Smart, Green + Productive Workplace

Example of an simpler approach to green building assessment and certification

Simone Skopek
Certifications:
• Lay out the parameters for sustainable design and implementation
• Recognize high performance
“Leaders” represent <1% of building stock
Challenges:

- Cost
- Point chasing
- Prescriptive requirements and pre-requisites – “interpretation rulings”
- Complex certification and onerous submission requirements
Recommended Approach

- More affordable
- Simpler
- Apply rigor where it matters:
  - Report carbon, energy, water, waste
  - Management & operations
- Continuous improvement
- Bottom line
“In our view, G+P is a solid program – comprehensive and user-friendly, that could easily replace LEED for Commercial Interiors (ID+C) and LEED-EBOM for tenants, and which delivers more directly relevant information, much faster and at a considerably lower cost than the BIU system from the UK’s BRE.

We believe it hits the mark where other assessments have failed.”

Jerry Yudelson
Author, speaker
former president of the Green Building Initiative
Former Chair of the GreenBuild Steering Cttee
Building occupants:

- Impact the performance of buildings
- Challenging to motivate behavior changes
- Few metrics
- More interested in improving brand and productivity
New Realities Impacting the Workplace
New Realities Impacting the Workplace
New Realities Impacting the Workplace
New Realities Impacting the Workplace
New Realities Impacting the Workplace
## New Realities Impacting the Workplace

### 5 Workplace Models

<table>
<thead>
<tr>
<th>Space per Employee (sf/person)</th>
<th>Everyone has their own office or cubicle</th>
<th>Everyone has their own desk in an open office</th>
<th>Everyone has their own desk + some common space</th>
<th>Some assigned, some unassigned workstations + common space</th>
<th>ALL unassigned + common support space</th>
</tr>
</thead>
<tbody>
<tr>
<td>300-250sf/person</td>
<td>Everyone has their own office or cubicle</td>
<td>Everyone has their own desk in an open office</td>
<td>Everyone has their own desk + some common space</td>
<td>Some assigned, some unassigned workstations + common space</td>
<td>ALL unassigned + common support space</td>
</tr>
<tr>
<td>250-200sf/person</td>
<td>Everyone has their own desk in an open office</td>
<td>Everyone has their own desk + some common space</td>
<td>Some assigned, some unassigned workstations + common space</td>
<td>ALL unassigned + common support space</td>
<td></td>
</tr>
<tr>
<td>200-150sf/person</td>
<td>Everyone has their own desk + some common space</td>
<td>Some assigned, some unassigned workstations + common space</td>
<td>ALL unassigned + common support space</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150-100sf/person</td>
<td>Some assigned, some unassigned workstations + common space</td>
<td>ALL unassigned + common support space</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100-150sf/person</td>
<td>ALL unassigned + common support space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Increasing Choice, Efficiency, Flexibility and Cultural Integration**

- **But the biggest shift is here**

- **Space per employee is decreasing**

- **Most organizations sit here**
New Realities Impacting the Workplace
New Realities Impacting the Workplace

- 67% of employers say “employees’ poor health habits” is challenging affordable health coverage.
- 50% of employers offer wellness promotion initiatives.
- Need layout and features that promote exercise / good ergonomics; and dining facilities
As a result, **73%** of corporate real estate executives expect to make changes in the workplace to improve productivity.
G4-EN3

Energy consumption within the organization

a. Report total fuel consumption from non-renewable sources in joules or multiples, including fuel types used.
b. Report total fuel consumption from renewable fuel sources in joules or multiples, including fuel types used.
c. Report in joules, watt-hours or multiples, the total:
   ⚪ Electricity consumption
   ⚪ Heating consumption
   ⚪ Cooling consumption
   ⚪ Steam consumption
d. Report in joules, watt-hours or multiples, the total:
   ⚪ Electricity sold
   ⚪ Heating sold
   ⚪ Cooling sold
   ⚪ Steam sold
e. Report total energy consumption in joules or multiples.
f. Report standards, methodologies, and assumptions used.
g. Report the source of the conversion factors used.
A green office is not necessarily comfortable or productive
A productive office is not necessarily green
‘In your opinion, what is the best thing about this office?’
1. Natural light
2. Open plan
3. View
‘In your opinion, what is the best thing about this office?’
1. Natural light
2. Open plan
3. View

‘Please describe your biggest complaint about your office’
1. Air temperature
2. Noise
3. Lack of privacy
### Fix problems .... Improve productivity

