Sustainability Action Plan
2.0

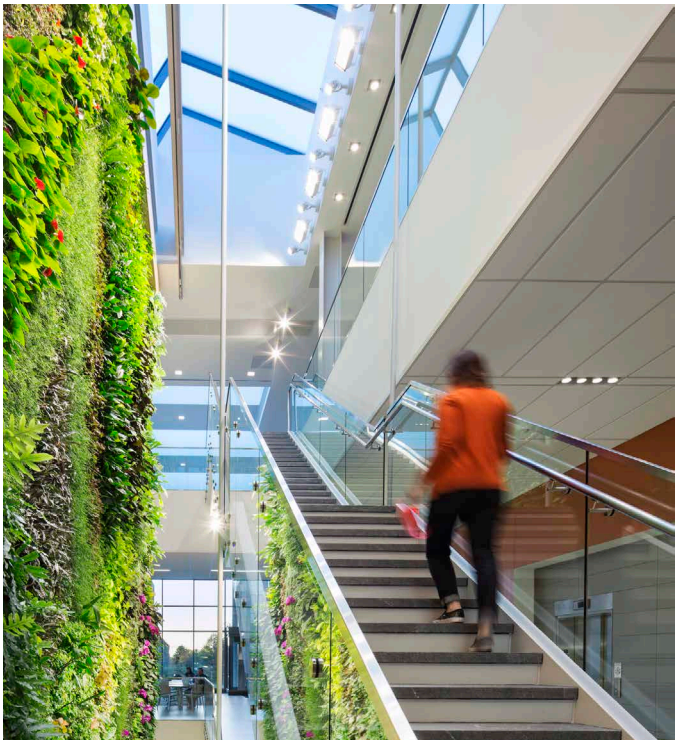
2023

University of Michigan, Kinesiology Building
2022 AIA PA COTE Award of Excellence

ballinger

context

As architects, engineers, interior designers, and planners, we have a professional and ethical responsibility to our clients and the communities we serve to boldly direct our talent and expertise toward reversing the effects of the climate crisis in the built environment.



Rutgers University, New Jersey Institute for Food, Nutrition & Health

Mission & Values

Since our founding, we at Ballinger have aligned our core mission with the projects, institutions, and people that are driven toward improving the human experience. For well more than a century, our projects have been the physical "home" to breakthroughs in scientific development, advancements in energy reduction, innovation in patient and caregiver experience, and cross-disciplinary collaboration of the brightest minds in academic teaching and research. Our strong belief in the firm's integrated approach to design has led the way in making places for people who make the future.

However, today's climate challenge necessitates a deliberate and committed shift **away** from the singular, "*human-centric*" focus of traditional design practice, and **toward** a holistic, "*ecosystem-centric*" approach. The climate crisis demands that we refocus our design process and approach on developing strategies for how our projects may not only *fit into* but *contribute to* the ecology in which they will reside. In other words, it is no longer acceptable or "sustainable" to design a building solely for *people*, with conventional practices that continue to *extract* from the earth. Rather, we must restore a mindset of respect for the land, its limited resources, and how we may design to give back to the ecosystem that our projects will inhabit.

Ballinger's consistent, integrated team approach toward solving the challenges of the *human* condition has us well-positioned to make this bold leap into solving the issues of the *ecological* condition. Moving toward "regenerative design" will require that we reach beyond traditional channels and processes. It will necessitate broader engagement with industry and research toward the discovery of new fuel sources, materials, and building performance monitoring techniques, as well as the deliberate expansion of our mindsets to think beyond traditional limitations imposed by standard practice. It also calls for broader engagement with our communities as part of an equitable and inclusive design process to ensure all voices are heard.

The Sustainability Action Plan that follows outlines the first steps in this process. It is intended to be a living document that evolves with our progress, with the ultimate goal of shifting from *following* industry-prescribed tracking methods to *developing* the methods, products, technologies and design approaches that will lead the industry by example. We invite you all to contribute your creativity and unique perspectives through your project work toward addressing this significant challenge.

Representative of our firm ethos, we have recently engaged in a collaborative, interdisciplinary evaluation to develop the Ballinger Sustainability Action Plan 2.0.

