

MINNESOTA



POST-OCCUPANCY EVALUATION

Indoor Environmental Quality + Workplace Environment National Guard Armory – Cedar Street (NGA-CS) Minneapolis, MN

March 2016, Minneapolis, MN
Sustainable Post-Occupancy Evaluation Survey (SPOES)
B3 Guidelines

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1.0 Overview

The purpose of this report is to examine the connection between sustainable design criteria used in the design of the National Guard Armory – Cedar Street (NGA-CS) facility and occupants' satisfaction with their work environments located in the facility. The NGA-CS facility was designed using the B3 Guidelines (formerly known as the Minnesota Sustainable Building Guidelines or MSBG) and completed for occupancy in December 2013. The B3 Guidelines track specific state-funded, B3 buildings as a means of demonstrating real outcomes aimed at the conservation of energy resources, creation and maintenance of healthy environments, and occupants' satisfaction with their work environments. The Sustainable Post-Occupancy Evaluation Survey (SPOES) was developed to assess human outcomes in workplace, classroom, and residence hall settings in compliance with the B3 Guidelines project tracking requirements. This is a report of occupants' (hereafter called employees) responses from the survey conducted in February 2016.

This SPOES report focuses on employees' satisfaction with the physical environment as related to 26 indoor environmental quality (IEQ) criteria such as lighting, thermal, and acoustic conditions in their primary workspaces, i.e., offices. Employees' satisfaction with the facility (site, building, and interior) and the effect of the facility's physical environment on their perceptions of their work performance and health also are included. Finally, a brief look at employees' commuting and physical activities within the building are reported. The report provides descriptive information about employees' perceptions of the IEQ of their work environments. In addition, this information serves the broader development of knowledge regarding the influence of IEQ on employees.

2.0 Method

SPOES consists of a self-administered, Internet-based, questionnaire submitted to and completed by employees. The SPOES questionnaire has been tested for **validity** (measures what it is intended to measure) and **reliability** (repeatability or replicability of findings). Employees rate their level of satisfaction on a **Likert-type scale** (measurement scale) from 1 (very dissatisfied) to 7 (very satisfied) with IEQ of the facility and their primary workspaces. They also rate the influence of their physical environment on their perception of their work performance and health on a scale from 1 (hinders) to 7 (enhances).

The report provides a descriptive summary of the results stated as a **mean** (average of all responses), **standard deviations** (SD) (how different scores are from each other and the mean), and **number of responses** (N) for each question analyzed. The mean for a 7-point scale is 4.00. Lower or higher means reflect stronger tendencies towards dissatisfaction/satisfaction and hinders/enhances. Means that are close to the center of the scale (4) are considered to be neither dissatisfied/hinders or satisfied/enhances.

When interpreting **mean** responses, the following labels were used:

- 1.00 - 3.50 dissatisfied (or hinders)
- 3.51 - 4.50 neither dissatisfied (or hinders) nor satisfied (or enhances)
- 4.51 - 7.00 satisfied (or enhances)

An IEQ Score is also calculated for employees' satisfaction with IEQ criteria in their primary workspaces. This is a statistical combination of all category-level (explained below) IEQ scores, which results in a single IEQ score for all respondents and is reported in an IEQ Scorecard.

2.1 Description of the Questionnaire

Employees first rate their level of satisfaction with the facility (site, building, and interior) and the influence of their physical environment on their perception of their work performance and health. Then they respond to questions about their satisfaction with their primary workspaces in relation to IEQ criteria from the B3 Guidelines. Additionally, employees' demographic, physical activity, and commuting practice data are collected to provide context for the study.

In the SPOES questionnaire, the 26 IEQ criteria listed below are evaluated. There are two levels of criteria, categories and attributes. As shown in the list, the 'overall' criteria are boldfaced and called 'categories' or 'category level' criteria. A category is broader or more general such as Overall View Conditions or Overall Indoor Air Quality. Some categories have 'attributes' or 'attribute level' criteria and provide greater detail about the category. For example, Overall Thermal Conditions is a category level question, and there are four attribute level questions related to thermal conditions such as adjustability, air velocity (draft), humidity, and temperature. Overall Acoustic Conditions is a category with attributes of employees' ability to hear desired sounds and their ability to limit undesired sounds. There are 12 category-level and 14 attribute level questions. Means are calculated and reported for all category and attribute-level criteria.

