IUCN Conservation Centre in Gland, Switzerland

The creation of a sustainable building

Teamwork and commitment

By Julia Marton-Lefèvre, Director General,
International Union for Conservation of Nature

Julia Marton-Lefèvre at the ceremony for the Global Holcim Award Gold winners 2009 in Fez, Morocco.

Since 1948, the International Union for Conservation of Nature has been assisting the world to conserve the integrity and diversity of nature. The new IUCN Conservation Centre is an exciting milestone in our history. It allows IUCN to continue expanding its work, developing good conservation knowledge, cultivating partnerships, and bringing different types of people and organisations together to share, debate, and decide on some of the most pressing issues of our time. Only by collaborating effectively and globally can we master the challenges that face humankind and the planet.

Effective collaboration has been at the core of building the IUCN Conservation Centre. The stunning new building has incorporated many of the latest state-of-the-art ecological design and construction techniques and shows how one of the world's greenest new office buildings can be delivered on a very cost-effective basis. Each organisation and individual involved was fully committed to achieving these ambitious objectives. On behalf of IUCN, it is my pleasure to express our sincere gratitude to everyone who worked on and supported this project.

The new Centre, an extension to IUCN's existing headquarters, was made possible by generous support from the federal government of Switzerland and the commune of Gland – where the Centre is located – and by donations from many organisations, companies, and foundations.

The Swiss Confederation provided an interest-free construction loan of 20 million Swiss francs, repayable over 50 years; the commune of Gland granted IUCN permission to build on land next to the original building; the Building Foundation for International Organisations (FIPOI) advised and supported IUCN throughout the project; the Institut pour l'Economie de la Construction (IEC) assisted IUCN in working on technical building

and construction issues with the architects and project manager, and protected the interest of IUCN throughout the project; Karl Steiner SA capably took the lead on the project as the total service contractor and coordinated the many players; the architectural firm agps.architecture designed a building that clearly reflects our values; Hansjürg Leibundgut devised an ingeniously efficient energy concept; Amstein + Walthert provided innovative mechanical engineering solutions; INGENI beautifully integrated the structural system into the architecture; and the biologist Florian Meier worked in harmony with local nature to expand the ecological garden on the site.

In addition, we are very grateful to our preferred partners who supported the project through financial and in-kind donations. These include Holcim, through financing the conference room that sits atop the building and the donation of thermal and recycled concrete; the MAVA Foundation, through its financing of the large outdoor terrace and through its general financing to support IUCN's efforts to meet the most stringent green building standards; and Kinnarps, through the donation of all of the sustainable furniture for the building. We are also grateful to our other partners including Philips for its contribution of state-of-the-art, energy-efficient lighting; Dell for donating computers for the new IUCN Red List Training Centre; and the Loterie Romande's financing of the expansion of the natural garden.

The IUCN Conservation Centre has provided a unique opportunity for IUCN to engage with some of these partners in other ways as well. Since 2007 for example, we have been working with Holcim to develop robust ecosystem standards for their operations around the world; with Philips to develop "turtle-friendly" lighting for the Dhamra Port Development

in India; and with Kinnarps we have recently added a staff member from the company to our Commission on Ecosystem Management with the aim to bring a business perspective to this network of experts and to share their experience of integrating sustainability into their business practices and reporting.

Finally, I would like to thank the entire staff of IUCN for helping to shape the Conservation Centre, supporting the construction project, and continuously working to achieve the mission of IUCN.

IUCN has existed since 1948 to influence, encourage, and assist societies to better protect and manage nature. This Conservation Centre is an outstanding example of how we must build today and in the future. IUCN wants to tell the world about this to encourage green building, and this book is an important instrument in that endeavour. We are therefore greatly indebted to Holcim Ltd and the Holcim Foundation for Sustainable Construction for producing it.

The new IUCN Conservation Centre is a model for collaboration on building a more sustainable future. At a time when the welfare of future generations and the planet depends on what we do today, this is more important than ever.

An inspiring achievement

By Markus Akermann, CEO of Holcim Ltd and Chairman of the Management Board of the Holcim Foundation for Sustainable Construction

The expansion of the IUCN building in Gland is important for several reasons. First, it doubles the capacity of the headquarters of IUCN and provides much-needed space to accommodate this dynamic organisation. Second, as an exemplary green building, it offers a great deal to learn from. And third, the unusual way this building was created proves that outstanding and sustainable results can be achieved through collaboration and a clear vision for cooperation.

