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CENWO-ED-DG

9 May 2014

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

PART ONE, ASD FUNCTIONAL BASIS EVALUATION SUMMARY

This portion of the Memorandum will address the specific evaluations made as they relate to the Army Standard Design (ASD) for this facility type, discussed in the order observed. Because any completed facility also includes characteristics and features not part of the ASD requirements, not all of the potential Lesson's Learned have application to the ASD. The primary focus of this investigation is to improve the ASD and to do so in a way that reflects upon the underlying assumptions and theories (design concepts) upon which the ASD was developed. "PART TWO" of the Memorandum will include detail on the actual observations and take up the various issues unique to this facility as well as those applicable to the ASD. To assist perusal of the document the primary functional space type being discussed has been inserted (in parentheses) in between the appropriate groups of comments.

In general, most agreed that the completed facility is performing well in many ways; the building layout allows enough flexibility to overcome some of the functional requirements that are missing from the program. The users feel generally empowered to accomplish the Chaplaincy mission. This has been of tremendous value to the congregations being supported and the entire military community and Army mission.

Weaknesses of the facility focus primarily on a few components that are not functioning quite as intended. There were also a (very) small number of weaknesses that were rooted in all of the aspects of what puts a project together (contract, design, construction), as well.

Observations made that relate directly to the ASD requirements and the design concepts selected for use by the Office of the Chief of Chaplains (OCCH) are as follows:

1.1 The Worship Center A/V system performs well, except for the main speakers installed with the system. The main speakers are not used due to echoes based on the acoustical design of the space. A set of freestanding speakers are used in lieu of the central cluster above the first row of pews. **The ASD text will add additional language to expand the requirements for the contractor to provide an acoustical**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

analysis and report, as part of the contract. Additionally, the ASD will include more information regarding the coordination of the design and specifications to include the testing and commissioning of the A/V system, prior to project completion. The A/V controls will require the system be easy to use.

1.2 A long-standing issue with all of the Chapels is how to best accommodate the changing of lighting lamps in the high-ceilinged areas, i.e. the Worship Center. Fort Campbell Chaplaincy purchased a lift that remains stored in the utility area, and uses it to change light bulbs in the high ceiling areas. During the Phase I ESTR, Fort Campbell User has explained how access to the chandeliers in the Worship Center is a benefit to the facility; however, this solution requires removal of pew sections. **The CoS cannot guarantee the outcome of this solution for other projects; however, it was a creative solution for Fort Campbell, as we have been trying to accomplish similar outcomes on other projects.**

1.3 The user complained that the worship area can get hot when heavily occupied, even when the occupancy is not at the maximum. The user was informed that we would review the calculations for this area. **After a review, it seems that the worship area should have adequate cooling capacity. The design shows a cooling load based on 600 people in the worship area, with an additional 140 in the expansion area. The air handling unit-cooling coil is sized for this capacity, and the variable air volume box serving the worship area is shown with adequate airflow. Possible causes for this problem are the space temperature set point, inadequate actual airflow from the diffusers, excessive outside air intake at warmer outside air temperatures, or inadequate coil water flow.**

1.4 The lighting level in the Expansion Area is dim, compared to the light levels in the corridor. In an effort to conserve energy, the lighting design criteria for corridors in this facility meet the minimum light level requirements. **The programmatic relationship of the Expansion Area to the adjacent Worship Center and Activity Center allowed the designer to treat the Expansion Area as a corridor instead of a room. The CoS will consider using light levels above the minimum required.**

1.5 The A/V system works great; however, it is complex and at times difficult to use. **Managing the A/V console is a challenge due to the skill set and number of different users. The ASD will include more information regarding the coordination of the design and specifications to include training the staff, prior to project completion.**

1.6 Baptistery water takes up to 12 hrs to heat. **Basic circulating heaters vary according to size of heater. An 11.5 KW heater will take less time to heat baptistery water than a 6 KW heater. The ASD does not require a specific heater**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

size or rate at which to raise the water temperature by any number of degrees. The CoS will consider adding language to the ASD stating the warm-up period for baptistery should begin not less than 24 hours prior to service.

