



# **Indoor Environment Quality + Workplace Environment Anoka County Sheriff's Office (ACSO) Report 2**

**June 2015, Anoka, 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 Anoka County Sheriff's Office (ACSO) and employees' satisfaction with their work environments located in the ASCO. The ACSO facility was designed using the B3 Guidelines (formerly known as the Minnesota Sustainability Guidelines or MSBG) and completed for occupancy in 2010. 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. The survey was conducted in June 2015 and is the second of two required survey events for this building. (Report 1 can be found at <http://www.b3mn.org/poe>)

This SPOES report focuses on employees' satisfaction with the physical environment as related to 25 indoor environment 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). There were no physical measurements taken of environmental conditions such as temperature or acoustic level. This study is limited to employees' perceptions.

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



An IEQ Score is also calculated for employees' satisfaction with IEQ in their primary workspaces. This is a statistical combination of all category-level 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 responded to questions about their satisfaction with their primary workspaces in relation to IEQ criteria from the B3 Guidelines. Additionally, employees' physical activities and commuting practices were investigated.

In the SPOES questionnaire, the 25 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 and may 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, humidity, and temperature. Another example of a category with attributes is Overall Acoustic Conditions with attributes of employees' ability to hear desired sounds and their ability to limit undesired sounds. Other categories do not have attributes, such as Overall View Conditions or Overall Indoor Air Quality. There are 12 category-level and 13 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.

### **Overall Acoustic Quality**

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

### **Overall Appearance (aesthetics)**

### **Overall Cleaning and Maintenance**

### **Overall Daylighting Conditions**

- Adjustability of daylighting
- Amount of daylighting

### **Overall Electric Lighting Conditions**

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

### **Overall Furnishings**

- Adjustability of furnishings
- Function of furnishings

### **Overall Indoor Air Quality**

### **Overall Privacy**

### **Overall Technology**

### **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**

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 taken, e.g., environmental temperature, humidity, or lighting levels.

### 3.0 Sample Description

#### 3.1 Building Description

The ACSO facility is located at 13301 Hanson Boulevard, Andover, MN. The building (see Figure 1) is the home of the Anoka County Sheriff's Office and includes the Civil and Transport Units, Criminal Investigation Division, Records Management, Sheriff's Administration, and related support functions. The facility also provides space for the Anoka, Sherburne, and Wright County Regional Forensic Lab, underground parking for squad cars, property storage (evidence room), and a fitness room. Offices, laboratories, training rooms, and common spaces are distributed across three floors encompassing 135,500 square feet.



Figure 1. Anoka County Sheriff's Office (Photo: Anoka County Sheriff's Office)

#### 3.2 Description of Respondents

The ACSO has approximately 180 employees at this location. The response rate to the questionnaire was approximately 23%. Of those responding, 59% were male and 41% were female. The mean age of respondents was slightly over 44 years, with a range of 25 to 65+ years.

The ACSO was headquartered at the Anoka County Courthouse prior to relocating to the current site in 2010. Since that time, 87% of the respondents reported that they have worked at the new ACSO facility for more than 3 years, 5% have been there 2-3 years, 5% have been there for 1-2 years, and 3% of the respondents have spent less than 1 year at this site. Relating to hours worked during a typical week at ACSO, 44% of the employees reported they spend 40+ hours a week in the ACSO facility; 27% spend 30-40 hours a week at ACSO; 7% spend 20-29 hours at ACSO; and 22% spend less than 20 hours in the

ACSO facility. Relating to the percentage of time employees spend per week in their primary workspace, 57.5% of the employees reported they spend more than 75% of their time per week in their primary workspace; 22.5% spend 51-75% of their time per week in their primary workspace; 5% spend 25-50% of their time per week in their primary workspace; and 15% spend less than 25% of their time per week in their primary workspace.

