AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF PAGES
J	1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0005	18 April 2002		

6. ISSUED BY CODE

U.S. ARMY ENGINEER DISTRICT, ALBUQUERQUE
CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, N.E.
ALBUQUERQUE, NEW MEXICO 87109-3435

7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

CODE FACILITY CODE

(√) 9A. AMENDMENT OF SOLICITATION NO.

X DACW47-02-R-0002

9B. DATED *(SEE ITEM 11)*
23 January 2002

10A. MODIFICATION OF CONTRACTS/ORDER NO.

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [X] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

PROJECT: TWO-PHASE DESIGN/BUILD, BACA/Dlo'ay azhi CONSOLIDATED REPLACEMENT SCHOOL, PREWITT, McKINLEY COUNTY, NEW MEXICO

1. This is Amendment No. 5 to Solicitation No. DACW47-02-R-0002; 23 January 2002. The following revisions shall be incorporated into the specifications. All other provisions shall remain unchanged.

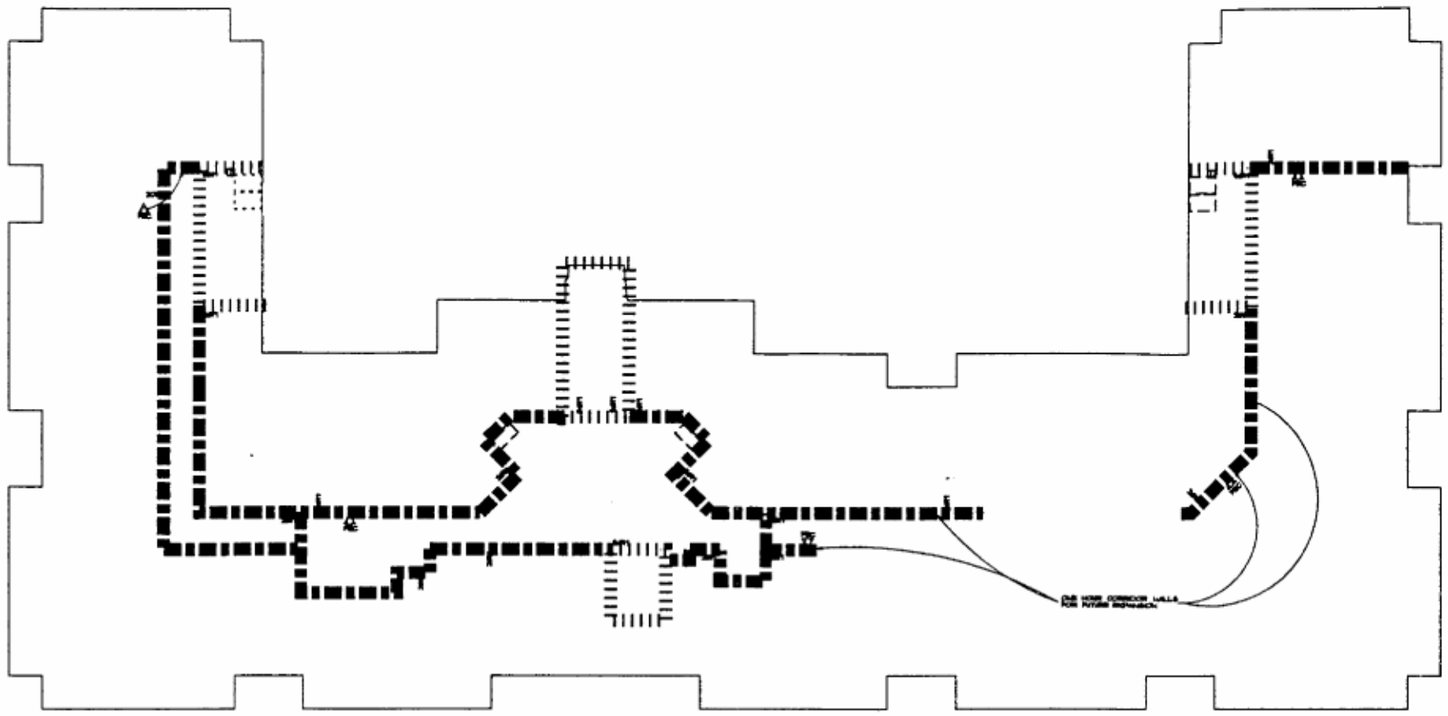
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR _____ *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ *(Signature of Contracting Officer)*	16C. DATE SIGNED

2. SPECIFICATIONS: Delete the following listed pages and substitute the pages attached hereto. On the revised pages, for convenience, changes are emphasized by the amendment number in parentheses before and after changes from the previous issue. All portions of the revised (or new) pages shall apply whether or not changes have been indicated.