An IEQ Satisfaction Score is also calculated for employees' satisfaction with IEQ in their primary workspaces. This is a statistical combination of the 12 category-level criteria only and results in a single, mean IEQ Satisfaction Score for all employees' satisfaction with the physical conditions of their primary workspaces. Attribute-level criteria are not included in the IEQ Score because unequal weight would be given to criteria that have both category and attribute-level questions.

In the following list, **category (boldface)** criteria are listed in alphabetical order. If a category has attributes, they are listed with the category.

Overall Acoustic Quality

- Ability to hear desired sounds
- Ability to limit undesired sounds

Overall Appearance (aesthetics)

Overall Cleaning and Maintenance

Overall Daylighting Conditions

- Amount of daylighting
- Adjustability of daylighting

Overall Electric Lighting Conditions

- Amount of electric lighting
- Adjustability of electric lighting
- Adjustability of task lighting

Overall Furnishings

- Function of furnishings
- Adjustability of furnishings

Overall Indoor Air Quality

Overall Privacy

Overall Technology

- Access to electric outlets

Overall Thermal Conditions

- Adjustability of thermal conditions
- Air velocity (drafty/stagnant)
- Humidity (dry or moist)
- Temperature (hot or cold)

Overall Vibration and Movement

Overall View Conditions

2.2 Limitations

Employees' participation is voluntary, and responses are self-reported. As is true with all survey research, the responses indicate employees' perceptions. There were no physical measurements, e.g., temperature, humidity, or lighting levels of the environment taken. This study is limited to employees' perceptions.

3.0 Sample Description

3.1 Description of Building

The NGA-CS facility is located at 600 Cedar Street, St. Paul, MN. The building (see Figure 1) is a three-story, 111,000 square foot building that includes private and group offices, classrooms, and conference rooms. There are also support areas such as locker rooms, supply rooms, a small commercial kitchen, drill hall (gymnasium), and an underground parking garage. Only the overall facility and primary workspaces (55,000 square feet) that were renovated were included in this study. The building underwent a renovation; it serves as a training and administrative area for National Guard employees.



Figure 1. National Guard Armory – Cedar Street (Photo courtesy of NGA-CS)

3.2 Description of Respondents

This survey was administered to 182 employees with workspace in the facility during February 2016. The response rate to the questionnaire was approximately 43%. Of those responding, 65% were male, 31% were female, and 4% indicated 'other.' The mean age of respondents was 41 years, with a range from 26-62 years of age.

The NGA-CS renovation was completed and ready for operation in December, 2013. Since that time, 51% of the respondents reported that they worked at the NGA-CS facility for three or more years, 31% have worked there one-two years, and 18% of the respondents spent less than one year at this facility. Relating to hours worked during a typical week at NGA-CS, 63% of the employees reported they spend 40+ hours a week in the facility; 36% spend 30-40 hours a week at NGA-CS; 1% spend 20-29 hours at NGA-CS; and none spend less than 20 hours in the NGA-CS facility.

Relating to the time employees spend per week in their primary workspace, 74% of employees reported they spend more than 75% of their weekly time in their primary workspace; 24% spend 25-50% of their time in their primary workspace; and only 1% spend less than 25% of their time in their primary workspace. These responses indicate the amount of time employees are exposed to IEQ conditions in their workplace environment. Employees also indicate that 58% of their primary workspaces were located within 15 feet of an exterior window; 24% were not within 15 feet of an exterior window; and 3% did not know.

An interesting anomaly occurred between the start of the facility's renovation and this study. There are currently 182 employees, which is a significant growth from the 100 employees occupying this facility

at the beginning of renovation. As is typical, organizations and employees are moved as new space is created. This often leads to employees working in “places that were never intended to have full-time occupants” (building liaison statement). Additionally, some employees were relocated from another building where some amenities differed. These are the types of changes that can affect the outcome of an evaluation and should be noted.