The ACSO is a workplace environment with private offices, shared offices, workstations (cubicles), and laboratories serving as primary workspaces. Results indicate 49% of the employees had private offices or shared one with others, 17% work in a cubicle (enclosed by partitions), 7% work at a desk in an open area, and 10% work in a laboratory setting. In addition, 17% of the open responses to this question identified primary workspaces outside of the ACSO (e.g., a patrol car) and miscellaneous locations throughout the facility. Employees also indicate that 60% of their primary workspaces were located within 15 feet of an exterior window.

## 4.0 Findings and Discussion

### 4.1 ACSO Facility (Site, Building, and Interior): Overall Satisfaction, Work Performance, and Health

Employees responded to questions concerning the ACSO 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 with a blue mark. The standard deviation is shown by the vertical bar that runs from 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 will be all grey and green. This graph is simply a visual image of the findings from Table 1.

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

Facility (Site, Building, and Interior)	Mean (1-7)	SD	N	Interpretation
Overall Satisfaction	5.56	1.32	41	Satisfied
Overall Work Performance	5.07	1.49	41	Enhances
Overall Health	4.95	1.09	41	Enhances



Figure 1. ACSO facility - overall satisfaction, work performance, and health

Results indicate that employees were **satisfied (M = 5.56)** with the ACSO facility (building, site, and interior) and reported that their overall work performance was **enhanced (M = 5.07)** by the facility. Employees reported that their overall health was **enhanced (M = 4.95)** 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.

Table 2. Primary workspace – overall satisfaction, work performance and health

Primary Workspace	Mean (1-7)	SD	N	Interpretation
Overall Satisfaction	4.88	1.75	41	Satisfied
Overall Work Performance	4.83	1.70	41	Enhances
Overall Health	4.45	1.50	40	Neither Enhances/Hinders

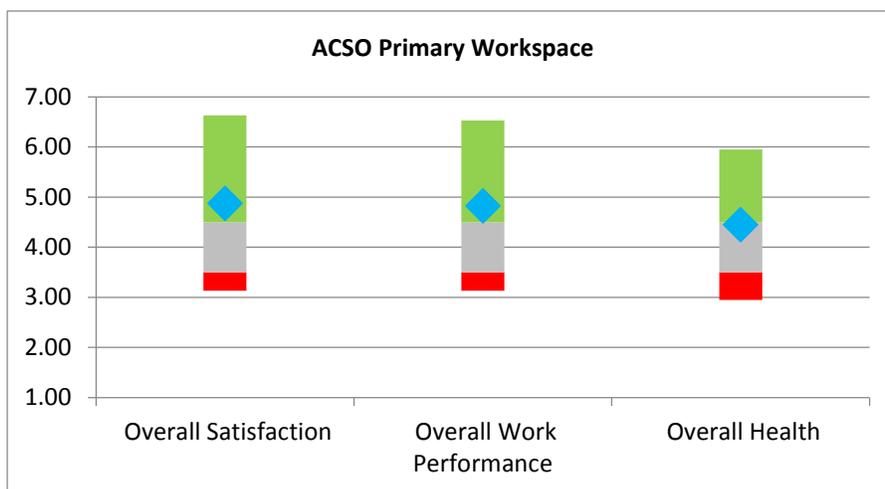


Figure 2. Primary workspace - overall satisfaction, work performance, and health

Results indicate that employees were **satisfied (M = 4.88)** with their primary workspace, their overall work performance was **enhanced (M = 4.83)** by their primary workspace, and their overall health was **neither enhanced nor hindered (M = 4.45)** by their primary workspace.

### 4.3 Primary Workspace: Satisfaction with Indoor Environment Quality (IEQ)

Employees responded to questions concerning their satisfaction with IEQ criteria (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 as well as how the responses are interpreted. Figure 4 is a visual image of the findings from Table 3.