<table>
<thead>
<tr>
<th>Improved feature</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved acoustics</td>
<td>+ 6 - 300%</td>
</tr>
<tr>
<td>Improved lighting, day lighting and views</td>
<td>+ 5 - 18%</td>
</tr>
<tr>
<td>Improved thermal comfort and ventilation</td>
<td>+ 5%</td>
</tr>
<tr>
<td>Reduced stress from commuting</td>
<td>+ 11.5 working days/FTE</td>
</tr>
<tr>
<td>Improved ergonomics and privacy</td>
<td>+ 6%</td>
</tr>
<tr>
<td>Layout, comfort, social cohesion</td>
<td>+ 30%</td>
</tr>
</tbody>
</table>
Green + Productive Workplace

**SMART**
- Space use efficiency
- Occupant engagement
  - Green Team
  - HR
  - IT
  - Tenant/landlord teamwork
- Commuting

**GREEN**
- Energy/carbon
  - Lighting; heating/cooling; plug load; server rooms
- Water
- Materials & Resources
  - Green office supplies; green construction materials; reduce consumption (e.g. paper)
- Waste
- Public disclosure
  - Energy; carbon; water; waste

**PRODUCTIVE**
- Layout
  - That supports tasks/workflow and informal cohesive networks
- Acoustics
- Visual comfort
  - Daylighting; lighting design; biophilia; visual interest
- Thermal comfort
- IAQ
- Employee amenities
- Wellness programs
Green + Productive Workplace

- Low energy intensity
- High % of occupants who find the environment acceptable
- High performance building

Occupant acceptability
East HQ (fit-out 2016)
22,230 SF / 94 employees

Slade (renovated in 2013)
Sales & Marketing
17,760 SF / 83 employees

Burl St.
Finance, Accounting/HR
13,763 SF / 71 employees

Danby Rd. (fit-out 2016)
Research Division
31,332 SF / 122 employees

Rae St.
Client accounts
32,200 SF / 145 employees

Elm Ave.
Client Accounts
12,300 SF / 73 employees
Policies and directives that set a company-wide direction to be carried out by facility managers, business unit managers, Green Teams, HR, IT and employees.

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Date entered</th>
<th>Score</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRM Headquarters</td>
<td>Dec. 18, 2015</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Rutherford Center</td>
<td>Dec. 12, 2015</td>
<td>64%</td>
<td>45%</td>
</tr>
<tr>
<td>Leo Productions</td>
<td>Dec. 22, 2015</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>NEM S.E. Branch</td>
<td>Dec. 22, 2015</td>
<td>78%</td>
<td>60%</td>
</tr>
<tr>
<td>POLICIES</td>
<td>Policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DISCLOSURE</strong></td>
<td>Does the firm have a published Environmental Policy or annual CSR report that addresses its real estate (including leased assets) with respect to energy, GHG emissions and waste management?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DIRECTIVES</strong></td>
<td>Does the firm communicate directives re. sustainability and wellness to the appropriate personnel in terms of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) TARGETS;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) STRATEGIES and RESOURCES; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) KEY PERFORMANCE INDICATORS (KPIs) to reduce energy, waste (and water where applicable) in offices?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers of Business Units</td>
<td>Yes – all three (Targets, Strategies and KPIs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenant Facility Managers</td>
<td>2 out of 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green Teams</td>
<td>Yes in a general way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resources</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees</td>
<td>NA (single small location)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build-out</td>
<td>Are all sites in the portfolio larger than 10,000 SF actively monitored and benchmarked for energy and sustainability?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NA (small locations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do new or renewed leases contain specific &quot;green clauses&quot; that set out mutually agreed performance targets and actions that landlord and tenant will take to achieve those shared goals?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a requirement for separate electricity metering at the time of a new (or renewed lease or build-out)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Policies and directives that set a company-wide direction to be carried out by facility managers, business unit managers, Green Teams, HR, IT and employees.
BRM Headquarters

Green Assessment

Sustainability in the workplace including energy, water, waste, materials, commuting and Green Teams

Comfort & Productivity Assessment

Workplace attributes that affect productivity and wellness including layout, acoustics, visual comfort, thermal comfort, IAQ, amenities and wellness programs
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is ambient lighting high efficiency (T8s, T5s or LED lighting)?</td>
<td>90-100% high efficiency, 80-89%, 50-79%, &lt;50% high efficiency</td>
</tr>
<tr>
<td>Are LED lamps being used for general lighting?</td>
<td>&gt;50% of the area, &gt;25% of the area, &gt;10% of the area, &lt;10%</td>
</tr>
<tr>
<td>Do task lights or display lighting use energy efficient bulbs?</td>
<td>Yes – primarily LED bulbs, No – primarily CFL bulbs, T8s or T5s, No, NA (no task lighting)</td>
</tr>
<tr>
<td>Do (electric) ambient lighting levels meet (and not exceed) the values recommended by IESNA in most of the following areas:</td>
<td></td>
</tr>
<tr>
<td>• for screen tasks, 200 - 300 lux (28 FC) of ambient lighting?</td>
<td>Yes, No, NA (minimal computer work is done), Not sure</td>
</tr>
<tr>
<td>• for service areas e.g. hallways, print rooms, kitchens and tenant-installed washrooms, 100-200 lux (10 FC)?</td>
<td>75-100% of service areas, 50-74%, Less than 50%, NA (no service areas), Not sure</td>
</tr>
<tr>
<td>Does the office consume 0.9 watts/SF or less?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## Lighting Controls