1.7 The A/V system works great; however, the system does not have the ability to record on the DVR, which is a capability the User really wants. **The ASD does describe the salient features for the A/V system that are required to enhance the functional ministry and communication capabilities, including the ability to record. During the design for the Liberty Chapel, the COS was continuing to define the scope and criteria for the A/V system. The intent of the ASD was always to require the Contractor to submit an A/V design proposal of sufficient detail to evaluate the general quality, media, and recording/broadcasting supporting features. The 2012 ASD does include additional information regarding the design and coordination of the A/V system.**

1.8 Outlets in the Kitchen Suite caused some initial issues when putting coffee pots on the same circuit; the User has distributed coffee pots to several circuits and resolved the conflict. **Although this issue is no longer a problem at this facility, the current ASD adds verbiage to include more outlets and circuits, so to avoid having this happen again.**

1.9 The Sacristy and Robing Room are the best they have ever seen. **This is gratifying evidence of the forethought put into the 2004 ASD and this specific project.**

1.10 The Blessed Sacristy Room is currently the music instrument storage area. **The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation.**

1.11 The User believes there is not enough Toddler/Nursery space for the number of children that attend the Chapel. **The Phase I ESTR mentions this issue and the COS recognizes that this facility has a high demand for a robust child watch system. The goal of the ASD is to provide optimum usable features for all users activities in any environment, where all share the benefits of a relatively flexible and extremely functional facility.**

1.12 The Nursing Mothers Room is currently being used for children's special arts and crafts projects. This room usually contains a chair for nursing mothers; however, these chairs now reside in the Women's Restroom. **Often, the User will repurpose an underutilized room or space to accommodate other activities. The CoS believes the ASD provides enough flexibility that allows the user to adapt spaces and rooms, without compromising the intent of the facility.**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

1.13 The ice machine has never worked properly. **As thought at the Phase 1 End State Technical Review, the problem does not seem to be the GFI outlet. After doing some checking, the COS found out that the ice machine is no longer under warranty. The COS provided the User with information on the closest authorized service center in case they would like to follow up more on the problem. In addition, an on-line user manual was provided with instructions and troubleshooting tips.**

1.14 According to the User, this facility does not have enough storage; however, they are utilizing the storage capacity under the raised platform in the Activity Center for storing chairs. **This is gratifying evidence of the forethought put into the 2004 ASD and this specific project. The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation. The introduction of under-stage storage began in 1985; however, miss-coordination of storage dollies and other issues has led to the decision to discontinue the use of under-stage storage in the Activity Center for the 2012 ASD.**

1.15 The Coat/Reception Room is currently a storage room, to make up for the lack of storage elsewhere. **The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation.**

1.16 The uneven tile allowed dirt and mop water to collect in the grout lines and the floor appeared dirty. The unevenness of the tile also posed a tripping hazard to individuals using the facility. **The Installation had someone come out and measure the unevenness of the tile flooring. The tiles that did not meet the tolerances allowed by the Tile Council of North America (TCNA) Handbook were replaced. The porcelain tile was also cleaned and stripped to remove any soiling that had occurred. The Installation had been cleaning the tile with soap and water and the soap was attracting and retaining dirt. The installation is now using water to clean the tile. In addition, they have a cleaning contract to clean the tile quarterly. The Installation is much happier with the porcelain floor tile now.**

IN SUMMARY: In general, the results of this ESTR demonstrate that the underlying concepts behind the 2004 ASD were sound and effective. Each of the principle functional areas and features are supporting an excellent level of successful ministry. The completed facility appears to represent a very-close-to-optimum balance between aesthetics, function, cost, and maintainability. The completed facility also appears to represent a high-value long-term asset for the military community, the Garrison, the OCCH, and the Army.

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

PART TWO, ALL OBSERVATIONS AND DISCUSSIONS

This portion of the Memorandum will address each observation. Because any completed facility also includes characteristics and features not part of the ASD requirements, not all of the potential Lesson's Learned have application to the ASD. Some are project specific and related to project history, unique points-of-view, unique features, or unique functions that needed to be added to the general facility mission. This portion of the report allows all such observations and discussions to be recorded and applied to future projects as appropriate. The following observations and discussions were identified:

(Administrative Spaces)

2.1 A problem with the roof system's flashing is causing severe water infiltration, especially in the Administrative Space. The Contractor is attempting to repair the problem; however, water continues to infiltrate the interior of the building. **Shortly after the Phase II ESTR, the Project Engineer informed us that the contractor replaced the Z strip along the transition between the high and low bay. It was installed with butyl tape and screws spaced 6-inches O.C. After this, it was still leaking around the precast stone so the contractor added some flashing around this area which seems to have corrected the problem. After a couple of significant rain events, it appears the leaking is no longer an issue.**

2.2 This area functions great and is used regularly; however, the air-handling unit shuts down in cold weather due to the freezestat tripping on a low temperature causing thermal discomfort. **After reviewing the contract drawings, the CoS will send Sgt. Delouch a list of possible solutions.**

(The Worship Center)

2.3 The Worship Center A/V system performs well, except for the main speakers installed with the system. The main speakers are not used due to echoes based on the acoustical design of the space. A set of freestanding speakers are used in lieu of the central cluster above the first row of pews. **The ASD text will add additional language to expand the requirements for the contractor to provide an acoustical analysis and report, as part of the contract. Additionally, the ASD will include more information regarding the coordination of the design and specifications to include the testing and commissioning of the A/V system, prior to project completion. The A/V controls will require the system be easy to use. (Same Comment as 1.1)**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