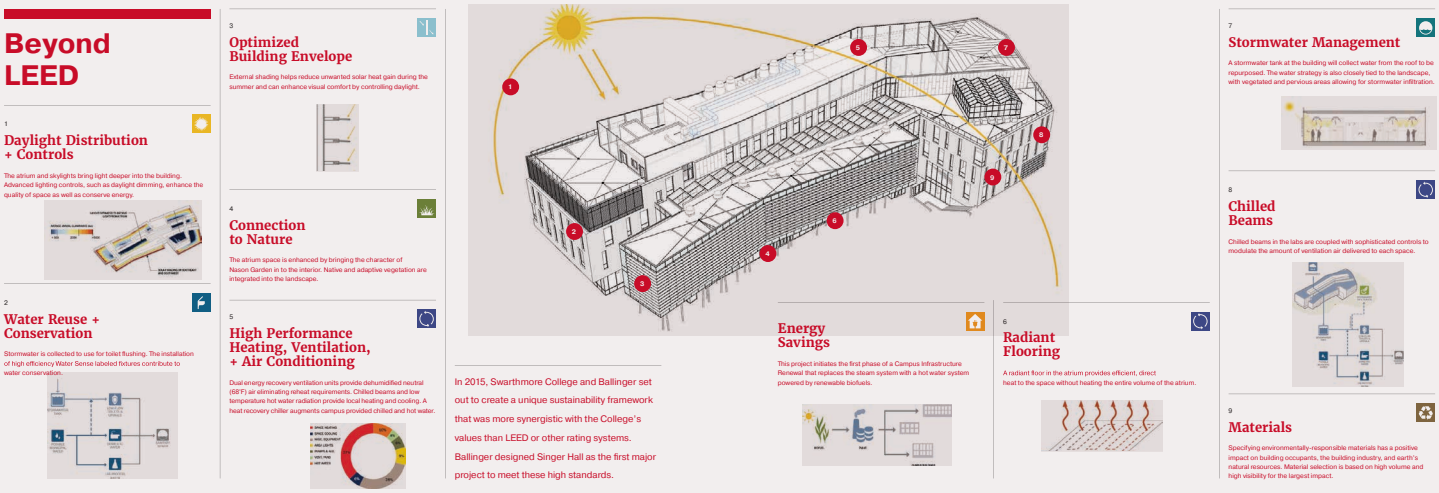
Through this effort, we have reviewed sustainability successes and achievements to date, and initiated a process of self-critique toward elevating our performance across all sustainability measures on each of our projects.

The Ballinger Sustainability Action Plan (SAP) codifies the advancement of sustainability performance in our work through the establishment of:

- Firm-wide commitments across eleven design and operational measures
  - + Equity
  - + Site
  - + Water
  - + Operational Carbon
  - + Embodied Carbon
  - + Resiliency
  - + Wellbeing
  - + Post Occupancy Evaluation (POE)
  - + Knowledge Sharing
  - + Community
  - + Operations
- A consistent, intentional design process and workplan to support project teams in meeting these commitments
- Accountability measures to gauge our process
- Operations recommendations to reduce Ballinger's day-to-day impacts while enhancing health and wellbeing in our work environment

AIA 2030, MEP 2040, SE 2050

Ballinger's commitment to resource stewardship recognizes the unparalleled role that creating, renovating, and operating buildings contributes to greenhouse gas (GHG) emissions. To this end, we have committed to the decarbonization of new and existing buildings – a commitment formalized in our active participation as signatories to the AIA 2030 Commitment, MEP 2040, and SE 2050 programs.



commitments

The following are firm-wide commitments across eleven design and operational measures:

Equity

We strive to create spaces that are welcoming, accessible, and inclusive. We recognize that dialogue with all stakeholders impacted by a project, including those with different perspectives, values, and backgrounds, enhances possibilities for innovation and creativity.

Site

We believe that the quality of open spaces and the landscape itself are as important as internal spaces in the built environment. We design climate-responsive, comfortable, and nourishing site solutions to create welcoming places for the communities they serve. We design sites to minimize water consumption, optimize stormwater management, maximize material conservation, and promote carbon sequestration as part of an integrated design approach.

Water

Potable water is a valuable and increasingly scarce resource. Water conservation and reuse is critical to developing resilient and sustainable projects, including the associated benefits of reducing electricity, gas, and chemical usage. To this end, we must holistically manage water usage and treatment in building and process systems in conjunction with managing stormwater quantity and quality.

Operational Carbon

Net Zero energy usage and carbon neutrality are the goals for all projects. We will continue to champion energy conservation initiatives as part of an integrated design process. We will use Life Cycle Costing (LCC) to identify significant operational savings and emission reductions over the lifetime of the building. To reduce or offset the carbon footprint of our projects, we will promote renewable energy generation on site to meet the project loads and contribute to local and regional power systems.

Embodied Carbon

Building materials and systems selections must account for the building life cycle, be designed for durability, and require minimal maintenance. These selections must also consider the energy and resources inherent in their extraction, manufacture, transportation, and installation. Material and systems selections shall be evaluated using Life Cycle Analysis (LCA) to holistically account for the environmental impact in their manufacturing, construction, use, end-of-life, and ultimately, their return to nature. We will evaluate Global Warming Potential (GWP) of products and learn about new products that make sense without impact to the quality of our structures.