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is (most of) the lighting linked to a building automation system (BAS) and/or to occupancy sensor controls?</td>
<td>Yes, Yes – and also integrated with HVAC, No, Not sure</td>
</tr>
<tr>
<td>Do enclosed spaces (such as offices, meeting rooms, storage rooms) have their own lighting controls or occupancy sensors?</td>
<td>75-100% of enclosed areas, 50-74%, &lt;50% of enclosed area, NA (no enclosed spaces)</td>
</tr>
<tr>
<td>Are there zoned lighting controls for different areas within large open offices or retail (more than 3,000 SF?)</td>
<td>Yes (75% of office area), Partial (&gt;50%), No, NA</td>
</tr>
<tr>
<td>Can lights be dimmed in most of the office?</td>
<td>Yes - most areas (&gt;70%), Some areas (&gt;50%), No</td>
</tr>
<tr>
<td>Are there lighting occupancy sensors (motion detectors) in the following areas:</td>
<td></td>
</tr>
<tr>
<td>- Open office areas?</td>
<td>Yes, Some, No, NA</td>
</tr>
<tr>
<td>- Occupant-installed washrooms?</td>
<td>Yes, Some, No, NA</td>
</tr>
</tbody>
</table>
### Reduce Hours of Lighting

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| Is there prominent signage that lights should be turned off when space is unoccupied OR are there occupancy sensors or automatic controls to turn off the lights at the end of the day? | Yes - signage or occupancy sensors  
No signage but employees habitually switch lights off when a room is unoccupied  
No  
NA (occupants do not control lighting)  
NA (build-out) |
| Are lights switched off at night, weekends etc.? (i.e. Is there a system or protocol to ensure this?) OR are there occupancy sensor or automatic controls to switch off lights at the end of the day? | Yes - automated  
Yes – manually switched off consistently as per a rigorous protocol  
No  
NA (facility runs 24 hrs.)  
NA (build-out) |
| Where lighting is controlled manually, are midnight audits conducted to monitor whether lights are being switched off? | Yes  
No  
NA (automated shut-off) |
| Is cleaning done during the day?                                        | Yes - automated  
No  
NA (facility runs 24 hrs. or not feasible)  
NA (build-out) |
| Where lighting is controlled centrally after hours, are there additional zone switches with occupancy sensors or timers in the occupant space to control after-hours lighting? | Yes  
No  
NA |
BRM Headquarters

Green Assessment

Sustainability in the workplace including energy, water, waste, materials, commuting and Green Teams

Comfort & Productivity Assessment

Workplace attributes that affect productivity and wellness including layout, acoustics, visual comfort, thermal comfort, IAQ, amenities and wellness programs
<table>
<thead>
<tr>
<th></th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>67%</td>
</tr>
<tr>
<td>Call worker satisfaction</td>
<td>300%</td>
</tr>
<tr>
<td>Sales productivity</td>
<td>20%</td>
</tr>
<tr>
<td>Ability to focus</td>
<td>48%</td>
</tr>
<tr>
<td>Memory tasks</td>
<td>10%</td>
</tr>
<tr>
<td>Stress (blood pressure heart rate)</td>
<td>27%</td>
</tr>
</tbody>
</table>
LAYOUT AND ACOUSTICS
6-300% improved productivity
Welcome to the Quiet Zone

- Turn cell phone ringers to silent
- Take phone conversations out of library
- Music with headphones allowed (make sure you’re not disturbing others with volume)

Talk out there, think in here.
DAYLIGHT & VIEW
7-18% improved productivity
DAYLIGHT & VIEW
7-18% improved productivity
LIGHTING DESIGN
5% improved productivity
THERMAL COMFORT
5% improved productivity
IAQ
10-100% improved productivity
AMENITIES
WELLNESS PROGRAMS
### ACOUSTICS

Does an employee survey indicate that the majority are satisfied with the acoustic environment?
- High level of satisfaction overall
- Mixed responses
- Largely dissatisfied
- NA (no occupant survey done)
- NA (build-out)

