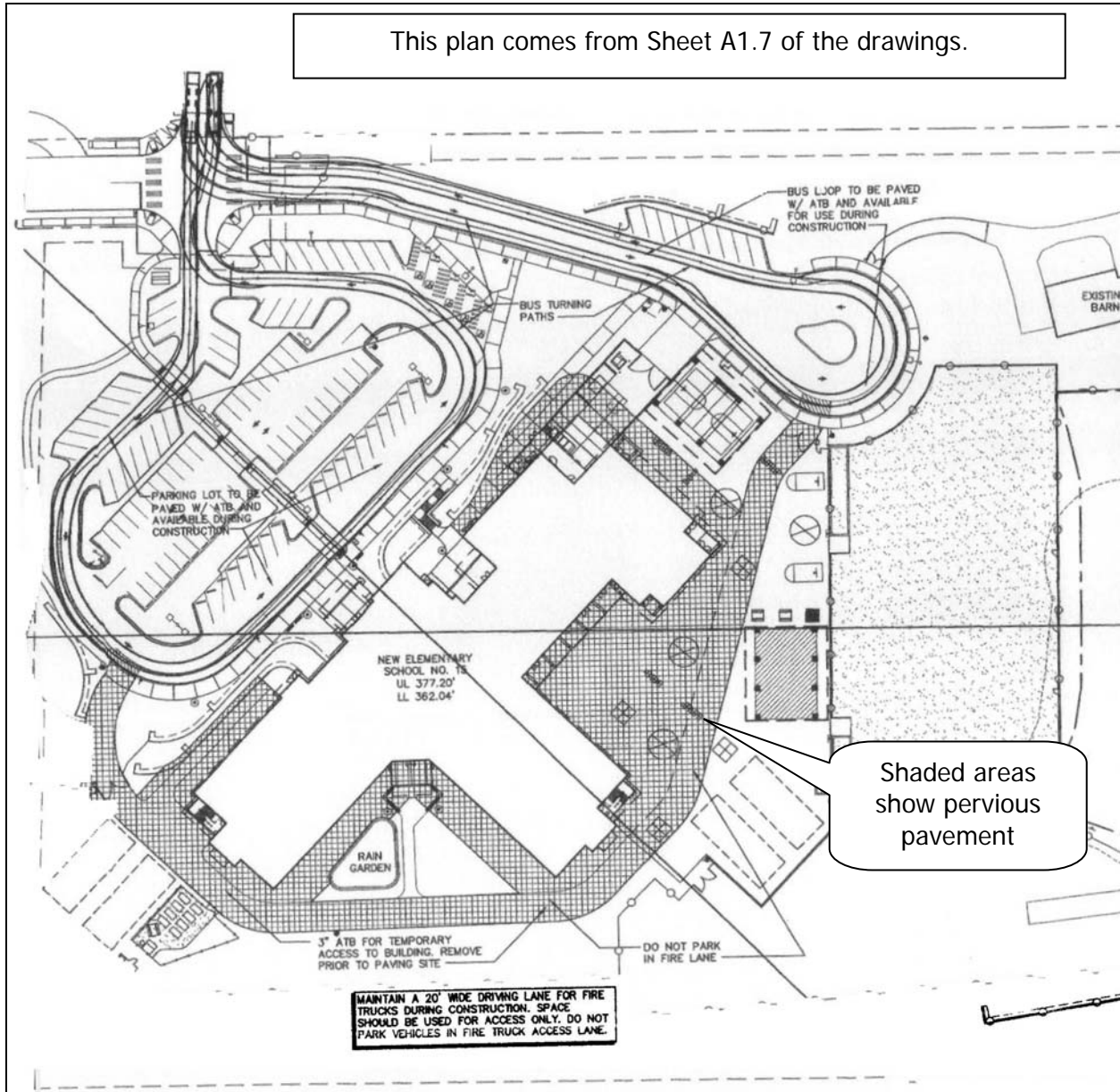
VE PROPOSAL No. 2: Idea No. 70 Delete the temporary ATB pavement

ADVANTAGES	DISADVANTAGES
1. Saves money.	1. May impair construction access
2. Reduces work required for site development.	2. Increases sediment in storm runoff during construction.
3. Conserves resources.	
4. Shifts the responsibility for means and methods to the contractor.	

Description of Design Element Selected for Study

The design element selected for study is the temporary asphalt concrete mat specified in the design documents.

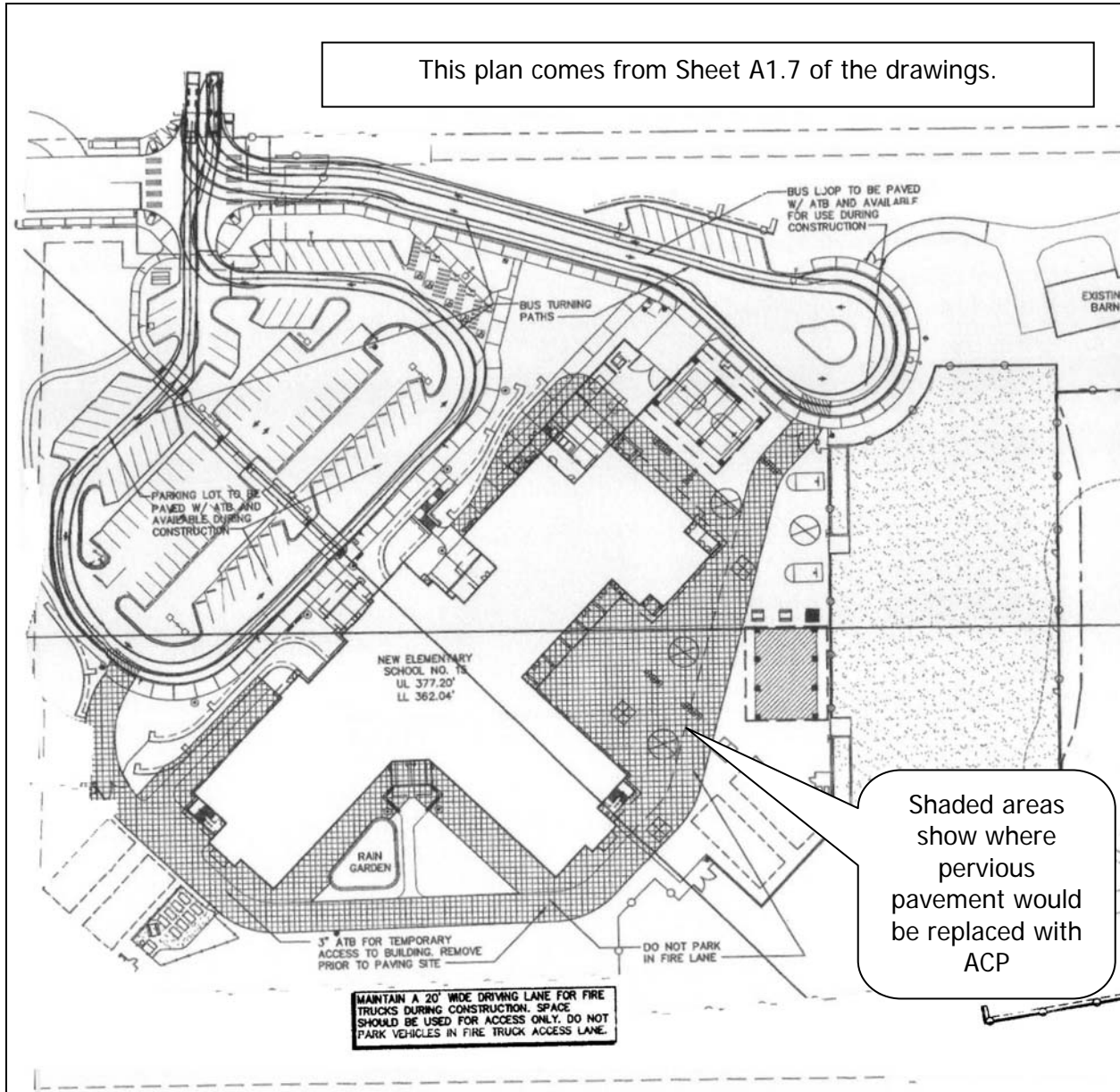
Sketch of Design Element Selected for Study



Description of VE Proposal Element Selected for Study

This proposal suggests replacement of the pervious asphalt mat on with conventional asphalt concrete. For analysis of the proposal, the pavement cross section selected is the same section proposed in the contract documents for the parking area in front of the school building. The area selected for this VE Proposal is shown on Sheet 3.01, which is not included in this report.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
AC Paving	SF	\$ 2.00	45,800	\$ 91,600	0	\$ 0
Subtotal of Concepts with Designer's Unit Costs				\$ 91,600		\$ 0
Overhead & Profit		4.50%		\$ 4,122		\$ 0
TOTALS				\$ 95,722		\$ 0
TOTALS (Rounded)				\$ 96,000		\$ 0
NET SAVINGS						\$ 96,000

Life Cycle Cost Calculations

There are no additional cost calculations for this proposal..

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a cost savings of \$ 96,000.