We will evaluate building renovation or the adaptive reuse of existing structures whenever possible versus the impacts of new construction.

Resiliency

Ballinger designs enduring and maintainable facilities to survive and adapt to changing environmental conditions. We will verify our designs using future models and design resilient buildings hardened against potential grid reductions while striving to minimize client pre-investment.

Wellbeing

Our practice focuses on designs that improve health, support learning and discovery, contribute to employee wellbeing, and enhance our communal lives. We take a holistic approach to the qualitative aspects of buildings and spaces through the implementation of adaptable spaces, biophilic principles, and programming that positively impacts occupant physical and mental comfort.

Post Occupancy Evaluation (POE)

We conduct POEs to help understand whether our projects have met the stated quantitative performance and qualitative project goals. We use the findings to inform benchmarks for future endeavors.

Knowledge Sharing

Ballinger will continue to expand upon our expertise through continuing education to include deeper sustainability literacy, training in, and testing of, analytical software tools, the introduction of new products, and processes, as well as the sharing of lessons learned. Internally and externally, we will explicitly convey our commitments, critically analyze our results, and share our successes to inspire ongoing improvement in sustainability practices of Ballinger, our clients, and our professions.

Community

We recognize our responsibility to the communities and cities in which we work. Through our internal B:Engaged initiative, Ballinger supports and encourages staff members to actively lend their skills and mentorship to our communities in order to broaden our perspectives and enrich the built and social fabric of where we live and practice. Ballinger supports, participates and/or holds leadership roles in the Philadelphia chapter of the American Institute of Architects (AIA), its Committee on the Environment (COTE), Philadelphia's Center for Architecture + Design, the Community Design Collaborative (CDC), Habitat for Humanity, the Urban Land Institute (ULI), the Design Advocacy Group (DAG), and the Philadelphia chapter of ASHRAE.

Operations

Due to our central urban location, 75% of Ballinger employees use public transit, walk, or bike to our office, resulting in a low transportation carbon footprint in combination with our hybrid work policy.

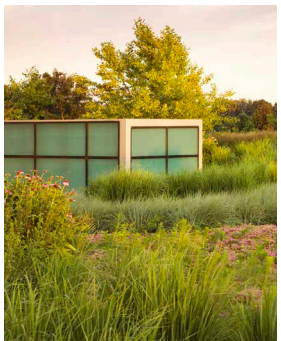
We will measure our current energy use and waste stream to establish baselines upon which we will pursue additional measures to minimize our carbon footprint as it relates to energy, waste, and purchases in both our office and project-related operations. We will also continue lifestyle initiatives that improve the health and well being of all Ballinger members.

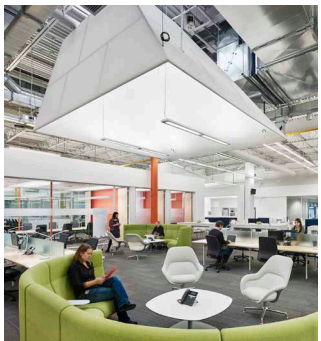
Ballinger stands firmly against all forms of discrimination and is dedicated to fostering a community of serious and open intellectual inquiry in which all current and future Ballinger firm members can fully participate regardless of ethnicity, race, religion, age, gender identity, sexual orientation, nationality, socio- economic status, or disabilities. As a commitment to attracting strong and diverse future candidates, Ballinger in 2022 established five annual higher education scholarships in our core disciplines for students who historically have been underrepresented in our professions.









