

---

## EXECUTIVE SUMMARY

**TITLE:** Westwood Hills Nature Center Project – Update on Design Development

**RECOMMENDED ACTION:** Staff and consultants will present an update on the design development phase for the Westwood Hills Nature Center project.

**POLICY CONSIDERATION:** Is Council supportive of the results of the design development phase and the goal to work towards a Zero Energy building?

**SUMMARY:** The Westwood Hills Nature Center (WHNC) project has been discussed and included in the City’s CIP and long range financial plan since 2015. The City Council was presented the Master Plan for WHNC on May 23, 2016; approved entering into an agreement with Hammel, Green and Abrahamson, Inc. (HGA) on June 19, 2017 to design a new interpretive center knowing that the total cost of the project would be \$12 million; authorized entering into an agreement with RJM Construction on September 5, 2017 to provide construction management services; and on December 18, 2017, approved the schematic design phase and authorized staff to begin the design development phase.

Per Council’s direction, the HGA design team used the Master Plan as a guide to create the schematic design and refined through the design development phase. Sustainability strategies and energy analysis have been developed and sustainability rating systems have been reviewed. Based on Council direction, the design team is working towards a “Zero Energy” certified building, which means one hundred percent of the building’s energy needs on a net annual basis are supplied by on-site renewable energy <https://www.living-future.org/net-zero/certification/>. Generally, zero energy is accomplished through maximizing passive climatic opportunities, choosing efficient mechanical systems, and continuing to fine tune the building’s operation to reduce energy loads dramatically. Offsite energy may need to be used during some years as elements that are beyond our control (weather) play a huge role in meeting our sustainability goals. If Council continues to direct staff towards a certified Zero Energy building, all components in the Life Cycle Analysis need to be integrated (please see attached “Life Cycle and Energy Cost Analysis” for this data).

**FINANCIAL OR BUDGET CONSIDERATION:** As discussed by the Council on March 26, the proposed source of funding would be the issuance of general obligation bonds to be repaid by a levy on all taxable properties in the community over a 20 year period. The estimated impact on a median valued single family home is approximately \$34-\$37/yr.

**VISION CONSIDERATION:** St. Louis Park is committed to being a leader in environmental stewardship. We will increase environmental consciousness and responsibility in all areas of city business.

**SUPPORTING DOCUMENTS:** Discussion  
Life Cycle and Energy Cost Analysis  
Westwood Hills Nature Center Building Floor Plan

**Prepared by:** Jason T. West, Recreation Superintendent  
Cynthia S. Walsh, Operations and Recreation Director

**Approved by:** Tom Harmening, City Manager

## **DISCUSSION**

**BACKGROUND:** On May 23, 2016 Council was presented the results of the master planning process for the Westwood Hills Nature Center (WHNC). The poor conditions of this facility, along with the success of the programs offered at this site with limited program space, were the impetus behind a master planning process. The building is aging and has inefficient systems and exterior. Water intrusion is a chronic problem and the heating system is in poor condition and does not function properly. Investing in the maintenance and capital needs of the building are not cost effective long term due to the condition and small size of the building. Public access to the building is distant from parking and accessibility is an issue.

As a part of the master plan work, a public process took place which included public meetings, surveys at special events, online surveys, etc. Citizen input played a key role in shaping this plan. Input was also gathered from the community in regards to the master plan and the proposed interpretive center at recent events.

**FINDINGS FROM THE MASTER PLAN:** The common themes that emerged from the master plan are as follows:

- Move the building location closer to the parking lot for convenience and accessibility yet keeping it tucked into the trees for a more natural setting as much as possible.
- Create a gathering space where people can use the indoor space without interfering with the classrooms.
- Increase the size of meeting rooms to accommodate 50 people in each small multi-purpose room and open up to have the capacity for 150 participants for special events and large gathering space.
- Increase the number of parking stalls to accommodate all users of the building and outside amenities.
- Design the interpretive center building to be energy efficient.
- Current interpretive center location would be repurposed as an outdoor education/community gathering space.