4.0 Findings and Discussion

4.1 NGA-CS Facility (Site, Building, and Interior): Overall Satisfaction, Work Performance, and Health

Employees responded to questions concerning the NGA-CS facility (site, building, and interior) and their overall satisfaction with the facility, overall perceptions of their work performance in relation to the facility, and their overall perception of their health in relation to the facility. Table 1 shows the means and standard deviations of their responses as well as how the responses are interpreted. Figure 2 is a graph that shows the mean for each question, which is identified with a blue mark. The standard deviation is shown by the green/red, vertical bar with green representing satisfied (or enhanced) and red representing dissatisfaction (or hindered). Gray represents the ‘neither/nor’ range of responses. In cases where there were no dissatisfied responses, the bar may be all green or gray and green. This graph is simply a visual image of the findings from Table 1.

Table 1. NGA-CS facility - overall satisfaction, work performance, and health

Overall	Mean	SD	N	Interpretation
Satisfaction	5.07	1.30	75	Satisfied
Work Performance	4.67	1.10	75	Enhanced
Health	4.48	1.17	75	Neither Enhanced/Hindered

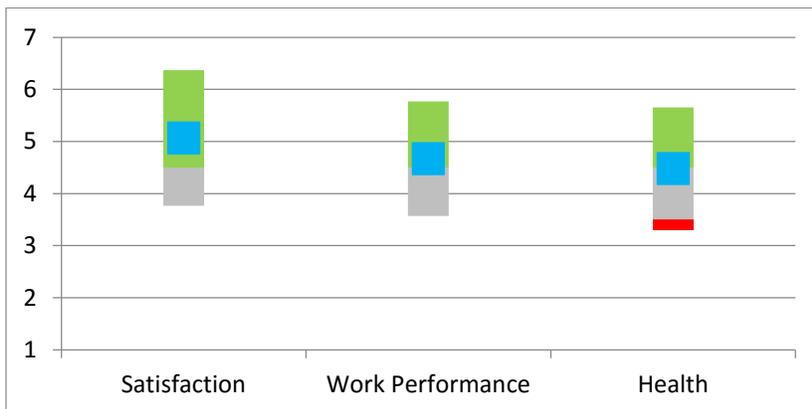


Figure 2. NGA-CS facility - overall satisfaction, work performance, and health

Results indicate that employees were **satisfied (M = 5.07)** with the NGA-CS physical environment of the facility (building, site, and interior) and reported that their overall work performance was **enhanced (M = 4.67)** by the facility. Employees reported that their overall health was **neither enhanced nor hindered (M = 4.48)** by the facility.

4.2 Primary Workspace: Overall Satisfaction, Work Performance, and Health

Employees responded to questions concerning their overall satisfaction and overall perceptions of their work performance and health as related to their primary workspace (e.g., private office, workstation, or other primary workspace). Table 2 shows the means and standard deviations of their responses as well as how the responses are interpreted. Figure 3 is a visual image of the findings from Table 2; an explanation of the graph was given for Figure 2.

Table 2. NGA-CS primary workspace – overall satisfaction, work performance and health

Overall	Mean	SD	N	Interpretation
Satisfaction	4.63	1.44	75	Satisfied
Work Performance	4.56	1.38	75	Enhanced
Health	4.52	1.16	75	Enhanced

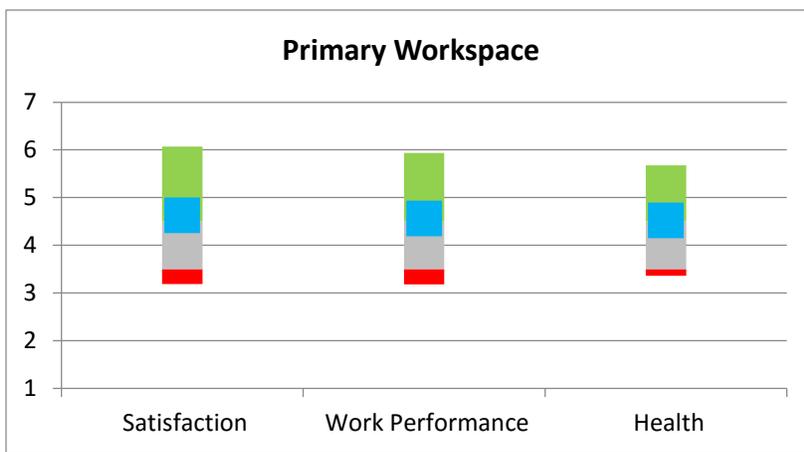


Figure 3. NGA-CS primary workspace - overall satisfaction, work performance, and health

Results indicate that employees were **satisfied (M = 4.63)** with their primary workspace, their overall work performance was **enhanced (M = 4.56)** by their primary workspace, and their overall health was **enhanced (M = 4.52)** by their primary workspace, though at a low level of enhancement.