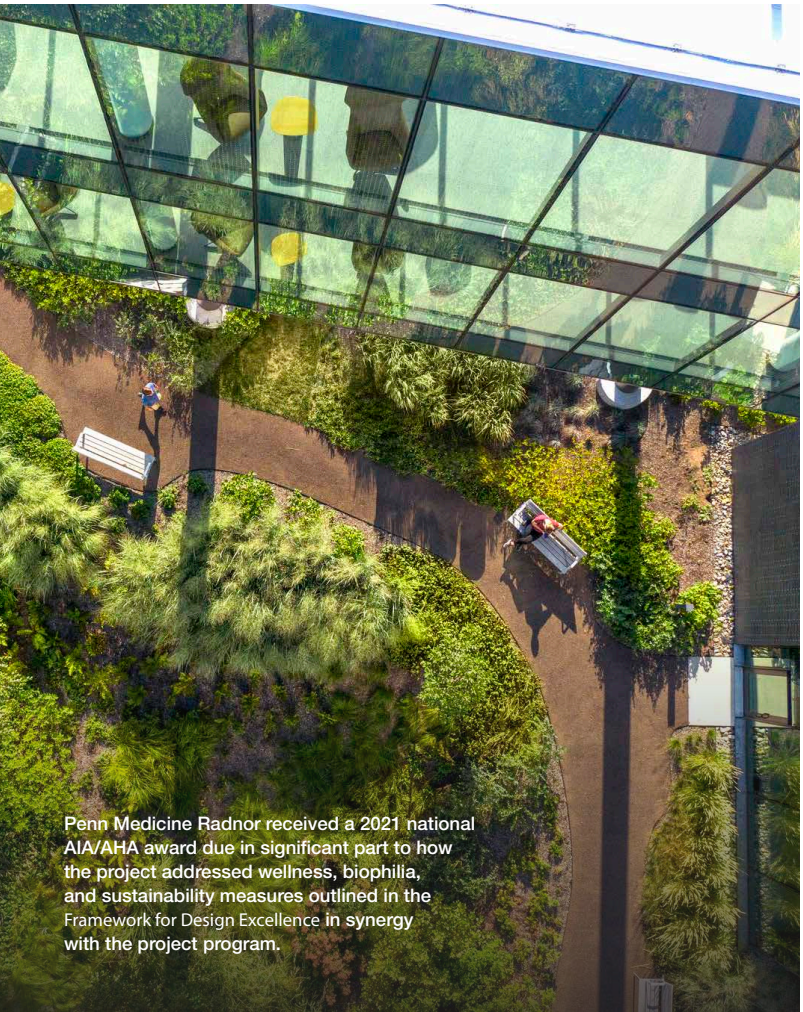



accountability

To ensure we are meeting our sustainability project goals and firm commitments, we must hold ourselves accountable.

The first step towards accountability requires the measurement and collection of the relevant data.

Next, and most critically, we must use the evaluation of this data to inform improvements moving forward.



Penn Medicine Radnor received a 2021 national AIA/AHA award due in significant part to how the project addressed wellness, biophilia, and sustainability measures outlined in the Framework for Design Excellence in synergy with the project program.

Advancing our performance requires a process of continuous assessment and improvement. Improvement built on improvement will be required to meet these ambitious, but essential, long term commitments.

Equity

In conjunction with our commitments to designing equitable and inclusive spaces to enrich community life, teams will evaluate how the design process and implementation have addressed design strategies promoting equity through review of applicable questions below:

- Has the design process directly included the perspectives of the community served by the project, and not just the assumptions of the project team?
- Has the project accommodated individuals with physical or mental limitations?
- Does the project accommodate diverse life situations including providing spaces to support gender inclusivity and equity?
- Does the project provide spaces with privacy such as health rooms, suites for nursing mothers, or prayer/ meditation rooms?
- Does the project promote spaces for interaction within and engagement with the community?

We will evaluate emerging equity standards and tools as a basis for measuring success.

AIA 2030, MEP 2040, SE 2050

As a signatory to the AIA 2030 Commitment since 2011 and the newer MEP 2040 and SE 2050 programs, Ballinger will:

- Continue to collect and report operational and embodied carbon performance on a multi-disciplinary basis
- Ensure all projects establish appropriate energy (pEUI, LPD) benchmarks, and targets at their outset. In conjunction with POE accountability measures, obtain and report EUI data to the AIA2030 DDx
- Incorporate LCA results of key systems and materials as a part of design options review process
- Perform whole building LCAs as projects move forward

LEED, WELL, & Building Certification Programs

LEED, WELL, and other certification programs represent comprehensive rating systems for measuring project performance across environmental, social, and health and wellness criteria. Projects pursuing these certifications set targets within the respective credit categories and identify strategies to achieve these credits. The documentation and submission of projects for certification provides a process for measuring project accountability.

Projects not directly pursuing these certifications can use these systems' frameworks and credit criteria to help identify appropriate sustainability goals within the respective categories. However, project teams should encourage the formal pursuit of these sustainability certification programs to promote accountability and verify follow-through on the respective measures.

AIA Framework for Design Excellence

While every project or client may not elect to pursue a third party sustainability certification, the AIA Framework for Design Excellence provides an accessible guideline for all projects to identify and set out to achieve sustainable design goals. The commitments outlined earlier in the Ballinger SAP 2.0 build directly on the Framework measures and adapt them to our working process.

The Framework also provides a "super spreadsheet" to track and evaluate performance within each of the outlined sustainable design measures. Additionally, projects pursuing AIA design awards at the local, state, and national levels all need to complete a sustainable design submission in a "common app" or similar format based on the super spreadsheet.

Internal Review, QA/QC

Teams will conduct project sustainability reviews at phase milestones to verify progress and address any issues identified during review. These sustainability review discussions will be integrated into our design process and project schedules, paralleling and supplementing our QA/QC process.