## **PROJECT SCHEDULE**

### Process to date

- 2008: All municipal facilities were surveyed to develop a maintenance and improvement schedule as part of the long range financial planning process. The MSC, Fire Stations, and City Hall were prioritized to resolve specific issues.
- 2012: Over the years it became clear that the Westwood Hills Nature Center building was oversubscribed due to the popularity of the site and the programming provided. Further analysis concluded that making a significant investment to repair the many deficiencies and update the building was not a good long term solution that would meet the service needs today and in the future.
- 2013: Financial resources were added into the CIP to begin the Master Plan process.
- 2015: Master Plan process started.
- 2015 – 2016: Public input (public meetings, on-line and in person surveys, marketing materials).
- May 2016: City Council presented the Master Plan.
- June 19, 2017: Council authorized retaining Hammel, Green and Abrahamson, Inc. (HGA) to design a new interpretive center.

- September 5, 2017: Council authorized an agreement with RJM Construction to provide construction management services for this project.
- October 2017: Public input (on-line and in-person surveys, marketing materials, social media, website updates and project calendar).
- December 18, 2017: Council approved the Schematic Design and authorized moving forward with design development.
- February – April 2018: Public input (conducted over 15 public meetings, shared the process through social media and website updates, created marketing materials, architects and staff created design documents and refined building plan etc.).

### Moving Forward

Assuming the City Council decided to move forward with the project, outlined below is the anticipated schedule:

- May 7, 2018: Request Council to approve design development and enter into construction document phase.
- November 2018: Request Council to approve construction documents, authorize plans and specs and authorize bids.
- Late November or December 2018: Approve bids and authorize the project.
- Spring 2019: Construction begins as soon as weather permits.
- Fall 2020: Construction is complete including deconstruction of current building.

**SCHEMATIC DESIGN PHASE:** The schematic design addressed the program and space desires of the Master Plan. This schematic design was presented to the Parks and Recreation Advisory Commission at their November 29 meeting. The Commissioners provided great suggestions about pedestrian flow and trail circulation. They were supportive of a design that works towards zero energy hoping that those elements could be used as teaching tools. They recommended that the schematic design be presented to the City Council. City Council approved the schematic design on December 18, 2017.

**DESIGN DEVELOPMENT PHASE:** Through the design development phase the building footprint was decreased by approximately 2,000 square feet to contain the project cost to the established budget of \$12 million. The design development includes spaces for four mews for raptors, three multi-purpose rooms that will accommodate 25 people in room A and 50 people each in room B and C, all which open into one larger space that can be used for programs or rentals with room for 125. In addition, the building design includes a catering kitchen for use by people renting the classrooms, separate exhibit and gathering space, a small lounge area for people to sit and observe nature, a conference room for use by staff or small neighborhood/resident gatherings, staff offices and all the back of house space for storage, mechanical, raptor and animal care etc. Through the design development phase color pallets, flooring, walls, textures, finishes, furniture, etc. are being chosen, as well as, soil boring, bird glass, mechanical refinement, audio/visual details, life cycle cost analysis, and making sure the construction and building meets all state and city codes.

Split Rock Studios is designing the exhibits with the intent to integrate the building into site and exhibit design to support the nature center's educational programming. Designing the exhibits appropriately is important as we consider working towards zero energy since they can be one of the largest energy users. Split Rock Studios has completed their Schematic Design Phase II where there are four separate exhibit zones: pollinators, wetland, woodland snag, and prairie mound. This will be shared with Council at the April 9 Council Study Session.

