# Laboratory Achieves Gold LEED™ Sustainability Certification Through VM

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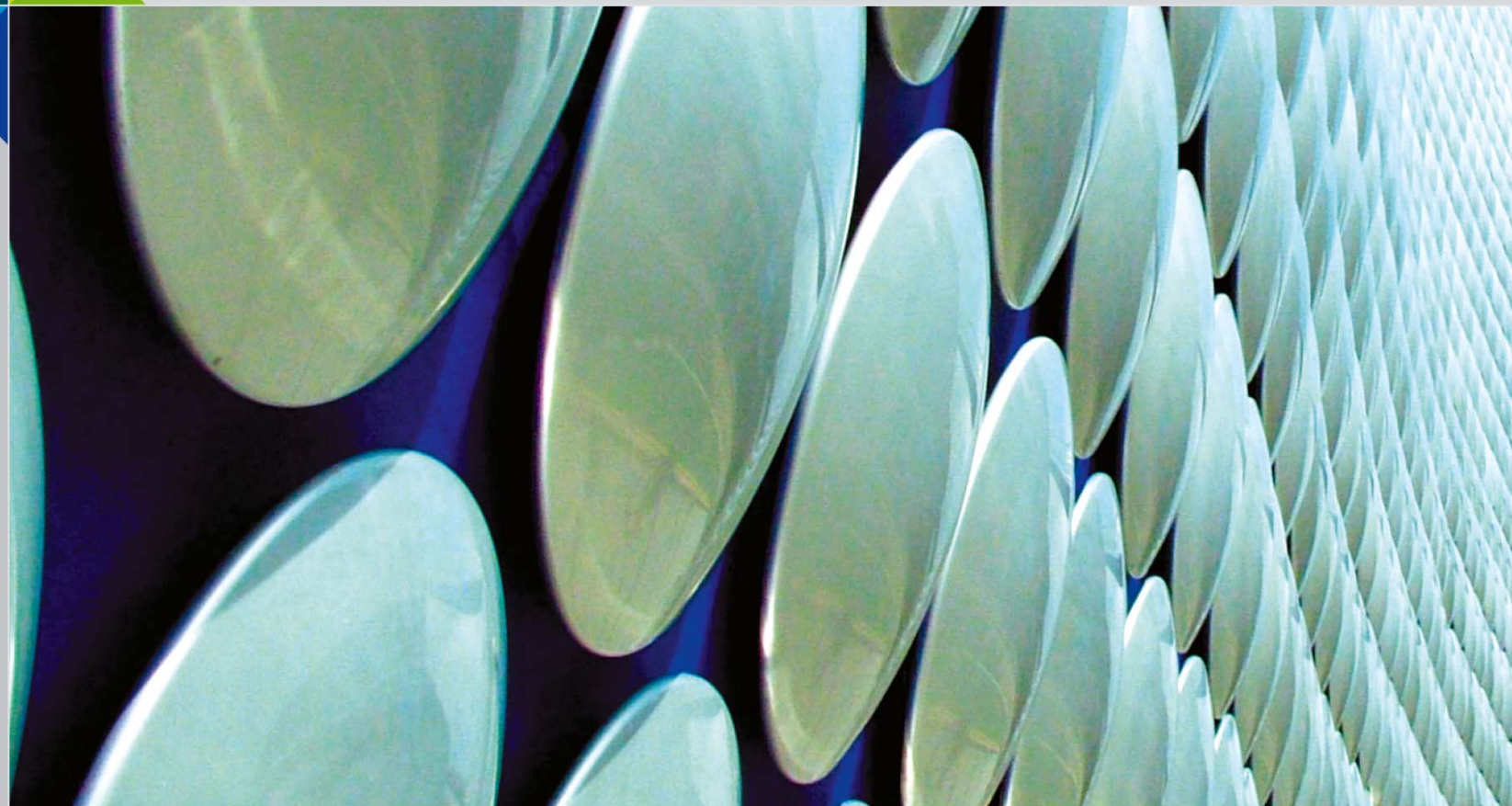
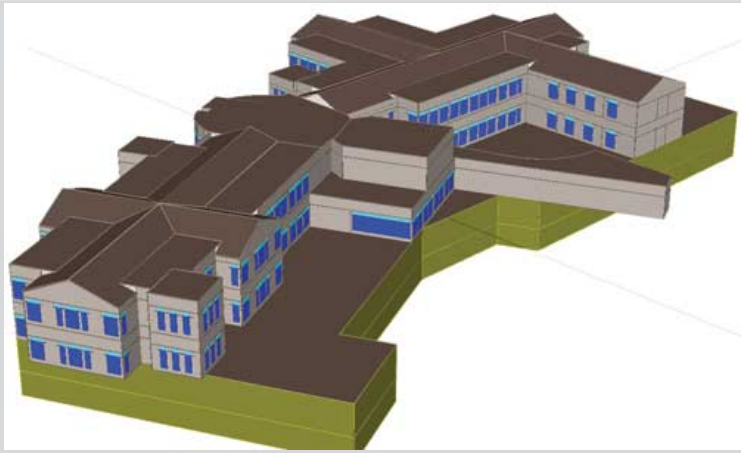




- Faithful+Gould conducted a Sustainability Value Management Review of the schematic design for the Headquarters Expansion, Howard Hughes Medical Institute, Chevy Chase, Maryland
- The headquarters expansion project consists of a new 58,000 square feet (gsf), two-story office addition to be constructed over approximately 80,000 gsf of parking in one or two levels

- “The primary purpose and objective of the Howard Hughes Medical Institute shall be the promotion of human knowledge within the field of the basic sciences (principally the field of medical research and education) and the effective application thereof for the benefit of mankind.”
- HHMI wanted to achieve Gold LEED™ Certification on this important project to make a statement to their current and future partners of their support for sustainability.