4.3 Primary Workspace: Satisfaction with Indoor Environmental Quality (IEQ)

Employees responded to questions concerning their satisfaction with IEQ categories (thermal conditions, indoor air quality, acoustic conditions, etc.) related to their primary workspace (e.g., private office, workstation, or other primary workspace). Table 3 shows the means and standard deviations of their responses in order from highest to lowest mean, as well as how the responses are interpreted. Figure 4 is a visual image of the findings from Table 3; an explanation of the graph was given for Figure 2.

Table 3. NGA-CS primary workspace - satisfaction with IEQ criteria

#	IEQ Criteria (1-26) (Category level criteria are bold face)	Mean	SD	N	Interpretation (S = Satisfied) (D = Dissatisfied)
1	Overall technology	5.26	1.41	74	Satisfied
2	Amount of electric light	5.20	1.38	74	Satisfied
3	Overall electric lighting conditions	4.95	1.57	73	Satisfied
4	Overall vibration and movement	4.92	1.59	74	Satisfied
5	Access to electric outlets	4.85	1.62	74	Satisfied
6	Function of furnishings	4.70	1.61	74	Satisfied
7	Ability to hear desired sounds	4.66	1.36	73	Satisfied
8	Overall furnishings	4.62	1.67	74	Satisfied
9	Overall indoor air quality	4.61	1.60	74	Satisfied
10	Overall appearance (aesthetics)	4.53	1.57	73	Satisfied
11	Adjustability of task lighting	4.46	1.71	74	Neither S or D
12	Air velocity (drafty or stagnant)	4.39	1.69	74	Neither S or D
13	Humidity (dry or moist)	4.38	1.61	73	Neither S or D
14	Adjustability of task lighting	4.32	1.80	73	Neither S or D
15	Adjustability of furnishings	4.31	1.76	74	Neither S or D
16	Overall thermal conditions	4.11	1.62	74	Neither S or D
17	Temperature (hot or cold)	4.11	1.62	74	Neither S or D
18	Overall daylighting conditions	3.99	2.02	72	Neither S or D
19	Overall acoustic quality	3.95	1.64	73	Neither S or D
20	Amount of daylighting	3.84	2.11	74	Neither S or D
21	Overall privacy (sound and visual privacy)	3.77	1.91	74	Neither S or D
22	Overall view conditions	3.73	2.02	74	Neither S or D
23	Adjustability of daylighting	3.68	2.03	74	Neither S or D
24	Ability to limit undesired sounds	3.43	1.72	74	Dissatisfied
25	Adjustability of thermal conditions	3.42	1.62	74	Dissatisfied
26	Overall cleaning and maintenance	3.15	1.83	74	Dissatisfied