Holcim, as a global leader in the construction materials industry, is proud to have played a role in this project by providing CO_2-reduced cement and concrete incorporating recycled aggregates and also through financial support. However, the collaboration between IUCN and Holcim extends well beyond this exciting project. The Holcim-IUCN relationship, based on a multi-year agreement that started in 2007, aims at developing robust ecosystem conservation standards for the Holcim Group and contributing to improvements in the cement and related sectors. Being in a resource-intensive business, Holcim is driven by the conviction that biodiversity conservation plays an ever-more important role in its long-term resource and reserve strategy. The company aims to continuously improve its land-stewardship performance and has found that IUCN provides the most relevant expertise and network to support this effort at global and local levels.

IUCN also participated in some key events of the Holcim Foundation for Sustainable Construction, which conducts a range of important activities worldwide – aiming to raise awareness of the important role that architecture, engineering, urban planning, and construction have in

achieving a more sustainable future – and to globally encourage critical interdisciplinary and long-range perspectives. The way we build today decisively influences the world future generations will experience because the construction and operation of buildings and infrastructure accounts for well over half of all energy and resources consumed worldwide. The World Green Building Council (WGBC) reports that the world's current building stock produces more than 40 percent of global CO_2 emissions and that green buildings can substantially reduce CO_2 emissions, energy consumption, waste generation, and water use. All players in the building process – owners, architects, engineers, contractors, material suppliers, authorities, and users – bear the responsibility to support more sustainable approaches.

Sharing knowledge and innovation plays a key part in this because the necessary change can be accomplished only when the broad public is aware of the issues and can make informed decisions and act accordingly. So when an outstanding example of sustainable architecture comes along, it's worth celebrating and publicising.

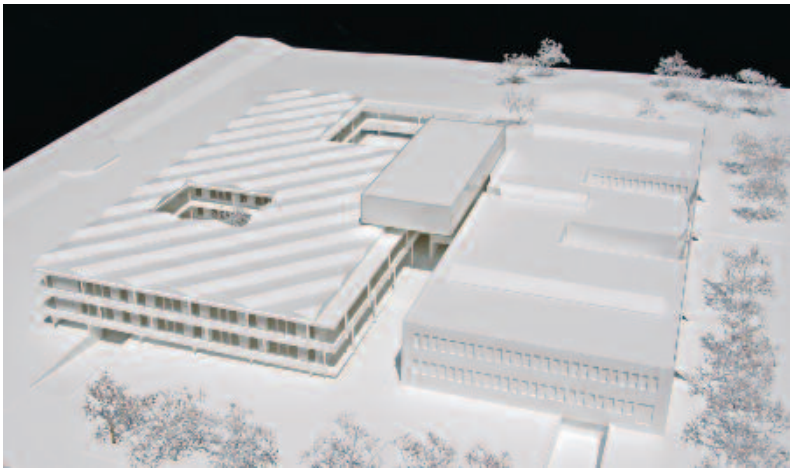
And that's the point of this book, to applaud the new IUCN Conservation Centre – a landmark green building. The book gives a comprehensive impression of the building. It shows how a team of dedicated people achieved ambitious goals under difficult circumstances, it describes unusual technical approaches and solutions that will likely become standard building practice, and it documents a work of architecture that is as rational, responsible, and functional as it is beautiful. This is encouraging proof that we can indeed build a sustainable world and this can be accelerated by close collaboration between the private sector and the conservation community.

Target issues for sustainable construction

Quantum change and transferability
Ecological quality and resource conservation
Ethical standards and social equity
Economic performance and compatibility
Contextual and aesthetic impact

Sustainable development and architecture are multifarious subjects intertwined with many other complex issues. To make sustainable construction easier to understand, assess, and practice, the Holcim Foundation for Sustainable Construction developed a five-point definition. These five so-called "target issues" serve to measure the degree to which a building contributes to sustainable development. Three of the five target issues align with the primary goals of the Rio Agenda: balanced environmental, social, and economic performance. A further target issue applies specifically to building – the creation of appropriate buildings, neighbourhoods, towns, and cities. The final target issue recognises the need for significant advancements that can be applied on a broad scale.