2.4 A long-standing issue with all of the Chapels is how to best accommodate the changing of lighting lamps in the high-ceilinged areas, i.e. the Worship Center. Fort Campbell Chaplaincy purchased a lift that remains stored in the utility area, and uses it to change light bulbs in the high ceiling areas. During the Phase I ESTR, Fort Campbell User has explained how access to the chandeliers in the Worship Center is a benefit to the facility; however, this solution requires removal of pew sections. **The CoS cannot guarantee the outcome of this solution for other projects; however, it was a creative solution for Fort Campbell, and we have been trying to accomplish similar outcomes on other projects. (Same Comment as 1.2)**

2.5 The user complained that the worship area can get hot when heavily occupied, even when the occupancy is not at the maximum. The user was informed that we would review the calculations for this area. **After a review, it seems that the worship area should have adequate cooling capacity. The design shows a cooling load based on 600 people in the worship area, with an additional 140 in the expansion area. The air handling unit-cooling coil is sized for this capacity, and the variable air volume box serving the worship area is shown with adequate airflow. Possible causes for this problem are the space temperature set point, inadequate actual airflow from the diffusers, excessive outside air intake at warmer outside air temperatures, or inadequate coil water flow. (Same Comment as 1.3)**

(Expansion Area)

2.6 The lighting level in the Expansion Area is dim, compared to the light levels in the corridor. In an effort to conserve energy, the lighting design criteria for corridors in this facility meet the minimum light level requirements. **The programmatic relationship of the Expansion Area to the adjacent Worship Center and Activity Center allowed the designer to treat the Expansion Area as a corridor instead of a room. The CoS will consider using light levels above the minimum required. (Same Comment as 1.4)**

(The Activity Center)

2.7 The A/V system works great; however, it is complex and at times difficult to use. **Managing the A/V console is a challenge due to the skill set and number of different users. The ASD will include more information regarding the coordination of the design and specifications to include training the staff, prior to project completion. (Same Comment as 1.5)**

(The Baptistery Suite)

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

2.8 Baptistry water takes up to 12 hrs to heat. **Basic circulating heaters vary according to size of heater. An 11.5 KW heater will take less time to heat baptistry water than a 6 KW heater. The ASD does not require a specific heater size or rate at which to raise the water temperature by any number of degrees. The CoS will consider adding language to the ASD stating the warm-up period for baptistry should begin not less than 24 hours prior to service. (Same Comment as 1.6)**

(Audio/Visual System Issues)

2.9 The A/V system works great; however, the system does not have the ability to record on the DVR, which is a capability the User really wants. **The ASD does describe the salient features for the A/V system that are required to enhance the functional ministry and communication capabilities, including the ability to record. During the design for the Liberty Chapel, the COS was continuing to define the scope and criteria for the A/V system. The intent of the ASD was always to require the Contractor to submit an A/V design proposal of sufficient detail to evaluate the general quality, media, and recording/broadcasting supporting features. The 2012 ASD does include additional information regarding the design and coordination of the A/V system. (Same Comment as 1.7)**

(The Kitchen Suite)

2.10 Outlets in the Kitchen Suite caused some initial issues when putting coffee pots on the same circuit; the User has distributed coffee pots to several circuits and resolved the conflict. **Although this issue is no longer a problem at this facility, the current ASD adds verbiage to include more outlets and circuits, so to avoid having this happen again. (Same Comment as 1.8)**

(The Blessed Sacrament Space)

2.11 The Sacristy and Robing Room are the best they have ever seen. **This is gratifying evidence of the forethought put into the 2004 ASD and this specific project. (Same as Comment 1.9)**

(The Sacristy and Robing)

2.12 The Blessed Sacristy Room is currently the music instrument storage area. **The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation. (Same as Comment 1.10)**

(Multi-purpose/Classroom Spaces)

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

2.13 These rooms work great and are used regularly; however, they suffer from the same symptoms as the Office Space, the air-handling unit shutting down in cold weather due to the freezestat tripping on a low temperature causing thermal discomfort. **After reviewing the contract drawings, the CoS will send Sgt. Delouch a list of possible solutions.**

(The Toddler Nursery Accommodations)

2.14 These rooms work great and are used regularly; however, they suffer from the same symptoms of the Office Space, the air-handling unit shutting down in cold weather due to the freezestat tripping on a low temperature causing thermal discomfort. **After reviewing the contract drawings, the CoS will send Sgt. Delouch a list of possible solutions.**