Table 3. Primary workspace - satisfaction with IEQ criteria

#	IEQ Criteria (1-25) (Category level criteria are bold face)	Mean (1-7)	SD	N	Interpretation (D = Dissatisfied) (S = Satisfied)
1	<b>Overall indoor air quality</b>	<b>5.39</b>	<b>1.38</b>	<b>41</b>	<b>Satisfied</b>
2	<b>Overall vibration and movement</b>	<b>5.35</b>	<b>1.21</b>	<b>40</b>	<b>Satisfied</b>
3	<b>Overall appearance (aesthetics)</b>	<b>5.22</b>	<b>1.17</b>	<b>41</b>	<b>Satisfied</b>
4	<b>Overall daylighting conditions</b>	<b>5.13</b>	<b>1.94</b>	<b>40</b>	<b>Satisfied</b>
5	Amount of electric light	5.10	1.71	41	Satisfied
6	<b>Overall furnishings</b>	<b>5.05</b>	<b>1.18</b>	<b>41</b>	<b>Satisfied</b>
7	Ability to hear desired sounds	5.00	1.53	41	Satisfied
8	<b>Overall electric lighting conditions</b>	<b>4.98</b>	<b>1.84</b>	<b>41</b>	<b>Satisfied</b>
9	Amount of daylighting	4.98	2.07	41	Satisfied
10	<b>Overall view conditions</b>	<b>4.85</b>	<b>1.82</b>	<b>41</b>	<b>Satisfied</b>
11	<b>Overall technology</b>	<b>4.83</b>	<b>1.69</b>	<b>41</b>	<b>Satisfied</b>
12	Function of your furnishings	4.73	1.43	41	Satisfied
13	<b>Overall acoustic quality</b>	<b>4.63</b>	<b>1.81</b>	<b>41</b>	<b>Satisfied</b>
14	Air velocity (drafty or stagnant)	4.61	1.61	41	Satisfied
15	<b>Overall cleaning and maintenance</b>	<b>4.60</b>	<b>1.71</b>	<b>40</b>	<b>Satisfied</b>
16	Adjustability of the daylighting	4.51	2.00	41	Satisfied
17	Adjustability of your task lighting	4.37	1.93	41	Neither S/ D
18	Humidity (dry or moist)	4.32	1.75	41	Neither S/ D
19	<b>Overall privacy conditions</b>	<b>4.22</b>	<b>1.93</b>	<b>41</b>	<b>Neither S/ D</b>
20	Adjustability of the electric lighting	4.15	2.04	41	Neither S/ D
21	Ability to limit undesired sounds	3.95	1.83	41	Neither S/ D
22	Adjustability of your furnishings	3.95	1.64	41	Neither S/ D
23	Temperature (hot or cold)	3.63	1.74	41	Neither S/ D
24	<b>Overall thermal conditions</b>	<b>3.63</b>	<b>1.68</b>	<b>41</b>	<b>Neither S/ D</b>
25	Adjustability of the thermal conditions	2.73	1.88	41	Dissatisfied