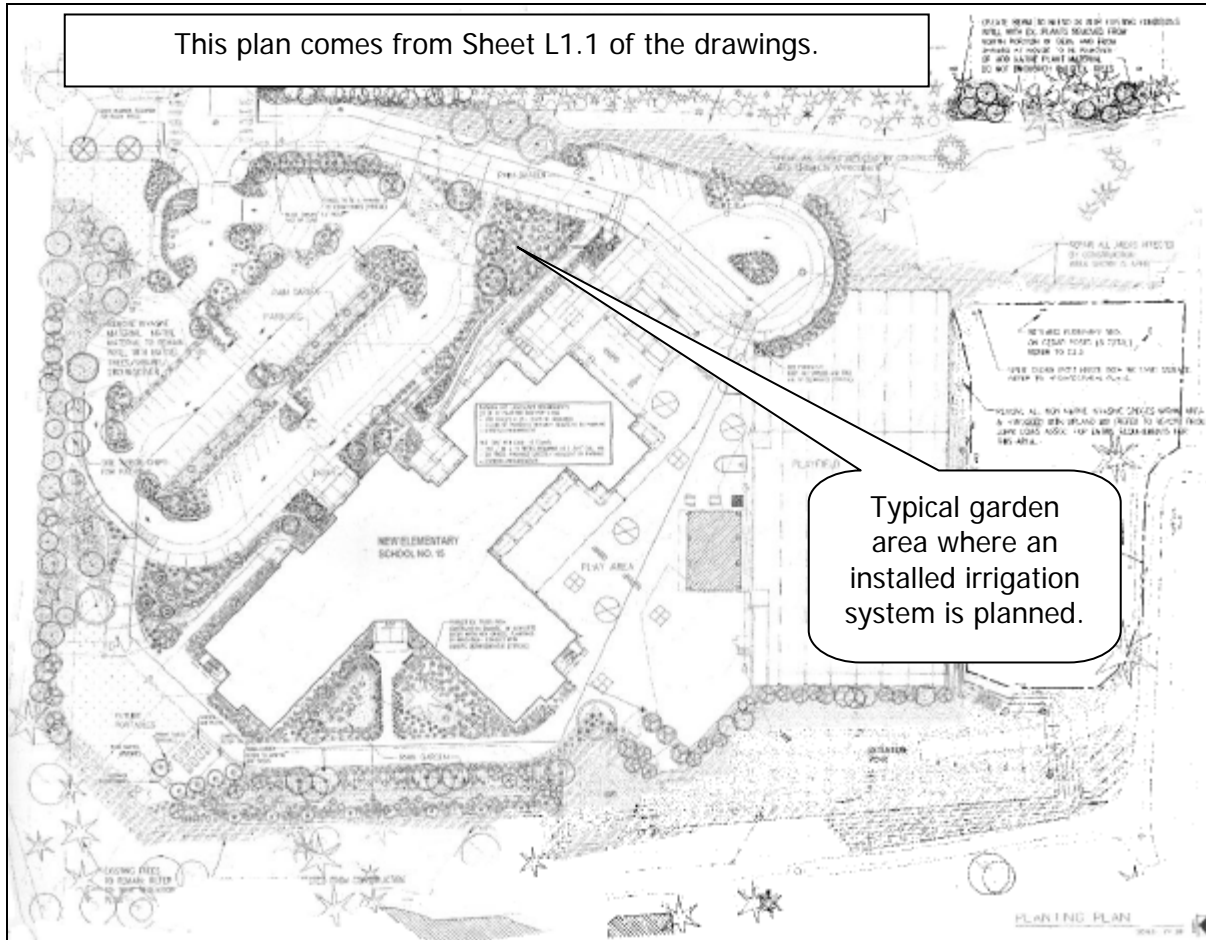
VE PROPOSAL NO. 3: IDEA NO. 14 - Consider using drought resistant plantings without irrigation in the garden areas in order to reduce irrigation system to a temporary "two year" starter system and only permanently irrigate the lawn areas.

ADVANTAGES	DISADVANTAGES
1. Saves money.	1. May be viewed by some people as less desirable.
2. Reduces the amount of work necessary to be completed as part of the construction contract.	2. Varies from past District practice.
3. May increase the amount of plantings that are sustained during the plant acclimation to the site.	

Description of Design Element Selected for Study

The design now shows a permanent irrigation system that is planned for the garden areas of the site. This is a typical design for many facilities.

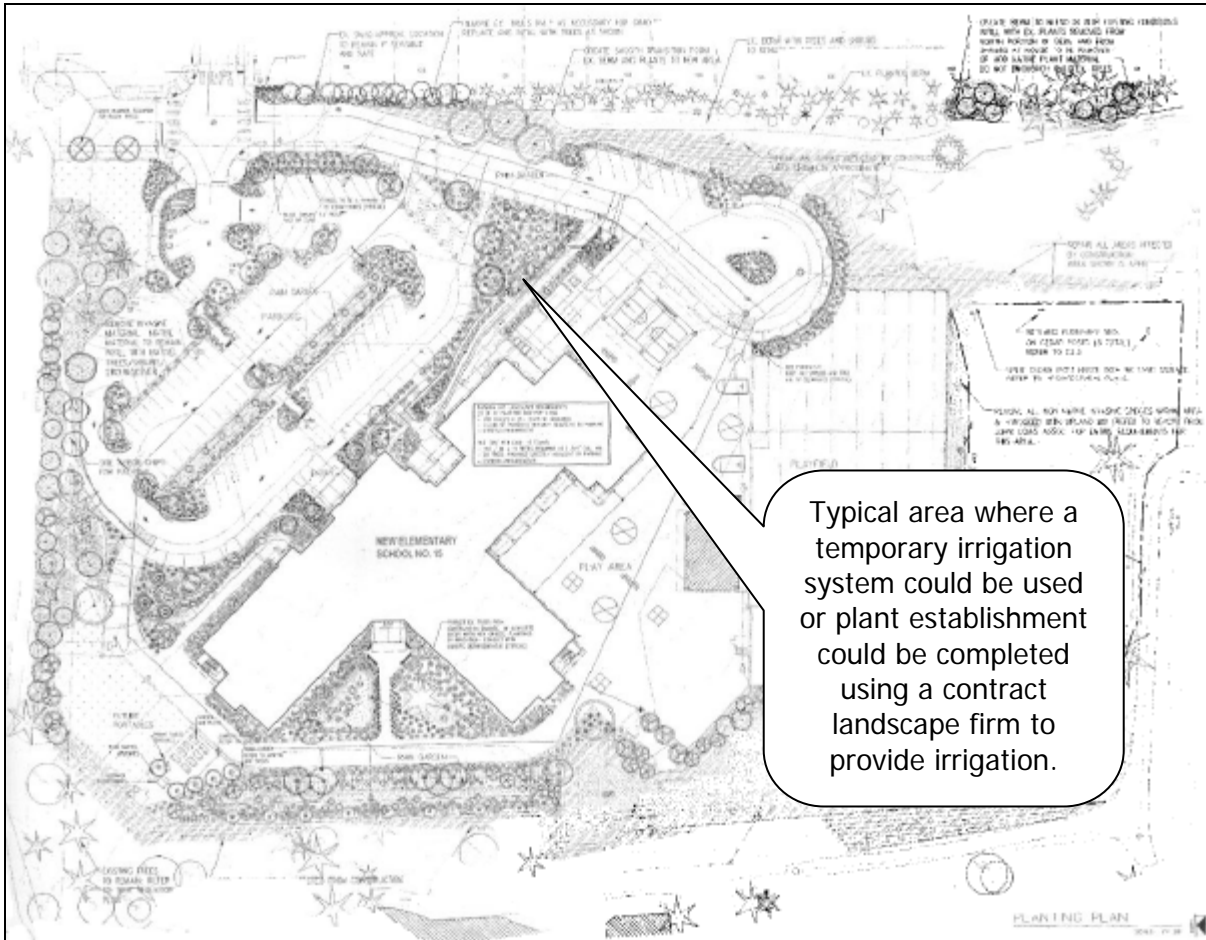
Sketch of Design Element Selected for Study



Description of VE Proposal Element Selected for Study

The design element selected for study is the permanent irrigation system that is planned for the garden areas of the site. Some owners have found that the use of drought tolerant plantings with a irrigation system that is planned only for temporary use can provide a more desirable outcome after the two year plant establishment period with less capital cost. There should be no increase in the operations and maintenance cost for this proposal. The plant establishment period can have irrigation supplied by a temporary irrigation system installed in the garden areas or by the use of a "contract maintenance" landscaper. The City of Bothell uses a contract landscaper to establish plantings. That landscaper uses a water truck to supply irrigation water to the plants on a regular. Then there is no temporary irrigation system at the end of the two year period to remove.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.

Capital Cost Estimate

The cost for a contract landscaper to provide irrigation services for two years is included in the capital cost shown below.

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Irrigation System	LS	\$ 101,650	1	\$ 101,650	0	\$ 0
Trees	LS	\$ 34,300	1	\$ 34,300	0.50	\$ 17,150
Shrubs	LS	\$ 52,452	1	\$ 52,452	0.50	\$ 26,226



Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Two Yr. Contract Services	Yr.	\$ 36,000	0	\$ 0	2	\$ 72,000
Subtotal of Concepts with Designer's Unit Costs				\$ 188,402		\$ 115,376
Overhead & Profit		4.50%		\$ 8,478		\$ 5,192
TOTALS				\$ 196,880		\$ 120,568
TOTALS (Rounded)				\$ 197,000		\$ 121,000
NET SAVINGS						\$ 76,000

Life Cycle Cost Calculations

The replacement costs are calculated based on the idea that 20% of the plantings would be replaced within the first 5 years.