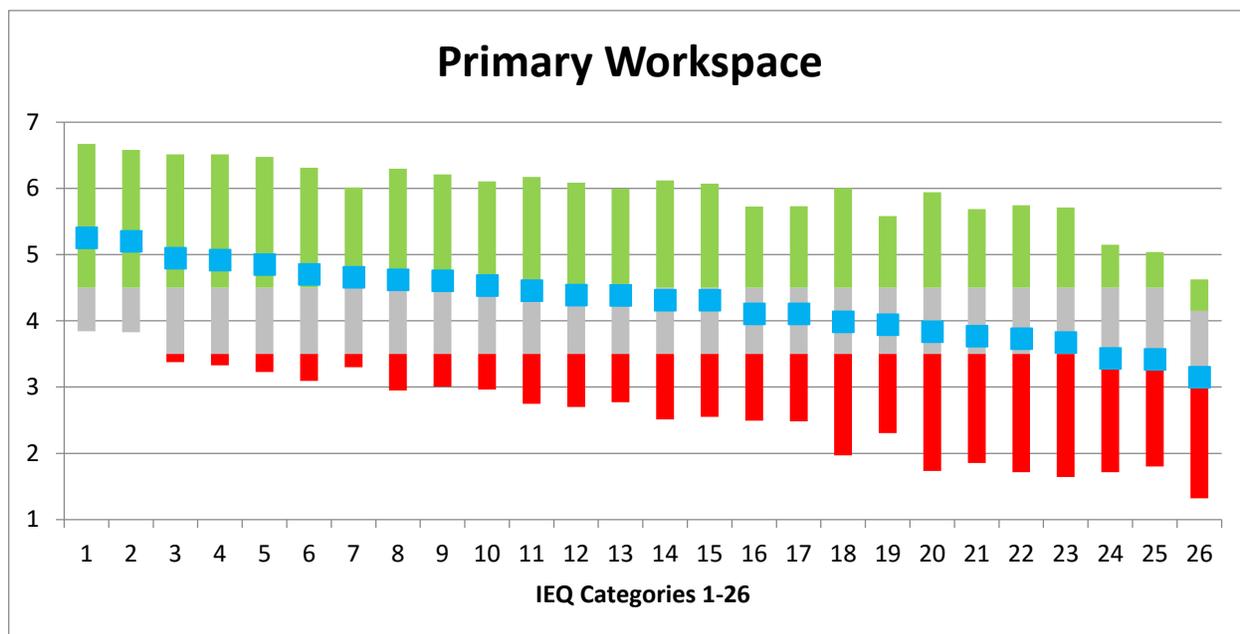


Figure 4. NGA-CS primary workspace - satisfaction with IEQ criteria (IEQ 1-26 are listed in Table 3)

Results indicate that employees were **satisfied** with 10 of the IEQ criteria in their primary workspaces, i.e., means at or above 4.50. Importantly, employees were **neither satisfied nor dissatisfied** with 13 of the IEQ criteria, ranging from a mean of 3.68 (adjustability of daylighting) to 4.46 (adjustability of task lighting). Employees indicate that they were **dissatisfied** with three IEQ criteria, e.g., ability to limit desired sounds (3.43), adjustability of thermal conditions (3.42), and overall cleaning and maintenance (3.15). The three criteria that employees were dissatisfied with are ripe for change to improve employees' satisfaction with their primary workspaces. However, those criteria in the 'neutral' satisfaction range can also be reviewed and considered for change. Potential for change will be addressed in Section 6.2 Recommendations. Further explanation of these scores also can be found in Appendix A. Open-Ended Responses.

4.4 IEQ Satisfaction Scorecard

The IEQ Satisfaction Score is determined by calculating a mean of the 12 'Overall' category level IEQ criteria. At this time, criteria are weighted equally in this calculation as little evidence exists that provides rationale for weighting some criteria heavier than others. The IEQ mean is representative of a fair overall IEQ score and can serve as a benchmark of employees' satisfaction with the physical environment of their primary workspace. As shown in Figure 5, the **IEQ Satisfaction Score** for NGA-CS is **4.30**, which falls into the neither satisfied nor dissatisfied range. The large number of categories (6 of 12) with scores in the 'neutral' or dissatisfied range contribute to this low IEQ Score.



Figure 5. NGA-CS primary workspace - IEQ Satisfaction Score

As shown in Table 3, satisfaction with the Overall technology and the Overall electric lighting conditions were the criteria with the highest satisfaction means and pulled the IEQ Satisfaction Score in a positive direction. However, six mean scores out of 12 category-level criteria below 4.5 pulled the IEQ Score down. Please note that the IEQ Satisfaction Score only uses the category level criteria (those labeled 'Overall'; see section 2.1, paragraph 3 for explanation).

5.0 Physical Activity Engagement and Commuting Practices

In the final section of the survey, employees responded to questions regarding their overall physical activity while at NGA-CS (site, building, and interior) and their commuting practices.

5.1 Physical Activity Engagement

Providing employees with opportunities for alternative paths of travel around the workplace, e.g., taking stairs as opposed to the elevator, provides opportunities to engage in additional types of physical activities. Engaging in physical travel throughout the work environment can be associated with healthier lifestyles.

Table 4. Overall physical activity (walking, stair use, etc.) affected by the NGA-CS facility

NGA-CS Facility (site, building, and interior)	Mean	SD	N	Interpretation
Overall physical activity (walking, stair use, etc.)	5.10	1.55	73	Enhanced

Results indicate that employees felt that NGA-CS **enhanced (M = 5.10)** their physical activities (walking, stair use, etc.).