Are there any observed or reported acoustic problems associated with:

<table>
<thead>
<tr>
<th>Source</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources outside the building?</td>
<td>No problems</td>
</tr>
<tr>
<td>Neighboring tenancies?</td>
<td>No problems</td>
</tr>
<tr>
<td>HVAC (Typically a rumbling, vibration or rushing noise)?</td>
<td>No problems</td>
</tr>
<tr>
<td>Lighting fixtures (typically a humming or buzzing noise)?</td>
<td>No problems</td>
</tr>
<tr>
<td>Plumbing (typically creaking, squeaking or rattling)?</td>
<td>No problems</td>
</tr>
</tbody>
</table>

Are there dedicated “Quiet Zones” OR acoustically separated areas for focused concentrated work?
- Yes - sufficient to meet demand
- Not sufficient to meet demand
- NA (e.g. call center, retail)

Are there sufficient small enclosed meeting rooms to take conference calls on speaker phones or have a confidential conversation?
- Yes - sufficient to meet demand
- Not sufficient to meet demand
Does an employee survey indicate that the majority are satisfied with the acoustic environment?

- Generally satisfied overall
- Mixed responses
- Largely dissatisfied
- NA (no occupant survey done)
- NA (build-out)

Are there any observed or reported acoustic problems associated with:

- Sources outside the building?
  - No problems
  - Some problems
- Neighboring tenancies?
  - No problems
  - Some problems
- HVAC (Typically a rumbling, vibration or rushing noise)?
  - No problems
  - Some problems
- Lighting fixtures (typically a humming or buzzing noise)?
  - No problems
  - Some problems
- Plumbing (typically creaking, squeaking or rattling)?
  - No problems
  - Some problems

- Are there dedicated “Quiet Zones” OR acoustically separated areas for focused concentrated work?
  - Yes - sufficient to meet demand
  - Not sufficient to meet demand
  - NA (e.g. call center, retail)

Are there sufficient small enclosed meeting rooms to take conference calls on speaker phones or have a confidential conversation?

- Yes - sufficient to meet demand
- Not sufficient to meet demand

TIP: The survey can be a quick e-mail survey (e.g. Monkey Survey™) modelled on a survey by the Center for the Built Environment (CBE) at UC Berkeley. It asks a small number of questions of a general nature to flag areas of concern:

1. How satisfied are you with the noise level in your workspace?
2. How satisfied are you with the sound privacy in your workspace?
3. Overall, does the acoustic quality in your workspace enhance or interfere with your ability to get your job done?

There are several ways to interpret the data. One of the simplest is the % who agree with statements in the survey (e.g. "78% agree that they are satisfied with the noise level").

Where problems are found, then proceed to a more in-depth investigation.

VERIFICATION: View employee survey. Interview occupants.
**Acoustics**

Do walls, ceilings and partitions absorb sound as follows:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
<th>NA (not a build-out)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceilings with an NRC of at least 0.75 OR acoustical ceiling clouds or canopies of at least NRC 0.90?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls with an NRC of 0.80 or more?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partitions with an NRC of 0.70 or more?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpeted floors with a NRC of 0.15?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Build-out**

Do wall assemblies avoid sound travelling between rooms through the walls by having the following minimum Sound Transmission Class (STC) ratings:

<table>
<thead>
<tr>
<th>STC-50 to isolate video conference and training rooms?</th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
<th>NA (no conference rooms)</th>
<th>NA (not a build-out)</th>
</tr>
</thead>
</table>
Green + Productive Workplace
Summary Report for Pittsburgh Center

YOUR SCORES

Pittsburgh Center
- 80% OVERALL
- 71% GREEN
- 86% PRODUCTIVE
- 71% OVERALL
- 68% GREEN
- 74% PRODUCTIVE

PORTFOLIO AVERAGE
- 71% OVERALL
- 68% GREEN
- 74% PRODUCTIVE

INDUSTRY COMPARISON

OVERALL SCORE
- Industry Avg. 68%
- Facility 80%
- Industry Avg. 65%
- Facility 74%

GREEN
- Industry Avg. 65%
- Facility 80%
- Industry Avg. 73%
- Facility 85%

PRODUCTIVE
- Industry Avg. 73%
- Facility 85%

SUB-SECTION SCORES

GREEN
- Energy 66%
- Water 55%
- Waste 100%
- Materials 76%
- Commuting 91%
- Green Team 51%

HEALTH & PRODUCTIVITY
- Acoustic Comfort 78%
- IAQ 55%
- Thermal comfort 100%
- Visual comfort 90%
- Layout 95%
- Amenities 76%
- Wellness 84%