Delete Page	Insert Page
Volume 3 of 3	
Appendix A, Fire 5.2	Appendix A, Fire 5.2
Appendix A, Fire 5.3	Appendix A, Fire 5.3
Appendix A, Vol 2, I thru Spec II	(Delete Volume 2 in its entirety)
Appendix B, Chapter 3, Program of Requirements, Pages 20 and 21	Appendix B, Chapter, Program of Requirements, Pages 20 and 21
Appendix B, Chapter 6, Environmental Assessment Report, Page 1	Appendix B, Chapter 6, Environmental Assessment Report, Page 1
Appendix B, Chapter 9 (Delete entire chapter)	Appendix B, Chapter 9 (Insert entire chapter)

////////LAST ITEM////////



1 / FPU BASEMENT FLOOR WALL RATINGS

(ALL WALLS NOT NOTED ARE TO BE NON-COMBUSTABLE 1 HOUR CONSTRUCTION) 1/8"=1'-0"

LEGEND

- 36" X 48" AREA OF REFUGE
- RESCUE ASSIST INTERCOM
- MAG HOLD OPENS
- STROBE
- INDICATES CEILING DOOR
- ONE HOUR FIRE RESISTIVE CORRIDOR WALL OR MECHANICAL SHAFT WALL OR CEILING ASSEMBLY
- TWO HOUR FIRE RESISTIVE EXIT ENCLOSURE
- ONE HOUR FIRE RESISTIVE OCCUPANCY SEPARATION WALL
- SHADED AREA REPRESENTS AN A-3 OR B-2 OCCUPANCY TYPE
- FEC - FIRE EXTINGUISHER & CABINET
  FE - FIRE EXTINGUISHER WALL MOUNTED
- FIRE ALARM PULL STATION
- FIRE ALARM HORN & STROBE
- SMOKE DETECTOR
- HEAT DETECTOR
- EXIT SIGN
- FIRE SYSTEM FLOW & TAMPER CONNECTIONS

CODE NOTES

BUILDING CONSTRUCTION TYPE: TYPE 3, 1 HR.

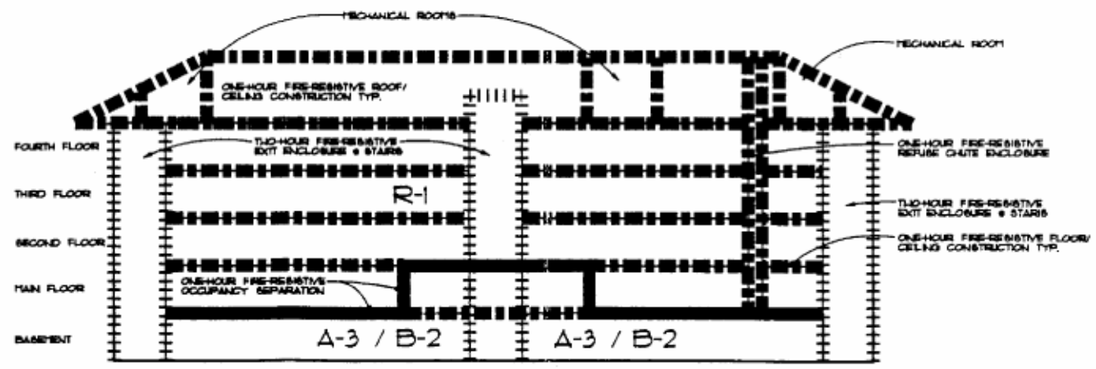
BUILDING OCCUPANCIES: A-3, B-2, R-1

ALLOWABLE AREA:

	A-3	B-2	R-1
BASIC ALLOWABLE	13,500 SF	18,000 SF	13,500 SF
YARDS (100%)	27,000 SF	36,000 SF	27,000 SF
MULTI-STORY (100%)	54,000 SF	72,000 SF	54,000 SF
FIRE SPRINKLER (300%)	189,000 SF	144,000 SF	189,000 SF
TOTAL ALLOWABLE	189,000 SF	144,000 SF	189,000 SF

ACTUAL BUILDING AREA

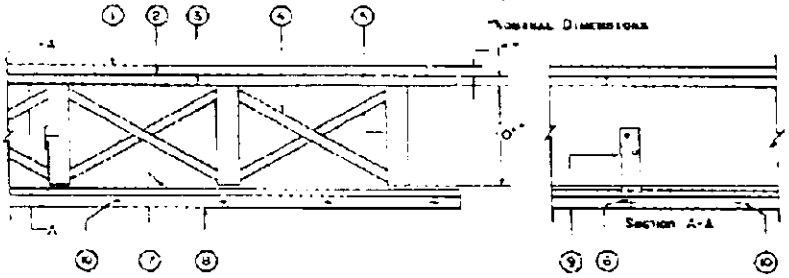
BASEMENT	1,571 SF	14,561 SF	
MAIN FLOOR		2,446 SF	13,662 SF
SECOND FLOOR			15,561 SF
THIRD FLOOR			15,561 SF
FOURTH FLOOR			13,561 SF
TOTAL	1,571 SF	16,969 SF	68,893 SF



2 / FPU RATINGS SECTION (DIAGRAMATIC ONLY)

TYPE 3, 1 HR. CONSTRUCTION SCALE: N.T.S.