INITIAL COSTS

BASE COST

TOTAL INITIAL COSTS

	Original Concept	VE Concept
	\$ 197,000	\$ 121,000
	\$ 197,000	\$ 121,000

FUTURE REPLACEMENT COSTS

20 Year Period

YEAR 5 = \$18,000 x .784

PRESENT WORTH OF FUTURE REPLACEMENT COST

YEAR 5 @ = \$9,000 x .784

\$ 14,000	
	\$ 7,000

SALVAGE VALUE

PRESENT WORTH OF SALVAGE VALUE

TOTAL (PRESENT WORTHS--SALVAGE VALUE)

\$ 0	\$ 0
\$ 0	\$ 0

ANNUAL COSTS

(a) MAINTENANCE = \$70,000 X 12.462 (round)

(a) MAINTENANCE = \$35,000 X 12.462 (round)

PRESENT WORTH OF ANNUAL COSTS

TOTAL PRESENT WORTH (ANNUAL+FUTURE+INITIAL)

SAVINGS (ORIGINAL- ALTERNATIVE)

\$ 872,000	
	\$ 436,000
\$ 872,000	\$ 436,000
\$ 1,069,000	\$ 557,000
	\$ 512,000

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a cost savings of \$ 76,000 and a life-cycle cost savings of \$512,000.



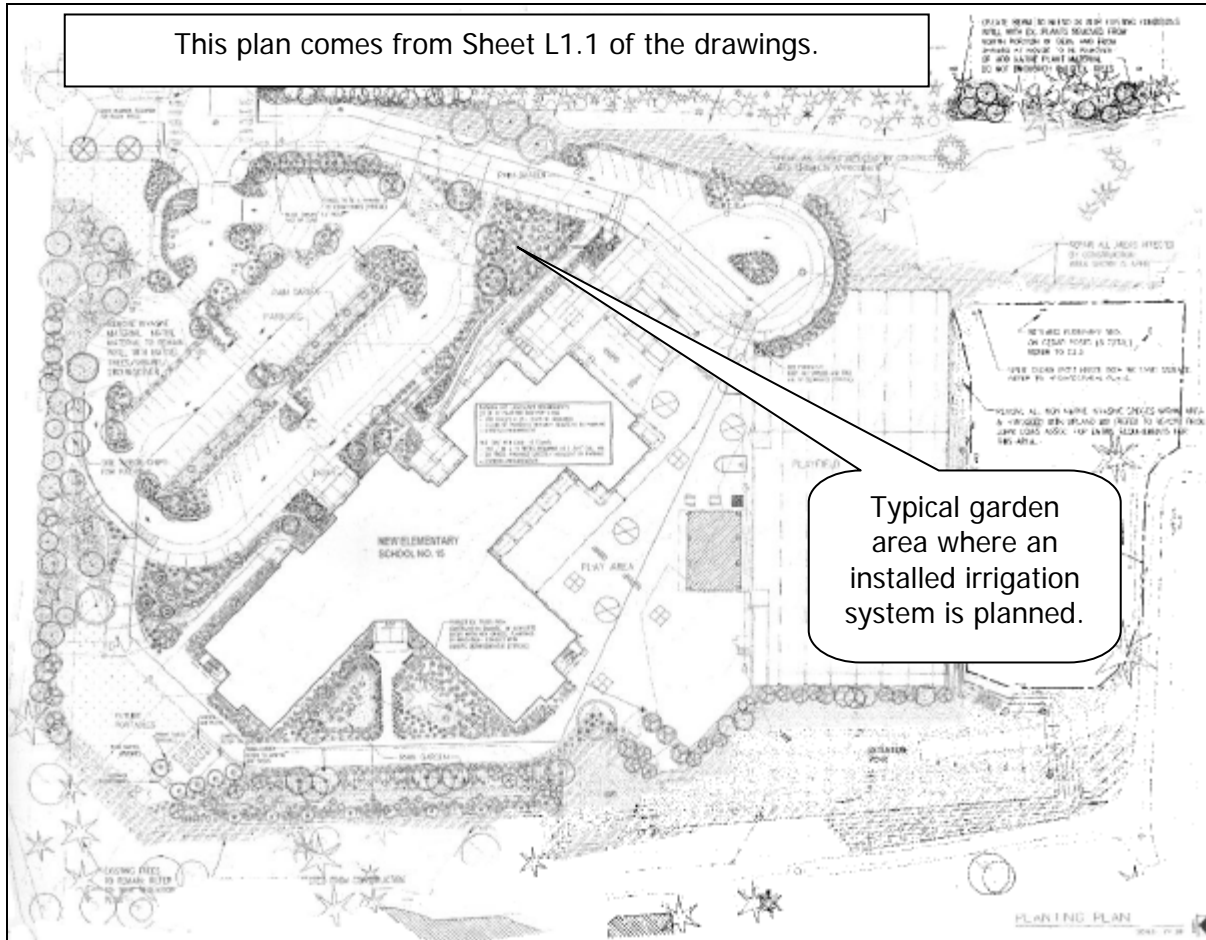
VE PROPOSAL NO. 4: IDEA NO. 73 - Redesign the shrub beds to utilize draught tolerant plants without an installed irrigation system.

ADVANTAGES	DISADVANTAGES
1. Saves money.	1. May be viewed by some people as less desirable.
2. Reduces the amount of work necessary to be completed as part of the construction contract.	2. Varies from past District practice.
3. May increase the amount of plantings that are sustained during the plant acclimation to the site.	3. Reduces the amount of plants initially at the time of construction.

Description of Design Element Selected for Study

The design now shows a permanent irrigation system that is planned for the garden areas of the site. This is a typical design for many facilities.

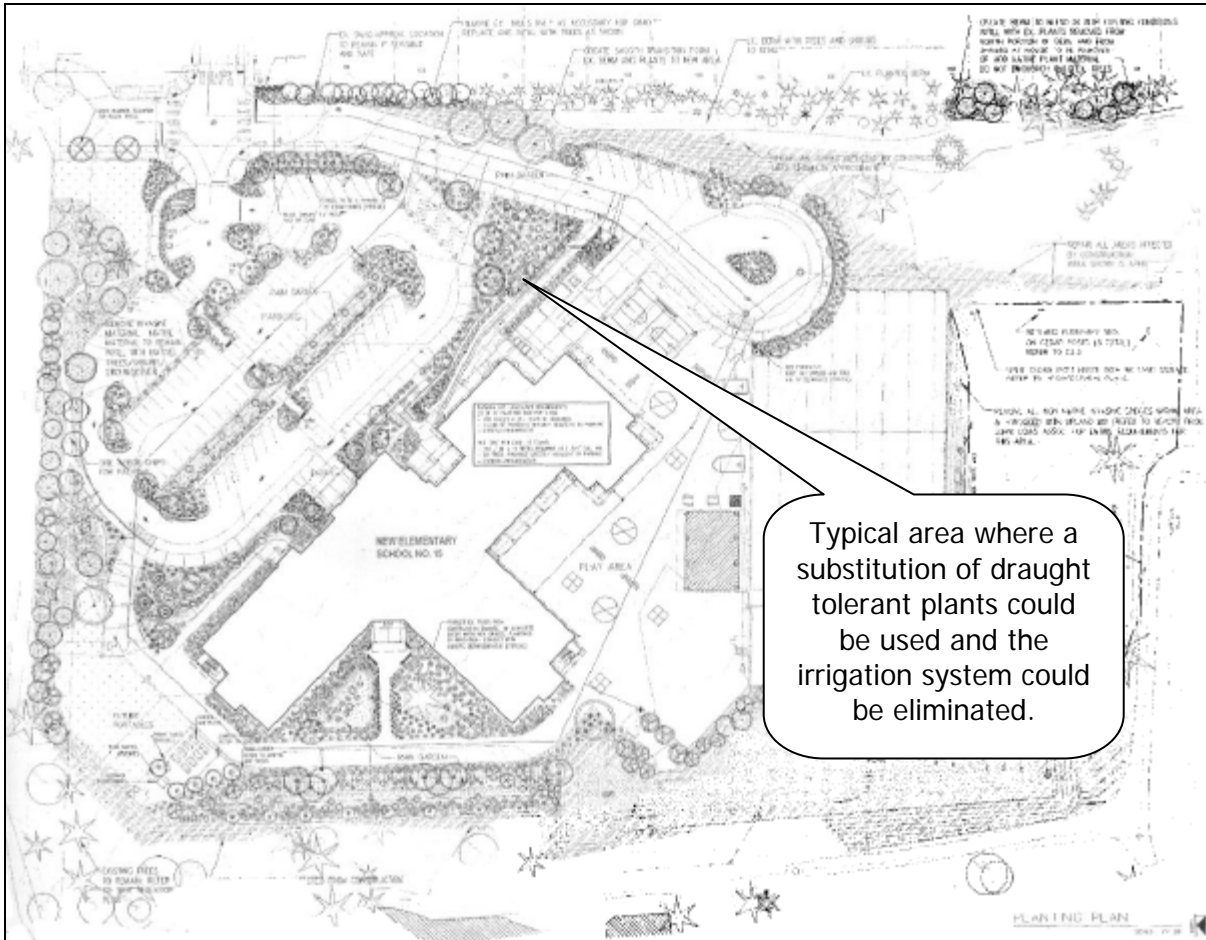
Sketch of Design Element Selected for Study



Description of VE Proposal Element Selected for Study

The design element selected for study is the permanent irrigation system that is planned for the garden areas of the site. Some owners have found that the use of drought tolerant plantings can provide an acceptable solution that also shows the community a consideration for conservation of resources with regard to the amount of plantings and the requisite maintenance associated with a conventional irrigation system. This proposal is similar to VE Proposal No. 3, but it totally eliminates the irrigation and reduces the amount of plantings. Maintenance costs have been maintained at the same amount as VE Proposal No. 3, and there may be an opportunity for greater life-cycle savings.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.

Capital Cost Estimate

The cost for a contract landscaper to provide irrigation services for two years is included in the capital cost shown below.