- The VM Team utilized a Faithful+Gould LEEDTM scoring spreadsheet as a guide to determining which LEEDTM points the current design had already achieved, which additional LEEDTM points were reasonably obtainable, and the steps necessary to obtain them.

**LEED Project: HHMI Headquarters Expansion**

| Y | ? | N | | |
|---|---|---|---|---|
| 43 | 9 | 17 | **Total Project Score** | Possible Points 69 |

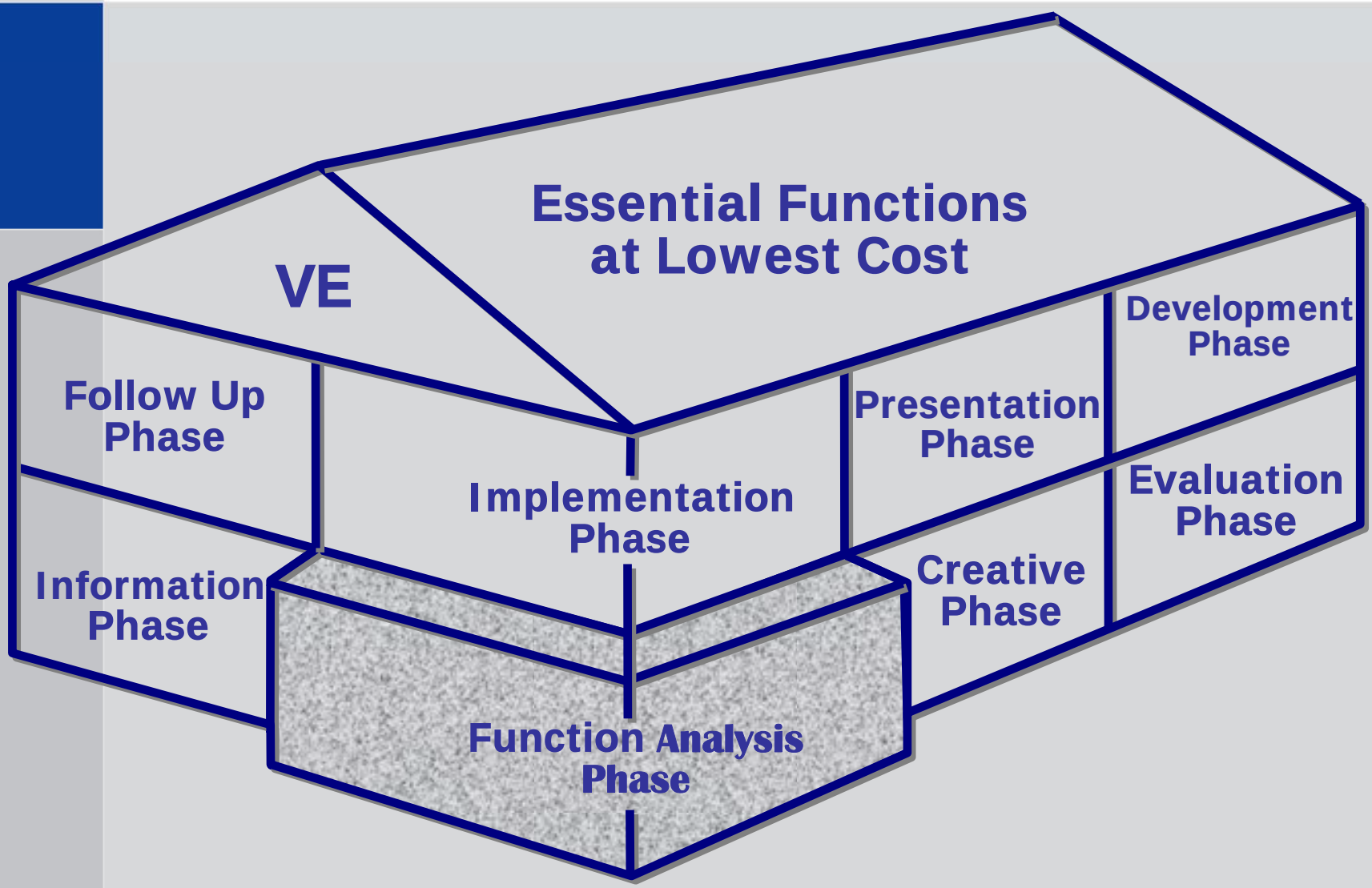
Certified [26 to 32] Silver [33 to 38] Gold [39 to 51] Platinum [52 or more points]

| Y | ? | N | Sustainable Sites | Possible Points 14 | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | Erosion & Sediment Control | 0 |
| 1 | | | Credit 1 | Site Selection | 1 |
| | | 1 | Credit 2 | Developmental Density | 1 |