2.15 The User believes there is not enough Toddler/Nursery space for the number of children that attend the Chapel. **The Phase I ESTR mentions this issue and the COS recognizes that this facility has a high demand for a robust child watch system. The goal of the ASD is to provide optimum usable features for all users activities in any environment, where all share the benefits of a relatively flexible and extremely functional facility. (Same Comment as 1.11)**

(Nursing Mothers Room)

2.16 The Nursing Mothers Room is currently being used for children's special arts and crafts projects. This room usually contains a chair for nursing mothers; however, these chairs now reside in the Women's Restroom. **Often, the User will repurpose an underutilized room or space to accommodate other activities. The CoS believes the ASD provides enough flexibility that allows the user to adapt spaces and rooms, without compromising the intent of the facility. (Same as Comment 1.12)**

(Vestibules/Lobbies/Corridors/Stairways)

(Storage Spaces)

2.17 According to the User, this facility does not have enough storage; however, they are utilizing the storage capacity under the raised platform in the Activity Center for storing chairs. **This is gratifying evidence of the forethought put into the 2004 ASD and this specific project. The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation. The introduction of under-stage storage began in 1985; however, miss-coordination of storage dollies and other issues has led to the decision to**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

discontinue the use of under-stage storage in the Activity Center for the 2012 ASD. (Same Comment as 1.14)
(Coat/Reception Room)

2.18 The Coat/Reception Room is currently a storage room, to make up for the lack of storage elsewhere. **The storage restrictions hampering this facility will not exist in future facilities; the 2012 ASD will significantly improve this situation. (Same as Comment 1.15)**

(Toilet Rooms and Janitor's Closets)

2.19 The water out of the sink over-sprays. **The CoS did observe the over-spray from some of the bathroom faucets. We believe the problem might be the aerator, since not all sinks have this problem.**

(Building Features and Finishes)

2.20 The uneven tile allowed dirt and mop water to collect in the grout lines and the floor appeared dirty. The unevenness of the tile also posed a tripping hazard to individuals using the facility. **The Installation had someone come out and measure the unevenness of the tile flooring. The tiles that did not meet the tolerances allowed by the Tile Council of North America (TCNA) Handbook were replaced. The porcelain tile was also cleaned and stripped to remove any soiling that had occurred. The Installation had been cleaning the tile with soap and water and the soap was attracting and retaining dirt. The installation is now using water to clean the tile. In addition, they have a cleaning contract to thoroughly clean the tile quarterly. The Installation is much happier with the porcelain floor tile now. (Same Comment as 1.16)**

2.21 The Installation is happy with the building features/ finishes and the furniture. **This was gratifying evidence of the forethought put into the 2004 ASD and this specific project.**

2.22 Exterior doors do not function as intended (a good yank can unlatch locked door). **The Phase I ESTR mentions this issue and the CoS recommended the Directorate of Public Works (DPW) address the hardware deficiencies with the contractor.**

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

(Furniture, Appliances, and Equipment Items)

2.23 The ice machine has never worked properly. **As thought at the Phase 1 End State Technical Review, the problem does not seem to be the GFI outlet. After doing some checking the COS found out the ice machine is no longer under warranty. The COS provided the User with information on the closest authorized service center in case they would like to follow up more on the problem. In addition, an on-line user manual was provided with instructions and troubleshooting tips. (Same Comment as 1.13)**

(Equipment Rooms and Systems)

2.24 The air handling unit that serves the classroom and office areas has been shutting down in cold weather due to the freezestat tripping on a low temperature. The user has found a solution by opening one of the air handler access doors to allow the warmer air from the mezzanine to mix with the outside air. The user was informed that this should not be a permanent solution because it does not provide the outside air required for proper ventilation. Unfortunately, the solution will most likely require involvement from the post DPW or someone on the EMCS front end. **After reviewing the contract drawings, the CoS will send Sgt. Delouch a list of possible solutions.**

2.25 The Heating, Ventilating, and Air-Conditioning (HVAC) system runs quiet. **This is gratifying evidence of the forethought put into this specific project.**

(Site Issues)

2.26 Drainage ditch does not completely drain (potential water hazard for kids) on main entry side. **The CoS recommended the User address the issue with the Directorate of Public Works (DPW).**

PART THREE, UNIQUE ISSUES

2.27 Nothing Significant to Report (NSTR)

PART FOUR, THE REVIEW PROCESS AND PARTICIPANTS

The following team of participants gathered at the Chapel Complex May 9, 2014. The review process began with a meeting and continuation of previous discussions of lessons learned related issues, building operations, descriptions of what congregations are being served and their usage patterns, etc. Once general discussion reached an

CENWO-ED-DG

SUBJECT: End State Technical Review Report, Phase II, construction completed 2012. Fort Campbell, KY, Chapel Complex (PN 28706)

appropriate point, the team shifted to a tour of the facility with further items brought up as we went.

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