PRODUCTIVITY
- Acoustic Comfort 66%
- IAQ 55%
- Thermal comfort 100%
- Visual comfort 90%
- Layout 95%
- Amenities 76%
- Wellness 84%

RATING
- Pittsburgh Center

RED FLAG SUMMARY
(areas that should be further investigated for corrective action)
- Check for potential lighting energy savings
- There may be ways to reduce water consumption
- Check acoustics (measurements and occupant survey)

FINANCIAL IMPACTS
(Conservative orders of magnitude of the potential energy savings and productivity gains based on the 3-30-300 model)

GREEN
- 71,827 square feet
- Lighting $103,940
- Plug load No major savings

PRODUCTIVITY
- 1,700 employees
- Acoustics $224,400
- IAQ No savings
- Thermal comfort No savings
- Visual comfort No savings
- Layout No savings

AREAS FOR FURTHER INVESTIGATION
- Occupancy sensors for lighting in all conference rooms
- Midnight audit for lighting
- Automatic lights shut-off at night
- Energy expert do a walk-through of the server room to review the air distribution
- Meter water consumption in the commercial kitchen
- Find out the ratings of the air filters
- Acoustic measurements and occupant survey
EXECUTIVE SUMMARY
Overview
Scores & Ratings
Financial Impacts
Red Flag Summary

CORPORATE LEADERSHIP
Polices
Disclosure
Directives

GREEN WORKPLACE
Energy
Water
Waste
Materials
Commuting
Green Team

HEALTH & PRODUCTIVITY
Acoustic Comfort
Indoor Air Quality
Thermal Comfort
Visual Comfort
Layout

BENCHMARKING SCALE

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Overall</th>
<th>Green</th>
<th>Productive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>70-74%</td>
<td>70-100%</td>
<td>70-100%</td>
</tr>
<tr>
<td>Very Good</td>
<td>75 - 79%</td>
<td>70-100%</td>
<td>70-100%</td>
</tr>
<tr>
<td>Excellent</td>
<td>80-84%</td>
<td>70-100%</td>
<td>70-100%</td>
</tr>
<tr>
<td>Outstanding</td>
<td>85-100%</td>
<td>70-100%</td>
<td>70-100%</td>
</tr>
</tbody>
</table>

G+P Workplace uses a simple traffic light scoring scheme:
<50% Potential risk
50 - 70% Opportunity
> 70% Above average

YOUR BENCHMARKS

<table>
<thead>
<tr>
<th>Location</th>
<th>Overall</th>
<th>Green</th>
<th>Productive</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horsham</td>
<td>81%</td>
<td>76%</td>
<td>83%</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td>San Diego</td>
<td>76%</td>
<td>72%</td>
<td>73%</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>Lowell</td>
<td>60%</td>
<td>53%</td>
<td>65%</td>
<td>-</td>
</tr>
<tr>
<td>Santa Clara (116)</td>
<td>62%</td>
<td>60%</td>
<td>63%</td>
<td>-</td>
</tr>
<tr>
<td>Santa Clara (116A)</td>
<td>71%</td>
<td>70%</td>
<td>72%</td>
<td>GOOD</td>
</tr>
<tr>
<td>Lawrence</td>
<td>69%</td>
<td>66%</td>
<td>72%</td>
<td>-</td>
</tr>
</tbody>
</table>
# Executive Summary

- Overview
- Scores & Ratings
- Financial Impacts
- Red Flag Summary

## Corporate Leadership

- Policies
- Disclosure
- Directives

## Green Workplace

- Energy
- Water
- Waste
- Materials
- Commuting
- Green Team

## Health & Productivity

- Productive
- Acoustics
- IAQ
- Thermal
- Visual
- Layout
- Amenities
- Wellness

## Green

<table>
<thead>
<tr>
<th></th>
<th>Green</th>
<th>Energy</th>
<th>Water</th>
<th>Waste</th>
<th>Materials</th>
<th>Commuting</th>
<th>Green Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio</td>
<td>65%</td>
<td>62%</td>
<td>52%</td>
<td>69%</td>
<td>66%</td>
<td>85%</td>
<td>55%</td>
</tr>
<tr>
<td>Bay St. Operations</td>
<td>73%</td>
<td>69%</td>
<td>74%</td>
<td>74%</td>
<td>78%</td>
<td>83%</td>
<td>95%</td>
</tr>
<tr>
<td>BRM HQ</td>
<td>89%</td>
<td>93%</td>
<td>88%</td>
<td>87%</td>
<td>97%</td>
<td>82%</td>
<td>69%</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>62%</td>
<td>57%</td>
<td>62%</td>
<td>67%</td>
<td>66%</td>
<td>81%</td>
<td>46%</td>
</tr>
<tr>
<td>Rutherford Center</td>
<td>39%</td>
<td>30%</td>
<td>8%</td>
<td>49%</td>
<td>22%</td>
<td>92%</td>
<td>49%</td>
</tr>
</tbody>
</table>