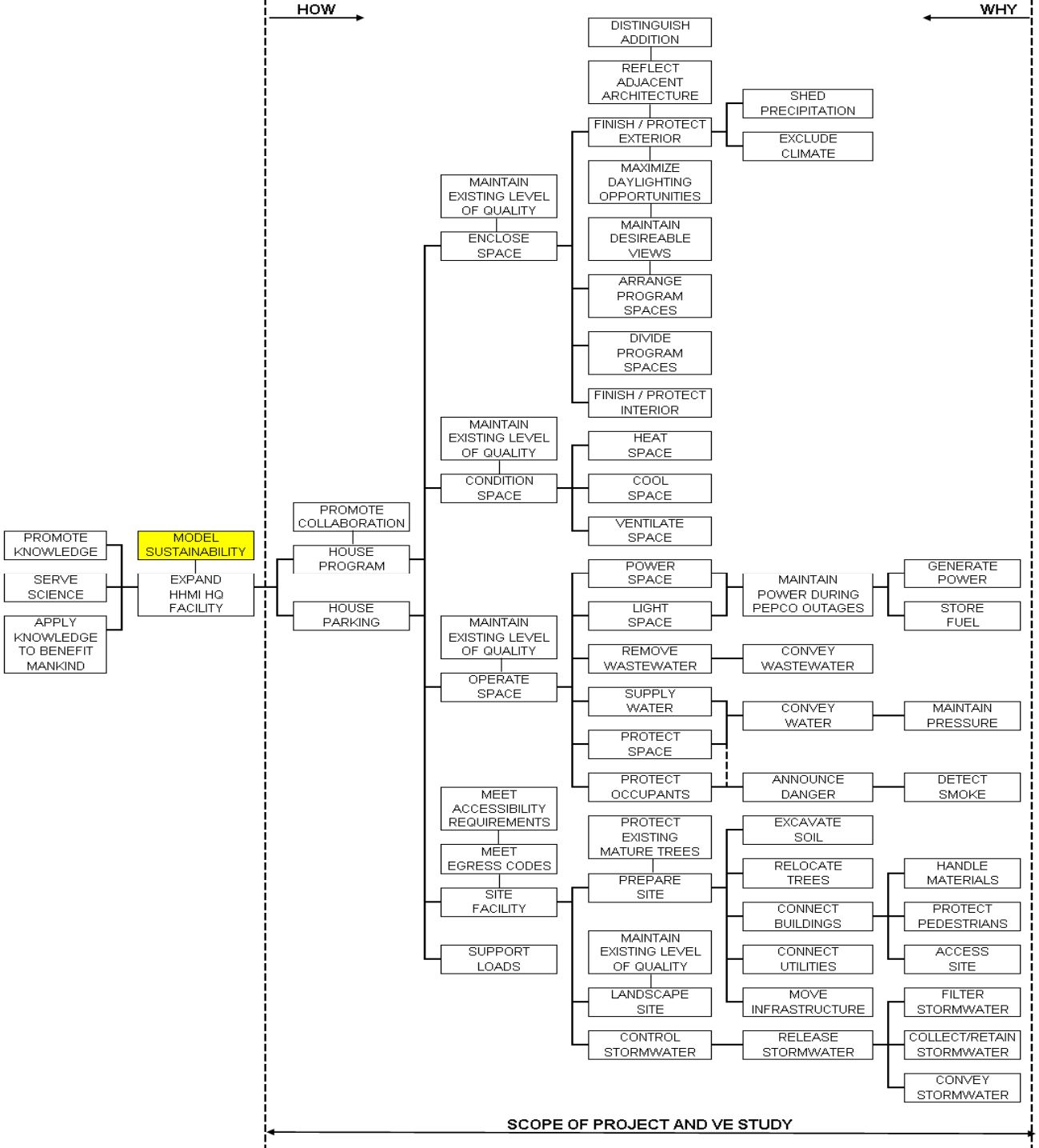
| Y | ? | N | Materials & Resources | Possible Points 13 | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | Storage & Collection of Recyclables | 0 |
| | | 1 | Credit 1.1 | **Building Reuse,** Maintain 75% of existing shell | 1 |
| | | 1 | Credit 1.2 | **Building Reuse,** Maintain 100% of existing shell | 1 |

- The VM team worked through the spreadsheet, item by item, within the context of the purpose of the project, aesthetic and functional requirements, and general capital and life cycle cost implications using the following VE Job Plan.

# VM Job Plan

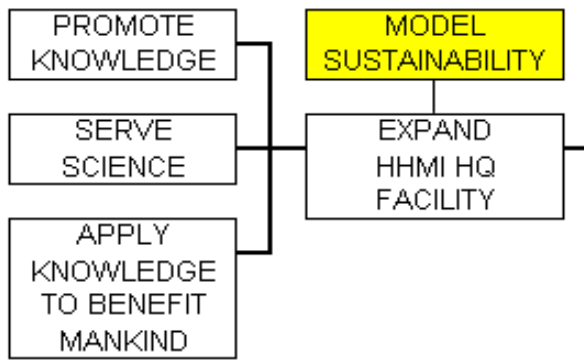

VE
Essential Functions
at Lowest Cost
Follow Up
Phase
Information
Phase
Implementation
Phase
Function Analysis
Phase
Presentation
Phase
Creative
Phase
Development
Phase
Evaluation
Phase