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Irrigation System	LS	\$ 101,650	1	\$ 101,650	0	\$ 0
Trees	LS	\$ 34,300	1	\$ 34,300	0.50	\$ 17,150
Shrubs	LS	\$ 52,452	1	\$ 52,452	0.50	\$ 26,226



Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Subtotal of Concepts with Designer's Unit Costs				\$ 188,402		\$ 43,376
Overhead & Profit		4.50%		\$ 8,478		\$ 1,952
TOTALS				\$ 196,880		\$ 45,328
TOTALS (Rounded)				\$ 197,000		\$ 45,000
NET SAVINGS						\$ 152,000

Life Cycle Cost Calculations

The replacement costs are calculated based on the idea that 20% of the plantings would be replaced within the first 5 years.

			Original Concept	VE Concept
INITIAL COSTS				
BASE COST			\$ 197,000	\$ 45,000
TOTAL INITIAL COSTS			\$ 197,000	\$ 45,000
FUTURE REPLACEMENT COSTS			\$ 45,000	
YEAR	5	20 Year Period	\$ 14,000	
PRESENT WORTH OF FUTURE REPLACEMENT COST				
YEAR	5	@		\$ 7,000
SALVAGE VALUE				
PRESENT WORTH OF SALVAGE VALUE			\$ 0	\$ 0
TOTAL (PRESENT WORTHS--SALVAGE VALUE)			\$ 0	\$ 0
ANNUAL COSTS				
(a) MAINTENANCE		= \$70,000 X 12.462 (round)	\$ 872,000	
(a) MAINTENANCE		= \$35,000 X 12.462 (round)		\$ 436,000
PRESENT WORTH OF ANNUAL COSTS			\$ 872,000	\$ 436,000
TOTAL PRESENT WORTH (ANNUAL+ FUTURE+ INITIAL)			\$ 1,069,000	\$ 481,000
SAVINGS (ORIGINAL- ALTERNATIVE)				\$ 588,000

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a cost savings of \$ 152,000 and a life-cycle cost savings of \$588,000.



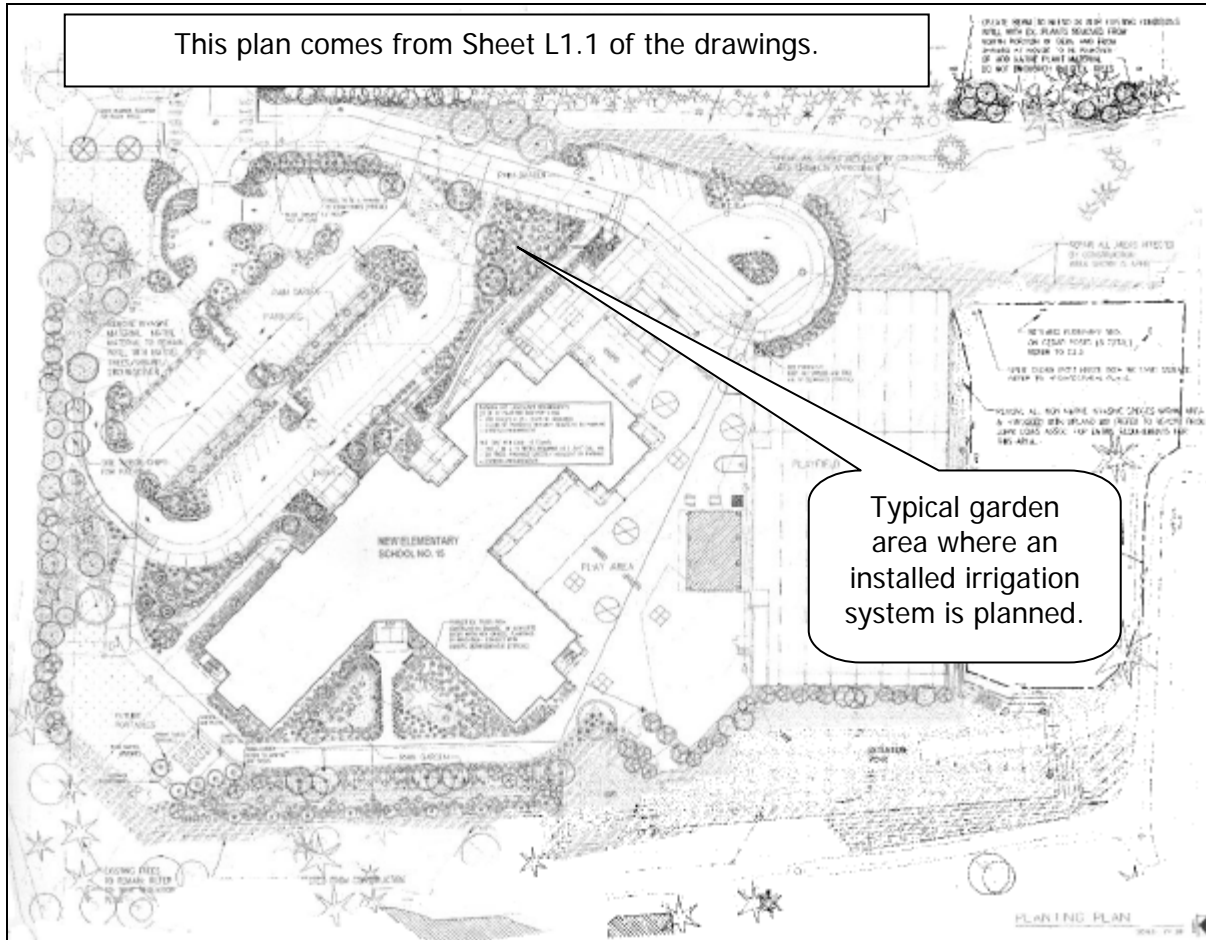
VE PROPOSAL No. 5: IDEA No. 74 - Use the same expenditure now planned for draught tolerant plants only without an installed irrigation system.

ADVANTAGES	DISADVANTAGES
1. Saves money.	1. May be viewed by some people as less desirable.
2. Reduces the amount of work necessary to be completed as part of the construction contract.	2. Varies from past District practice.
3. May increase the amount of plantings that are sustained during the plant acclimation to the site.	
4. Retains a very complete system of plants for the landscaping.	

Description of Design Element Selected for Study

The design now shows a permanent irrigation system that is planned for the garden areas of the site. This is a typical design for many facilities.

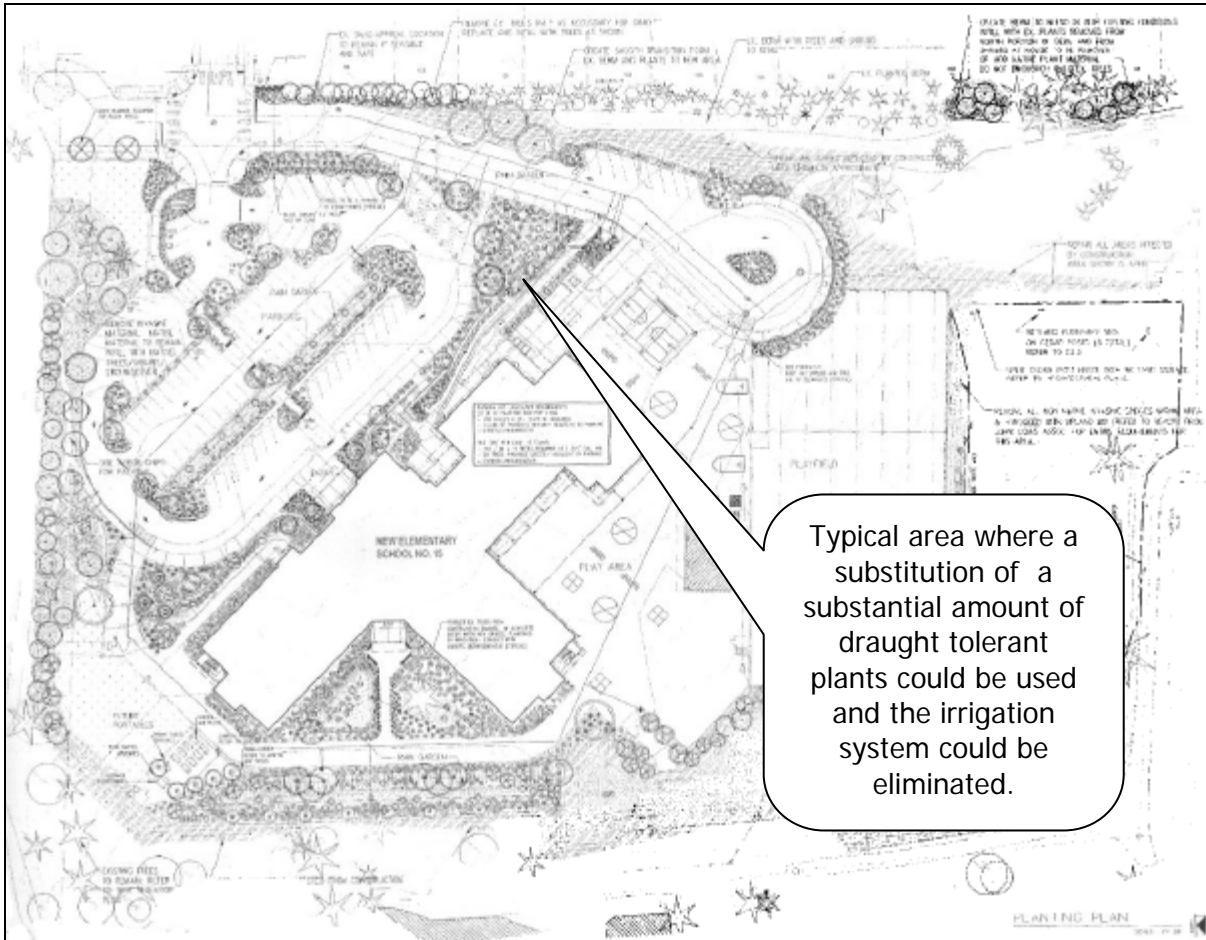
Sketch of Design Element Selected for Study



Description of VE Proposal Element Selected for Study

The design element selected for study is the permanent irrigation system that is planned for the garden areas of the site. Some owners have found that the use of drought tolerant plantings can provide an acceptable solution that also shows the community a consideration for conservation of resources with regard to the amount of plantings and the requisite maintenance associated with a conventional irrigation system. This proposal is similar to VE Proposal No. 4, but it totally eliminates the irrigation while maintaining the original expenditure for the amount of plantings. Maintenance costs have been maintained at the same amount as VE Proposal No. 3, and there may be an opportunity for greater life-cycle savings.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.

