Insular ABC's Phase III Task 1

School Facility Planning Workshop

Commonwealth of the Northern Mariana Islands

July 2015

Commonwealth of the Northern Mariana Islands
PUBLIC SCHOOL SYSTEM
STUDENTS FIRST

US Army Corps of Engineers
Honolulu District

Office of Insular Affairs
US Department of Interior

HHF PLANNERS
places for people

Contents

Acronyms

CIP	Capital Improvement Project
CNMI	Commonwealth of Northern Mariana Islands
DMRP	Deferred Maintenance Reduction Program
ECM	Energy Conservation Measures
H/S	Health and Safety
IEQ	Indoor Environmental Quality
MOU	Memorandum of Understanding
O&M	Operations and Maintenance
OIA	Office of Insular Affairs
RR	Restroom
SPED	Special Education

1. Insular ABCs Initiative Background

The US Office of Insular Affairs' (OIA) Insular ABCs Initiative is a multi-phase effort focused on improving the physical condition of the US Insular Area Public Schools (in Guam, Commonwealth of Northern Mariana Islands (CNMI), American Samoa and the US Virgin Islands). The Phase III Task 1 (Phase 3.1) planning effort included several steps to prepare for Deferred Maintenance Reduction Program (DMRP) execution and various capacity building efforts. As a part of Phase 3.1, the ABCs Team prepared school facility planning workshops for each of the territories.

1.1. ABCs Phase II findings

Several aspects of the school facilities were documented in Phase II which can be used in facility master planning to help identify needs and guide investments. In CNMI, the physical condition assessments conducted at 322 buildings of 20 schools identified approximately $11.3 million (M) DM (2013 dollars, not including costs for needed site improvements), $1.3M of which was considered Health and Safety (H/S) DM. With a replacement value of an estimated $167M, the building inventory totaled 900,000 square feet, carrying a student population of 10,117 students (2013 data).

The overall facility score is 4.3 on a scale of 1-5—where 1 indicates major DM and major repair and/or replacement is required and 5 indicates that no DM exists and only normally scheduled maintenance is required; 0 was used to note when an item is required but not present. The lowest scores were for roofing, mechanical, electrical, and plumbing concerns. Schools are 40 years old on average. Surveys occurred in 2012 following completion of ARRA-funded facility improvements (e.g., roof repairs, painting, etc.). Key problems include electrical system upgrades, weatherproofing, inadequate natural ventilation, emergency vehicle access, fire protection (including fire hydrant provision), and site drainage.

In addition to these other metrics that can be used for facility planning, energy audits were conducted and Energy Conservation Measures (ECM) were proposed. With an estimated $11.3M investment (2013 dollars), the public schools could save $1.5M/year in utility costs.

1.2. ABCs Phase 3.1

Insular ABCs Phase 3.1 began in the fourth quarter of 2014 with preliminary outreach to territory contacts and the establishment of Memoranda of Understanding (MOU) between OIA and the Governors of each territory. The signed MOU effectuate commitments to work together on the Phase III with two major objectives of reducing the DM backlog and build local capacity to assist in ongoing and future facility management efforts.

OIA and the Governor agreed to allocate $1M/year of annual Capital Improvement Project (CIP) grant funds for 5 years as dedicated funding for DMRP projects. OIA is providing technical support through USACE and its contractor, HHF Planners, to oversee program execution and education and training plan initiatives. A DMRP management team will be hired to oversee the

repair program over a four-year work period. Capacity building initiatives include the school facility planning workshops, the deployment of an enterprise asset management system (to be used for facility management, including DMRP work order tracking), ongoing education and training activities ranging from job site skill development to best practices in developing school maintenance budgets and overseeing maintenance programs.

The ABCs Team conducted workshops in each territory to describe the school facility master planning process (e.g., establishing a local policy framework, long range plan, short range implementation strategy, CIP plans and facility standards). The workshops were meant to run participants through a range of topics to help broaden understanding of the challenges that facility managers and school administrators face, the breadth of considerations that go into designing and maintaining schools, and some strategies for streamlining facility management efforts and addressing common concerns.

2. Workshop Record

2.1. Visioning Session

The objective of the visioning session was: For stakeholders to articulate a vision for the future of education in CNMI and what school facilities might look like to support that education vision. Participants were asked:

- What role should schools have in shaping the future of the community?
- What would an ideal school be/do?
- What is "success"? For students? For teachers? For the community?
- What actions can be taken to achieve these goals?
- What metrics could measure progress toward these goals? (economic goals, graduation rates, employment stats)

Figure 2-1 – (above) Small group discussion during Visioning Session

Figure 2-2 – (right) Visioning Session compilation of Goals and Actions

Visioning topics to kick-start the discussion included:

- Safe schools
- Focus on student outcomes
- Different focus areas for schools
- College and career oriented
- Community-centered facilities

Table 1 - Comments transcribed from group work (post-its shown in Figure 2)

Goals/Vision	**Strategies**		
Career cluster buildings	Develop a study of needs of communities: tourism/hospitality, education, health/safety	Develop a SMART PLAN	
Promote high academic achievement for all students	Qualified personnel, curriculum tools and technology.	Additional facilities for CTE classes	
Ongoing improvement of technology infrastructure		Conducive learning environment.	Additional facilities for continuing education classes
Safe and orderly learning environments	Prioritizing projects and school funds to align with infrastructure needs		
– *Health and wellness for students and community* – *Be accessible to the whole community—resources available to everyone.*	Gym with equipment; libraries with resources; computer labs, cafeterias, etc.		
21st Century Classrooms	Increase bandwidth; Wiring connectivity	Student centered – Lighting – Size – Furniture and fixtures	Upgrade – Library – Access to technology – learning resources
Safe and orderly	Reduce congestion/traffic	Safety procedures; population consideration; security manned vs unmanned	Pest control
Manageable, cost effective	Standardizing equipment and fixtures	Trained personnel	– Lower energy and maintenance costs – Weather considerations
Maintenance	Develop a 5-year maintenance plan	Continuous professional development for all	Sufficient staff
Relating to growth and development; school levels Head Start → High school			
Students are college ready but are also able to serve the needs of the community			
High school graduates are ready for college or careers	Test preparation (ACT, NMC) Placement for college	Create opportunities/ programs for career readiness; Co-op.	Northern Marianas Trade Institute and Workforce Investment Act collaboration
Provide all campuses with similar and adequate facilities	Identify stated criteria before budgeting	All facilities must be compliant with life safety	Identify qualified personnel

2.2. Visioning Comments from Participants

The following is a summary of key visioning concepts from participants:

- Career Cluster: elementary school layout can remain generic, but future middle and high school facilities could be formed into a career cluster.
- Advanced (IT) Infrastructure improvements are needed. And yet, despite changing technology, the social aspects of child growth and development, will remain important.
- Participants stated a need to learn more about career-path interests from the community. School facilities should not be limited to just students but could also be used by the community (e.g. gym, library, school garden) and could also support continuing adult education.
- To improve efficiency of maintaining facilities, components should be standardized, avoiding proprietary brands if possible. This could broaden sourcing and reduce costs.
- New classrooms should be able to deal with heat and be prepared for climate change.
- Schools should connect students with career opportunities, facilitating student exposure to professional careers.