## Health & Productivity

<table>
<thead>
<tr>
<th></th>
<th>Productive</th>
<th>Acoustics</th>
<th>IAQ</th>
<th>Thermal</th>
<th>Visual</th>
<th>Layout</th>
<th>Amenities</th>
<th>Wellness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio</td>
<td>59%</td>
<td>46%</td>
<td>69%</td>
<td>40%</td>
<td>74%</td>
<td>54%</td>
<td>81%</td>
<td>51%</td>
</tr>
<tr>
<td>Bay St. Operations</td>
<td>74%</td>
<td>95%</td>
<td>65%</td>
<td>59%</td>
<td>80%</td>
<td>81%</td>
<td>74%</td>
<td>64%</td>
</tr>
<tr>
<td>BRM HQ</td>
<td>59%</td>
<td>35%</td>
<td>81%</td>
<td>32%</td>
<td>92%</td>
<td>47%</td>
<td>85%</td>
<td>42%</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>54%</td>
<td>35%</td>
<td>83%</td>
<td>11%</td>
<td>71%</td>
<td>45%</td>
<td>82%</td>
<td>53%</td>
</tr>
</tbody>
</table>
# Executive Summary

**Overview**

**Scores & Ratings**

**Financial Impacts**

**Red Flag Summary**

## Corporate Leadership

**Policies**

**Disclosure**

**Directives**

## Green Workplace

**Energy**

**Water**

**Waste**

**Materials**

**Commuting**

**Green Team**

## Health & Productivity

**Acoustic Comfort**

**Indoor Air Quality**

**Thermal Comfort**

**Visual Comfort**

**Layout**

---

### Red Flag Summary

The following is an overview of red flags that warrant concern or call for further investigation.

<table>
<thead>
<tr>
<th>Bay Street Ops Center</th>
<th>Green</th>
<th>Productive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- There may be ways to improve the layout to better correspond to actual work processes and support informal cohesive networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Check for opportunities to improve health and wellness in the workplace</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rutherford Center</th>
<th>Green</th>
<th>Productive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Acoustic conditions may be impacting wellbeing and productivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Thermal comfort issues could be affecting wellbeing and productivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- There may be ways to improve the layout to better correspond to actual work processes and support informal cohesive networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Check for opportunities to improve health and wellness in the workplace</td>
</tr>
</tbody>
</table>
**EXECUTIVE SUMMARY**

Overview
Scores & Ratings
Financial Impacts
Red Flag Summary

**CORPORATE LEADERSHIP**

Policies
Disclosure
Directives

**GREEN WORKPLACE**

Energy
Water
Waste
Materials
Commuting
Green Team

**HEALTH & PRODUCTIVITY**

Acoustic Comfort
Indoor Air Quality
Thermal Comfort
Visual Comfort
Layout

---

### ENERGY - LIGHTING

<table>
<thead>
<tr>
<th>Location</th>
<th>High Efficiency &amp; Moderate Levels</th>
<th>Controls</th>
<th>Reduce Hours of Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street</td>
<td>74%</td>
<td>95%</td>
<td>65%</td>
</tr>
<tr>
<td>BRM</td>
<td>59%</td>
<td>35%</td>
<td>81%</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>54%</td>
<td>35%</td>
<td>83%</td>
</tr>
<tr>
<td>Rutherford</td>
<td>51%</td>
<td>30%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Lighting is high efficiency; Light levels comply with IESNA recommendations. Lighting linked to BAS; Zoned controls; Dimmable lighting; Occupancy sensors; Daylight harvesting. Where lights are manually controlled, prominent "lights-off" signage; midnight audits for manual controls; Lights off at night; Daytime cleaning.

---

### ENERGY - PLUG LOAD

**Office & Kitchen Appliances**

Workstation devices ensure that desktop equipment is switched off when not in use; Where there are no switch-off devices, there is signage reminding employees to switch off desktop equipment, AND midnight audits to verify. There are no redundant appliances; the office uses laptops rather than desktops; The office/kitchen uses ENERGY STAR office equipment and appliances.