Capital Cost Estimate

There is no cost for a contract landscaper to provide irrigation services for two years is included in the capital cost shown below.



Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Irrigation System	LS	\$ 101,650	1	\$ 101,650	0	\$ 0
Subtotal of Concepts with Designer's Unit Costs				\$ 101,650		\$ 0
Overhead & Profit		4.50%		\$ 4,574		\$ 0
TOTALS				\$ 106,224		\$ 0
TOTALS (Rounded)				\$ 106,000		\$ 0
NET SAVINGS						\$ 106,000

Life Cycle Cost Calculations

The replacement costs are calculated based on the idea that 20% of the plantings would be replaced within the first 5 years. Therefore there is no savings in the future replacement costs as shown in VE Proposal No. 4.

	Original Concept	VE Concept
INITIAL COSTS		
BASE COST	\$ 106,000	\$ 0
TOTAL INITIAL COSTS	\$ 106,000	\$ 0
ANNUAL COSTS		
(a) MAINTENANCE = \$70,000 X 12.462 (round)	\$ 872,000	
(a) MAINTENANCE = \$35,000 X 12.462 (round)		\$ 436,000
PRESENT WORTH OF ANNUAL COSTS	\$ 872,000	\$ 436,000
TOTAL PRESENT WORTH (ANNUAL+ FUTURE+ INITIAL)	\$ 978,000	\$ 436,000
SAVINGS (ORIGINAL- ALTERNATIVE)		\$ 542,000

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a cost savings of \$ 106,000 and a life-cycle cost savings of \$542,000.



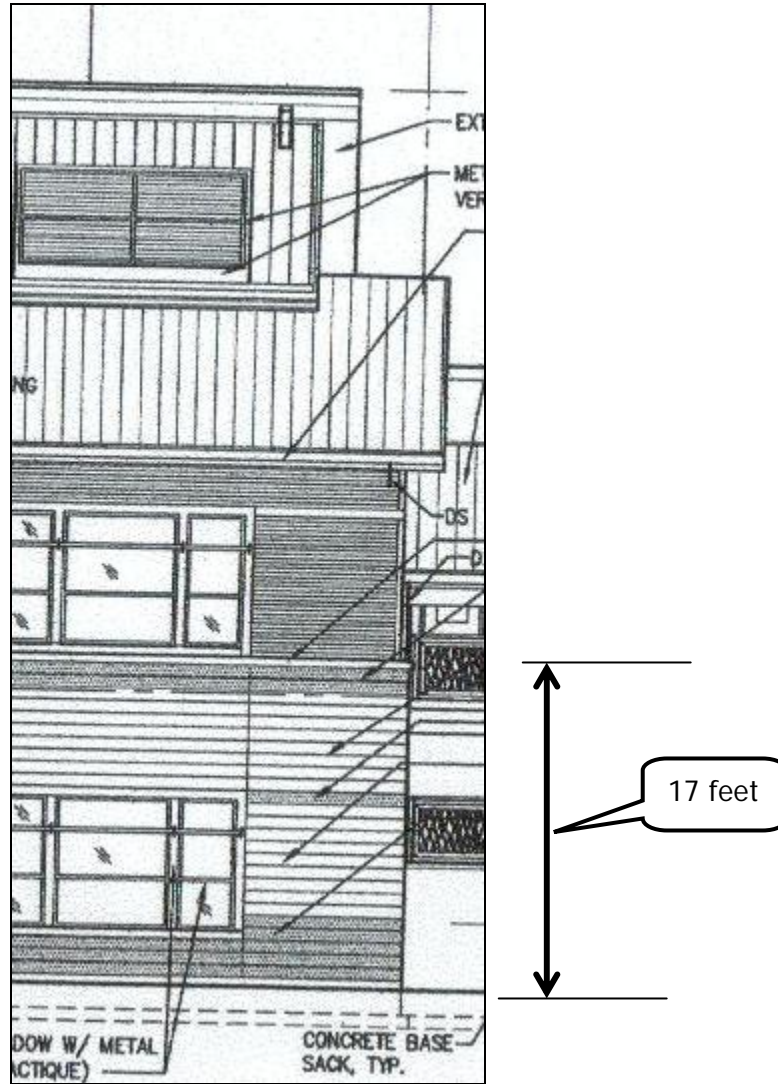
VE PROPOSAL No. 6: IDEA No. 94 – The current design shows a height of the CMU wainscot at 17-feet +/- . The CR&VE Team suggests that this could be reduced to 8 or 9 feet.

ADVANTAGES	DISADVANTAGES
1. Saves a modest amount of money.	May be viewed by some people as a less desirable line of demarcation along the outside.
2. Shows a lower termination of the CMU wainscot.	

Description of Design Element Selected for Study

The design now shows a change in the exterior façade at about 17 feet where the CMU wainscot transitions to the metal siding that is located above the CMU.

Sketch of Design Element Selected for Study

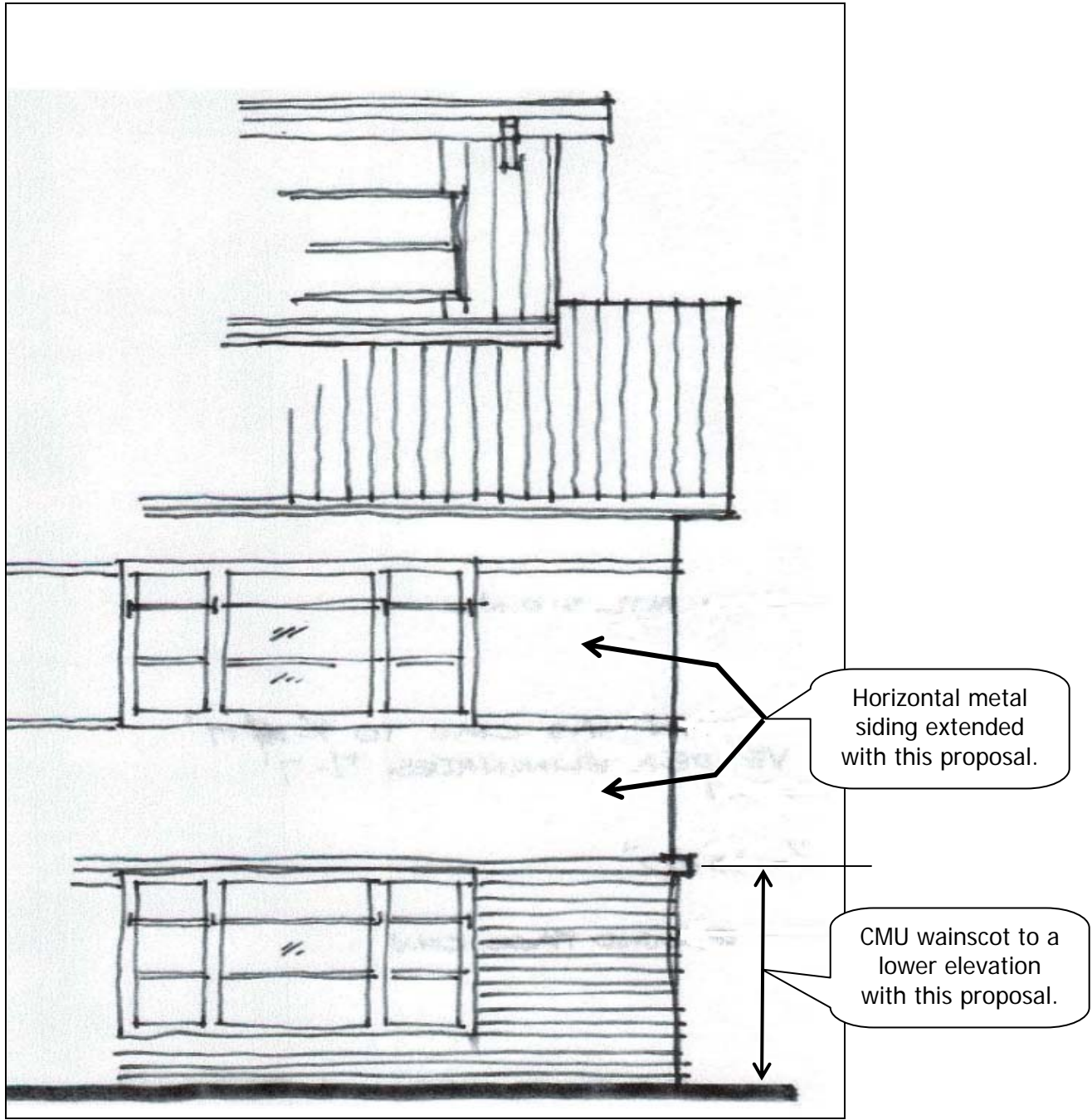


This Partial East Elevation comes from Sheet A3.1 of the drawings, view No. 1.