3. Day 1 - Design

3.1. Design Session 1: Elements of Campus Planning

3.1.1. Requirements and Spatial Organization

Participants were encouraged to use the goals and strategies listed in the previous Visioning exercise, to inform the types of spaces for this exercise. Drivers of facility requirements were also introduced in terms of curriculum requirements and spatial organization was articulated using functional requirements listed/arranged on post-its.

The Design Session 1 break out exercise was conducted in two steps. Step one was to list the ideal school requirements and Step two: arrange those requirements in physical proximity to each other. Placing and rearranging the requirement-post-its, encouraged participant discussion about functional relationships and dependencies. Some groups took the concept further and began designing a school site plan. One group focused on the design features and qualities of ideal educational facilities.

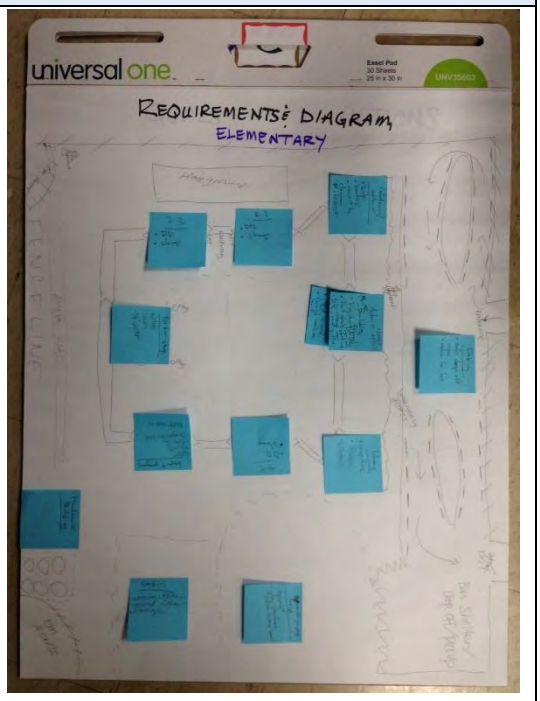
3-2 - Determining Middle School requirements

3-1 - Presenting High School functional relationships

3.1.2. Facility Requirements (Step 1)

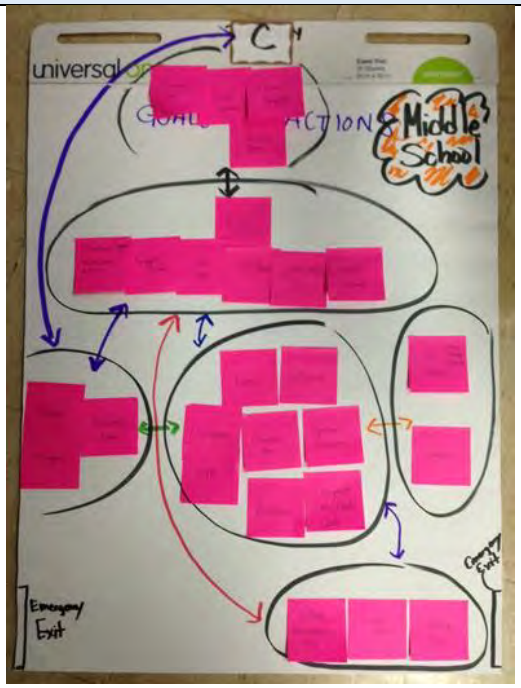
Elementary School (Group #1)

- Bus Shelter/Drop-off, Pick-up w/Main Entry (large enough for bus) and separate Exit gate
- Parking
- Fire hydrants near emergency access road
- Maintenance Building
- Cafeteria (sink, counters, convert to classroom and restroom)
- Emergency Access (at rear of school)
- Admin (Nurse, Principal, VP, Front Desk, RR, Copy Rm, Storage, Counseling, Staff Rm, Office). Should be ADA accessible. Covered Concrete Walkways
- Water Tanks
- Library (computers, lounge, restrooms (RR))
- Rear Access Road (school surrounded w/perimeter fence), Fire hydrant at rear
- Grade levels grouped into separate Classroom buildings (K-1, 2-3, 4-5)
- Garden (watering system, covered area, storage)
- Outdoor Stage (outlets, lights, PA system)
- Multipurpose Field w/equipment and play structures (slides, balance beam)
- Support Programs (Special Education (SPED), CCLHS, Title 1, Computer Lab, RR)



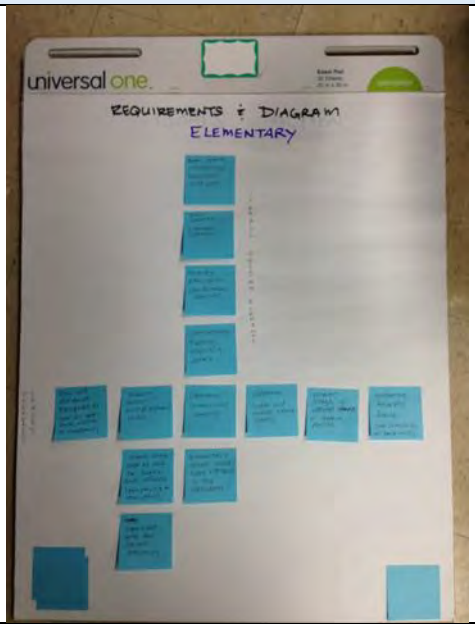
Middle School (Group #2)

- Main Entry
- Security Box
- Fence/Entrance
- Pickup/Dropoff
- Parking Area
- Office
- Student Support (Counselor, Nurse)
- Supply Room
- Network Op Center
- Copy Room
- Staff/Visitor Conf Rm
- Staff Lounge
- Water Tanks
- Garbage Area
- Emergency Exit x2 at rear of campus
- PE Areas (Gym, Fields, Courts)
- Garden
- Cafeteria
- Library
- Classrooms
- Career Tech Ed
- Common Area
- SPED
- Computer Lab/Media Center



Continued: Middle School (Group #2)	
• RR • Stage • Flagpole • Assembly Area • Storage/Maintenance Area	

High School (Group #3)	
• Main Entry • Admin (with view of entry) • Parent Resource • Multimedia Library (Network Op Center) • Student/Guest Staff Parking and Drop-off Area • Computer Lab and Classroom • Student Support Center • Teacher Communal Workroom • Restrooms (strategically located around campus) • JROTC • Water Tanks • Cafeteria • Theater • Classrooms • Hospitality/Tourism (culinary, landscaping, hotel, foreign language specialty classrooms) • Business and Admin • Supply/Food Storage	

Elementary School (Group #4)	
<u>Qualities of these Spaces</u> • Better spatial relationships between buildings • Easily secured; Intercom systems <u>Design Elements</u> • Nice, well-designed playgrounds (not an open field, similar to Head Start) • Student Center/Multimedia Studio • Classrooms (modern & Spacious) • Cafeteria (indoor and outdoor eating spaces) • Supervised area for various activities • Energy efficient comfortable interiors • Aesthetically pleasing, inspiring details • Outdoor stage w/natural shade or shading devices • Welcoming, friendly fence (no chain-link or barbed wire) • Student center could be used for health and wellness (yoga, playing on rainy days) • Restrooms should be located within the classrooms	