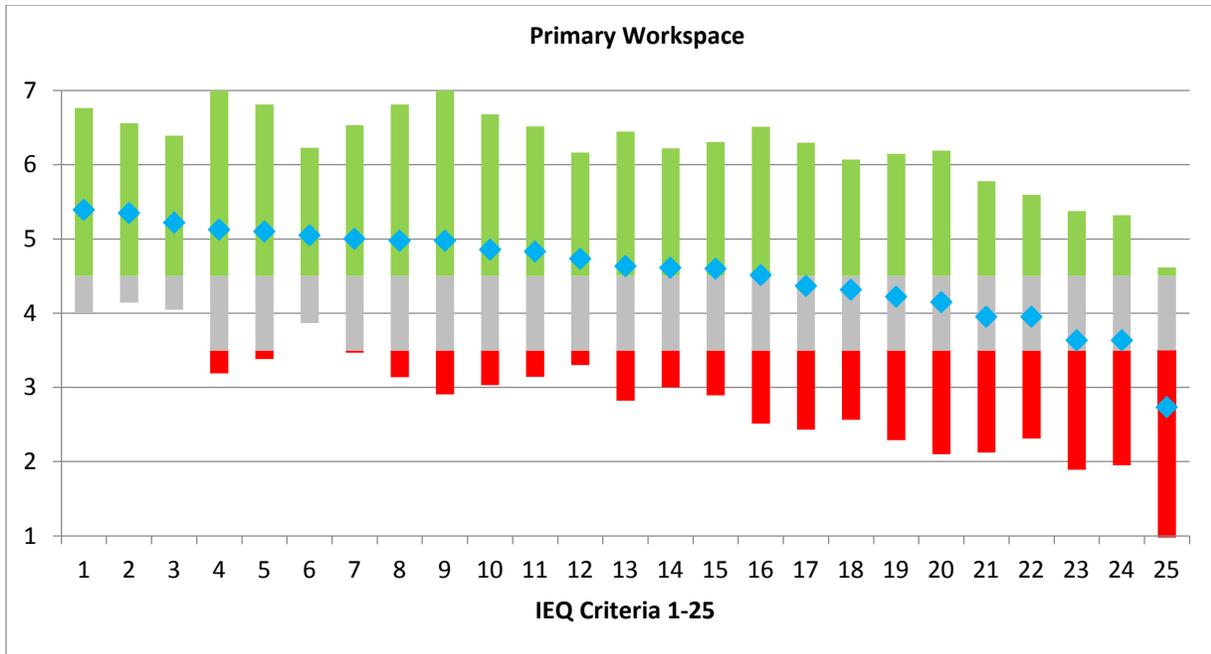


Figure 3. Primary workspace - satisfaction with IEQ criteria (IEQ 1-25 are listed in Table 3 above)

Results indicate that employees were satisfied with 16 of the 25 IEQ criteria in their primary workspaces, i.e., with means at or above 4.50. Employees were neither satisfied nor dissatisfied with 8 IEQ criteria and dissatisfied with one IEQ criteria. 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 all overall category level IEQ criteria. At this time, all 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 ASCO is **4.82**.



Figure 4. Primary Workspace - IEQ Satisfaction Score

Overall, employees showed a positive, but low level of satisfaction with IEQ as indicated by the mean score **4.82**. As shown in Table 3, satisfaction with **Overall IAQ, Overall vibration and movement, Overall appearance, Overall daylighting, and Overall furnishings** were the IEQ criteria with the highest satisfaction and pulled the IEQ Satisfaction Score in a positive direction. However, lower levels of satisfaction with **Overall acoustic quality, Overall cleaning and maintenance, Overall privacy, and Overall thermal conditions** pulled the IEQ Score down. These issues can be addressed by building management to increase employees’ satisfaction. Please note that the IEQ Satisfaction Score only uses the category level criteria (those labeled ‘Overall’; see section 2.1, paragraph 3 for explanation). These will be noted in Section 6.2 Recommendations.

## 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 ACSO (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 ACSO facility

ACSO facility (site, building, and interior)	Mean (1-7)	SD	N	Interpretation
Overall physical activity (walking, stair use, etc.)	4.93	1.07	40	Enhances

Results indicate that employees felt that ACSO **enhanced (M = 4.93)** their physical activities (walking, stair use, etc.). Further, of the 16 respondents to this question, 58.5% said they were **satisfied** with the facility’s influence on their overall physical activity, 40% said they were **neither dissatisfied nor satisfied**, and 2.5% **said that they were dissatisfied**.

### 5.2 Commuting Practices

Employees’ commuting practices examine primary modes of travel, commuting distance traveled, and the ability to use alternative modes of commuting. These data provide important information about commuting practices that enable researchers to track employees’ commuting practices and assess the impact on the carbon footprint across all project types. Although commuting practices do not fall under the IEQ guidelines, they are addressed in the B3 Guidelines.

The ACSO is located in the city of Andover, MN, just north of Coon Rapids, east of Anoka, and west of Blaine. The location is not adjacent to public transit (i.e., light rail, the North Star Service, or public

transit). Additionally, there are currently no metro or local bus service stops identified at or near the ACSO location.

Table 5 provides results on employees’ primary mode of transportation; Table 6 summarizes commuting distances between home and the ACSO 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 Anoka County 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 – ACSO Primary mode of transportation

Primary mode of transportation (Home to ACSO)	Drive alone (or with children < 16)	Bicycle	Motorcycle / Moped
Employee commuting practices (%)	95%	2.5%	2.5%

Related to primary modes of transportation, 95% of employees drive alone (or with children under 16) and 5% used a motorcycle, moped, or bicycle to travel to ACSO. There were no responses for any other commuting practice or combination of commuting modes.