Staff has also been working with consultants to complete the following:

- Wetland delineation
- Site survey
- Trees located within survey area
- All utilities
- The proposed new building site has been staked
- Soil borings and geotechnical soil testing
- Acoustic analysis
- Exhibit lighting analysis
- Audio/Visual analysis
- Energy analysis
- Exhibit coordination with Split Rock Studios
- Exterior/Interior material concept design
- Bird glass and window system research
- Storm water management design
- Code review with design team

**2018 DESIGN DEVELOPMENT PUBLIC PROCESS PRESENTATIONS:**

Feb. 8: Present to Discover St. Louis Park Staff

Feb. 12: Present to Health in the Park – City Hall

Feb. 13: Present to Dept. Head Team

Feb. 13: Present to CEAC – Lenox Community Center

Feb. 22: Present at a WHNC Public Meeting

Feb. 26: Present at DRC

Feb. 27: Present at Root and Shoots – High School

Feb. 27: Present at Senior Men’s Group – Lenox Community Center

Feb. 28: Present at a WHNC Public Meeting (HGA presents)

March 2: Present at Sunrise Rotary

March 12: Present at School Board Meeting – High School

March 15: Present at DSLP – Marriott

March 28: Present at Multicultural Advisory Committee

April 3: Present at WHNC Volunteer Breakfast

April 4: Present at Joint Commission Meeting (PRAC, Planning Com., Sustainability Commission)

April 11: Present at Realtor Forum – City Hall

April 16: Present to Noontime Rotary – Double Tree West End

One of the suggestions that came out of the public process was the possibility of providing a means by which people could donate to the project. Staff will be exploring ideas of how we may incorporate donation opportunities into the project.

**SOIL CONDITIONS:** The City has contracted with American Engineer Testing (AET) to conduct soil testing through soil borings and cone testing. The test results found organic/marsh material as deep as 15 feet in certain spots where the building would be located on the site. One of the solutions might be to use geopiers to anchor the concrete slab of the building. We are in the process of examining the budget impacts this may have on the project. We will be making the necessary adjustments to the project design to stay within the budget. If there are any significant tradeoffs that need to occur, staff will bring those options back to the City Council.

**SUSTAINABILITY GOAL:** As a firm, HGA brings a wealth of knowledge in the area of sustainable design. HGA has also brought on consultant Chris Piche' from the Integral Group. Chris brings a broad understanding of high performance building engineering systems to this project. His approach is rooted in the philosophy that environmentally responsible design must constantly evolve to suit the technology available in balance with the project. To that end, the design of this building currently includes sustainable design that integrates HVAC, plumbing, solar, and a number of other elements to achieve Zero Energy status.

Zero Energy buildings are highly energy efficient buildings in which the total consumption of energy from all sources is balanced by onsite renewable energy generation on an annual basis. The Zero Energy Building Certification (ZE) is a newly available certification (as of March 2017), and builds on years of leadership towards zero energy building design from both the International Living Future's Institute (ILFI) and the New Building Institute (NBI). ILFI is the organization behind the Living Building Challenge –which is arguably the most progressive green building certification available for buildings today. The New Building's Institute has been a third-party auditor and verifier for zero energy buildings since 2009 and is also responsible for establishing an industry-wide definition for Zero Energy buildings, as well as documenting these projects through the Zero Energy Database.

Zero energy buildings are among the most progressive sustainable design projects in the world today. Due to the new and innovative nature of this goal, St. Louis Park has the opportunity to create a project which is among the first (or perhaps be the first) non-residential Zero Energy Project in Minnesota--leading the way for future sustainable design work in our cold-climate region.

**LIFE CYCLE AND ENERGY COST ANALYSIS:** The attached analysis was developed in response to council's question of how the energy saving strategies proposed compare to the cost to implement the energy saving strategies. This first required HGA to develop building and mechanical plans to sufficient detail to perform energy modeling and a cost analysis.

There are four major components providing most of the reduced energy consumption and production for the proposed building. While the design incorporates other strategies like building orientation for ventilation and passive solar, the analysis was only for items which could be individually evaluated.

Pursuing a Zero Energy goal requires all the components work collectively. Without an enhanced thermal envelope for example, the mechanical systems would need to be increased in capacity.

Lifetime operation savings was chosen rather than simple energy cost savings to reflect the total cost of equipment, maintenance, and replacement costs, in addition to energy costs over the lifetime of the building.