Design No. L001
Unrestrained Assembly Rating—1 Hr.
Finish Ratings—12 and 14 Min. (See Item 8)



1. **Finish Flooring**—1 by 4 in. T&G, laid perpendicular to joists, or 19/32-in. plywood, any grade "Underlayment" or "Sturd-I-Floor" with T&G long edges, and conforming with PS 1-83. Face grain of plywood to be perpendicular to joists with joints staggered.

1A. **Alternate Finish Flooring**—The alternate finish flooring may consist of the following:

System No. 1

Floor Topping Mixture*—10-13 gal. of water to 170 lbs of floor topping mixture to 595 lbs. of sand. Compressive strength 900 psi minimum. Thickness to be 1 in. minimum. Building paper (Item 2) optional.

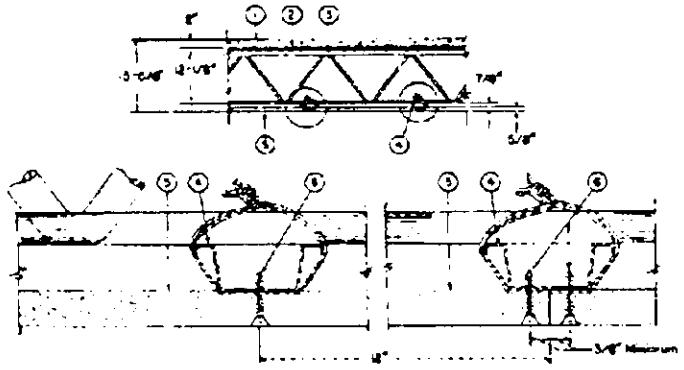
Floor Crete Systems, Inc.—Type II.

System No. 2

Floor Topping Mixture*—Foam concentrate mixed 40:1 by volume with water and expanded at 100 psi through a foam nozzle. Mix at rate of 1.4 cu. ft. of preformed foam to 94 lbs Type I Portland Cement, 62.5 lb of Pea Gravel and 312.5 lbs of sand, with approximately 5.8 gal of water. Cast density of Floor Topping Mixture 100 lbs. pcf ± 5 pcf. Min compressive strength 1000 psi. Thickness 1 in.

Lisi-Crete, Inc.—Type I.

Design No. G501
Restrained Assembly Rating—1 Hr.
Unrestrained Assembly Rating—1 Hr.



1. **Normal-Weight Concrete**—Carbonate or siliceous aggregate, 150 ± 3 pcf unit weight, 3000 psi compressive strength.
2. **Metal Lath**—¾ in. nb, 3.4 lb/sq yd expanded steel; tied to each joist at every other rib, and midway between joists at side lap with 18 SWG galv steel wire.
   As an alternate corrugated-steel deck 9/16 in. deep, 28 MSG min galv may be used. Welded to supports 15 in. O.C. using welding washers. The concrete thickness is measured from the surface of the concrete to the top of the steel deck corrugations.
3. **Steel Joists**—Type 12J4 joist size, spaced 24 in. O.C. and welded to end supports.
   Bridging (Not Illustrated)—Steel bars, ⅞ in. diam. Welded to top and bottom chord of each joist.

FLOOR/CEILING ASSEMBLY

Special Program / Support Spaces	NASF	GSF	% Gross
Special Education Programs	8,030	10,040	100.0%
Total for spaces not stipulated by type and number in BIA Education Space Guidelines. These are school program specific.	**8,030**	**10,040**	**100.0%**

Exhibit 11: Special Education Programs. *Total for spaces not stipulated by type and number in BIA Education Space Guidelines. These are school program specific.*

- North Central Accreditation Requirements,
- American Indian Curriculum Standards,
- Terra Nova, and
- Navajo Nation Education Standards.

5.3 Space Assignments - Support Areas

General maintenance services are provided by the tribe from facilities located in Crownpoint. This area of the school is referenced in the BIA Education Space Guidelines, but space type or size is not given. Exhibit 12 gives the total estimated area required to provide:

- site specific maintenance offices and storage, and
- space allocated to mechanical systems campus-wide since the exact type of system is not yet determined.

Support Areas	NASF	GSF	% Gross
Maintenance / Mechanical	7,670	9,020	100.0%
Total for spaces not stipulated by type and number in BIA Education Space Guidelines. These are school support needs specific.	**7,670**	**9,020**	**100.0%**

Exhibit 12: Support *Total for spaces not stipulated by type and number in BIA Education Space Guidelines. These are school support needs specific.*

	GSF per POR	GSF / Student (BIA allowable as averaged)	Capacity / Residency Enrollment	GSF BIA Allowable NOTE 1)*	GSF / Student per POR	Diff. from Suggested BIA Space Guidelines
Baca/Dlo'ay azhi Consolidated School	69,375	180	390	70,212	178	-02
Special Education Programs	10,040	N/A	390	N/A	26	+26
Maintenance / Mechanical	9,020	None	390	N/A	23	+23
Total**	**88,435**		**390**	**N/A**	**227**	**+18,223**

Percent over BIA Space Guidelines **26.3%**

NOTE 1) BIA Allowable is calculated under Exhibit 9: Total Space Allocated to Baca/Dlo'ay azhi Consolidated School per BIA GSF tables

Exhibit 13: Comparison of POR Assigned Square Footage to BIA Guidelines.