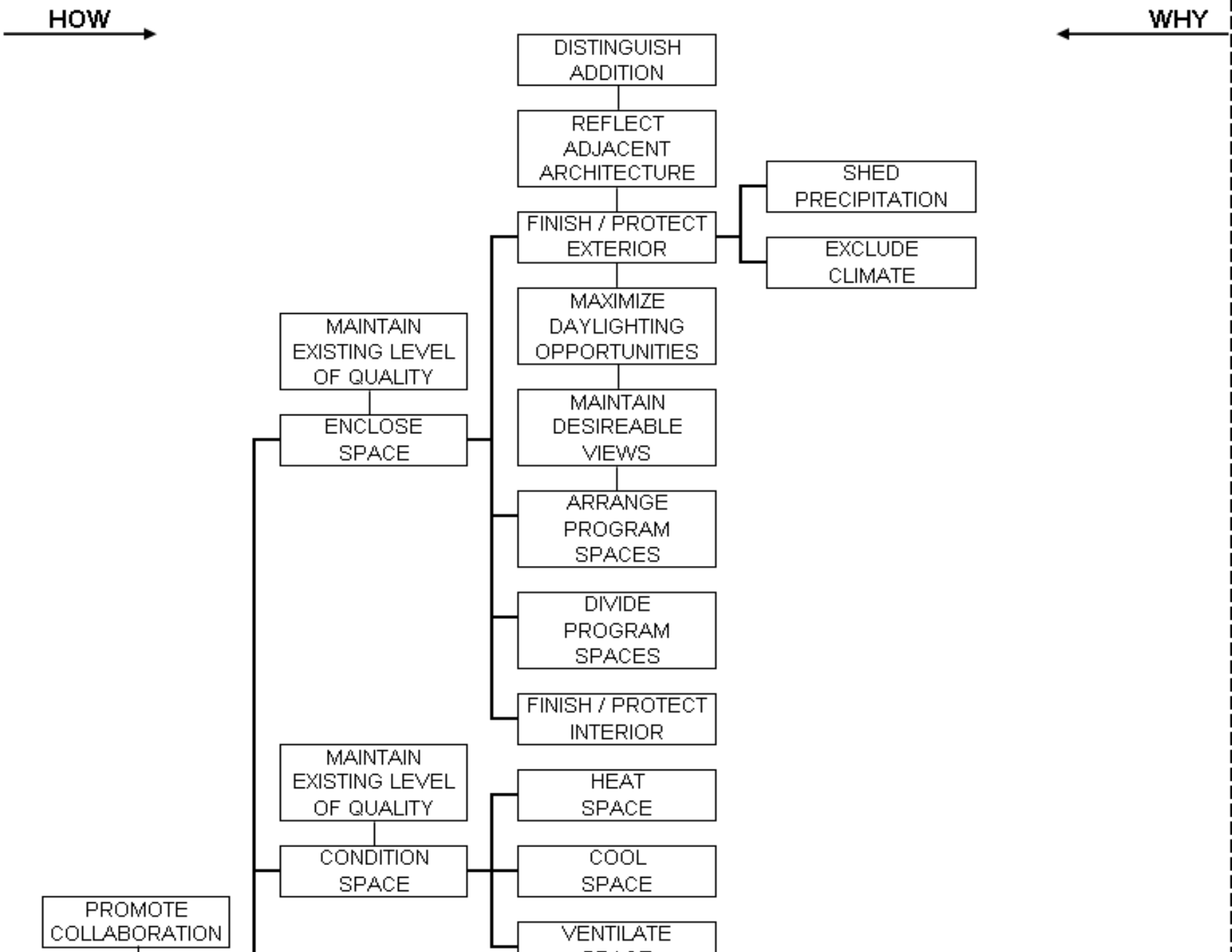
- This effort was supported by two key references from the United States Green Building Council:
  - LEEDTM – New Construction (NC), Version 2.2
  - LEEDTM NC-Application Guide for Multiple Buildings and  On-Campus Building Projects
- The VM Team found the project could very reasonably attain a score of 43, qualifying the project for Gold level certification.
- The requirements to attain these 43 points are all consistent with the current schematic design and within the aesthetic and functional framework for the project shown in the following FAST diagram.