Measurement & Verification / POE

Sustainability analyses and project evaluations typically employ predicted design data and performance assumptions. Because there is variability in the reliability of this predicted data and even sophisticated models can misjudge a project's operating assumptions, it is imperative to validate predicted design assumptions through measurement and verification of a project's operating data. A POE can identify performance and configuration adjustments needed to align the building with its intended design. Internally, this evaluation is an essential way to inform adjustments to ongoing project models. Post-occupancy data will also improve the accuracy of our future design models.

It is similarly imperative to receive post-occupancy feedback on the qualitative performance of our projects. POE surveys evaluating thermal, visual, and acoustical comfort provide valuable data, which we can also use to validate design criteria, both qualitative and quantitative.

Operations

Our central, urban location includes easy access to transit, proximity to residential neighborhoods, and an in-building bike room; a recent survey showed that 75% of our office employees commutes by transit, bike/scooter, or walking, and that an additional 18% uses transit "some of the time." Ballinger will build on this foundation of operational sustainability through our hybrid work policy, initiated in 2017; office recycling; waste management, including paper use reduction; an enhanced green purchasing policy; low-flow fixtures; and natural and task-based lighting strategies. We commit to phasing out single-use cups and dishware in the office and to identifying additional areas of office-wide sustainability improvement. By measuring our annual energy usage and waste stream, we can evaluate the effectiveness of our reduction measures and adjust accordingly.

Ballinger stands firmly against all forms of discrimination and is dedicated to fostering a community of serious and open intellectual inquiry in which all current and future Ballinger firm members can fully participate regardless of ethnicity, race, religion, age, gender identity, sexual orientation, nationality, socio- economic status, or disabilities. As a commitment to attracting strong and diverse future candidates, Ballinger in 2022 established five annual higher education scholarships in our core disciplines for students who historically have been underrepresented in our professions.

Rutgers University, New Jersey Institute for Food, Nutrition & Health

University of Michigan, Naval Architecture Marine Engineering

process

Understanding that each project and client brings unique requirements, it is the responsibility of the project team to determine the most appropriate and impactful sustainability goals.

Once identified, teams will review strategies to reach these goals, and, through the course of the project, teams will continue to evaluate progress towards these goals.

Design

To support the holistic advancement of sustainability in our work, the SAP 2.0 outlines an integrated, interdisciplinary support structure and process for Ballinger project teams.

Support

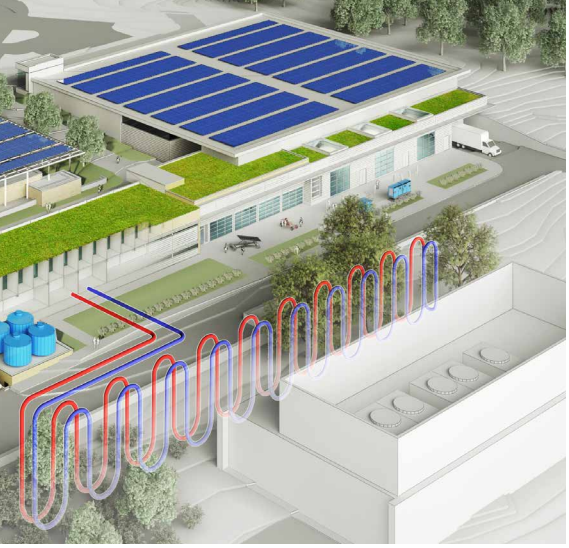
- Sustainability Leadership Group (SLG) will provide explicit and ongoing support and encouragement to meeting/ exceeding our SAP 2.0 commitments, including necessary firmwide resources
- Build upon the role of our longstanding Sustainability Working Group's (SWG) multidisciplinary knowledge and expertise to support a firm-wide sustainable design structure that ensures a consistent, intentional, interdisciplinary process is implemented on each project
- Identify Project Sustainability Leads (SPL) who will track progress and fulfillment of project sustainability goals over the project's duration (the SWG will be available as a support resource throughout)

Project Goals Setting Session / Charette

- Hold an initial integrated design charrette / sustainability goal-setting session(s) utilizing our multidisciplinary SWG group for support. This session will review:
  - + Client goals, if known
  - + Ballinger's sustainability commitments, with attention to the most relevant and impactful strategies for advancing the project's sustainability aspirations and performance
  - + AIA Framework for Design Excellence
  - + Certification systems such as LEED and WELL
  - + Requirements of applicable environmental codes/standards
  - + Any additional sustainability guidelines specific to the project

Confirmation of Project Goals / Benchmarks / Targets

- Set specific, measurable, and aspirational sustainability project goals based on program requirements. These goals will seek the strongest project synergies and greatest benefit for the client, occupants, and stakeholders



University of Maryland Baltimore County, Integrated Life Sciences Building

- Review the project sustainability goals with the client and evaluate strategies to achieve the goals
- Establish project benchmarks and targets using the AIA 2030 DDx, MEP 2040, SE 2050, or other benchmarking tools