Please refer to the attachment for detailed data regarding the Life Cycle and Energy Cost Analysis. Staff will review this in greater detail at the study session.

Westwood Hills Nature Center

**Life Cycle and Energy Cost Analysis**  
**Summary Tables and Notes– DRAFT**  
 4/02/2018

<b>Whole Building Comparison<sup>1</sup></b>		
	<b>Baseline WHNC Building</b>	<b>Zero Energy WHNC Building</b>
Construction Cost difference	--	+\$1.36M
Annual Energy Savings	--	\$12,000
Lifetime Operational Savings (maintenance/operations, replacement, and energy costs)	--	\$808,000
Lifetime Cost (NPV) Savings	--	\$32,000

**Zero Energy Component Comparison**

Cost impacts for individual components of zero energy building design

<b>Building Envelope Comparison<sup>2</sup> (walls, roof, floor, and glazing)</b>		
	<b>Baseline Envelope</b>	<b>High Performance Envelope</b>
Construction Cost difference	--	+\$524,000
Annual Energy Savings	--	\$1,800
Lifetime Operational Savings	--	\$190,000

<b>Mechanical Systems Comparison<sup>3</sup></b>		
	<b>Air Cooled Chiller, Boilers, Fan Coil System</b>	<b>Geothermal Heat Pump System</b>
Construction Cost difference	--	+\$405,000
Annual Energy Savings	--	\$3,700
Lifetime Operational Savings	--	\$310,000

<b>Lighting Systems Comparison<sup>4</sup></b>		
	<b>Conventional System</b>	<b>High Performance System</b>
Construction Cost difference	--	+\$85,000
Annual Energy Savings	--	\$500
Lifetime Operational Savings	--	\$45,000

<b>Photovoltaic Comparison<sup>5</sup></b>		
	<b>No PV</b>	<b>40 EUI Energy Offset PV System</b>
Construction Cost difference	--	+\$350,000
Annual Energy Savings	--	\$6,000
Lifetime Operational Savings (includes 25-yr PV replacement)	--	\$262,500

## Westwood Hills Nature Center

### <sup>1</sup>Whole Building Comparison

#### Baseline WHNC Building

- Meets the current program.
- Has conventional envelope and mechanical systems.
- 50 year life span quality level.
- Meets the WHNC site conditions.
- Meets SLP generator requirements.
- Meets minimum SLP green rating system requirements.
- No on-site energy generation.
- Estimated building and site cost of approximately \$8.1M.
- Net Present Value (cost of the building over its life span, in today's dollars) is approximately \$10.91M.

#### Zero Energy WHNC Building

- Meets the current program
- Has high performance envelope and ground source heat pump with radiant floor systems
- 50 year life span quality level
- Meets the WHNC site conditions
- Meets SLP generator requirements
- Meets Zero Energy Certification Requirements
- On-site energy generation with photovoltaic arrays
- Estimated Building and Site Cost of approximately \$9.5M
- The Discounted payback for the proposed building is approximately 50 years.
- Net Present Value (cost of the building over its life span, in today's dollars) is approximately \$10.88M, a savings of \$32,000 over the baseline building.

### <sup>2</sup>Building Envelope Comparison

#### Baseline Building Envelope built for 50 year life span

- R-15 wall, 2" of continuous insulation
- R-25 roof, 4" of continuous insulation
- Doubled-paned, glazing system with standard window assembly (support and framing system)

#### High Performance Building Envelope built for 50 year life span

- R-30 wall, 3" of continuous insulation, with cavity insulation
- R-60 roof, 10" average of continuous insulation
- Doubled-paned, high-performance, low-leakage, improved thermal break window system with operable windows.
- Enhanced, below-slab insulation system of R-10 (2" of continuous insulation)

#### Detailed Impacts

- First Cost Difference of \$524,000
- The high performance envelope provides a 15% energy savings (reduction in Energy Use Intensity – EUI) when compared to the baseline building.
- If the high performance envelope is removed from the project, there would be \$1,800 per year added energy cost when compared to the "Basic" chiller and boiler system that meets project requirements.
- The high performance envelope allows for mechanical systems to be reduced – in terms of both peak capacity of heating and cooling systems as well as some local terminal equipment. If the high performance envelope were to be reduced, there would be a cost increase to mechanical systems of approximately 5% or roughly \$40k to \$50k.
- The high performance envelope allows for an improved user comfort.