5.2 Commuting Practices

NGA-CS is located within the capitol complex of St Paul, MN. Metro bus and light rail train stops are within three blocks of the building. The building has a partial basement providing about 10 on-site parking spots used primarily for government owned vehicles. A limited amount of free, on-street parking is available if employees arrive early in the morning. There are numerous fee-based parking

lots near the building. There is a state government program encouraging the use of mass transit by providing a reduced rate card for all buses and trains, the cost of which is deducted from employees' pay. There are also vans run by the state for carpooling, but there is limited information on their accessibility for this location.

Table 5 provides results on employees' primary mode of transportation; Table 6 summarizes commuting distances between home and the NGA-CS facility; and Table 7 summarizes employees' ability to commute using alternative choices (walk, public transit, bike, van, or carpool, etc.). These results, although not related to IEQ, do offer the Armory insight into employees' commuting behaviors and opinions. These data can provide important information about commuting practices that can reduce transportation energy consumption.

Table 5. Commuting Practices – NGA-CS Primary mode of transportation

Primary Mode of Transportation (N=73)	Drive Alone (or w/children <16)	Van or Carpool	Public	Other
NGA-CS Employees	88%	4%	3%	5%

Related to primary modes of transportation, 88% of employees drive alone (or with children under 16), 4% carpool or vanpool with others, 3% take public transportation, and 5% do a combination of commuting methods including biking in good weather and taking public transportation in inclement weather.

Table 6. Commuting Practices – NGA-CS Commuting distance traveled

Miles Traveled (N=73)	0-5 miles	6-15 miles	16-30 miles	31-45 miles	46-60 miles	61-75 miles	76+ miles
Home-to-NGA-CS (One-way)	9%	20%	38%	18%	11%	3%	1%

Results indicate that 29% of employees commuted 0-15 miles one-way between home and the NGA-CS, followed by 38% who commute 16-30 miles, 18% who commute 31-45 miles, and 15% who commute 46+- miles to the NGA-CS facility. All of these are one-way miles.

Table 7. Commuting practices – NGA-CS location and alternative commuting behaviors

Alternative Commuting	Mean	SD	N
Ability to commute in alternative ways	3.89	2.00	73

Results indicate that location of the NGA-CS **neither enhanced nor hindered** (M = 3.89) employees' ability to commute to work in alternative ways, e.g., walk, bicycle, public transit, van or carpool, etc.

6.0 Conclusions

6.1 Summary

A post-occupancy evaluation was conducted of employees of NGA-CS approximately 26 months after it was first occupied. The NGA-CS facility is used by employees of the National Guard for administrative work, training classes and exercises, and physical conditioning. This survey reports the responses from employees and their satisfaction with the physical environment of the facility and their primary workspaces.

The survey included questions related to employees' satisfaction with the facility (site, building, and interior) and influence of the facility on their work performance and health. Employees were **satisfied** with the facility (**M = 5.07**); they found the facility **enhances** their work performance (**M = 4.67**) and **neither enhanced nor hindered** their health (**M = 4.48**). In addition, slightly lower results were reported when employees were asked these same questions about their primary workspaces (private office, shared office, etc.). They reported **satisfaction** (**M = 4.63**) with their primary workspaces, that their work performance was **enhanced** (**M = 4.56**), and health was **enhanced** (**M = 4.52**) minimally by their primary workspace. As the range of scores was from 1-7, scores showed low levels of satisfaction.

Most of the survey questions related to employees' satisfaction with IEQ criteria in their primary workspaces (private office, laboratory, etc.). Employees' responses showed they were **satisfied** with the 10 of the 26 IEQ criteria. The mean satisfaction scores ranged from **4.53** (Overall appearance/aesthetics) to **5.26** (Overall technology). This shows a moderately positive level of **satisfaction**. Employees responded **neither dissatisfied nor satisfied** to 13 IEQ criteria and were **dissatisfied** with three IEQ criteria: ability to limit undesired sounds (3.43), adjustability of thermal conditions (3.42), and Overall cleaning and maintenance (3.15).