3.1.3. Functional Relationships (Step 2)

Key concerns and issues raised by the groups in determining the functional relationships between the areas listed in the preceding table:

High Schools

- Administrative offices must be visible at the entry
- Which career cluster should be emphasized (e.g. agriculture)

Middle Schools

- Security
- Layered design emphasizing security, visibility, and privacy
- Emergency evacuation exits at the rear
- Biggest challenge to achieving the ideal school is funding

Elementary Schools

- Security
- Focus on quality of internal spaces: comfortable, modern and spacious
- Restrooms within classrooms to improve supervision

Participants stated the following were priorities for Elementary school campus planning: Play areas should not be located close to classrooms due to noise and security concerns. Site access is important. Vehicular drop-off areas should be separate from pedestrian access routes – don't mix walkers and car riders. Secondary access routes (i.e. behind the school, if possible) should be provided for emergency access and service vehicles. A perimeter property fence is important to school security. A multimedia area would be ideally co-located with the parent resource area, near the main entry point to campus. Bathrooms located within classrooms would improve teacher supervision.

For middle school campus design, participants said security was a concern. The need for privacy, security and visibility should be approached as a layered design that places larger gathering spaces at the rear, further from the main entry. Chacha was mentioned as school layout that illustrated this concept. Participants said middle schools should be designed with separate "public" and "private" zones. For example, the stage/flagpole/assembly area should be separated from garden spaces. However, academic classrooms and common spaces should be centrally located. Restrooms should be dispersed throughout campus, in close proximity to student areas.

Figure 3-3 – Chacha JHS, participants said, had a good layering of public spaces near the entry and private space at the rear.

For high schools, campus layout would be influenced by the career cluster focus of the school. For example, an agriculture-focused school would include more garden and outdoor support facilities.

Information on hazards affecting school facilities was shared by one participant who provided the following information. While some CNMI schools were designed to withstand typhoons, none of them were designed to protect students against school shootings. Also, covered walkways between buildings sometimes block emergency vehicle access, which requires a minimum 13' vertical clearance and 20' width. Many schools are also missing mass notification devices that differentiate between earthquake, typhoon, or a shooter. Designated shelters are ideally used for up to 3 days maximum, constructed of concrete, have shutter-protected openings, located outside of flood prone areas, and ADA accessible. Fire Alarms are inoperable or outdated in nearly all PSS buildings. New fire regulations require a fire alarm and notification device or schools are allowed to provide a staff person on fire watch.

Figure 3-4 - Group break out session determining the functional relationships of an Elementary School

Figure 3-5 - Presenting Middle School functional relationships

3.2. Design Session 2: Elements of Campus Planning

3.2.1. School Site Planning Basics

The school site planning session was conducted in two parts. The first step of the site planning exercise was to do a site analysis. These principles have varying application to existing conditions, new construction, major renovation, repair, and replacement.

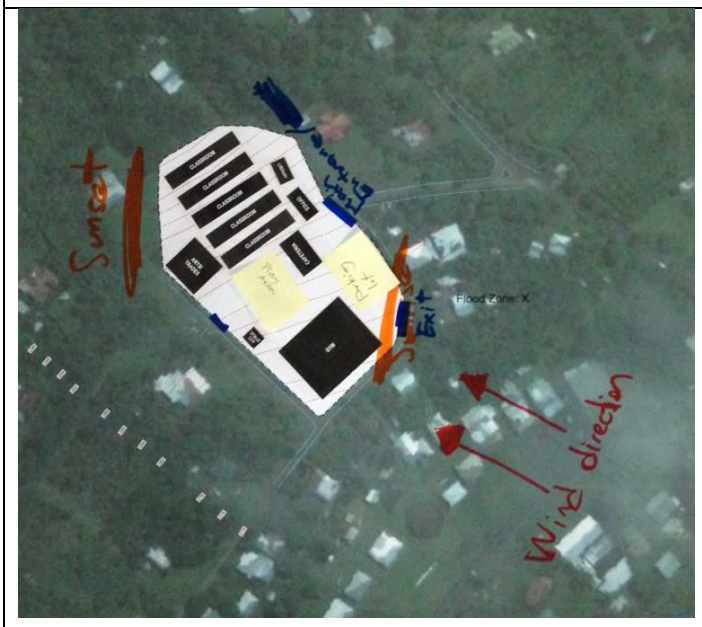
Suggested site analysis considerations included:

- Space Requirements
- Facility Adequacy
- Expansion or Consolidation
- Site Constraints and Assets
- Pedestrian Movement
- Alternative Energy
- Environmental Conditions: wind and sun directions
- Location of major/ minor roads
- Community assets (i.e. off-site uses within a walkable distance)

- Proximity to ocean
- Large trees
- Natural hazards
- Amount of land
- Infrastructure limitations
- Adjacent sources of noise

The second step of the site planning exercise was to place a given set of school buildings on an actual site. This exercise challenged participants to integrate their ideas about functional and spatial requirements of an ideal school, while engaging real-world constraints such as topography and street access. Groups were given the freedom to modify facilities in their site plan, such as stacking classroom to increase play areas, incorporate adjacent off-site playgrounds, or use post-it notes to supplement the pre-made building footprints. Overall the groups had a good understanding of integrating spaces and creative discussions about off-site resources.

Site Planning	
	The classroom building orientation aligns with the topography of the terraces; building orientation considers the solar axis; the gym is located off-site to provide more space on-campus and creates potential for the gym to be used as a shared community resource that is accessible from the campus as well as community;" write-in" spaces added by the group include parking, fields, water tanks, agriculture, and service area; cars/parking is kept on the perimeter and access for walkers is given priority with direct paths into the heart of the campus

	Consideration is given to solar and wind orientation as we well as the slope direction of the site; classrooms are organized into a courtyard configuration creating an outdoor play space with a perimeter defined by the buildings, which also provides eyes on the outdoor area for security and safety; the library is central to the classrooms and is adjacent to the main entrance creating potential for a shared community resource space; the gym spacing and orientation creates a secondary courtyard space which can be treated as an extension of the indoor recreation space; “write-in” areas inlcude a play area and parking
	Participants oriented classrooms along the terrain slope with the long axis predominiately along the east/west axis. This also aligns with the preferred solar orientation of the site to maximize indirect daylight and minimize heat gain; the gym, cafeteria, and classrooms create and exterior courtyard space with a centralized play area; the office is between the communal cafeteria and library spaces while also maintaining immediate access to the classroom buildings; internal spacing between buildings allows for uninhibited pedestrian circulation

3.2.1.1. Facility Space – Character and Quality

The objectives of this session was to discuss design elements that affect Indoor Environmental Quality (IEQ) and build awareness so that all participants are better equipped to evaluate facility conditions and work towards better designed schools and flexible learning environments for students. The third goal for this session was to facilitate communication between:

1) Classroom users (e.g. Teachers),
2) Administrative and facility management staff at the school level, (i.e. Principals and Maintenance staff), and
3) Regional decision makers in charge of funding and capital investment decisions (e.g. Board of Education and Legislators).