Description of VE Proposal Element Selected for Study

This proposal by the CR&VE Team suggests that the CMU wainscot could be used to an elevation of about 8 or 9 feet instead of the 17 feet in the current concept. This would extend the metal siding that currently begins about the 17 foot level down to the 8 or 9 foot level. There is a modest savings in capital cost by implementing this proposal.

Sketch of VE Proposal Element Selected for Study



Calculations

The only calculations for this proposal are for the cost estimate, which is shown below.



Capital Cost Estimate

There is no cost for a contract landscaper to provide irrigation services for two years is included in the capital cost shown below.

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
CMU Wainscot	SF	\$ 15	8,609	\$ 129,135	4,051	\$ 60,769
Metal Siding to replace CMU Wainscot	SF	\$ 9			4,558	\$ 41,019
Subtotal of Concepts with Designer's Unit Costs				\$ 129,135		\$ 60,769
Overhead & Profit		4.50%		\$ 5,811		\$ 4,580
TOTALS				\$ 134,946		\$ 106,369
TOTALS (Rounded)				\$ 135,000		\$ 106,000
NET SAVINGS						\$ 29,000

Life Cycle Cost Calculations

There are no life-cycle cost calculations for this proposal.

Conclusion

The VE team recommends that the Issaquah School District accept this proposal to realize a capital cost savings of \$ 29,000.



VE PROPOSAL NO. 7 IDEA No. 86. SUGGEST the specified roofing underlayment (Grace Ice & water Shield), be reduced to valleys, penetrations, eaves and use less costly high performance underlayment for field.

ADVANTAGES	DISADVANTAGES
Cost savings	1. Hybrid Underlayment System proposed will require additional attention to application – seams transitions etc.
	2. Additional details might be required for the implementation of this proposal.

Description of Design Element Selected for Study

Section 07410, Metal Roof and Metal Wall Siding covers the specifications for the current design.

Sketch of Design Element Selected for Study

Typical roof details are shown on drawing sheets A8.2-A8.5. Additional detailing might be required for implementation of the proposal.

Description of VE Proposal Element Selected for Study

Section 07410, Paragraph 2.06, Roof Panel Underlayment. The entire roof is specified to receive *Grace Ice and Water Shield*, 40 mil, self adhesive, polymerized asphalt underlayment or approved equal. No doubt, this is a great system that essentially provides a second roof and assurance to the owner that leaks will be avoided. Some cost savings is available if the self adhesive membrane underlayment is limited to “leak critical and ice dam potential areas”. The general field could be changed to a fully seamed mechanically attached underlayment product that will not diminish manufacturer’s or roofing company weatherization warranty.

Sketch of VE Proposal Element Selected for Study

Not included

Calculations

Not Provided

|



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Grace Ice and Water Shield Underlayment	SF	2	44,500	\$ 89,000	20,000	\$ 40,000
High Performance "Field" Underlayment Product	SF	.75	0	\$ 0	24,500	\$ 18,375
Subtotal of Concepts with Designer's Unit Costs				\$ 89,000		\$ 58,375
Overhead and Profit		4.50%		\$ 4,005		\$ 2,627
TOTALS				\$ 93,005		\$ 61,002
TOTALS (Rounded)				\$ 93,000		\$ 61,000
NET SAVINGS						\$ 32,000

Life Cycle Cost Calculations

None

Conclusion

Proposal uses high performance underlayment in field with specified self-adhered underlayment where problems with leaks or ice dams are likely to occur (valleys, penetrations, eaves). Hybrid system for underlayment maintains warranty and is acceptable professional practice. Note: Self Adhesive Underlayment should be specified as "High Temp". Slope of metal roofing is low (1.5/12 in many areas), VE team fails this item due to low slope conditions, need for second temporary roof during construction.



VE PROPOSAL NO. 8 IDEA NO. 84. Delete Metal Roofing and Substitute Membrane Roofing with
 Ribs.

ADVANTAGES	DISADVANTAGES
1. Cost savings	1. Some may consider this proposal less aesthetic
2. Weatherization – no metal joints	2. There may be less durability with this proposed concept.

Description of Design Element Selected for Study

Section 07410, Metal Roof and Metal Wall Siding.

Sketch of Design Element Selected for Study

Typical roof details are shown on drawing sheets A8.2-A8.5. These details are not shown in this report.

Description of VE Proposal Element Selected for Study

Section 07410, Paragraph 2.02, Metal Panel Products, B. Standing Seam Roofing Panels would require some modifications and additional sections might be required.

Sketch of VE Proposal Element Selected for Study

Not included

Calculations

Not Provided



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Specified Metal Roofing System	SF	\$ 20	44,500	\$ 890,000	0	\$ 0
Proposed Single-Ply Roofing System	SF	\$ 10			44,500	\$ 445,000
Subtotal of Concepts with Designer's Unit Costs				\$ 890,000		\$ 445,000
Overhead and Profit		4.50%		\$ 40,050		\$ 20,025
TOTALS				\$ 930,050		\$ 465,025
TOTALS (Rounded)				\$ 930,000		\$ 465,000
NET SAVINGS						\$ 465,000

Life Cycle Cost Calculations

None

Conclusion

The roofing is relatively low slope (1-1/2 / 12). Single-ply membrane roofing with heat welded seams would be a good weatherization choice. Metal standing seam roofing as specified with sealed seams is a good choice but by nature metal roofing with seams, flashings, sealants etc is subject to more potential leaks than single ply or other membrane type roofing. This is further exasperated with lower slopes. The designers have responded to this with a good choice of using the self-adhered underlayment – almost a “second roof” under the metal roof.

Metal is preferred aesthetically. However, single ply systems are available colored and with applied simulated standing seams. Suggested VE item has potential to achieve same weatherization result with reduced cost.



VE PROPOSAL No. 9 IDEA NO. 24. Delete the specified sunshades and light shelves from the North and East Elevations.

ADVANTAGES	DISADVANTAGES
1. Cost savings	1. Aesthetics
2. Long-term maintenance	2. Sun control @ North and East Elevations
	3. Natural Light Bounce provided at N&E Elevation Spaces

Description of Design Element Selected for Study

Section 10705, Exterior Sun Control Devices.

Sketch of Design Element Selected for Study

Typical details are shown on drawing sheet A6.6. The details are not contained in this report.

Description of VE Proposal Element Selected for Study

Devices located at North and East Elevations (non-direct sun sides of building).

Sketch of VE Proposal Element Selected for Study

Not included

Calculations

Not Provided



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Sunshades	LS	\$ 85,000	1	\$ 85,000	.5	\$ 42,500
Light shelves	LS	\$ 40,000	1	\$ 40,000	.5	\$ 20,000
Installation	LS	\$ 39,000	1	\$ 39,000	.5	\$ 19,500
Subtotal of Concepts with Designer's Unit Costs				\$ 164,000		\$ 82,000
Overhead and Profit		4.50%		\$ 7,380		\$ 3,690
TOTALS				\$ 171,380		\$ 85,690
TOTALS (Rounded)				\$ 171,000		\$ 86,000
NET SAVINGS						\$ 85,000

Life Cycle Cost Calculations

None

Conclusion

Sunshades and light shelves located on east and north elevations (non-direct sun sides) of the building may be less effective and may be able to be eliminated.



VE PROPOSAL No. 10 IDEA NO. 32 Construct Pre-engineered Covered Playshed (1 and 2) Structures

ADVANTAGES	DISADVANTAGES
5. Cost savings	3. Aesthetics

Description of Design Element Selected for Study

Playshed Structures 1 and 2 as detailed on S7.2 and S8.1

Sketch of Design Element Selected for Study

See drawings referenced above.

Description of VE Proposal Element Selected for Study

Allow for contractor designed pre-engineered steel building with metal roof playshed structures.

Sketch of VE Proposal Element Selected for Study

Not included

Calculations

Not Provided



Capital Cost Estimate

Item	Unit of Meas.	Unit Cost	Original Concept		Proposed Concept	
			Quantity	Total	Quantity	Total
Play shed No. 1 with current concept	LS	\$ 175,000	1	\$ 175,000	0	\$ 0
Play shed No. 2 with current concept	LS	\$ 165,000	1	\$ 165,000	0	\$ 0
Play shed No. 1 with CR&VE Team concept	LS	\$ 60,000	0	\$ 0	1	\$ 60,000
Play shed No. 2 with CR&VE Team concept	LS	\$ 60,000	0	\$ 0	1	\$ 60,000
Subtotal of Concepts with Designer's Unit Costs				\$ 340,000		\$ 120,000
Overhead and Profit		4.50%		\$ 15,300		\$ 5,400
TOTALS				\$ 355,300		\$ 125,400
TOTALS (Rounded)				\$ 355,000		\$ 125,000
NET SAVINGS						\$ 230,000

Life Cycle Cost Calculations

None

Conclusion

The play shed structures are approximately 800 square feet in size. From the cost estimate provided, these structures are estimated to cost over \$200 / SF. This is exclusive of the concrete slab, partial CMU walls and soft play surfacing. Allowing the contractor to provide a pre-engineered steel structure(s) with metal roofing could result in cost savings. The metal roofing is not as critical as the school building roof as it is not covering conditioned space. A less expensive metal roofing system could be color matched to the building roofing. The truss elements are custom designed to match the building elements – this feature would be lost and would not be as aesthetically pleasing.

*Report for a Constructability Review
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For the Issaquah School District*



ISSAQUAH
SCHOOL DISTRICT 411

For Elementary School No. 15

Ideas Developed but not Proposed



Do NOT PROPOSE No. 1 IDEA No. 019. Sheet A1.6 - Less expensive materials and/or methods could be used for the sound walls in lieu of plant pre-cast concrete.