5.4 Comparison - Programmed to Planning GSF Values

This chart compares the GSF values for the programmed spaces with the planning GSF value from the BIA guidelines. When the school opens the following will impact its size and resulting ability to use or not use all of the programmed space.

- The loss of the residential program will cause the school to drop in enrollment temporarily.
- Growth at the school will be first to reattain the current 305 student level and then over ten years grow into the facility's capacity of 390.

I. PROPOSED ACTION

A. Project Description

The proposed **Baca/Dlo'ay Azhi Consolidated Replacement School** will be constructed on the site of the existing Baca Day School located near Prewitt, New Mexico. In order for the existing school to continue operating during construction, the new school is anticipated to be constructed to the west side of the existing campus. Students from both the Baca Day School and the existing Dlo'ay azhi Community School located in Thoreau, New Mexico would attend the new school.

Although the design process has not yet begun, it may be anticipated that the new school will consist of a single, one-story building. At present, its exterior finishes are expected to include natural local stone, concrete masonry, and stucco, and the building will likely be a steel frame structure with metal stud infill, mixed with some concrete masonry walls as required. The building is expected to be about 80,000 to 86,000 square feet in total area, not including associated site development work and pavement.

The existing school property is located at the northwest corner of the intersection between Interstate Highway 40 (I-40) and State Highway 412 and encompasses approximately 40 acres of existing school property. (see Figure 1- Site Vicinity Map and Figure 2-Site Map in Appendix A). The actual property boundaries were not known at the time this document was prepared so the actual property size is approximated at 40 acres. The occupied / disturbed portion of the property is approximately 20 acres in size.

The property will have no change in use. A new school building is proposed for the site.

B. Purpose and Need

The property is currently developed with the Baca Day School. The school currently consists of 17 separate buildings and portable classrooms. The original school was constructed in the 1930s of hand-hewn sandstone and was comprised of several buildings. The original rock buildings are listed under the National Historical Preservation Act and will not be disturbed during the new school construction.

9
ARCHITECTURAL & ENGINEERING REQUIREMENTS

BACA / DLO'AY AZHI
CONSOLIDATED REPLACEMENT SCHOOL

LEEDSHILL-HERKENHOFF, INC.
an ASCG Company
500 Copper Avenue NW, Suite 500
P.O. Box 1217
Albuquerque, NM 87103 (505) 247-0294 Fax (505) 242-4845

ARCHITECTURAL AND ENGINEERING REQUIREMENTS

ARCHITECTURAL REQUIREMENTS

A. One overriding requirement of the new facility, concerning its siting and orientation, and expressed without reservation by members of the school and communities, is that the new **Baca and Dlo'ay azhi School** must be oriented with an east-facing entrance.

B. The architectural design of the new **Baca and Dlo'ay azhi Consolidated Replacement School** shall be in accordance with all applicable Codes, regulations and laws, including, but not limited to, the following current adopted versions:

1. Indian Preference - This project shall be carried out in conformance with Navajo Preference regulations concerning the selection of Contractors and the hiring of labor to perform the construction work.

2. Building Construction Standards - The applicable guide to building construction standards shall be the most current New Mexico adopted version of the **Uniform Building Code (UBC)**. Although there is no designated regulatory agency within the Navajo Nation, the **UBC** shall be utilized in providing a responsible design for the **Baca and Dlo'ay azhi Consolidated Replacement School**.

3. Life Safety Standards – The most current New Mexico adopted version of **National Fire Protection Association (NFPA) – Standard 101, Life Safety Code** shall be used to protect life and safety of the School's occupants. The New Mexico State Fire Marshall in evaluating and accepting the design utilizes this Code.

4. Accessibility Standards – Required access to the facility shall be provided in accordance with the **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**.

B. In general, the new school should be designed in such as way as to allow the addition of future space for additional education programs as well as the possibility of additional future classroom needs, in order to avoid the need for portable classrooms in the future.

C. The use of exterior and interior materials which are appropriate for the project, its site and its community, as well as materials that are durable, attractive, and relatively easy to maintain, is encouraged.

1. Materials such as masonry, brick and stone (compatible with stone found on historical buildings on the site) are practical and cost effective for both interior and exterior use.

2. Metal framing systems, with durable finish materials such as fiber reinforced gypsum board, stucco, metal and E.I.F.S., are also practical and cost effective for both interior and exterior use.

3. Metal roofing panel or standing seam systems for sloped roof surfaces, and single-ply membrane systems for relatively flat roofs, are characterized by good longevity, and can be serviced and repaired with local expertise.

4. Exterior doors, windows, and frames constructed of pre-finished aluminum or hollow metal are recommended to withstand high traffic use and provide an extensive useful life, with very little service or maintenance required.