Design / Performance Analysis

- Perform a site-specific site analysis that includes a review of climatic and microclimatic conditions
- Perform comparative analyses of early design and building systems options, including energy use, shading, solar insulation, massing, and embodied carbon to assist in selection of the ideal design options
- Evaluate materials and systems for holistic environmental performance criteria, including:
  - + LCA measuring embodied carbon, emissions, and longevity
  - + Environmental Product Declarations (EPDs)
  - + Health Product Declarations (HPDs)
- Identify the appropriate tools for performance analysis appropriate to each phase

Elevating Wellbeing, Equity, & Collaborative Goals

- Evaluate health and wellbeing criteria, including ventilation and air quality, access to light, connections with nature, and occupant comfort (thermal, visual, and acoustical)
- Identify opportunities within the project to promote equity in the design and creation of inclusive, accessible, and welcoming spaces to enhance community life
- Maintain an integrated design approach to problem-solving throughout

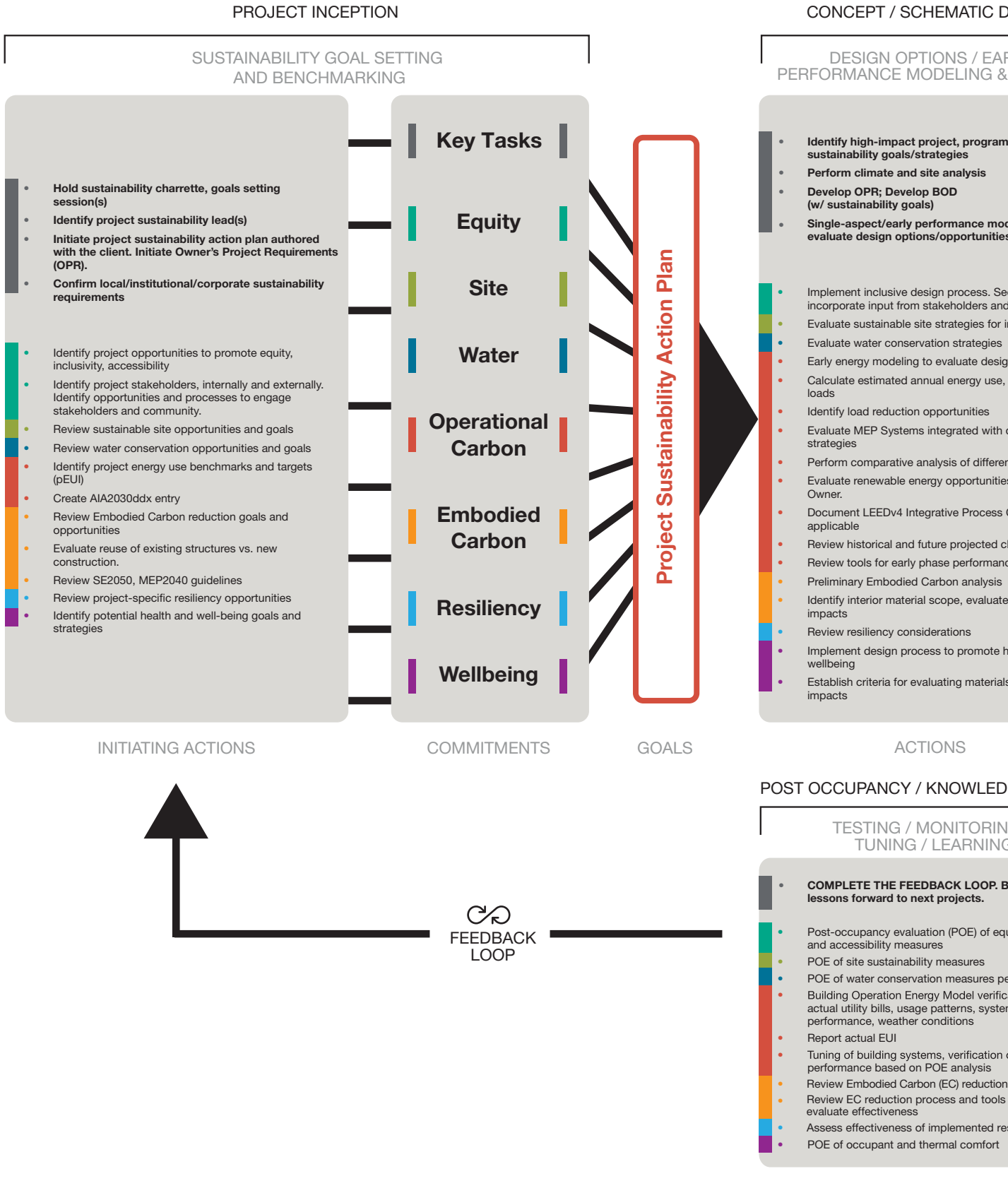
QA/QC

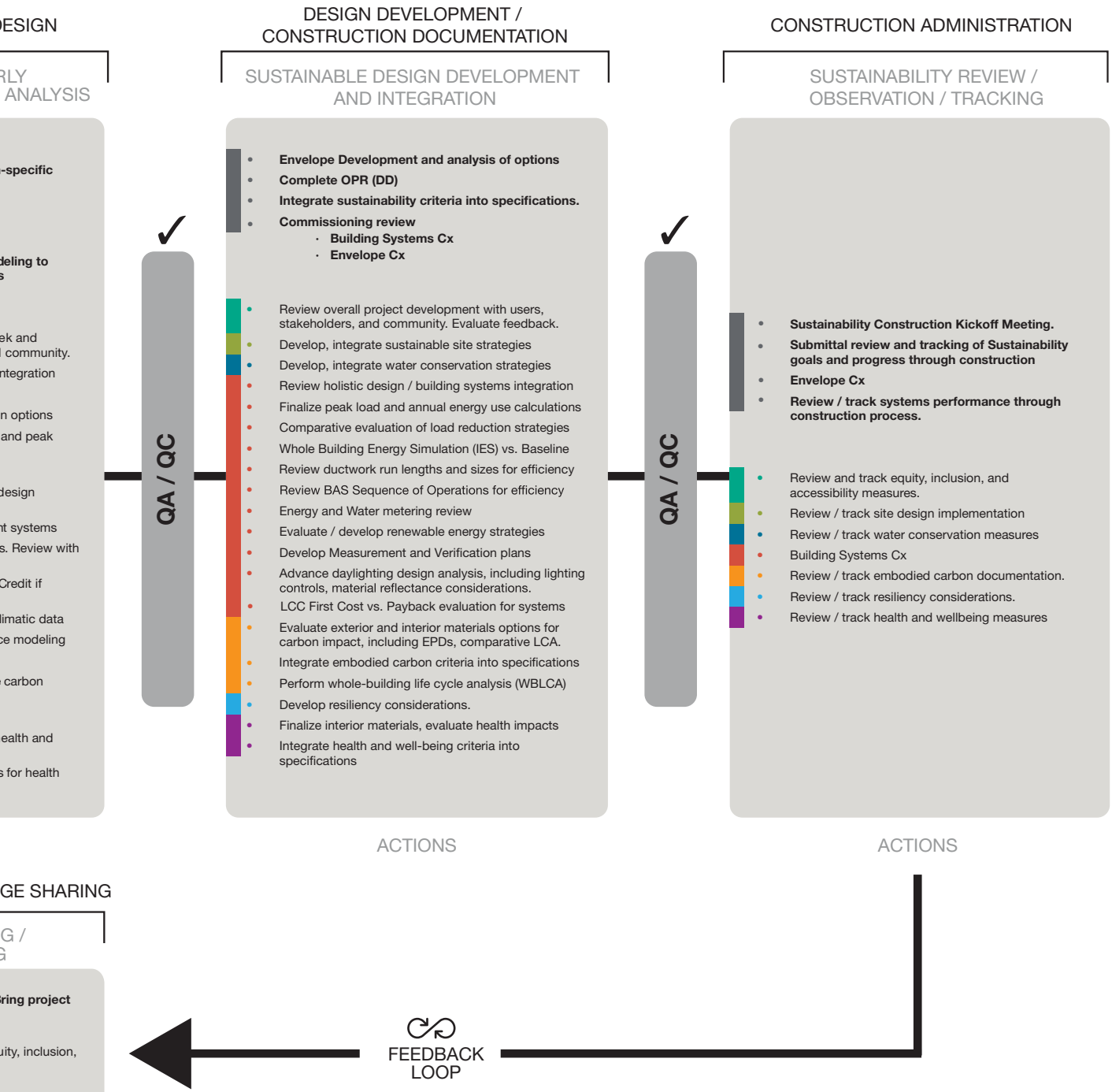
- Measure and track performance toward commitment benchmarks and targets through all project phases as a part of the Ballinger QA/QC process
- Track project sustainability goals, development, and documentation
- Hold multidisciplinary review meetings to evaluate sustainability progress through all project phases, leveraging the expertise of the team and our office