The character and quality of indoor spaces is not only connected to improved learning outcomes but also has the potential to impact operational costs. As ongoing operations and maintenance (O&M) costs reduce funds available for other expenses, participants were shown Life Cycle Costs of various materials and encouraged to consider true life-cycle costs (including accumulated O&M costs), not just initial installation costs, when selecting construction materials.

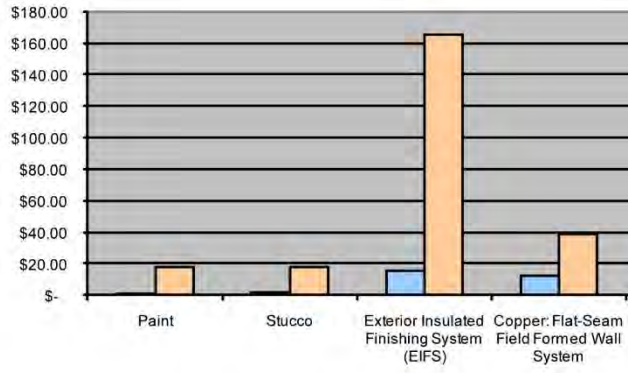


Figure 3-6 – Comparison of Exterior Wall Covering materials (cost/square foot). Paint and Stucco have very low first costs (blue) and lifecycle costs (orange). EIFS has modest fist costs but the *highest* total lifecycle cost.

Further improvements in IEQ (and potential O&M savings) could be achieved with natural daylighting. Participants were shown a sun path diagram and strategies to reduce solar heat gain, specific to CNMI's location in the northern hemisphere. Increasing opportunities for natural ventilation was also introduced to improve IEQ and provide operational cost savings. Notably, the Hawai'i Department of Education has estimated it would cost $1.7B to install air-conditioning all schools and $60M a year for electricity to operate the units.[1]

3.2.2. Indoor Environmental Quality Design Exercise

Because the long-term plan for CNMI PSS will most likely include a few new buildings, additions, and modernization of existing facilities, this session's exercise focused on case studies or retrofits to improve the IEQ at actual school buildings in CNMI. The following IEQ factors were discussed: Natural Ventilation, Thermal Comfort, Air Quality, Lighting and Acoustics.

[1] Hawai'i State Department of Education, "Heat Abatement Program at Public Schools," www.hawaiipublicschools.org/ConnectWithUs/Organization/SchoolFacilities/Pages/HeatAbatement.aspx Accessed June 25, 2015.

Improvements shown below are intended for discussion only, not recommendations for actual implementation. Concepts should be reviewed by an Architect and Structural, Mechanical and Electrical Engineer to prepare appropriate drawings and details. Roof insulation was also discussed, but is not shown in the diagrams below.

3.2.3. Findings from Group Discussions:

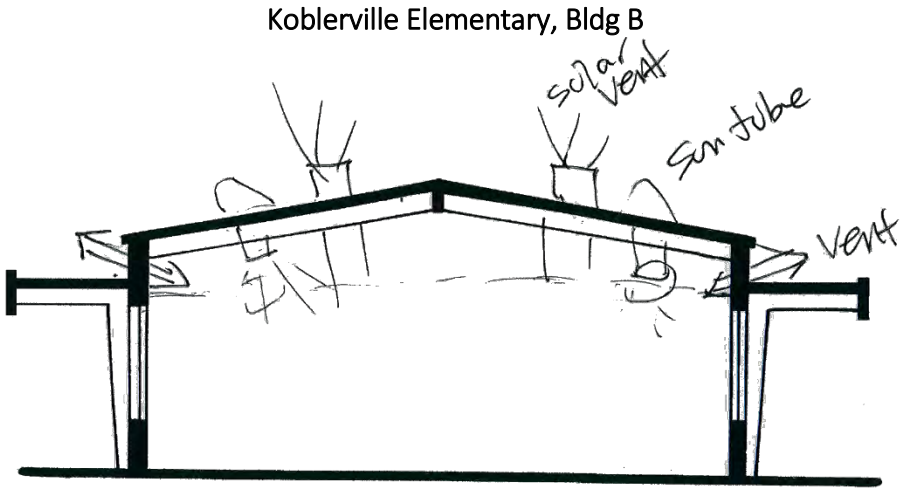


Figure 3-7 – Participants' proposed makeover would include solar vents, solar light tubes and a new clerestory windows. Existing overhangs provide sufficient window shade.

Figure 3-8— Clerestory windows at Koblerville could potentially be located high in the wall to provide additional light and ventilation. However, this concept should be reviewed by an Architect and Structural Engineer prior to implementation.

Hopwood Hunior High, Bldg A

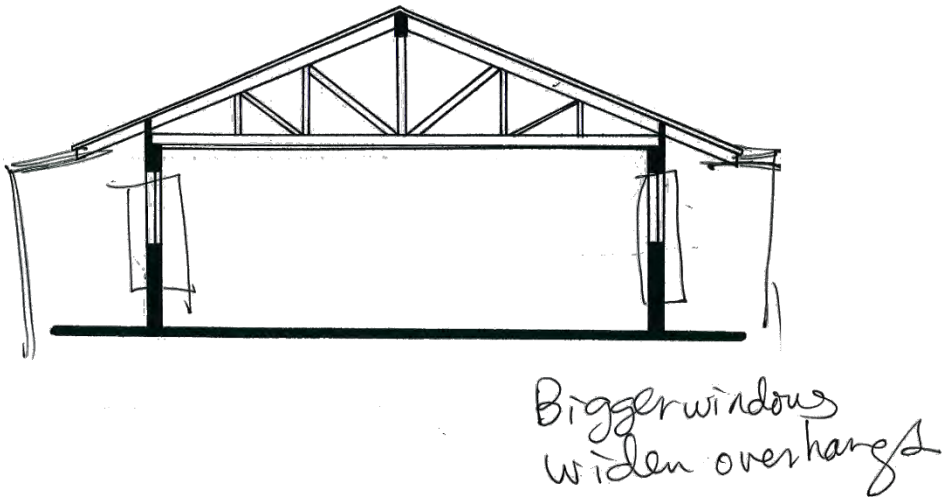


Figure 3-9 –Proposed improvements include larger windows and extending overhangs to reduce direct sunlight entering the classroom.

Figure 3-10 – Interior of Building A classroom shows heat and glare are IEQ concerns.

4. Day 2 - Policy

4.1. Policy Session 1: Enrollment Projections and Regional Influences

The goal of this session is to relate the importance of student enrollment projections in planning and investment in school facilities. Since population growth and decline are often cyclical and it is critical that the Facilities Master Plan integrate local knowledge: where are future residential developments being built, where are the new jobs and where are people moving/commuting to?