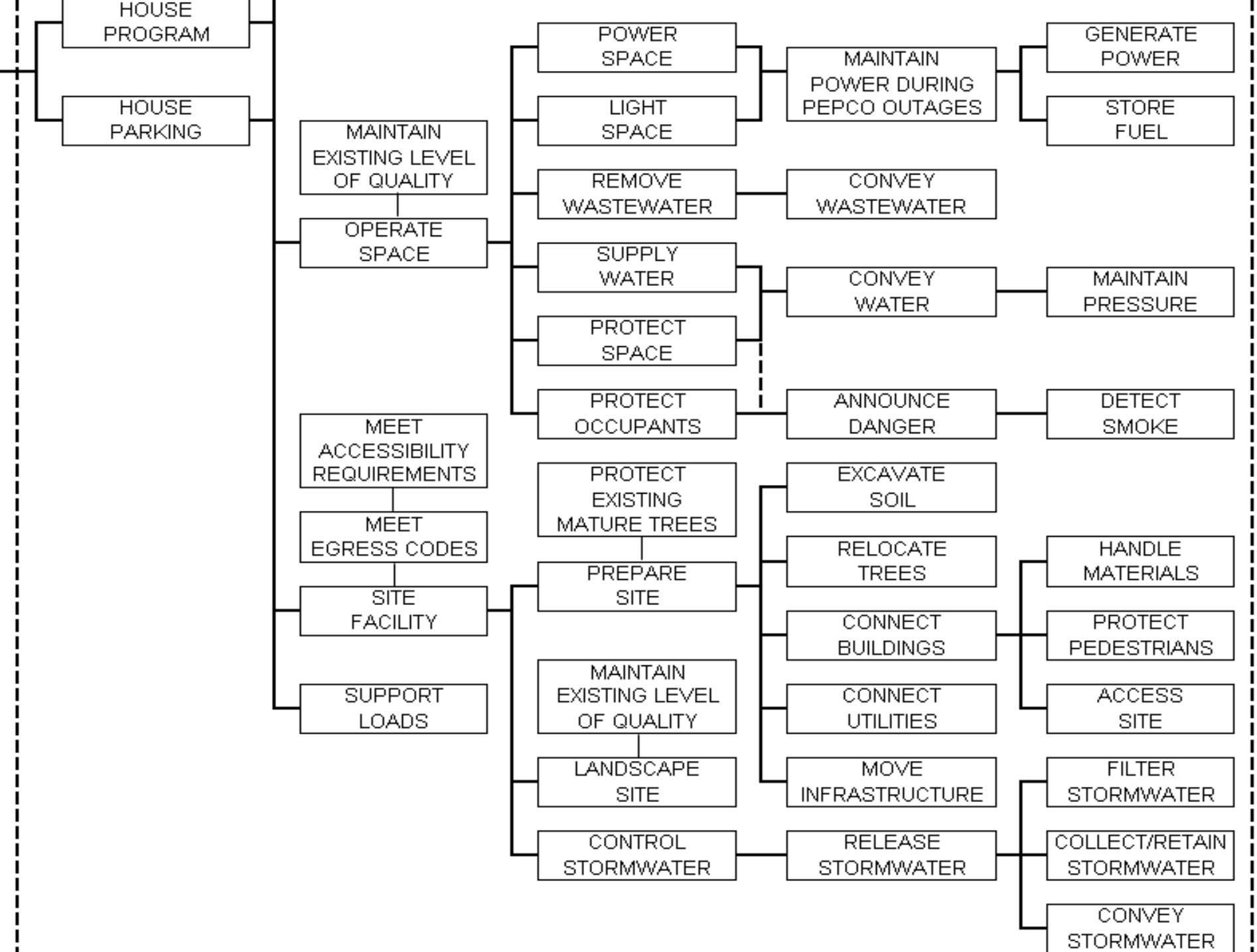



FAITHFUL+GOULD
CONSTRUCTIVE EXPERTISE

# FAST Diagram Howard Hughes Medical Institute Headquarters Expansion




HOW
WHY
DISTINGUISH ADDITION
REFLECT ADJACENT ARCHITECTURE
FINISH / PROTECT EXTERIOR
SHED PRECIPITATION
EXCLUDE CLIMATE
MAXIMIZE DAYLIGHTING OPPORTUNITIES
MAINTAIN DESIREABLE VIEWS
ARRANGE PROGRAM SPACES
DIVIDE PROGRAM SPACES
FINISH / PROTECT INTERIOR
MAINTAIN EXISTING LEVEL OF QUALITY
ENCLOSE SPACE
MAINTAIN EXISTING LEVEL OF QUALITY
CONDITION SPACE
HEAT SPACE
COOL SPACE
VENTILATE
PROMOTE COLLABORATION


HOUSE PROGRAM
HOUSE PARKING
MAINTAIN EXISTING LEVEL OF QUALITY
OPERATE SPACE
SUPPORT LOADS
MEET ACCESSIBILITY REQUIREMENTS
MEET EGRESS CODES
SITE FACILITY
POWER SPACE
LIGHT SPACE
REMOVE WASTEWATER
SUPPLY WATER
PROTECT SPACE
PROTECT OCCUPANTS
MAINTAIN POWER DURING PEPCO OUTAGES
CONVEY WASTEWATER
CONVEY WATER
ANNOUNCE DANGER
GENERATE POWER
STORE FUEL
MAINTAIN PRESSURE
DETECT SMOKE
PROTECT EXISTING MATURE TREES
PREPARE SITE
MAINTAIN EXISTING LEVEL OF QUALITY
LANDSCAPE SITE
CONTROL STORMWATER
EXCAVATE SOIL
RELOCATE TREES
CONNECT BUILDINGS
CONNECT UTILITIES
MOVE INFRASTRUCTURE
RELEASE STORMWATER
HANDLE MATERIALS
PROTECT PEDESTRIANS
ACCESS SITE
FILTER STORMWATER
COLLECT/RETAIN STORMWATER
CONVEY STORMWATER

- The additional capital cost to achieve this goal was estimated by the VM Team at between $565,000 and $760,000 or 1.3% to 2% of the existing estimate.
- The VM team is confident eventual energy studies performed as part of the design process will show a very short payback for these expenditures.
- The related suggestions, especially in the Indoor Environmental Quality category, will pay even greater dividends in the health and well being of headquarters personnel.
- The key points that led the VM team to the above conclusions are summarized in the following slides and summarized in a Sustainability FAST diagram:

## *Sustainable Site – 10 of 14 potential points*

- Currently available showers meet bicycle transportation need.
- Designated parking for multiple occupancy vehicles (MOV) / Low emission vehicles – set aside 10% (16 spaces) in prime locations. Increase of MOV use should reduce pressure on remaining 90%.
- Designate Open Space equivalent to building footprint to be protected and/or restored
- Design storm water system for two year storm in lieu of 1-year storm
- Relocate storm water management facilities to avoid disturbing the south side of the site and reduce portion of site being disturbed
- The two story garage design will make accomplishing the above items much more likely.