From employees' responses, an IEQ Score was developed and shows respondents' satisfaction with the IEQ of all category level criteria. For NGA-CS, the IEQ Satisfaction Score was **4.30**. This score reflects the five Overall categories that had neither satisfied nor dissatisfied scores and one Overall category that had a dissatisfied score (Overall cleaning and maintenance). Finally, employees reported that NGA-CS **enhanced** their physical activity, which is one of the sustainable design criteria that influence occupant behavior.

6.2 Recommendations

Several IEQ criteria satisfaction scores are in the positive direction, however, improvement on the 'neutral' and dissatisfied criteria may be possible. For IEQ categories that can be physically measured (e.g., thermal, acoustic, and lighting), it is recommended that these measurements be taken in the primary workspaces. Further, due to the growth in employee numbers between the onset of renovation and occupancy, space use types may have changed and be a contributing factor to the various scores. This should be addressed as indicated in the recommendations. Specific recommendations for the most common criteria of occupants' concern follow:

Acoustic Conditions

- Identify acoustic criteria for overall requirements.
- Determine if any task areas differ now from their original spatial layout/use (i.e., collaborative work spaces now located adjacent to focused work areas, individual workstations).
- Develop specialized acoustical performance requirements to support functional programming employees' tasks (e.g., sources of recurrent noise that need to be controlled, special user populations that may have distinct auditory performance limitations, or multiple uses of building spaces that may have different acoustic criteria). Identify and apply appropriate acoustics modeling software for the project.
- Measure acoustic performance onsite with full building systems (heating, ventilation, and air conditioning) running.
- Identify employees' privacy concerns via focus groups and/or log complaints relative to acoustical conditions for further evaluation.
- Consider employees' tasks within shared spaces to determine if spatial layout changes can be made for increased acoustic control.

Lighting Conditions

- Identify employees' lighting performance criteria that are to be met to achieve goals by conducting onsite measurements of existing illumination and compare them to standards for employees' tasks as identified by the Illuminating Engineering Society (IES).
- Determine if any task areas differ now from original intent to be sure illumination quantity and quality are not impeded by physical changes to the space (i.e., walls, ceilings, furnishings, fixtures, or equipment).
- Develop additional quality lighting criteria as needed for special facility (e.g., influence of daylight quality or quantity) or employee (e.g., age, task duration) issues.
- Log complaints related to lighting conditions for further evaluation.
- Identify poor lighting conditions in the workspace caused by a lack of control over daylighting, which can cause glare and eyestrain.

Personal Adjustability

- Determine what adjustability issues arise with temperature, lighting, or furnishings via a focus group.
- Identify personal, individual problem areas and relate them to other IEQ issues via a log of complaints relative to adjustability.
- Provide education to employees about any existing/achievable adjustment options, e.g., furnishings, air diffusers, lighting, temperature control, etc.

Privacy Conditions

- Identify employees' privacy concerns via focus groups or log complaints relative to privacy to determine if visual or audio privacy is most affected.
- Determine if any task areas or responsibilities differ from original intent and develop alternatives or modifications.
- Consider adding noise masking equipment and/or visual screening depending on the nature of the complaints.
- Document and compare acoustic privacy problem areas with acoustic measurements to pinpoint specific problem areas.

Thermal Conditions

- Measure thermal performance conditions on site.
- Log complaints related to thermal conditions for further evaluation.
- Determine special thermal comfort requirements or problems that may be encountered in the building due to physicality of work activities, duration of sitting, or design/layout considerations. Focus groups can be useful in identifying problem locations.
- Determine if any employees' task areas differ now from original layout to determine if air flow is meeting systems design intent.
- Review conditions that affect thermal comfort using ASHRAE Standard 55-2004 or *Human Factors Design Handbook* (see B3 Guidelines).

It seems obvious that employees' satisfaction can be improved by addressing the criteria that had 'neither dissatisfied nor satisfied' or dissatisfied scores. However, the rest of the criteria can receive some attention as well. The above recommendations can help address change in these criteria to further improve employees' satisfaction. Exploring these areas in more detail and making adjustments may increase overall satisfaction at the primary workspace. It must be noted that the expense of building and operating a facility is second only to employee-related expenses over the life of the

building. Therefore maintaining or improving employees' satisfaction is a sound investment, which, in turn affects their performance and their health.