5. Interior glazing can also be framed with pre-finished aluminum or hollow metal, and the use of glass block masonry is also appropriate.

6. Interior doors should be solid core wood or laminate materials for durability, warmth of appearance and sound attenuation qualities. Doors leading to mechanical or maintenance areas may also be of hollow metal construction. All frames for interior doors are recommended to be hollow metal for strength, durability, and ease of maintenance and longevity.

7. Flooring materials appropriate for this school include both hard and soft surfaces, depending upon the spatial requirements. Ceramic and resilient tile materials are appropriate for high traffic and circulation areas, with ceramic tile with appropriate backing preferable in wet areas such as shower areas, kitchens and toilet rooms. Hardwood cushioned flooring is recommended for gymnasium floors, for its shock absorbing qualities, longevity, and ease of maintenance.

8. Interior ceilings, in general, should be high quality suspended T-grid systems for acoustic qualities, accessibility, ease of replacement for damaged components, and economy. Kitchen and wet area ceilings should be moisture resistant and washable, and may be suspended lay-in or gypsum board type. Exceptions to this might be ceilings in: the Lobby area, where a special type of ceiling may be used; in the gymnasium, where no ceiling is recommended, and; in the music rooms, where exceptional acoustic qualities are required.

D. The new school facility must be designed to be "flexible" and capable of meeting both current and future educational programs, teaching techniques, and technological requirements, to the maximum extent possible.

1. If load-bearing walls are required by the structural system, they should be used only in areas that are unlikely to change such as corridors, toilet rooms, gymnasiums, locker/shower rooms, cafeteria/kitchen, etc.

2. Non-load-bearing frame walls and/or movable/folding walls should be used in areas which may be subject to change in the future, or which require flexibility immediately. These walls should also provide adequate sound separation between rooms.

E. The facility must incorporate all of the equipment, fixtures, and furnishings to support the needs of faculty, staff and students.

1. Provide adequate storage facilities that are convenient to teaching spaces and for the use of maintenance and administrative staff. These may be separate storage rooms, or they may be built-in storage casework.

2. Provide adequate writing and display surfaces to allow teachers to better engage the interest of students.

3. Provide work surfaces, casework, sinks, computer stations, and furnishings that are appropriate for the teaching/learning functions of each room.

F. The design of the new **Baca and Dlo'ay azhi Consolidated Replacement School** should, as much as possible and practicable, be conducive to minimizing long-term operational costs through the use of "energy efficient" design principles. Additionally, the use of energy conservative, recycled, or recyclable materials is also encouraged, including the application of "green design" principles.

1. Orientation of the building appropriate for optimal solar gain, minimal heat loss, and protection from inclement weather and wind.
   a) Maximize passive solar gain for winter periods.
   b) Provide passive storage, through the use of massive and heat-retaining materials, in spaces such as lobbies and corridors, where temperature swings are not critical.
   c) Include means to discharge excessive heat.
   d) Provide passive and/or active means of distributing desired heating or cooling to nearby spaces.

2. Incorporate natural lighting into circulation and teaching spaces, as follows:
   a) Energy-efficient windows, of adequate size, oriented for maximum day lighting without contributing to excessive heat losses or gains, and resistant to ultraviolet radiation.

b) Skylighting to introduce natural light into interior spaces where desired, and to minimize the need for daytime electric lighting.

c) Provide optimal control for electric lighting systems for flexibility and energy efficiency.

3. Incorporate natural ventilation for fresh air and circulation, being careful not to allow introduction of excessive noise from Interstate highway traffic.

G. The site planning of the new **Baca and Dlo'ay azhi School** should include the following desirable elements:

1. Campus Entry – a new "gateway" should be designed to identify and provide entrance to the newly designed school campus. Vehicular and pedestrian circulation to and from the school, as well as within the school, should be carefully considered.

2. Outdoor Spaces – designed to enhance or reinforce traditional or cultural programs through social or ceremonial events and activities. This may be achieved through the design of a central, landscaped plaza, covered gathering spaces, play areas, gardens, traditional plantings, and recreational and/or performance spaces. Metaphorical use of cultural/native symbolism, while not mandatory, may be integrated into these elements to identify or organize specific areas.

3. Landscaping – trees, berms and walls should be incorporated into the campus plan to provide protection from harsh winter winds, channel cooling summer breezes, and provide protection from traffic noise. A desirable element, as expressed by teachers, administrators and parents, was the enclosure of the campus with a wall or fence. Any planted material incorporated into the design should be indigenous to the area, and require minimal water use.

4. Pedestrian Circulation – major walkways and paths should be clearly defined, easy to maintain, and provide access to campus elements and buildings as directly as possible.

5. Security – security elements should be selected and placed to enhance the security and safety of students, faculty, staff, and visitors to the new **Baca and Dlo'ay azhi School**.