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Operations</td>
<td>89%</td>
</tr>
<tr>
<td>BRM Headquarters</td>
<td>86%</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>22%</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Overview
Scores & Ratings
Financial Impacts
Red Flag Summary

CORPORATE LEADERSHIP

Policies
Disclosure
Directives

GREEN WORKPLACE

Energy
Water
Waste
Materials
Commuting
Green Team

HEALTH & PRODUCTIVITY

Acoustic Comfort
Indoor Air Quality
Thermal Comfort
Visual Comfort
Layout

LAYOUT

Activity-based Layout
Activity-based allocation of space for collaboration, concentration, conversation and confidentiality; Balanced use of space; Ease with which to find people, book space

Social Cohesiveness
Features that promote informal social cohesion; Ease with which to find people, book meeting rooms

Flexibility
Flexible space, furniture, power and communications connectivity; Flexible work arrangements

<table>
<thead>
<tr>
<th>Location</th>
<th>Activity-based Layout</th>
<th>Social Cohesiveness</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Operations</td>
<td>48%</td>
<td>77%</td>
<td>61%</td>
</tr>
<tr>
<td>BRM Headquarters</td>
<td>86%</td>
<td>100%</td>
<td>31%</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>22%</td>
<td>80%</td>
<td>73%</td>
</tr>
<tr>
<td>Rutherford Center</td>
<td>36%</td>
<td>32%</td>
<td>81%</td>
</tr>
</tbody>
</table>

AMENITIES

Local Amenities
Walkable neighborhood with shops, banking, a variety of restaurants; green spaces; Where public transportation is lacking, there is minimal gridlock and ready access to main arteries, airport etc.

Office Amenities
Employee amenities: lunch room, exercise facilities, quiet room, facility for nursing mothers; water stations

<table>
<thead>
<tr>
<th>Location</th>
<th>Local Amenities</th>
<th>Office Amenities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Operations</td>
<td>48%</td>
<td>77%</td>
</tr>
<tr>
<td>BRM Headquarters</td>
<td>86%</td>
<td>100%</td>
</tr>
</tbody>
</table>
FINANCIAL IMPACTS

The following values represent the order of magnitude of wasted energy and lost productivity due to current deficiencies. The estimates show the potential savings from taking corrective action. Values are purposely estimated on the low side to provide a credible case for action. Conservative estimates for “energy inefficiency” are a maximum of 5% for a worst case of inefficient lighting, plug load and server room lighting and plug load. Conservative estimates for “lost productivity” are a maximum of 6%, which represent the reduced quantity and/or quality of work output per employee (as gauged in minutes lost) in a worst case scenario of acoustic, thermal and visual discomfort, bad air, poor layout of space and lack of wellness features and amenities.

<table>
<thead>
<tr>
<th>Green workplace</th>
<th>Square Feet</th>
<th>Lighting</th>
<th>Plug Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Operations Center</td>
<td>13,763 SF</td>
<td>$660</td>
<td>No Savings</td>
</tr>
<tr>
<td>BRM Headquarters</td>
<td>32,200 SF</td>
<td>No Savings</td>
<td>No Savings</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>50,000 SF</td>
<td>No Savings</td>
<td>$3,000</td>
</tr>
<tr>
<td>Rutherford Center</td>
<td>102,300 SF</td>
<td>$7,370</td>
<td>$6,140</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Overview
Scores & Ratings
Financial Impacts
Red Flag Summary

CORPORATE LEADERSHIP
Polices
Disclosure
Directives

GREEN WORKPLACE
Energy
Water
Waste
Materials
Commuting
Green Team

HEALTH & PRODUCTIVITY
Acoustic Comfort
Indoor Air Quality
Thermal Comfort
Visual Comfort
Layout

FINANCIAL IMPACTS

The following values represent the order of magnitude of wasted energy and lost productivity due to current deficiencies. The estimates show the potential savings from taking corrective action. Values are purposely estimated on the low side to provide a credible case for action. Conservative estimates for “energy inefficiency” are a maximum of 5% for a worst case of inefficient lighting, plug load and server room lighting and plug load. Conservative estimates for “lost productivity” are a maximum of 6%, which represent the reduced quantity and/or quality of work output per employee (as gauged in minutes lost) in a worst case scenario of acoustic, thermal and visual discomfort, bad air, poor layout of space and lack of wellness features and amenities.