# *Sustainable Site – 10 of 14 potential points*

| 10 | 2 | 2 | Sustainable Sites | | Possible Points | 14 |
|---|---|---|---|---|---|---|
| Y | ? | N | | | | |
| Y | | | Prereq 1 | **Erosion & Sediment Control** | | 0 |
| 1 | | | Credit 1 | **Site Selection** | | 1 |
| | | 1 | Credit 2 | **Developmental Density** | | 1 |
| | | 1 | Credit 3 | **Brownfield Redevelopment** | | 1 |
| 1 | | | Credit 4.1 | **Alternative Transportation**, Public Transportation Access | | 1 |
| 1 | | | Credit 4.2 | **Alternative Transportation**, Bicycle Storage & Changing Rooms | | 1 |
| 1 | | | Credit 4.3 | **Alternative Transportation**, Low Emission & Low fuel vehicles | | 1 |
| 1 | | | Credit 4.4 | **Alternative Transportation**, Parking Capacity | | 1 |
| | 1 | | Credit 5.1 | **Reduced Site Disturbance**, Protect or Restore Open Space | | 1 |
| 1 | | | Credit 5.2 | **Reduced Site Disturbance**, Development Footprint | | 1 |
| 1 | | | Credit 6.1 | **Storm Water Management,** Quantity Control | | 1 |
| 1 | | | Credit 6.2 | **Storm Water Management,** Quality Control | | 1 |
| 1 | | | Credit 7.1 | **Heat Island Effect**, Non-Roof | | 1 |
| | 1 | | Credit 7.2 | **Heat Island Effect**, Roof | | 1 |
| 1 | | | Credit 8 | **Light Pollution Reduction** | | 1 |

Wiki Maple

# *Water Efficiency – 4 of 5 potential points*

- Utilize collected storm water for irrigation by providing a pump and piping to irrigation system (likely under $10,000) to avoid use of potable water for irrigation
- Likewise evaluate storm water use for flushing urinals and lavatories
- Specify water efficient fixtures such as ½ gallon flush urinals and up/down flush valves for lavatories
- Target water use reduction of 30% or more

| 4 | 1 | 0 | Water Efficiency | | Possible Points | 5 |
|---|---|---|---|---|---|---|
| Y | ? | N | | | | |
| 1 | | | Credit 1.1 | **Water Efficient Landscaping,** Reduce by 50% | | 1 |
| 1 | | | Credit 1.2 | **Water Efficient Landscaping,** No potable use or no irrigation | | 1 |
| | 1 | | Credit 2 | **Innovative Wastewater Technologies** | | 1 |
| 1 | | | Credit 3 | **Water Use Reduction,** 20% Reduction | | 1 |
| 1 | | | Credit 4 | **Water Use Reduction,** 30% Reduction | | 1 |

## *Energy & Atmosphere – 6 of 17 potential pts*

- Continue design intent (energy efficient ballasts, occupancy sensors, daylighting controls, etc.) to achieve energy performance of at least 21% below ASHRAE 90.1 - 2004
- Use energy modeling to design/verify the above
- Purchase additional commissioning services as per LEEDTM NC
- Prepare refrigerant calculations to achieve enhanced refrigerant management
- Additional professional services and devices to achieve the above estimated at between $40,000 and $80,000
- If needed, a point for green power can be attained simply by paying extra to buy green power

# *Energy & Atmosphere – 6 of 17 potential pts*

| 6 | 4 | 7 | Energy and Atmosphere | | Possible Points | 17 |
|---|---|---|---|---|---|---|
| Y | ? | N | | | | |
| Y | | | Prereq 1 | **Fundamental Commissioning of the Building Energy Systems** | | 0 |
| Y | | | Prereq 2 | **Minimum Energy Performance** | | 0 |
| Y | | | Prereq 3 | **Fundamental Refrigeration Management** | | 0 |
| 2 | | | Credit 1.2 | **Optimize Energy Performance,** 14% new | | 2 |
| 2 | | | Credit 1.4 | **Optimize Energy Performance,** 21% new | | 2 |
| | 2 | | Credit 1.6 | **Optimize Energy Performance,** 28% new | | 2 |
| | | 2 | Credit 1.8 | **Optimize Energy Performance,** 35% new | | 2 |
| | | 2 | Credit 1.10 | **Optimize Energy Performance,** 42% new | | 2 |
| | | 1 | Credit 2.1 | **Renewable Energy,** 2.5% | | 1 |
| | | 1 | Credit 2.2 | **Renewable Energy,** 7.5% | | 1 |
| | | 1 | Credit 2.3 | **Renewable Energy,** 12.5% | | 1 |
| 1 | | | Credit 3 | **Additional Commissioning** | | 1 |
| 1 | | | Credit 4 | **Enhanced Refrigerant Management** | | 1 |
| | 1 | | Credit 5 | **Measurement Verification** | | 1 |
| | 1 | | Credit 6 | **Green Power** | | 1 |