CIVIL ENGINEERING REQUIREMENTS

A. Provide a Master Campus Plan which, based upon the final siting of the new school building(s), addresses the following needs:

1. Allow vehicular traffic circulation to and from the site, through the use of relocated highway access driveway(s) as required to minimize new road construction and allow efficient access to the site for delivery and service vehicles, school buses, and automobiles. Provide barriers or gates where appropriate to prohibit vehicular traffic into restricted or controlled areas.

2. Effectively separate vehicular traffic from pedestrian traffic to maximize safety for students, faculty, staff and visitors. A "ring" road, or cul-de-sac, may be appropriate to contain school functions and maintain adequate safety buffers.

3. Provide adequate permanent parking for teachers, parking and loading areas for service and delivery vehicles, and sufficient parking (permanent or intermittent) for larger community or athletic events.

4. Provide new entry sign to clearly identify the new **Baca and Dlo'ay azhi School**, and to direct traffic onto and through the school site.

5. Athletic fields, facilities, and equipment should be designed for maximum longevity, minimal maintenance, and safety. A grass playing field is strongly desired by coaching staff as well as the community, and should be included, along with a sprinkler system to ensure its long-term survival.

6. Provide site drainage that protects the building and effectively channels and controls surface runoff during intense periods of precipitation.

7. Upgrade above-grade and underground utilities, sewerage system, and fire loop as required to adequately serve and protect the new facility.

STRUCTURAL ENGINEERING REQUIREMENTS

A. The following information is provided as guidelines to be followed to ensure that the new **Baca and Dlo'ay azhi School** is structurally sound, economical to construct, and meets or exceeds the following Code requirements and structural design standards:

1. The most current New Mexico adopted version of the **Uniform Building Code (UBC)**, or the edition enforced by the local code jurisdiction having construction authority.

2. Vertical live load and snow load design in accordance with applicable Codes.

3. Lateral design for wind and seismic loads, appropriate for the school site, and in accordance with applicable Codes.

4. Selection of structural systems based upon the following criteria:
   a) required fire resistance
   b) durability
   c) architectural requirements
   d) aesthetics
   e) structural requirements
   f) economy

B. Geotechnical Engineering Study

1. AMEC Earth & Environmental, Inc. have prepared a report for this project to assist in the selection of an appropriate foundation system as well as to identify any other Geotechnical issues affecting the new school's structure. This report is titled "**Geotechnical Engineering Study – Baca School, 80,000 square feet Building, Prewitt, New Mexico.**" AMEC Project No. 0-517-000152, dated 29 November, 2000. Following is a summary of the report's recommendations of the building's foundation system:
   a) Foundation systems – shallow, spread-type footings.
   b) Site preparation – over-excavation of a portion of the native soils beneath the proposed building to provide a minimum depth of three (3) feet of compacted structural fill beneath the base of all foundations and floor slabs. The structural fill should also extend laterally a minimum of three (3) feet from the footing perimeters.
   c) Footings shall bear at uniform depths below finished grade to support the proposed structure on a minimum thickness of three (3) feet of structural fill.
   d) Minimum depths of footings should be 3 feet below finished grade at the perimeter, and 2.5 feet below finished floor slab elevations for interior footings.

c) Post-construction moisture increases in supporting soils are a major cause of soil movement that could cause damaging differential foundation movements and result in structural damage to the building. Careful site drainage and moisture protection procedures, as outlined in the report, are critical to the satisfactory structural performance of the building. Review of the drawings, specifications, and construction by a Geotechnical Engineer is strongly encouraged to ensure strict adherence to report recommendations regarding drainage and fill compaction.

2. The shallow spread footing type of foundation system is an economical and proven method of building support, and should be appropriate for the new **Baca and Dlo'ay azhi School** project.

MECHANICAL ENGINEERING REQUIREMENTS

A. General

1. Codes, Ordinances and Regulations that will govern the Mechanical design of the new **Baca and Dlo'ay azhi School** are as follows:
   a) All work, material and installation methods will conform to appropriate local and state Codes, regulatory and enforcing agencies including the **UBC**, UPC, **UMC** and **Life Safety Codes.**
   b) Requirements of the BIA Design Handbook will also be utilized on this project.
   c) Mechanical design will conform to ASHRAE 90.1-89, Energy-Efficient Design of New Buildings except Low-Rise Residential Buildings.
   d) Design will also conform to ASHRAE 62-89, Ventilation for Acceptable Indoor Air Quality.

B. Heating, Ventilating and Air Conditioning (HVAC)

1. The HVAC system proposed for this project will provide both heating and cooling, while introducing sufficient ventilation to meet comfort levels and Code requirements. The most efficient system for providing both heating and cooling is that of packaged rooftop units, which will be part of a system to provide optimal zone controls and minimal maintenance.

2. Temperature control systems shall be designed for maximum efficiency and zonal control, while allowing automated night and weekend setbacks.

3. Since natural gas is currently unavailable to the site, the HVAC system, as well as the domestic hot water system, would be fired using LP Gas supplied from an aboveground tank on site.