POEs

- Measure and verify modeled performance vs. operational performance of systems
- Conduct POE surveys to gauge occupant comfort and satisfaction

workplan


PROJECT INCEPTION
CONCEPT / SCHEMATIC D
SUSTAINABILITY GOAL SETTING AND BENCHMARKING
DESIGN OPTIONS / EAR PERFORMANCE MODELING &
Hold sustainability charrette, goals setting session(s)
Identify project sustainability lead(s)
Initiate project sustainability action plan authored with the client. Initiate Owner's Project Requirements (OPR).
Confirm local/institutional/corporate sustainability requirements
Identify project opportunities to promote equity, inclusivity, accessibility
Identify project stakeholders, internally and externally. Identify opportunities and processes to engage stakeholders and community.
Review sustainable site opportunities and goals
Review water conservation opportunities and goals
Identify project energy use benchmarks and targets (pEUI)
Create AIA2030ddx entry
Review Embodied Carbon reduction goals and opportunities
Evaluate reuse of existing structures vs. new construction.
Review SE2050, MEP2040 guidelines
Review project-specific resiliency opportunities
Identify potential health and well-being goals and strategies
Key Tasks
Equity
Site
Water
Operational Carbon
Embodied Carbon
Resiliency
Wellbeing
Project Sustainability Action Plan
Identify high-impact project, program sustainability goals/strategies
Perform climate and site analysis
Develop OPR; Develop BOD (w/ sustainability goals)
Single-aspect/early performance mod evaluate design options/opportunities
Implement inclusive design process. Se incorporate input from stakeholders and
Evaluate sustainable site strategies for i
Evaluate water conservation strategies
Early energy modeling to evaluate desig
Calculate estimated annual energy use, loads
Identify load reduction opportunities
Evaluate MEP Systems integrated with strategies
Perform comparative analysis of differe
Evaluate renewable energy opportunities Owner.
Document LEEDv4 Integrative Process applicable
Review historical and future projected cl
Review tools for early phase performanc
Preliminary Embodied Carbon analysis
Identify interior material scope, evaluate impacts
Review resiliency considerations
Implement design process to promote h wellbeing
Establish criteria for evaluating materials impacts
INITIATING ACTIONS
COMMITMENTS
GOALS
ACTIONS
POST OCCUPANCY / KNOWLED
TESTING / MONITORIN TUNING / LEARNING
FEEDBACK LOOP
COMPLETE THE FEEDBACK LOOP. B lessons forward to next projects.
Post-occupancy evaluation (POE) of equ and accessibility measures
POE of site sustainability measures
POE of water conservation measures pe
Building Operation Energy Model verific actual utility bills, usage patterns, syste performance, weather conditions
Report actual EUI
Tuning of building systems, verification performance based on POE analysis
Review Embodied Carbon (EC) reduction
Review EC reduction process and tools evaluate effectiveness
Assess effectiveness of implemented re
POE of occupant and thermal comfort
ACTIONS


DESIGN
RLY
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design
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carbon
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s for health
DESIGN DEVELOPMENT /
CONSTRUCTION DOCUMENTATION
SUSTAINABLE DESIGN DEVELOPMENT
AND INTEGRATION
Envelope Development and analysis of options
Complete OPR (DD)
Integrate sustainability criteria into specifications.
Commissioning review
Building Systems Cx
Envelope Cx
Review overall project development with users, stakeholders, and community. Evaluate feedback.
Develop, integrate sustainable site strategies
Develop, integrate water conservation strategies
Review holistic design / building systems integration
Finalize peak load and annual energy use calculations
Comparative evaluation of load reduction strategies
Whole Building Energy Simulation (IES) vs. Baseline
Review ductwork run lengths and sizes for efficiency
Review BAS Sequence of Operations for efficiency
Energy and Water metering review
Evaluate / develop renewable energy strategies
Develop Measurement and Verification plans
Advance daylighting design analysis, including lighting controls, material reflectance considerations.
LCC First Cost vs. Payback evaluation for systems
Evaluate exterior and interior materials options for carbon impact, including EPDs, comparative LCA.
Integrate embodied carbon criteria into specifications
Perform whole-building life cycle analysis (WBLCA)
Develop resiliency considerations.
Finalize interior materials, evaluate health impacts
Integrate health and well-being criteria into specifications
ACTIONS
QA / QC
QA / QC
CONSTRUCTION ADMINISTRATION
SUSTAINABILITY REVIEW /
OBSERVATION / TRACKING
Sustainability Construction Kickoff Meeting.
Submittal review and tracking of Sustainability goals and progress through construction
Envelope Cx
Review / track systems performance through construction process.
Review and track equity, inclusion, and accessibility measures.
Review / track site design implementation
Review / track water conservation measures
Building Systems Cx
Review / track embodied carbon documentation.
Review / track resiliency considerations.
Review / track health and wellbeing measures
ACTIONS
GE SHARING
G /
G
ring project
uity, inclusion,
erformance
ation based on
ms
of systems
vs. base model
used,
siliency measures
FEEDBACK
LOOP