Building new classrooms is not the only way to deal with growing enrollment. In fact, construction is often the most expensive way to deal with growing enrollments and should therefore be the last option, after programmatic (i.e. relocating special programs to other campuses, floating teachers to increase classroom utilization) and administrative (i.e. attendance boundaries) changes.

4.1.1. Historic enrollment trends

This session began with US Census data, comparing population shifts from 2000 to 2010, looking at population density maps and then more specifically, looking at future population projections of school-aged cohorts.

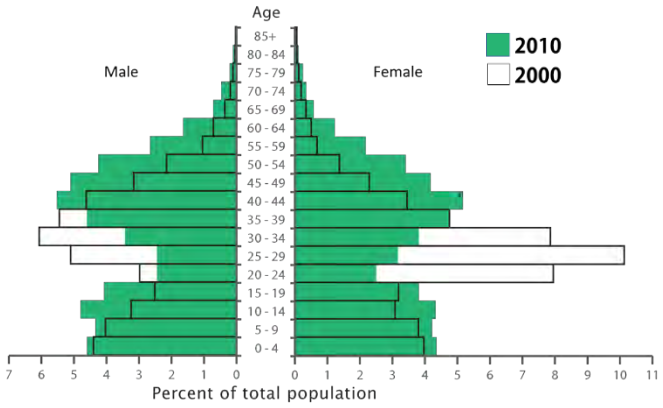


Figure 4-1 – CNMI Change in Population by Age and Sex, 2000 and 2010 (US Census)

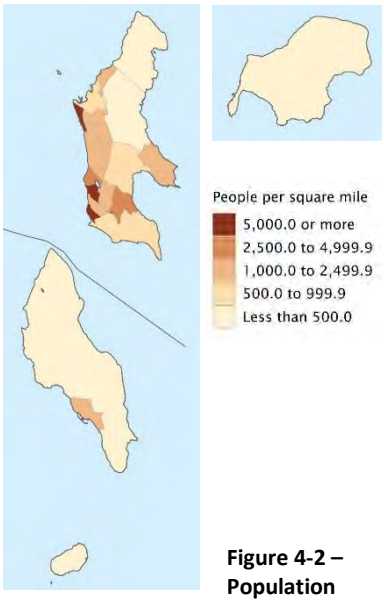
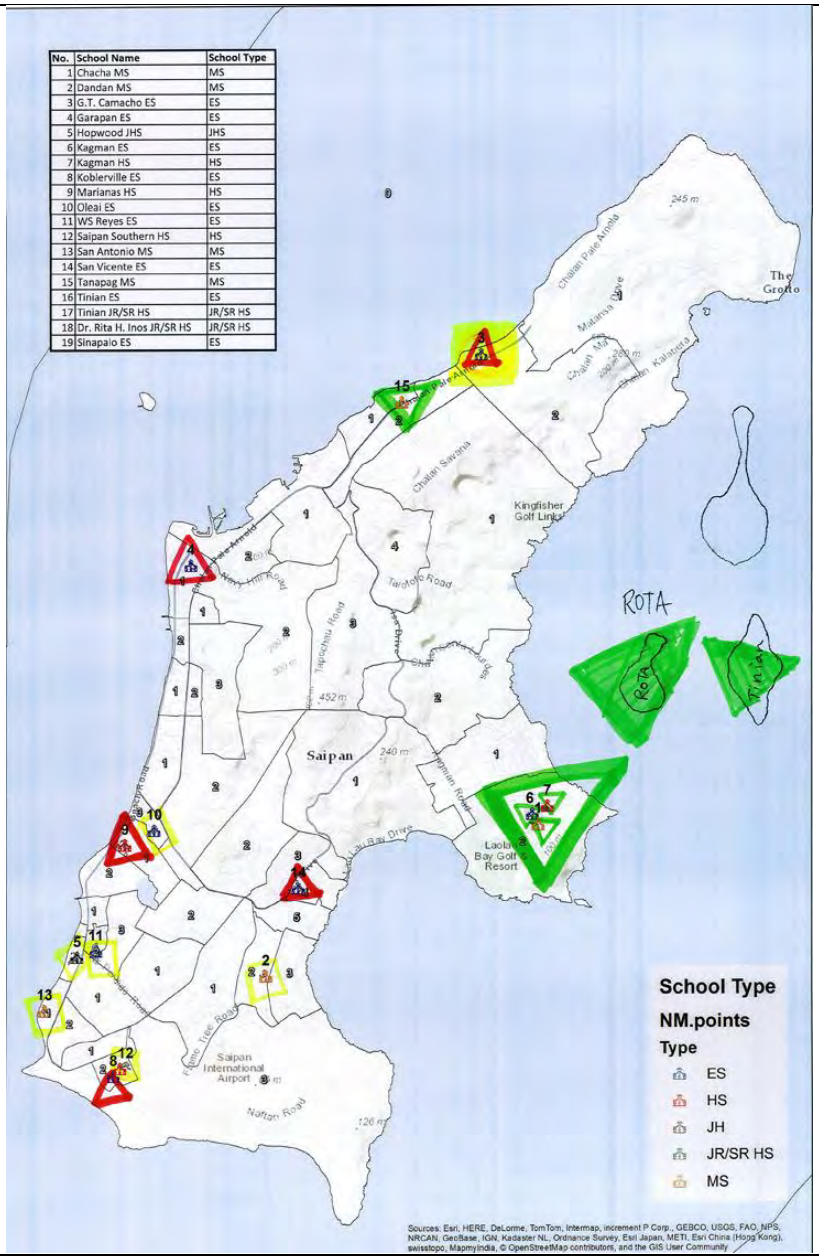