C. Exhaust Systems

1. Exhaust fans will be provided to exhaust all toilet rooms, janitor closets, and other areas as required by Code.

2. An exhaust and make-up air system will be provided for cooking hoods and dishwashing equipment in the kitchen.

D. Ductwork

1. All ductwork will be constructed in accordance with SMACNA low velocity standards.

2. All supply and return ductwork will be galvanized sheet metal with joints sealed with fire retardant duct sealer.

3. All exhaust ductwork for kitchen cooking hoods and dishwasher will be welded stainless steel.

4. Duct liner will be provided upstream and downstream of any fan coil unit or air handler for noise attenuation.

E. HVAC Test and Balance

1. Air and Water balancing will be accomplished by an independent AABC/NEBB Contractor with a minimum of three years experience on projects of similar size and scope.

F. Insulation

1. In general, a complete covering of insulation will be installed on all domestic hot water piping, building heating and cooling piping, and all supply and outside air ductwork, as well as any horizontal roof drain piping and roof drain bodies.

G. Plumbing

1. General:
   a) The domestic water system will utilize copper piping and be provided with backflow prevention as required by Code.
   b) Isolation valves will be provided to shut off major piping branches on all systems.

2. Domestic Hot Water:
   a) A 120-deg F Domestic Hot Water System shall be used.
   b) A central domestic storage water heater, using LP gas fuel, will be used.
   c) A domestic hot water recirculation system should be considered to assure that domestic hot water is available in a reasonable period of time after the most distant faucet is opened.
   d) A recirculating 140-deg F Hot Water System will be required for the scullery sink, tray washer, dishwasher and cart wash, supplied from a separate LP gas fired, forced draft, storage type water heater. An instantaneous electric booster heater (designed and specified by the kitchen consultant) will provide a 180-deg F hot water final rinse.

3. Plumbing Fixtures
   a) All water closets, urinals, and lavatories will be vitreous china.
   b) Flush valves will be exposed, lever handle operated type.
   c) Faucets for lavatories will be push-button, blow closing type in all toilet rooms, and standard lever type in all faculty/staff toilet rooms.

d) Handicap fixtures will be provided as required by Code.

4. Fire Sprinkler Piping

a) A complete system of automatic fire sprinkler heads will be installed if required by Code. If required, recessed (flush pendant) sprinkler heads will be located in all finished ceiling areas, and standard upright pendants will be utilized in all exposed structure areas such as mechanical rooms, storage rooms, and the gymnasium.

ELECTRICAL ENGINEERING REQUIREMENTS

A. Codes and Standards

1. The following Codes and Standards, in force or adopted by the State of New Mexico at the time design commences, shall be used:

NFPA	National Fire Protection Association
UBC	Uniform Building Code
NEC	National Electrical Code
ADA	Americans with Disabilities Act
IES	Illuminating Engineers Society – Lighting Levels Standards
ANSI	American National Standards Institute
NEMA	National Electrical Manufacturer's Association
NTUA	Navajo Tribal Utility Authority

B. Design Requirements and Provisions. Following is a limited description and summary of the minimum Electrical design requirements to be followed in the design of the new **Baca and Dlo'ay azhi School**:

1. Exterior:
   a) Trenching for high voltage primary distribution.
   b) Concrete pads for high voltage transformer and switchgear, and additional requirements per local electrical utility company.
   c) Underground secondary power distribution.
   d) Power feeder distribution system.
   e) Parking and area lighting.
   f) Building flood/security lighting.
   g) Fire alarm annunciators.

2. Interior:
   a) Raceway systems and conductors.
   b) Power systems for HVAC, special equipment, and standard general receptacles.
   c) Illumination with emergency backup system.

3. Special Systems:
   a) Fire alarm system.
   b) Sound/Intercommunications system.
   c) Telephone system (integrated with Sound/Intercom).
   d) Master antenna or cable television system.
   e) Rough-in and support requirements for computer/data systems.

C. Electrical Construction - New Facilities.

1. Power Distribution System:
   a) The electrical service shall be a 277/480 volt, 3 phase, 4 wire, 60 HZ fed underground from overhead lines at U.S. Route 66. The

service shall consist of a service entrance switchboard, main circuit breaker with ground fault protection, circuit breaker distribution, and transient voltage surge suppression system. The switchboard shall be located in the main electrical room of the complex.

b) 480 volt, 3 phase and 277 volt, 1 phase power shall be distributed from the main electrical room to distribute power to HVAC equipment, motors, lighting, etc. 480 volt, 3-phase power shall also be stepped down to provide 120/208 volt, 3 phase, 4-wire power, which will be distributed to 120-volt receptacles and other 120/208-volt equipment.

c) Power distribution shall be circuit breaker type switchboards. The lighting and branch-circuit panelboards shall be the plug-on (bolt-on) circuit breaker type. Load centers should not be considered.

d) Separate power distribution shall be provided for serving data processing and sensitive electronic equipment loads. It shall include shielded isolation, non-linear type transformers and on-linear type panelboards.

e) Conductors shall be copper, size based on 75-deg C temperature rating. Conductor phase identification shall be color-coded.