Health & Productivity

<table>
<thead>
<tr>
<th></th>
<th># of employees</th>
<th>Acoustics</th>
<th>IAQ</th>
<th>Thermal comfort</th>
<th>Visual comfort</th>
<th>Layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Operations</td>
<td>56</td>
<td>No Savings</td>
<td>$14,780</td>
<td>$24,640</td>
<td>No Savings</td>
<td>No Savings</td>
</tr>
<tr>
<td>BRM Headquarters</td>
<td>122</td>
<td>$174,460</td>
<td>No Savings</td>
<td>$174,460</td>
<td>No Savings</td>
<td>$174,460</td>
</tr>
<tr>
<td>Mitchell &amp; Associates</td>
<td>200</td>
<td>$211,000</td>
<td>No Savings</td>
<td>$187,000</td>
<td>No Savings</td>
<td>$132,000</td>
</tr>
<tr>
<td>Rutherford Center</td>
<td>40</td>
<td>$35,200</td>
<td>$10,560</td>
<td>$17,600</td>
<td>$10,560</td>
<td>$35,200</td>
</tr>
</tbody>
</table>
### TO DO’S

#### ENERGY

<table>
<thead>
<tr>
<th>Description</th>
<th>Bay Street</th>
<th>BRM</th>
<th>Mitchell &amp; Ass</th>
<th>Rutherford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider the possibility of installing sub-metering for the project area.</td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Install high efficiency lighting.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Consider installing LED lighting.</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-yellow.svg" alt="Yellow Flag" /></td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Measure ambient lighting levels in areas where screen tasks are done.</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>200-300 lux (28 FC) of ambient lighting should be sufficient for screen tasks, along with some task lighting. There may be an opportunity to “de-lamp” some areas.</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Calculate the wattage per square foot for the office (wattage of all the lamps divided by floor area). Take appropriate action to achieve approximately 0.9 watts per SF.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Enclosed rooms (e.g. offices, meeting rooms, storage rooms) should have their own lighting controls.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Large open offices should have zoned lighting controls.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Consider installing dimming controls for lights.</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-yellow.svg" alt="Yellow Flag" /></td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-yellow.svg" alt="Yellow Flag" /></td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Provide lighting occupancy sensors (motion detectors) in conference rooms, enclosed offices, storage, supply rooms or printing rooms.</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-yellow.svg" alt="Yellow Flag" /></td>
<td>✓</td>
<td>✓</td>
<td><img src="https://www.svgrepo.com/svg/40/traffic-light-red.svg" alt="Red Flag" /></td>
</tr>
<tr>
<td>Consider installing daylight-sensors to automatically dim electric light levels.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Automate lights off at the end of the day, weekends etc.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>1</td>
<td><strong>Energy</strong></td>
<td><strong>Street Operations Cer</strong></td>
<td>BRM Headquarters 2014</td>
<td>BRM Headquarters 2015</td>
</tr>
<tr>
<td>2</td>
<td>Consider the possibility of installing sub-metering for the project area.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>Install high efficiency lighting.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>Consider installing LED lighting.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>5</td>
<td>Measure ambient lighting levels in areas where screen tasks are done. 200-300 lux (28 FC) of ambient lighting should be sufficient for screen tasks, along with some task lighting. There may be an opportunity to “de-lamp” some areas.</td>
<td>!</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>Calculate the wattage per square foot for the office (wattage of all the lamps divided by floor area). Take appropriate action to achieve approximately 0.9 watts per SF.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Enclosed rooms (e.g. offices, meeting rooms, storage rooms) should have their own lighting controls.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>8</td>
<td>Large open offices should have zoned lighting controls.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>9</td>
<td>Consider installing dimming controls for lights.</td>
<td>✓</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>10</td>
<td>Provide lighting occupancy sensors (motion detectors) in conference rooms, enclosed offices, storage, supply rooms or printing rooms.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>11</td>
<td>Consider installing daylight-sensors to automatically dim electric light levels.</td>
<td>!</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>12</td>
<td>Automate lights off at the end of the day, weekends etc.</td>
<td>!</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>Where there are no occupancy sensors or BAS to shut off lights, conduct midnight audits to check whether lights are being switched off after-hours.</td>
<td>!</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>14</td>
<td>Consider seeking professional advice to reduce unwanted heat loss and/or solar gain through windows.</td>
<td>✓</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>15</td>
<td>Consider adding solar control window film to reduce energy use and improve comfort in spaces that are in direct sunlight.</td>
<td>✓</td>
<td></td>
<td>!!</td>
</tr>
<tr>
<td>16</td>
<td>Install window blinds.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>17</td>
<td>Install automated controls on the operable windows based on outdoor temperature, occupancy sensors and window (open or closed) sensors.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>18</td>
<td>Check temperature settings i.e. 75°F (24°C) or higher in the summer, and 70°F (21 °C) or lower in winter.</td>
<td>✓</td>
<td></td>
<td>!!</td>
</tr>
<tr>
<td>19</td>
<td>Implement temperature set-back when the office is unoccupied.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>20</td>
<td>Install devices that switch off office equipment when occupants are not present.</td>
<td>!</td>
<td>✓</td>
<td>!!</td>
</tr>
</tbody>
</table>
Thank you