Table 6. Commuting Practices – ACSO Commuting distance traveled

Miles traveled (one way) home to ACSO	0-5 miles	6-15 miles	16-30 miles	31-45+ miles
Employees commuting distance (%)	20%	49%	24%	7%

Results indicate that 6% of employees commuted 0-5 miles one-way between home and the ACSO, followed by 31% who commute 6-15 miles, 38% commute between 16-30 miles, 6% commute between 31-45 miles, and 19% commute over 45+ miles. All of these are one-way miles.

Table 7. Commuting practices – ACSO location and alternative commuting behaviors

Alternative commuting opportunities	Mean (1-7)	SD	N	Interpretation
Employees commuting practices	3.51	1.90	41	Neither Hinders or Enhances

Results indicate that the location of the ACSO facility **neither hindered nor enhanced (M = 3.51)** employees’ ability to commute to work in alternative ways, e.g., walk, bicycle, public transit, van or carpool, etc. Further, of the 41 respondents to this question, 51% said the location **hindered** their commuting options, 24% were **neither hindered nor enhanced** by the location of ACSO, and 24% indicate that the location **enhanced** their ability to commute in alternative ways.

## 6.0 Conclusions

### 6.1 Summary

A post-occupancy evaluation was conducted of employees of ACSO at approximately four years after it was first occupied. Nearly 23% of the employees responded to the survey.

The survey included questions related to employees' overall satisfaction with the facility (site, building, and interior) and influence of the facility on their overall work performance and health. Employees were **satisfied** with the facility (**M = 5.56**); they found the facility **enhances** their overall work performance (**M = 5.07**) and **enhances** their overall health (**M = 4.95**). Slightly lower results were reported when employees were asked these same questions about their primary workspaces (private office, shared office, laboratory, etc.). They reported overall **satisfaction** (**M = 4.88**) with their primary workspaces and that their overall work performance (**M = 4.83**) and their overall health was **enhanced** (**M = 4.45**) by their primary workspaces. As the range of scores was from 1-7, scores that showed satisfaction are in a low range of positive scores for the ASCO facility, and low satisfaction scores for the primary workspace.

Most of the survey questions related to employees' satisfaction with the IEQ criteria in their primary workspaces (private office, laboratory, etc.). Employees' responses showed they were **satisfied** with most of the IEQ criteria. The mean satisfaction scores ranged from **4.51** (Adjustability of daylighting) to **5.39** (Overall IAQ). Interestingly, employees were somewhat neutral on eight criteria from **Overall thermal condition** (3.63) to **Adjustability of task lighting** (4.37).

From employees' responses, an IEQ Score was developed and shows their satisfaction with the IEQ of all category level criteria. For ASCO, the IEQ Satisfaction Score was 4.82. This score reflects a moderately low satisfaction level with all categories. Finally, employees reported that ASCO **enhances** their physical activity, which is one of the sustainable design criteria that influences occupant behavior.

## 6.2 Recommendations

The satisfaction scores are certainly in the positive direction, however, improvement 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. Specific recommendations for the most common areas 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, air conditioning; HVAC) 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 if 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 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 'dissatisfied' or 'neither dissatisfied nor satisfied' scores. The above recommendations can help address change in these criteria. The areas employees were dissatisfied with (adjustability of thermal conditions) can be addressed by the above recommendations. Exploring these areas in more detail and making adjustments may increase overall satisfaction at the primary workspace.

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 moderate satisfaction with the facility and most of the IEQ criteria. Through additional research, e.g., employee focus groups, the results can be used as a diagnostic tool to aid in improving IEQ criteria 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 responses. Following are qualitative responses to the criteria. Generally, the comments are shown as written.