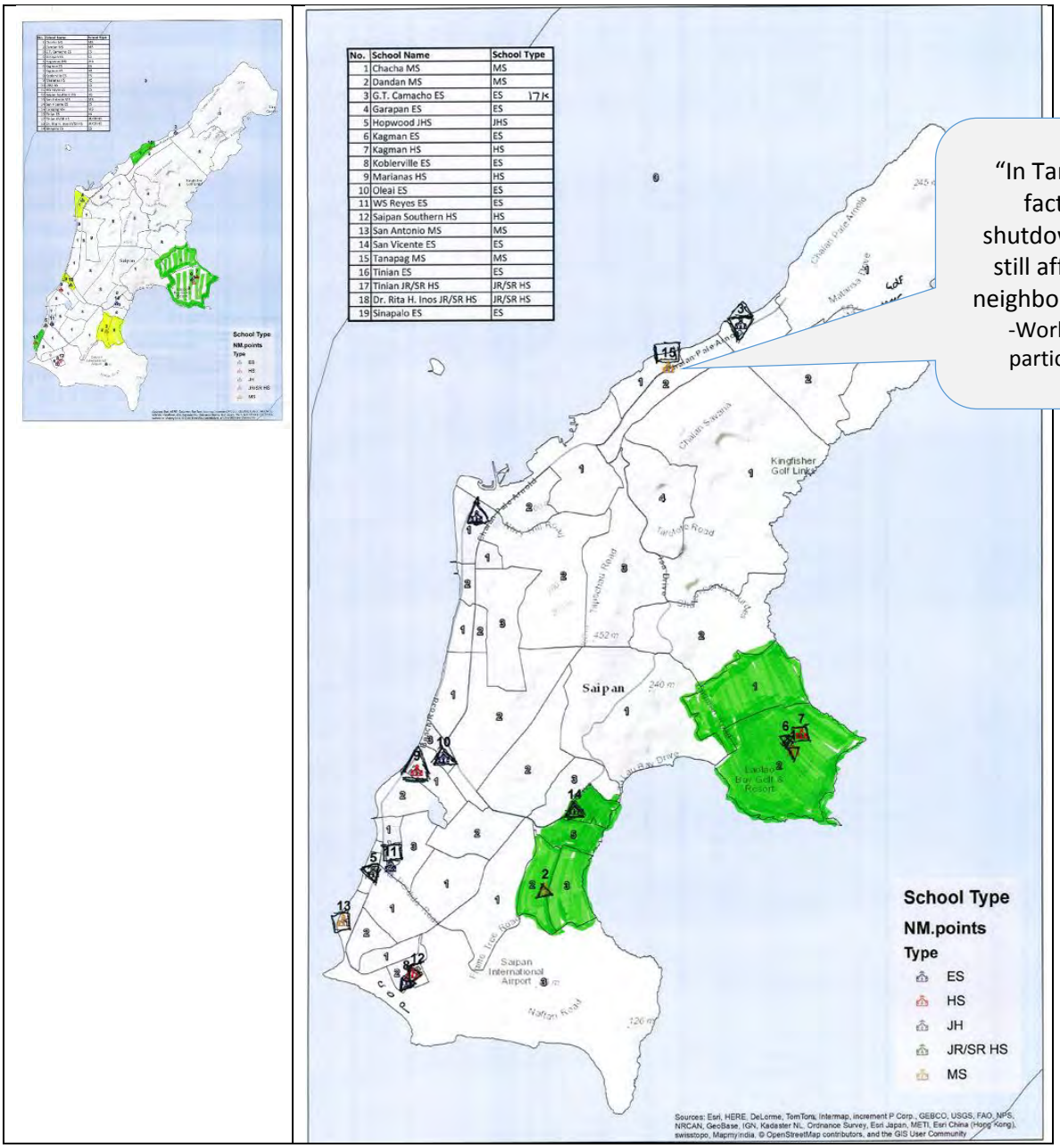
Figure 4-2 – Population Density by Census Tract: 2010 (US Census)

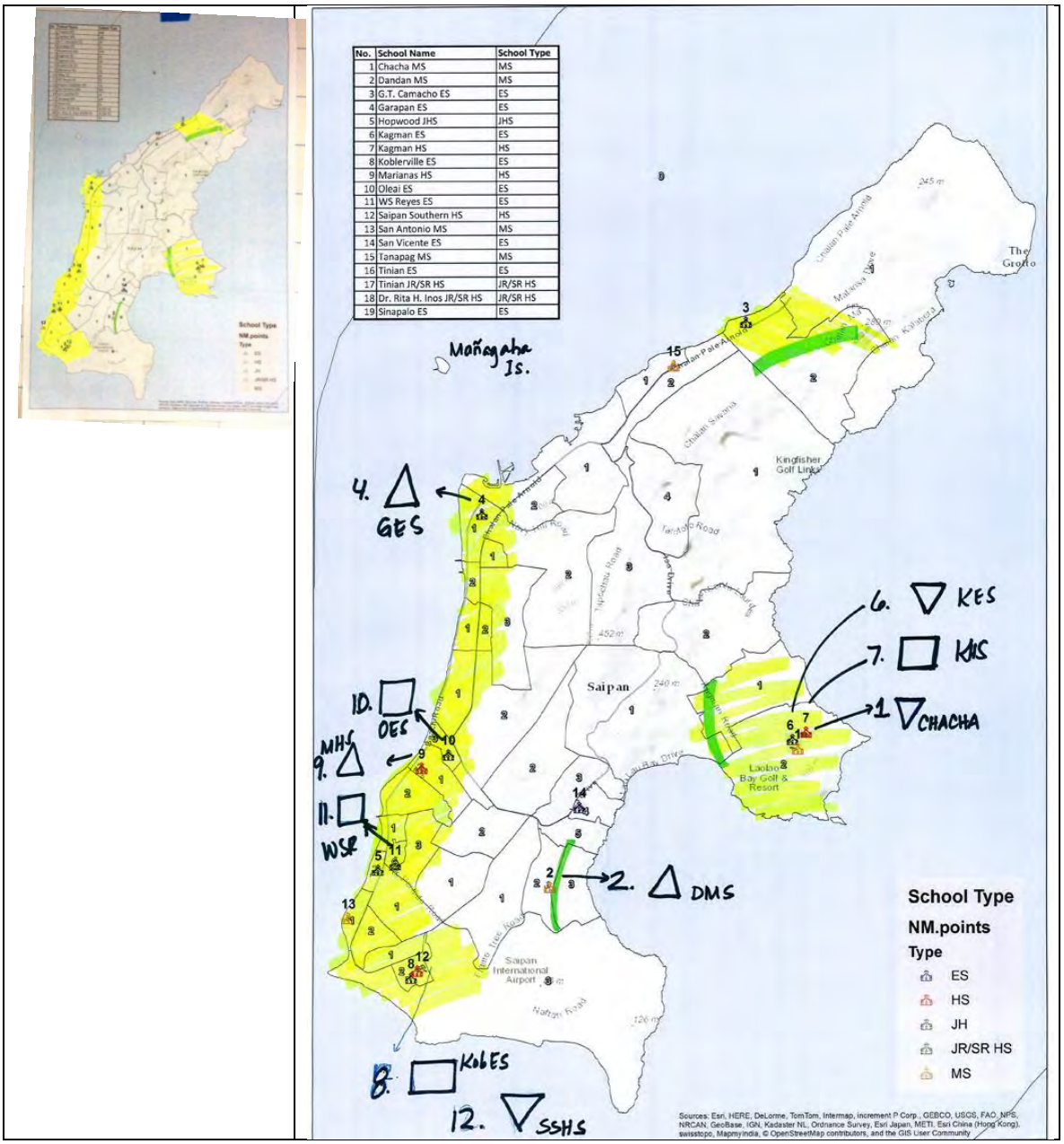
4.1.2. Regional influences on student enrollment

US Census population projections do not factor economic considerations, so their projections are not always accurate. Participants expressed disagreement when shown the US Census historic map of areas growing and declining in population.

In the following exercise, participants were asked to use their own experience and knowledge about their communities to create a 10-year forecast. Step 1: identify by coloring specific areas on a map that would experience population growth and decline; and Step 2: indicate specific schools they expect will be over, within, or under capacity.