## *Materials & Resources – 6 of 13 potential pts*

- Specify segregation of construction waste by General Contractor and divert 75% of waste from landfill disposal. Specialty contractors are now available to help accomplish this goal.
- Include site clearing - recycle asphalt, concrete, etc. from demolition and clearing
- Specify materials w/recycled content – steel, metal products, gypsum, carpet, etc. – so at least 20% of material cost is for recycled materials
- Research to find suitable building materials that have been extracted and manufactured regionally (500 mile radius) so at least 20% of material cost can be for such materials
- Specify use of Certified Wood products. There is up to a 30% premium in material cost for such products or approximately $40,000 for this project.

# *Materials & Resources – 6 of 13 potential pts*

| 6 | 1 | 6 | Materials & Resources | Possible Points | 13 |
|---|---|---|---|---|---|
| Y | ? | N | | | |
| Y | | | Prereq 1 | **Storage & Collection of Recyclables** | 0 |
| | | 1 | Credit 1.1 | **Building Reuse,** Maintain 75% of existing shell | 1 |
| | | 1 | Credit 1.2 | **Building Reuse,** Maintain 100% of existing shell | 1 |
| | | 1 | Credit 1.3 | **Building Reuse,** Maintain 100% of existing shell & 50% non-she | 1 |
| 1 | | | Credit 2.1 | **Construction Waste Management,** Divert 50% | 1 |
| 1 | | | Credit 2.2 | **Construction Waste Management,** Divert 75% | 1 |
| | | 1 | Credit 3.1 | **Resource Reuse,** Specify 5% | 1 |
| | | 1 | Credit 3.2 | **Resource Reuse,** Specify 10% | 1 |
| 1 | | | Credit4.1 | **Recycled Content,** Specify 5% | 1 |
| 1 | | | Credit 4.2 | **Recycled Content,** Specify 10% | 1 |
| 1 | | | Credit 5.1 | **Regional Materials,** 10% Extracted & Manufactured Regionally | 1 |
| | 1 | | Credit 5.2 | **Regional Materials,** 20% Extracted & Manufactured Regionally | 1 |
| | | 1 | Credit 6 | **Rapidly Renewable Materials** | 1 |
| 1 | | | Credit 7 | **Certified Wood** | 1 |

## *Indoor Environ Quality – 15 of 15 potential pts*

- In general, investing in the analysis and ‘smart’ systems to get these points will provide high quality environment for personnel
- Evaluate control of energy use versus increased ventilation through the inclusion of ‘smarter’ systems. Additional controls and points for ‘smart’ system are a premium of about $150,000 over the schematic design
- Verify increased ventilation effectiveness
- Incorporate programmable – dimmable ballasts at a premium of $100 per ballast or about $250,000 for the project.

## *Indoor Environ Quality – 15 of 15 potential pts* (continued)

- Individualized comfort control (separate VAV box and controls for each office) versus zoned controls for a premium of about $50,000 over the schematic design
- Take annual “customer” satisfaction survey to verify comfort
- Model daylight, exposure, and light levels to provide daylight to 75% of spaces while controlling glare. Schematic building design is well-suited to meet this goal plus views for 90% of spaces.