### Acoustic Conditions

- Sound carries. Conversations are distracting from a long ways a way. Sound seems to channel down the commons areas. Even in office with door open, sound carries out the door. Private conversations have to be at a whisper.
- There is a very noisy refrigeration unit that makes it hard to hear others speak and provides a constant noise to listen to all day long.
- The open space on second floor is horrible for typists; sound carries, the corridor brings extra noise.
- Office in an open area are ignored by people who are coming and going, chatting and laughing and not taking into consideration that employees at open desks are trying to do.
- Have them do something about the noise

### Building Services and Amenities

- There are some inappropriately placed security items. For example, the button to unlock a secured door is situated behind the computer monitor.
- The tap water tastes terrible / plastic.
- There is no filtered tap water that I know of.
- Tap water tastes terrible.
- Needs more/larger trees/shade.

### Cleaning and Maintenance

- Desks are a mess, have to constantly be cleaned up because they are shared; some employees are not neat workers.
- The cleaning staff here is terrible and throws the recycling in with the rest of the trash.
- Cleaning crew is lazy and ineffectual.

### Furnishings

- Adjustability of workstations / chairs, etc., is pretty much non-existent.
- Some stations have adjustable keyboards, most do not. I am now always too close to the screen of my computer.
- Desk cannot be adjusted and there is no place to put a keyboard tray, so I have to type with my wrists at an awkward height.
- A stand up work station option would be ideal.

### Lighting Conditions

- Overhead lighting is horrible –it causes headaches after extended periods.
- Location near daylighting is beneficial to people’s health; should not all be under fluorescent lights.
- There are bright lights in the ceiling that shine straight down on my desk and cannot be turned off (unless you unscrew the light bulbs).
- You can't see, it's so dark. Lighting is so poor and too noisy; we're like in a fish bowl
- The lighting is dark (in the open space on second floor).

- Ability to adjust electric from dim to bright would decrease eye strain.
- Natural light would allow for plants to be kept creating healthy clean air
- Have them do something about the lighting

### **Spatial layout**

- 4 people sharing one computer is difficult, although we are mostly out of the office. When we start our day, we have to wait to use a computer. The layout of my work area also requires that I sit at an angle so that I can use my computer while still assisting people.
- The stairs do not seem logically placed.
- Layout of lab section illogical.

### **Thermal Conditions**

- Temperature control in this building is astoundingly inadequate. Offices on the first floor can be ice cold, while others are stagnant and hot.
- Cannot control temperature changes. The temperature can be as high as 80 and as low as 55. At those extreme ends, it can affect my work and daily job duties.
- The air conditioning is often turned way down or completely off for night and weekend staff, with no thought or care for those left to be in the building during those hours!
- Office space is frequently cold.
- Work area gets very cold or very hot with no way to control temperature.
- It's either too hot or too cold; space heaters are used, along with fans. I have poor lighting in my office. It's noticeable that the front reception desk has a horrible draft at both openings and door blockers have to be used or the wind will blow things off the desk.
- The temperature in this area cannot be controlled so that we don't have to turn on our heaters even in the dead of winter when the heat should be on. In the summer we have to turn on our heaters. There is a constant down draft of cold air being blown across us.
- The heating/cooling issue is a primary problem.

### **View**

- Having interior views only with no option to view a window or natural light is wearing when working long shifts.

### **Overall Positive**

- Underground parking for squads is great!! The community room is great.
- It is a great building. We are proud to have it and hope it continues to be well maintained.
- I like working here, it is a beautiful building!
- It is a beautiful building.
- I am impressed with the planning needed to expand with simple things such as knocking out a wall in the men's locker room or knocking out a wall for CID expansion. Very cool.

## 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.

### **Factor analysis**

A multivariate statistical procedure that is used to identify and group together general dimensions or factors that underlie a large number of variables in a set of data. The procedure transforms the variables into new principal components or orthogonal factors. Variables within each factor are related to each other but have no relationship to variables in other factors.

### **Frequency**

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

### **Likert-type scale**

A measurement technique, employed in questionnaires and interviews, that utilizes a range of standardized response criteria 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 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).