f) Wiring devices shall consist of:
   - Toggle switches shall be 20A, 120-277V.
   - General convenience receptacles shall be specification grade 3-prong grounding type 20A, 125V (commercial grade shall be unacceptable).
   - Tamper-resistant receptacles shall be provided for kindergarten classrooms.
   - GFCI (ground fault circuit interrupter) receptacles shall be provided in wet areas, outdoors, and within 6'-0" of a sink or lavatory.
   - Other special purpose receptacles shall be provided for clothes dryers, ranges, food-service equipment, etc.

g) An equipment grounding system, consisting of a continuous equipment-grounding conductor, shall be installed on all conduit systems. The equipment grounding system shall be connected to the facilities grounding electrode system consisting of building steel, metal underground water/gas piping systems, and building underground.

h) Raceway systems shall consist of:
   - Electric Metallic Tubing (EMT): Concealed indoor.
   - Intermediate Metal Conduit (IMC): Exposed Indoor & Outdoor.
   - Rigid non-metallic Conduit (Plastic): Exterior underground and below slab.
   - Liquid tight flexible Conduit: Motor and Transformer connections.

2. Lighting Systems:

a) Interior Fixtures:

- Fluorescent lighting fixtures in most interior areas shall be specification grade 2' x 4' troffers with .125 thick prismatic acrylic lenses.
- Fluorescent fixtures with 3" deep, 27-cell parabolic louvers for visual display comfort (VDT) shall be used in computer lab classrooms and where six (6) or more computer terminals may be used in one area or classroom.
- Fluorescent T8-lamps and compact fluorescent fixtures shall be used throughout. Where ceiling heights are 15'-0" or higher, a metal halide source should be considered. All lamp sources shall be energy efficient.
- High efficiency metal halide gymnasium light fixtures shall be considered in the gymnasium. Fixtures shall include a louver and lens system to minimize glare for players and spectators.
- Fluorescent fixtures with 3" deep, 18-cell parabolic louvers, shall be considered in Administrative Offices.
- Ballasts: solid state, rapid-start, electronic ballasts for fluorescent fixtures.
- Anticipated lighting levels shall be as follows:

Classrooms	70	fc
Administrative Areas	50-75	fc
Library/Media Center	50	fc
Corridors	20	fc
Gymnasium	50	fc
Kitchen/Food Service	70	fc
Dining Area	30	fc

- The same source used for emergency egress illumination shall also be used for night and security lighting inside the building (unswitched and energized indefinitely).
- All other interior areas shall be evaluated and lighting levels provided to IES standards for optimal efficiency.

b) Exterior Fixtures:

- Wall mounted, vandal-resistant type fixtures shall be used to supplement the area lighting where required, and to prevent shadowed areas around building perimeter.
- Exterior lighting shall be metal halide, with high efficiency HID pulse start lamps and ballasts, using cut-off type luminaires with high impact lenses.
- Exterior lighting control shall use a time controller with astronomical dial, skip-a-day, and reserve power.
- Average maintained lighting levels shall be as follows:

Parking	1.0 to 1.5 fc
Building Perimeter	0.5 fc

c) Emergency Egress Lighting
   - Self-contained emergency battery pack wall units and exit lights shall be used for emergency egress lighting as required to meet NFPA 101 Life Safety Code.
   - In some areas, wall-pack emergency lighting fixtures with self-contained battery units shall be used to supplement immediate emergency egress illumination, particularly in high-occupancy assembly spaces.

3. Special Systems:

a) Fire Alarm System
   - An addressable analog-type fire alarm system shall be provided, consisting of, but not limited to, a main fire alarm control panel with integral battery back-up, remote fire alarm panels, smoke detectors, heat detectors, manual pull stations, and combination audible horn/light signals. This system shall be non-coded, supervised, and in accordance with the requirements of ADA, the State Fire Marshal and local fire codes.

b) Data and Voice Cabling System
   - A complete copper/fiber backbone communications and horizontal UTP copper cabling system shall be provided, including all equipment and cable termination connections.

c) Integrated Telecommunication System
   - Provide a telephone type communications system for all instructional and administrative areas. Provide for system integration of the following communications systems:
     - Telephone (PBX) System – Digital, to provide interconnection to public telephone lines and intercommunications throughout the school.
     - Voice Mail System
     - Intercom/Public Address System – Amplifier and speaker system for paging and public address throughout the school.
     - Master Clock and Program System – To provide the classroom time and schedule signaling, and be interconnected with the paging system.

d) Television Distribution System
   - Fully compatible with local cable company, or independent with satellite receiver, and able to accommodate all required frequencies. The system shall include splitters and passive components as required.

e) Sound Reinforcement Systems
   - Provide a complete sound reinforcement system for the gymnasium, cafeteria, and all classrooms. Equipment shall include racks, amplifiers, microphones, and input devices, etc., tailored to each specific room use.

f) Intrusion Detection System

- An intrusion system design shall include a system with microprocessor-based central controls, remote intrusion sensors and detection devices, and a communication link to perform monitoring, alarm and control functions. This system shall be physically and electronically modular with provisions for future expansion.