ADVANTAGES	DISADVANTAGES
1. Could save cost	Late in the design process to implement a significant change
2. May be able to be erected in less time.	

Description of Design Element Selected for Study

The design element selected for this study is the concrete retaining wall.

Sketch of Design Element Selected for Study

No sketch for this proposal.

Description of VE Proposal Element Selected for Study

The VE element selected for study is the current concept for a retaining wall on the property.

Sketch of VE Proposal Element Selected for Study

No sketch for this proposal.

Calculations

Investigation of using driven H piles with site cast planks inserted between them appears to be unsuitable due to the differential loading that the soil on one side of the wall provides. Therefore this concept is not proposed.

Capital Cost Estimate

Not done since this is not feasible.

Life Cycle Cost Calculations

Not done since this is not feasible.



Conclusion

The CR&VE Team does not propose this concept.

*Report for a Constructability Review
& a Value Engineering Study
For the Issaquah School District*



ISSAQUAH
SCHOOL DISTRICT 411

For Elementary School No. 15

Constructability Review



CONSTRUCTABILITY REVIEW

The notes presented herein are intended as a communication to the Owner and the Design Team from the CR&VE Team about ideas generated during the brainstorming that can be considered for potential improvements in constructability. The column on the right of this table is used to expand our thoughts beyond the initial idea developed during the Brainstorming portion of the workshop. It is recognized that some of the ideas listed here are already known to the Owner and Design Team and may be addressed in addenda or may be deemed not significant to implement. These comments are offered to you for your use as you see fit.

TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS		
No.	Brainstorming Idea Number/Description	Additional Commentary
1.	Idea No. 002. The directional orientation of the drawings varies between and within disciplines. North is found up, left, right, and skewed, which adds to confusion. Standardizing the orientation will help to minimize misunderstandings and mistakes.	It has been the experience of Members of the CR&VE Team that the potential for confusion in the field during construction can be greatly reduced if the drawings have a consistent orientation to the site with a minimum number of variations for the northerly direction.
2.	Idea No. 004. Specifications prohibit bidder's questions in the 10 days just prior to bid. The CR&VE Team believe that communications between the Design Team and the bidders should be encouraged. Let the design professional focus on proper response(s) without providing bidder advantage.	This can pose some difficulties in a bidding climate such as the one that exists now, since many contractors are simultaneously preparing bids for multiple projects. They seldom get into the details well in advance of the bid date. This can be true for the principal sub-contractors as well as the general contractor.
3.	Idea No. 005. The East part of the site exploration plan in the Geotechnical Report is missing.	All of the information should be included.
4.	Idea No. 006. DIV 1 Section 01110 Summary should indicate 'UIC' rather than 'UIB' wells.	This is a simple typographical error. You may have already found it.
5.	Idea No. 007. Is it realistic to indicate and expect NTP/start of construction only 2 weeks after bid with the requirement for Board approval, etc?	The CR&VE Team believes that this schedule may not be practical for the District due to the limited time available after the receipt of bids to check the submittals, and prepare a report for the Board.

TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS

No.	Brainstorming Idea Number/Description	Additional Commentary
6.	Idea No. 026. Sheet A5.2 - Could the insulation above the exterior walls in the truss spaces be draped with fastenings at top and bottom only in order to eliminate most or all of this extensive extra framing here and elsewhere?	This is a relatively minor item, but it might be a savings for the contractor for the installation of the insulation.
7.	Idea No. 027. Sheet A5.3 - Could the exposed exterior steel I beams be just painted or covered with a less expensive material/method than CMU facing here and elsewhere? Cracking potential is also a concern if CMU is used here. Are the expansion joints that are shown detailed?	The CR&VE Team suggests that the Design Team examine this idea for potential implementation.
8.	Idea No. 028. Sheet A5.3 - Backing/infill at steel beams could probably be done more economically with wood rather than metal studs here and elsewhere.	The CR&VE Team suggests that the Design Team examine this idea for potential implementation.
9.	Idea No. 033. Sheet A5.12 - What is the purpose of the insulation at mezzanine floors? In some places it is shown full thickness of joists and in others it is shown less than full thickness. The insulation is specified as 3 5/8 inch sound batts, but the drawing shows thicker insulation.	The CR&VE Team believes that this may be an error in the graphic presentation. It is our understanding that you desire to have 3 5/8 inch sound batts. Please check the graphics to see if they conform to the thickness indicated.
10.	Idea No. 035. Sheet A5.25 – Section 1 is labeled Interior but shows and exterior wall.	This is probably a typographical error.
11.	Idea No. 036. Sheet A5.28 – Section 4 shows the top of the wall at the elevation of '0'-0", which is incorrect.	This is probably a typographical error.
12.	Idea No. 037. Sheet A6.2 – The height for wainscot WF-2 through WF-4 are dimensioned, but the height for wainscot WF-1 is not shown clearly. The thickness for WF-1 medium density fiberboard is not specified in Section 06200.	Some additional coordination is required for the clarity and dimension for WF-1. You may also need to revise the specification Section 06200.



TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS

No.	Brainstorming Idea Number/Description	Additional Commentary
13.	Idea No. 041. Sheet S2.1 - Masonry screen wall footings are not shown the same as on Sheet A1.5. Section 17.	The CR&VE Team suggests that the differences between these two sections should be resolved.
14.	Idea No. 043. Sheet S2.2 – Some spread footing are so close together that they should be joined.	This is a matter of resolving what CAD produces versus what is practical in the field during construction.
15.	Idea No. 045. Sheet S2.4 – Wood should be held above the sidewalk, rather than in contact with this concrete.	This should be clarified on the drawing.
16.	Idea No. 047. Sheet C2.01 – Existing house is still on the site. Verify whether or not contractor is to remove or district will remove it.	There is some ambiguity about who is responsible for the removal of the house.
17.	Idea No. 049. Sheet C2.02 – Contractor should not be told where to locate the stockpile.	The CR&VE Team suggests that the location of the stockpile should be left to the contractor.
18.	Idea No. 050. Sheets C3.05, C4.04 through C4.08 – These sheets should be labelled clearly as off-site work.	The clear marking of the drawings to correspond with the bid item would be beneficial. This corresponds with Idea No. 024.
19.	Idea No. 056. Sheet M1.3 – Shows the chiller schedule as an alternate bid and this is not shown in the bid form as an alternate.	The CR&VE Team suggests that the differences between the drawing and the bid form should be resolved.
20.	Idea No. 059. DIV 0/1 Special Conditions Section 00800 does not exist.	Remove the reference or include Section 00800 in the Project Manual.
21.	Idea No. 060. DIV 0/1 Schedule in Section 01100 SUMMARY WORK—It is not possible to get a May 15 NTP date. Drop interim milestone schedule and let the general contractor control the schedule. The phasing language is not consistent, not tied to the drawings or written scope and not clearly defined.	The CR&VE Team believes that the fixed date stated is not guaranteed and should not be shown in this manner.

TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS

No.	Brainstorming Idea Number/Description	Additional Commentary
22.	Idea No. 063. DIV 0 Section 00410 Form of Proposal Part 2 of 2 requires general contractor to list base bid subcontractors and alternate subcontractors. The phrase “Add name of subcontractor here if they will become low bidder based on acceptance of an alternate”. The format and the amount of space provided for the contractor to list the subcontractors for alternates is not sufficient and is unclear with regard to proper completion during the bid preparation.	The CR&VE Team suggests that the format of the list could be improved to reduce confusion. It might be beneficial to list categories for the “changed subcontractors” such as Mechanical and Electrical.
23.	Idea No. 064. DIV 1 Section 01100 Summary of Work. There is a risk in having the floors “by others” with regard to the preparation of the slab. This responsibility for the general contractor could result in a change order—Summary Work 01100.	Anytime that there is an interface where more than one responsible party has work to be done there is a potential for “blaming the other guy” when the finished state does not match expectations or specifications.
24.	Idea No. 065. DIV 00410-Part 2 – This proposal form should reference the following plans: C3.05, C4.04 through C4.08	The clear marking of the drawings to correspond with the bid item would be beneficial. This corresponds with Idea No. 018.
25.	Idea No. 077. DIV 3 Does the exterior concrete sealer specified include horizontal concrete? This is a conflict with Spec. 07190—which one applies? Where is the anti-graffiti 8'-0"-minus specified?	Clarification here would be beneficial.
26.	Idea No. 078. DIV 3 The anti-graffiti coating will likely change the color of the CMU which may cause a change order when the contractor want to extend the coating further up the wall.	No additional comment here.
27.	Idea No. 079. DIV 3 There is no reference for cold weather concreting per ACI in the project manual.	The appropriate ACI references should be added.



TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS

No.	Brainstorming Idea Number/Description	Additional Commentary
28.	Idea No. 081. DIV 6 Section 06100 says plywood should be used for roof/wall sheathing. The structural notes allow plywood or OSB for both applications. The CR&VE Team recommends plywood for the roof sheathing.	If plywood is preferred for the roof and the contractor is allowed to use either OSB or plywood for wall sheathing, then this specification should be clarified.
29.	Idea No. 082. DIV 7 Section 07555 requires a UL Class A roof system. However, Sheet A8.1 indicates that a Class C minimum is required by code. Potential to remove "Densdeck" and replace with an alternative more moisture resistant product.	This contradiction should be eliminated.
30.	Idea No. 083. DIV 7 Sheet A5.27 has only approximately 6 inches of flashing height to the window frame. This is problematic for snow leaks.	This may be a graphics problem and the actual dimension may be greater. The architect should check this matter.
31.	Idea No. 085. DIV 7 Require the manufacturer's representative to provide inspection of the roof before and after the installation.	The Members of the CR&VE Team have experience that shows great benefit from having an on-site visit by the manufacturer's representative prior to the installation.
32.	Idea No. 088. DIV 7 Add ice and snow rakes to keep ice and snow from sliding off the roof.	Ice and snow rakes should be added in any locations over doors where the slope of the roof could cause ice or snow to shed at the doors.
33.	Idea No. 092. DIV 7 Verify that the working height between the gymnasium and the cafeteria roof is adequate to install the roofing flashing.	This may be a graphics problem and the actual dimension may be greater. The architect should check this matter.