## Westwood Hills Nature Center

### <sup>3</sup>Mechanical System Comparison

#### Conventional System

- To meet the basic needs of a new Westwood Hills Nature Center for the City of St Louis Park, the mechanical system could be a more conventional air cooled chiller system with gas fired boilers serving distributed fan coil units.

#### High Performance System

- The proposed high performance mechanical systems for the new Westwood Hills Nature Center are distributed geothermal heat pump units, with radiant heating systems, and connected to a geothermal well field.

#### Detailed Impacts

- The geothermal heat pump system adds approximately \$405,000 in mechanical system first costs when compared to the “Basic” chiller and boiler system.
- The geothermal heat pump system reduces energy consumption (Energy Use Intensity – EUI) by approximately 50%. Due to energy rate structures, the energy cost savings for the geothermal heat pumps is approximately \$3,700 per year in energy cost savings or approximately a 22% energy cost savings.
- When using life-cycle analysis, the “Basic” WHNC chiller and boiler system has a Net Present Value (NPV) of \$2,380,000 while the geothermal heat pump system has a NPV of \$2,430,000. The resultant Discounted Payback for the geothermal heat pump systems is approximately 50 years.
- Utility rebates are anticipated to be nominal and would improve the results slightly.
- For the “Basic” chiller and boiler system, additional project costs including screenwalls for the chiller and additional mechanical room space are not included in the first cost impact but should be considered.

### <sup>4</sup>Lighting Systems Comparison

#### Conventional Lighting System

- Base energy code compliant lighting system to include LED lighting, dimming, daylight harvesting control, vacancy sensor control.

#### High Performance Lighting System

- The proposed high performance lighting system to include the base energy code compliant features listed above plus an advanced lighting and control system, daylight balancing/automatic dimming, 10% lower lighting power density (LPD) than code, and shade control.

### <sup>5</sup>Photovoltaic Comparison

#### Baseline – No Photovoltaic System

##### Impacts:

- Annual Energy Cost Increase of approx. \$6,000 (consumption kWh).

#### PV Option – Photovoltaic System to meet 40 EUI Building Energy Offset, with 25 year replacement

##### Impacts:

- First Cost Difference of \$350,000.
- Since PV is being used as part of a zero-energy building certification, and not just to generate renewable power or save money from purchasing electricity, then panel replacement must occur at about 25 years to maintain full energy production, as panel production currently decreases at about ½ % per year.
- At 25 year replacement, it is anticipated that cost will be reduced due to PV infrastructure already in place being reused, and the efficiency output of PV will be higher due to presumed technology developments.
- Energy Cost difference of ~\$6,000 per year savings for complete 50 year life cycle.



**LEGEND**

- |   |   |  |   |
|---|---|--|---|
| <span style="display: inline-block; width: 20px; height: 10px; background-color: orange; border: 1px solid black;"></span> ADMIN              | <span style="display: inline-block; width: 20px; height: 10px; background-color: lightgrey; border: 1px solid black;"></span> CIRCULATION | <span style="display: inline-block; width: 20px; height: 10px; background-color: white; border: 1px solid black;"></span> EXTERIOR             | <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow; border: 1px solid black;"></span> PUBLIC GATHERING |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: darkgrey; border: 1px solid black;"></span> BUILDING SUPPORT | <span style="display: inline-block; width: 20px; height: 10px; background-color: green; border: 1px solid black;"></span> EDUCATION       | <span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span> PROGRAM SUPPORT | <span style="display: inline-block; width: 20px; height: 10px; background-color: grey; border: 1px solid black;"></span> SUPPORT            |