Exercise: Mapping Population Change	
Step 1 (Population Growth)	Step 2 (Future Enrollment)
= growth = decline	= over capacity = within capacity = under capacity
	


No. School Name School Type
1 Chacha MS MS
2 Dandan MS MS
3 G.T. Camacho ES ES
4 Garapan ES ES
5 Hopwood JHS JHS
6 Kagman ES ES
7 Kagman HS HS
8 Koblerville ES ES
9 Marianas HS HS
10 Oleai ES ES
11 WS Reyes ES ES
12 Saipan Southern HS HS
13 San Antonio MS MS
14 San Vicente ES ES
15 Tanapag MS MS
16 Tinian ES ES
17 Tinian JR/SR HS JR/SR HS
18 Dr. Rita H. Inos JR/SR HS JR/SR HS
19 Sinapalo ES ES
"In Tanapag, factory shutdowns are still affecting neighborhoods." -Workshop participant
Saipan
Kingfisher Golf Links
Lao Lao Bay Golf & Resort
Saipan International Airport
Naftan Road
Tapochau Road
School Type
NM.points
Type
ES
HS
JH
JR/SR HS
MS
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


No. School Name School Type
1 Chacha MS MS
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4 Garapan ES ES
5 Hopwood JHS JHS
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7 Kagman HS HS
8 Koblerville ES ES
9 Marianas HS HS
10 Oleai ES ES
11 WS Reyes ES ES
12 Saipan Southern HS HS
13 San Antonio MS MS
14 San Vicente ES ES
15 Tanapag MS MS
16 Tinian ES ES
17 Tinian JR/SR HS JR/SR HS
18 Dr. Rita H. Inos JR/SR HS JR/SR HS
19 Sinapalo ES ES
Moñagaha Is.
4. GES
6. KES
7. KMS
1. CHACHA
10. OES
9. MHS
11. WSR
2. DMS
8. KobES
12. SSHS
Saipan
School Type
NM.points
Type
ES
HS
JH
JR/SR HS
MS

4.1.3. Comments from Participants

Participants expressed differing sentiments about areas experiencing population growth and decline. One participant stated that factory shut downs in Tanapag and San Antonio are still affecting neighborhoods and will continue to erode the number of families and student population in those areas. Some felt that Dandan and Kagman would continue to lose population as people move closer to where they work. One participant said Kagman also had a higher crime rate, pushing some families out of the area. A contrary point of view was that some people were moving into the Kagman area because it was now more affordable. Another contrary view was that population in Dandan will grow due to new construction and a recent land use change that

could add new jobs and student enrollment closer to the airport. In general, participants agreed that growth was occurring along the west shore of Saipan. Growth is expected in Oelai and Garapan, where new hotels and casinos are being built. Resort worker's children will add to school enrollments.

Participants felt that due to the higher costs of living, Rota and Tinian should expect to see population losses continue ($4/gallon of gas in Saipan vs $6.50/gal in Rota).

Other future developments/trends that will shape enrollment patterns:

- Immigration
    - Contract worker visas sunset in 2019 and would affect enrollment levels.
- Economic development
    - Hotel development
    - Casinos
    - Military buildup
    - Kagman area – could build back up with new investments
    - Gas prices
    - Location/jobs/housing
    - Crime rates
    - Shifting private-public school enrollment shifts as economy cycles up and down

4.1.4. Measuring Enrollment Capacity

Shifting population trends impact the demands placed on school facilities (e.g. are there enough classrooms for students?) In this section participants were provided a brief description of different methods of measuring enrollment capacity: current enrollment, number of classrooms, floor area per student, instructional area per student, and assigned utilization area per student. The goal of this discussion was to elicit participants' feedback about what criteria they feel is most important in measuring enrollment capacity and how do their schools deal with fluctuations in enrollment.

Participants generally agreed that the number of classrooms available, not classroom floor area, was the most important capacity measure for student enrollment. Since PSS hasn't built any new classrooms recently, being able to accommodate students with programmatic changes has been the most important tool to adapt to changing enrollment.

PSS has not built new classrooms recently, forcing some schools to provide for more students within the same facilities.

-Workshop participant

4.1.5. Adapting to Fluctuating Enrollment

Participants stated several ways they currently and could potentially address fluctuating student enrollment.

- Zoning (redistricting)
- Curriculum development
    - Online courses could decrease the need to physical classroom spaces
    - Modifying instructional/curriculum requirements to fit programs within given instructional spaces
- Reconfigure existing facilities
    - Classroom count subject to change based on enrollment
    - Scheduling adjustments can help maximize classroom utilization
    - Incorporate outdoor spaces (classes under a tree)
    - Use cafeteria as an overflow classroom
- Maximizing utilization
    - Floating teachers between classrooms to increase utilization rates
    - Higher student-teacher ratios

4.2. Policy Session 2: Basic Principles of Maintenance Budgeting

The objectives of this session were 1) to underscore the importance of performing adequate maintenance in Life Cycle Costs, 2) differentiate O&M from Repair and Maintenance (R&M) costs when comparing performance data, 3) Estimate an R&M Budget, and 4) the importance of having data to defend R&M funding.

As a best practice, Preventive Maintenance costs less than Reactive Maintenance. While the "run-it-til-it-breaks" strategy saves money in the short-run, it costs more when the total Cost of Ownership of the facility is considered.

One participant shared that the each school's

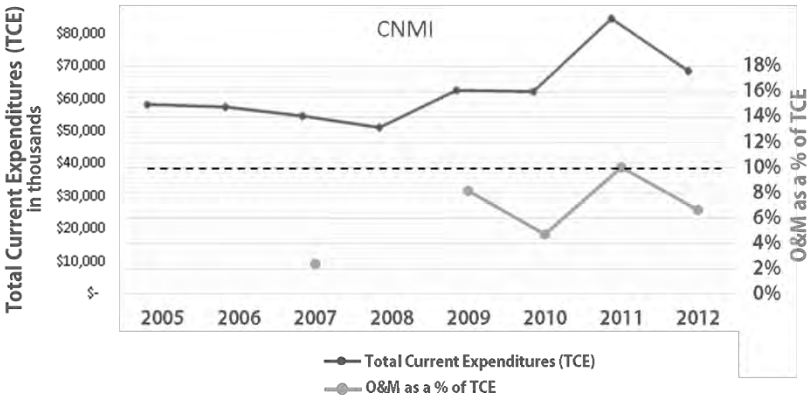

Figure 4-3 – Operations & Maintenance Expenditures (2005-2012) data provided by NCES[2]

[2] O&M for 2005, 2006 and 2008, not reported. Expenditures for capital outlay: construction of buildings, roads and other improvements and for purchases of equipment, land and existing structures were not included because they vary widely year to year. Source: *Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2004-12.* National Center for Education Statistics.

maintenance budget is determined by the following. Small schools (less than 200 student enrollment) are allocated a $17,000 base which must cover janitorial services, supplies, and maintenance. Larger schools (greater than 200 students) receive $50/student. Utilities for large and small schools are reimbursed by PSS.

Kagman reportedly has central air-conditioning, yet has enrollment below 200 students. It therefore has a high cost per student.

4.2.1. National Comparisons

According to the National Center for Education Statistics, public primary and secondary schools in the US spend on average, 10% of their total budget[3] on O&M. In recent years, CNMI PSS spent on average, 6% of its total budget on O&M (see previous graph).