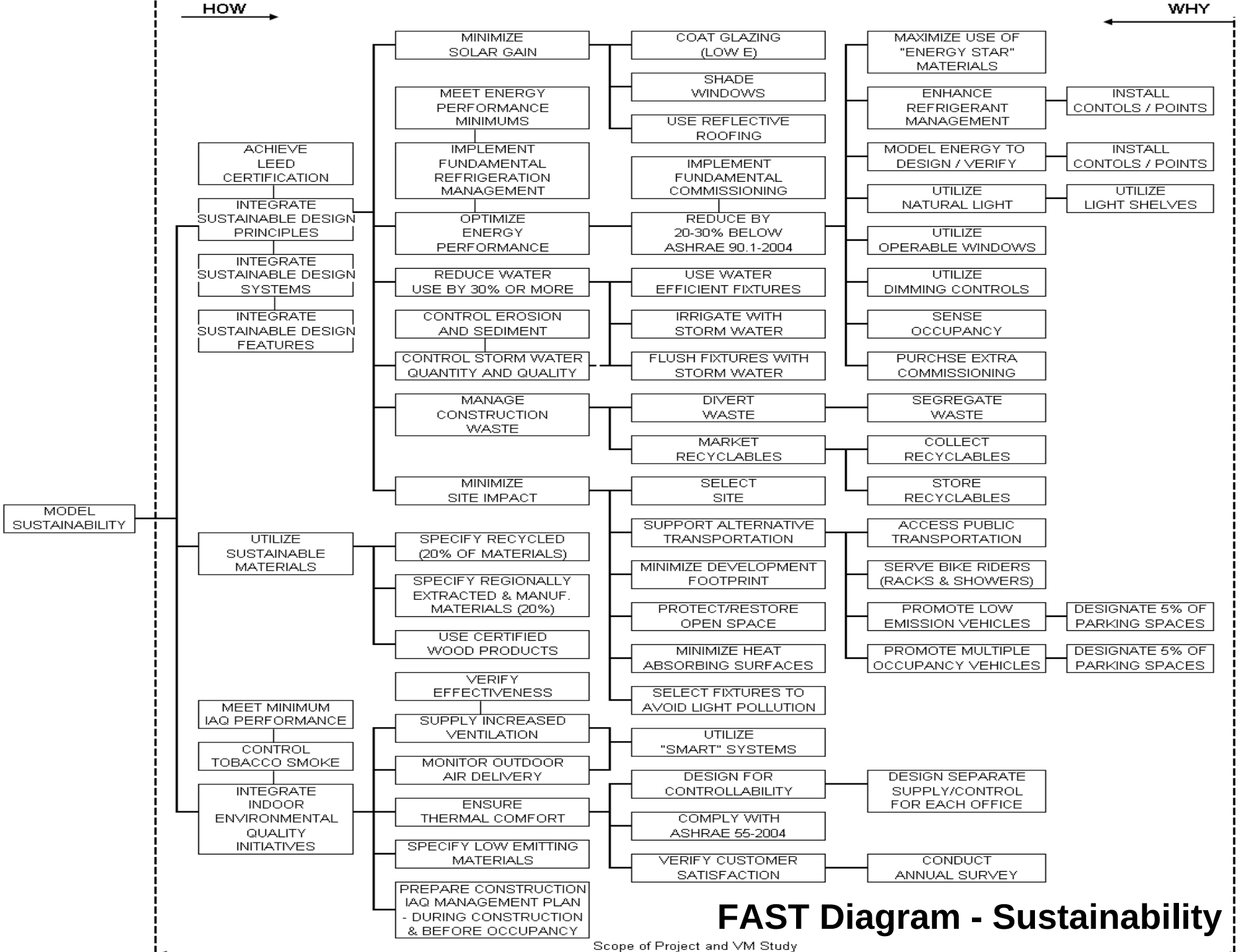
# Indoor Environ Quality – 15 of 15 potential pts

| 15 | 0 | 0 | Indoor Environmental Quality | Possible Points | 15 |
|---|---|---|---|---|---|
| Y | ? | N | | | |
| Y | | | Prereq 1 | **Minimum IAQ Performance** | 0 |
| Y | | | Prereq 2 | **Environmental Tobacco Smoke,** (ETS) Control | 0 |
| 1 | | | Credit 1 | **Outdoor Air Delivery Monitoring** | 1 |
| 1 | | | Credit 2 | **Increased Ventilation** | 1 |
| 1 | | | Credit 3.1 | **Construction IAQ Management Plan,** During Construction | 1 |
| 1 | | | Credit 3.2 | **Construction IAQ Management Plan,** Before Occupancy | 1 |
| 1 | | | Credit 4.1 | **Low Emitting Materials,** Adhesives & Sealants | 1 |
| 1 | | | Credit 4.2 | **Low Emitting Materials,** Paints | 1 |
| 1 | | | Credit 4.3 | **Low Emitting Materials,** Carpet | 1 |
| 1 | | | Credit 4.4 | **Low Emitting Materials,** Composite Wood | 1 |
| 1 | | | Credit 5 | **Indoor Chemical & Pollutant Source Control** | 1 |
| 1 | | | Credit 6.1 | **Controllability of Systems,** Lighting | 1 |
| 1 | | | Credit 6.2 | **Controllability of Systems,** Thermal Comfort | 1 |
| 1 | | | Credit 7.1 | **Thermal Comfort,** Comply with ASHRAE 55-2004 | 1 |
| 1 | | | Credit 7.2 | **Thermal Comfort,** Verification (Customer Satisfaction Rating) | 1 |
| 1 | | | Credit 8.1 | **Daylight & Views,** Daylight 75% of spaces | 1 |
| 1 | | | Credit 8.2 | **Daylight & Views,** Views for 90% of spaces | 1 |

# *Innovation & Design Process – 2 of 5 potential points*

- Accomplishment of all of the items cited above should lead to at least one point to credit exemplary performance
- A LEEDTM accredited professional will be part of the design team

| 2 | 1 | 2 | Innovation & Design Process | Possible Points | 5 |
|---|---|---|---|---|---|
| Y | ? | N | | | |
| 1 | | | Credit 1.1 | **Innovation In Design,** Credit Exemplary Performance | 1 |
| | 1 | | Credit 1.2 | **Innovation In Design,** Credit Exemplary Performance | 1 |
| | | 1 | Credit 1.3 | **Innovation In Design,** Credit Exemplary Performance | 1 |
| | | 1 | Credit 1.4 | **Innovation In Design,** Credit Exemplary Performance | 1 |
| 1 | | | Credit 2 | **LEED Accredited Professional** | 1 |




# FAST Diagram - Sustainability

## *Conclusions*

- HHMI achieved Gold LEED™ Certification on this important project thereby demonstrating their support for sustainability to their current and future partners.
- Using the VM process, HHMI achieved their goal in the most cost effective way.
- VM and sustainability is a match made in heaven – both provide best value for the money spent.
- Questions??