This study investigated employees' satisfaction with the facility and primary workspaces. IEQ satisfaction is individual, but the results of the survey show a central tendency of low to moderate satisfaction with the facility and several of the IEQ categories. The results can be used as a diagnostic tool to aid in improving IEQ conditions for employees and to set the benchmarks from which improvement can be measured in the future.

Appendix A. Open-Ended Responses

Employees had the opportunity to raise specific concerns on the overall facility and their primary workspaces. Important information can be gleaned from the open-ended survey responses. NGA-CS employees raised specific concerns about cleaning and maintenance, daylighting, and thermal conditions. However, the comments do give insight into specific issues that should be addressed by building management. Generally, the comments are shown as written.

Overall Positive

- The Armory can be beautiful and inviting too.
- I don't mind it, it's updated from what it was a few years ago.

Overall Facility

- Limited restroom facilities and access to water fountains/sinks. But it does enhance physical activity.
- I'll get back to you, I have to go purchase more aspirin.
- The overall appearance of the public areas is very lacking compared to when I started here.
- More windows on East Side, please.
- No windows.
- In a perfect world it would connect into the capitol area tunnel system.
- No attention was paid to the exterior sidewalks. They are in poor condition and in need of repair.
- Interior doors should have card access locks, especially those that access the second floor of the building. Same with locker rooms/shower facilities. Keyed locks are not conducive to good internal security considerations.
- Continue to have problems related to the fire alarm system when it sees a dry valve sprinkler system fault that the fire system may interpret as a fire alarm. The handler for our area has tripped on 5 or more occasions.

Daylighting and View Conditions

- On north side, 2nd floor, I get a building parking lot to look at with natural light going out towards that direction.
- The hall way in front of the long doors is the best view to cheer you up, but the sunlight is the best on the tall doorway which extends from 1st floor to 2nd floor on south side of the building. Even though you get a view of the rail/car traffic many people hesitate (me too) and pause/have conversations on 2nd floor and soak up the sun. Maybe skylights or screened in porch (both floors=easy access) added to building would be a good alternative for us having breaks instead of an enclosed office hidden by the natural beauty of necessary nature we all crave for.

IAQ

- No fresh air which keeps people alert (I am not a sleepy person)
- Thought should be given to provide those that smoke a sheltered area in which to do so. In inclement weather, smokers do so in alternate, covered areas causing smoke to enter the building and adjacent work spaces.

Maintenance and Cleaning

- The bathrooms, stair wells, carpets and locker rooms are in need of a very good cleaning. I understand we are looking for a competent cleaning outsource, but the environment is really taking a toll with how long this process is taking.
- The bathrooms, locker room, and hallways are dirty

Thermal Conditions

- Windows should have more insulation for WINTER months.
- Constant heat pouring out with no relief, temperatures climb to 80+ degrees. Staff get red faces, headaches, and are sick to their stomachs. The Armory staff are unable to reset it. Attempts to fix the valve have only been temporary fixes. This has happened on 5 or more occasions, where the heat runs non-stop, offices get up to 80+ degrees in temperature. Unhealthy environment.

Appendix B. Glossary

Descriptive statistics

Statistics used to summarize large sets of data (i.e., means, frequencies, medians). Descriptive statistics describe only the sample under consideration and are not intended to infer results to the larger population.

Frequency

A descriptive statistic that provides information about how many of a particular response or measurement is observed.

Likert-type scale

A measurement technique, employed in questionnaires and interviews, that utilizes a range of standardized response categories such as strongly agree, agree, etc.

Mean

The average score of a set of data calculated by adding all scores together, then dividing by the number of scores.

N

The number of subjects or participants responding to the questions, or a single question, in the study.

Reliability

The repeatability or replicability of findings; the same results are produced each time. Instruments and procedures should produce the same results when applied to similar people in similar situations, or on a second occasion.

Standard deviation

A statistic used to measure the variability of a group of scores (how different scores are from each other and the mean). For example, if the range of scores is 1-7 and the mean (average) is 5.0 with a standard deviation of 1.0, then the scores are closely clustered around the mean, i.e., there is one unit of variation among all scores. If the mean was 5.0 and the SD was 3.0, there is a broader range of variation among the scores...a smaller SD means the scores are similar and the mean score is likely to be more accurate and more useful (this is better!).

Validity

The extent to which an instrument or procedure measures what it is intended to measure (internal validity). The generalizability of results to another population (external validity).