4.2.2. Estimating a Maintenance Budget

As a rule of thumb, an annual Maintenance Budget should be 2% to 4% of the Current Replacement Value (CRV).[4] CRV is the estimated cost of constructing a new facility, designed and equipped for the same use as the original building. For CNMI PSS, this means that an appropriate range of approximately $3M to $7M should be budgeted each year for Repairs and Maintenance.

Annual Maintenance budgets should not include operational costs such as utilities, security, custodial or landscaping services; those are operational costs. Only the staffing, materials and services required to sustain the physical school facilities should be included.[5] Capital improvement funds to build new or modernize existing classrooms should not be deducted from the 2% to 4% amount. Funds budgeted for deferred maintenance should also not be subtracted from annual maintenance budgets. Addressing deferred maintenance is an accumulation of maintenance that should have been done previously.

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[3] 10% of Current Expenditures. Expenditures for capital outlay: construction of buildings, roads and other improvements and for purchases of equipment, land and existing structures were not included because they vary widely year to year. Source: *Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2004-12.* National Center for Education Statistics.

[4] Committee on Advanced Maintenance Concepts for Buildings, *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings.* National Academy Press: Washington D.C., 1990.

[5] The US Department of Defense Unified Facilities Criteria uses the term "Sustainment" and defines it as: "...regular roof replacement, refinishing wall surfaces, repairing and replacing electrical, heating, and cooling systems, replacing tile and carpeting, and similar types of work. It does not include repairing or replacing non-attached equipment or furniture, or building components that typically last more than 50 years (such as foundations and structural members). Sustainment does not include restoration, modernization, environmental compliance, specialized historical preservation, general facility condition inspections and assessments, planning and design (other than shop drawings), or costs related to acts of God, which are funded elsewhere. Other tasks associated with facilities operations (such as custodial services, grass cutting, landscaping, waste disposal, and the provision of central utilities) are also not included." US Department of Defense. 2014. *Unified Facilities Criteria (UFC) DoD Facilities Pricing Guide, UFC 3-701-01, March 2011, Change 6, 2014.* http://www.wbdg.org/ccb/DOD/UFC/ufc_3_701_01.pdf, DoD.

To illustrate the importance of differentiating operational costs from maintenance costs, consider the price of electricity. Electricity costs twice as much in CNMI than the continental US (27 cents/kWh in CNMI vs US average of 13 cents/kWh[6]. This means that operational costs consume a larger share of the O&M budget than typical schools in the US, which leaves disproportionately less for actual maintenance. Furthermore, based on these and other regional cost differences, the reader is cautioned against using comparisons of benchmark O&M costs per square foot between US public schools and a CNMI PSS schools.

4.2.3. Budget Forecasting and the Need for a Facility Master Plan

The group exercise planned for this session was designed to stimulate participants' thinking about allocating an annual maintenance budget to several schools. The goal was to raise awareness of the variables and information that should be considered and the difficulty when there is no Facility Master Plan to guide this effort.

4.2.4. Typical Questions Addressed in a Facility Master Plan

Participants were challenged to determine what criteria they would use to allocate a maintenance budget among several schools. Should older school buildings receive more maintenance funds than newer buildings?

- Which school should get more maintenance funding: a school that has higher student enrollment or a larger floor area?
- Should legal requirements (such as upgrades to the alarm system to meet current fire codes or kitchen refurbishment needed to meet sanitation standards) be prioritized over other deferred maintenance items?
- Should certain types of work be prioritized, such as leaking roofs that can quickly lead to costly repairs as other interior components are damaged?
- How do facility investment decisions, such as choosing fans or air-conditioners, affect a school's ability to deliver a specialized educational program? How important are facility conditions (Indoor Environmental Quality) to student performance?
- Should schools in flood prone areas or under capacity enrollment, receive less funding because they serve less students or are likely to suffer damage in the future?

4.2.5. The Role of a Facility Master Plan

Ideally, these questions and considerations in earlier sections (visioning, functional relationships, population projections) and more would all be given careful consideration and balanced in a systematic, standardized manner. That is the function of a facility master plan – to incorporate the community, school administrators and school board's vision and goals; relate the educational program to facility requirements; ensure that the physical facilities are provided to meet those

[6] US Energy Information Administration. http://www.eia.gov/state/?sid=CQ compared to US average: http://www.eia.gov/state/compare/?sid=HI%23?selected=US-HI#?selected=US-HI

goals; and to establish a plan to secure funding and a realistic timeline to provide new/renew those assets when facilities are no longer adequate.

4.3. Policy Session 3: The Importance of Data

4.3.1. The Value of an Enterprise Asset Management System

Besides a facility master plan to document these standards, an enterprise asset management system (EAMS) is often used as an archive (i.e. warranties, as-built plans and hazmat assessments), track performance data such as man hours worked and costs, and schedule preventive maintenance of major building systems and components. This system should also be able to process Work Orders.

The session explained to the group that EAMS modules would help to manage maintenance and replacement schedules, track budgets, justify shortfalls, track performance, and get to steady state that focuses on scheduled maintenance and reduced responses to trouble calls. The data provided by this system, once related data points are populated by the system users and administrators, would also help define budget and staffing requirements.

5. Feedback from Workshop Participants

At the conclusion of this workshop, participants were asked to complete an optional feedback form. There were a total of 34 respondents who completed a workshop evaluation form. Overall, they rated the workshop 4.6 out of 5, with 1 = “not helpful” to 5 = “very informative”.

5.1. Write-in Comments

The following comments were received directly from participants:

- Small group discussions were helpful to hear what’s going on in other schools and how they’re addressing them with the limited budget available. I hope my maintenance staff will see the serious planning that goes into this. I hope we can make a Maintenance Plan for our school from here on out.
- This will help me with budgeting my school’s R&M.
- Very useful, needed and long-overdue discussion and attention.
- [We need] more maintenance and any other workshop and further planning to improve repair and maintenance
- We need more funds for maintenance
- Presentations were very informative; my only concern was that there was too much group work. Maybe have two group works per day? Keep up the good work!
- Validated a lot of my thinking. This is excellent info and discussion material. The TED talk was great for teachers! But I can see how some of it might be lost on some audience members – the speech is fast and accent makes it hard to understand.
- This was a very useful and informative workshop. It gives great ideas and tools on planning buildings in the future… even for my area of expertise, not just schools.

5.2. Other topics that should have been covered, or items that should not be included?

- Renewable energy and best practices
- Incorporating network and communications in the planning of school facilities
- Maximizing life and utility of existing facilities
- Applicable federal laws that need to be considered BEFORE actual construction. Building codes for schools.
- What is the location of the new casino?
- [Need] more information on enrollment projections/capacity and tools or practices to gather effective and accurate data. Budget exercises and tools to allocate money should have been longer or more information provided. Need new ideas or direction for O&M budget. Doubt PSS will make changes to budget for maintenance of schools in need of repair.
- Provide information on recommended materials or structure form. For example, recommended window type for classroom to utilize/maximize light and wind/air flow.