TABLE 7—CONSTRUCTABILITY REVIEW COMMENTS

No.	Brainstorming Idea Number/Description	Additional Commentary
34.	Idea No. 093. The CR&VE Team noted differences in heights of the overhang as shown on the following: Section 1 on Sheet A3.2 scales 5'-5" which is not code compliant; Detail 3 on Sheet 5.25 shows 7' height from the surface of the plaza deck; Section 3 on Sheet A4.2 shows a different dimension. This is inconsistent. What is the correct height?	These sections should be checked and the differences resolved.
35.	Idea No. 098. Section 01230 1.4 B Alternate No. A-2 Amplified Sound System refers to Section 13376 which is not included in the Project Manual.	No additional comment here.
36.	Idea No. 100. There are dimensions needed to locate the structures on this project.	No additional comment here.
37.	Idea No. 101. C3.03 Note 4 should reference C3.14 and not C3.13 for the acceptable pipe materials.	No additional comment here.
38.	Idea No. 102. A8.3 Detail 4 Flashing at Entry Canopy PSL outrigger beams end cap flashings should have drip edges to prevent rain water from running down the underside of the beam.	No additional comment here.
39.	Idea No. 105. Sheet C3.04 – UIC Wells 6, 7 and 8 and the outflow control structure need invert elevations.	No additional comment here.

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ISSAQUAH
SCHOOL DISTRICT 411

For Elementary School No. 15

Supplemental Material



The supplemental material contained in this report consists of the following:

- Notes
- Cost Estimate Commentary

NOTES

The notes presented herein are intended as a communication to the Owner and the Design Team from the CR&VE Team about ideas generated during the brainstorming that did not result in proposals. Notes are ideas are often developed naturally by the Design Team over the course of the completion of the design. Some of the Notes could also be in the Constructability Review Table. The intention here is purely to communicate the thoughts from the CR&VE Team for the benefit of the project, and not any criticism of the Design Team.

TABLE 8—NOTES		
Seq. #	Brainstorming Idea Number/Description	Additional Commentary
1.	Idea No. 008. Only use proprietary specs when absolutely necessary. It has been indicated for metal roofing and siding, modular retaining walls, vinyl wall coverings, and several other materials and systems. Costs will be higher where competition is restricted or eliminated altogether	The Members of the CR&VE Team encourage extensive use of performance specifications and the use of "approved equal" to secure more competitive bids.
2.	Idea No. 009. Some additional additive alternate bids could be used as a hedge in case of higher than expected bids including landscaping, vinyl wall covering (in part or in total) and some nonessential specialties or items readily purchased or contracted by the school district directly. More attention could be given to this by the CR&VE Team if it is desired.	Another aspect of this comment would be to include any additive alternates that are not now in the project, since the current bidding climate suggests that the District will be able to get all of their current items within the approved budget.
3.	Idea No. 011. Sheet AC3 - Studs are indicated to be at 12 or 16 inches on center throughout the drawings. Some walls in low impact areas could be at 24 inches on center.	No additional comment here.
4.	Idea No. 016. Sheet A1.1 - Should the notation for 'E. Access Drive' instead be 'W. Access Drive'?	No additional comment here.

TABLE 8—NOTES

Seq. #	Brainstorming Idea Number/Description	Additional Commentary
5.	Idea No. 017. Sheet A1.1 - If the existing barn is to be retained, it should be checked for structural stability and safe use. Otherwise, it could be a dangerous, attractive nuisance.	The existing structure on the site may have already been suitably visited and inspected by the Design Team.
6.	Idea No. 018. Sheet A1.1 - The bus loop appears to be tight. Is there available space to enlarge it somewhat without sacrificing other needs on site?	No additional comment here.
7.	Idea No. 022. Sheet A2.41 - The drawing numbering system could be confusing, for example with A2.41 coming before A2.6. Suggest using 2 decimal places for all numbers, for example A2.60 which would logically come after A2.41.	No additional comment here.
8.	Idea No. 025. Sheet A4.1 - Is the furred wall note to use '2x9 flat' correct?	The CR&VE Team believes that this note should say "2 x 4".
9.	Idea No. 034. A5.24 - A storefront system may be more cost effective than the hollow metal system shown.	No additional comment here.
10.	Idea No. 039. Sheet A8.1 - Poche for membrane roofing does not match legend.	No additional comment here.
11.	Idea No. 042. Sheet S2.1A – This and other A suffix structural sheets should be indicated as dimensional (and other?) supplements for clarification of their use.	No additional comment here.
12.	Idea No. 046. Sheet S9.1 – The table headings need to be completed.	The headings should correspond to the details shown on the sheet.
13.	Idea No. 048. C2.02 – Use the permanent pond for an on-site sediment pond during construction.	No additional comment here.
14.	Idea No. 051. Sheet C3.10 – The CR&VE Team believes that there should be a way to completely drain the pond.	No additional comment here.



TABLE 8—NOTES		
Seq. #	Brainstorming Idea Number/Description	Additional Commentary
15.	Idea No. 052. Sheet A1.6 – Wall Elevation No. 7 shows a section 11/A1.6 and it should be 13/A1.6.	This may be a typographical error.
16.	Idea No. 053. The CR&VE Team suggests that the school district hire a registered engineer to check the capacity and distribution of the proposed additional water pipeline to assist in an economical size for the on-site pipeline.	No additional comment here.
17.	Idea No. 054. Consider reuse of the existing on-site asphalt paving for sacrificial construction ATB.	No additional comment here.
18.	Idea No. 062. DIV 0 Section 00200 Paragraph 1.16 should reference Part 2 and not Part 1 of the Bid Form.	This may be a typographical error.
19.	Idea No. 080. DIV 4 Where is cast stone included on the project, as specified in Section 04720?	No additional comment here.
20.	Idea No. 087. DIV 7 Add fall protection anchors to the specification for maintenance compliance. They are specified as one product and shown as another product on the drawings.	This contradiction should be resolved.
21.	Idea No. 096. WAC 2-308-12-081 requires the architect to “seal”, stamp and sign the cover, title page and all pages of the table of contents of the project manual. The CR&VE Team did not receive project manuals that meet this requirement.	No additional comment here.



COST ESTIMATE COMMENTARY

The estimate appears to be quite conservative and high based upon the total cost per square foot (\$227/sf for the building only, not including the site or play sheds) compared to other recent schools. The site and play shed (\$92/sf) costs also seem high in total, although this is a site intensive project, and the play sheds are heavy duty as designed. The District has completed other elementary schools with a similar design and their records can be used to "benchmark" this estimate.

Here are some specific comments from the CR&VE Team:

1. There is not sufficient time to check quantities or inclusiveness, but given the detailed breakdown and generous pricing it seems reasonable to assume that the significant elements and systems quantities are ample, if not high.
2. Many items are included as lump sum allowances, and most of these seem high including for example mob/demob, scaffolding and cranes (which may be amply included in the item unit costs anyway), some specialty items, and electrical start-up.
3. The play shed alternate is figured as deductive, rather than additive per the bid form.
4. Most of the alternates are not priced.
5. The project should not require 2 field engineers, 3 clerks/assistants, and 2 low bed trucks.
6. Inspection items should be outside of the construction contract.
7. Many GC items are figured for the full 15 month term of the contract, but they will not be needed from start to finish. Some examples are low bed trucks, crane, and perhaps the field engineer and/or clerk.
8. The project may not require a full time cleanup worker for the full duration as currently estimated.
9. Clearing and grubbing is estimated at \$6,500 per acre, which is high.
10. Soil export seems high at \$18/cy if a disposal area is close by. Can more of this excess be wasted on site as berms? Likewise, can more native material be used as fill so as to reduce the imported fill?
11. Portable toilet costs are extremely high.
12. Other high items include modular retaining walls (perhaps in part due to proprietary spec), safety fencing, some landscaping plantings and irrigation, concrete, masonry, steel base plates, floor trusses, wood decking, wall framing and sheathing, roofing, fall protection, siding, glazing, GWB, VWC, cabinetry, and AV systems.
13. No amounts are included for rain garden or UIC wells.
14. Floor coverings should not have been included at all, since they are to be furnished and installed by the owner per the specs.



15. Sunshades, light shelves, food service equipment, mechanical and electrical quantity detail was not provided.
16. There are no costs included for the temporary asphalt around the buildings included.
17. The cost estimate includes \$60,000 for irrigating the playfield. However, there is no irrigation for the playfield shown on the plans.
18. There is no cost included for basic demolition of the structure on-site.
19. Items from the "Standing Seam Metal Roofing" to the "Bird control . . ." shown on the bottom of page 11 of the CD Estimate Summary are duplicated on the top of page 12.

If a thorough qualitative review of the cost estimate has not been completed by the Design Team, the CR& VE Team recommends that they conduct such a review now and get the cost estimate corrected.

It is the opinion of the CR&VE Team that the District might receive bids that are two million dollars or more less than the estimate reviewed.