These five target issues are explained in detail and illustrated at www.holcimfoundation.org/target. The pages that follow summarize the five criteria and how the new IUCN Conservation Centre meets them.



IUCN Conservation Centre (left), Holcim Think Tank (centre), original building (right).

Quantum change and transferability

Significant advances in construction practice must be applied on a broad scale to achieve global sustainability. Practices and ideas that transfer best are those that are affordable, simple, and broadly applicable.

The IUCN Conservation Centre is a forum for global change – collecting and disseminating knowledge and coordinating organisations, events, and projects to promote sustainability.

The Centre is not a typical green building. It is a provocative building. It shows that sustainable construction has no stereotype.

The design team applied an all-encompassing approach to sustainable design. The approach is clear, effective, and can be applied in any socioeconomic or geographic setting.

The mechanical system for the building represents an innovative concept for widespread use. The benefits include energy efficiency, flexibility, economy, hygiene, and ease of installation.

Because IUCN enjoys a high profile worldwide, the IUCN Conservation Centre stands as a model green building to inspire member organisations, partners, governments, NGOs, and the private sector.

Ecological quality and resource conservation

Ecosystems worldwide are declining under tremendous pressure.
Buildings must spare finite resources and hold down greenhouse gas emissions.
Built environments must be healthful for humans, animals, and plants.
Green buildings contribute to a healthy natural environment by reducing waste, controlling pollution, and treating land, air, and water as precious resources.

The IUCN Conservation Centre is expected to be the world's first building to achieve LEED* Platinum and Minergie-P-Eco certification, two of the most stringent ratings for green buildings.

The Centre incorporates a wide array of energy-saving features and systems fully integrated into the building design. Energy required for operation has been calculated to be only twenty percent of that of standard buildings.

The super-insulated building uses geothermal energy as the heating and cooling source and features a decentralised CO_2-controlled ventilation system for energy efficiency.

The building is powered by two carbon-neutral renewable energy sources: hydroelectric power and electricity generated by the rooftop photovoltaic system.

Efficient water management includes waterless urinals, low-flow fixtures, motion sensors for faucets, and rainwater collection for irrigation and flushing toilets.

* LEED (Leadership in Energy and Environmental Design) is the Green Building Rating System of the U.S. Green Building Council (USGBC).

Ethical standards and social equity

As the global population expands beyond the planet's capacity, ethical imbalance becomes a threat to civilisation. In developing countries, the chief mandate of construction is to ensure basic needs such as shelter, water, schools, and access to goods, services, and medical care. In developed countries, the challenge is to achieve socially equitable stewardship of natural resources. Cities, towns, and buildings must respond to the emotional and psychological needs of people by providing stimulating environments, raising awareness of important values, inspiring the human spirit, and bonding society. Sustainable construction includes fair and respectful treatment of everyone involved during the design, construction, use, and recycling of buildings and cities.

The health and well-being of building users are central to the design of the IUCN Conservation Centre. The building offers a comfortable, healthful, and stimulating indoor environment.

As part of its public services, the IUCN Conservation Centre includes a Visitors' Centre and a beautiful and informative natural garden that is open to everyone.

Because IUCN is an association of member organisations, the new IUCN Conservation Centre promotes interaction and collaboration among countless organisations and individuals in support of environmental and ethical causes.

The Centre was created as a collaborative project supported by national and local governments, foundations, and private companies as sponsors, tenants, and technical partners.

IUCN developed the building with input from its staff, who had much to say about their future workspaces and even what types of food should or should not be served in the cafeteria.

Economic performance and compatibility

Buildings must be financially feasible to build, operate, maintain, and ultimately remove. They should support sustainable economic mechanisms, activities, and purposes. Construction projects can stimulate local economies, lead to broader economic integration, help establish long-term bases for livelihoods, and serve to equitably distribute wealth.

The IUCN Conservation Centre is efficient to operate, requires little maintenance, promotes high productivity, and will be economical to demolish at the end of its service life.

As an expansion to the IUCN headquarters, the building collects all staff under one roof, facilitating efficient collaboration and interaction. The building also includes tenant spaces rented by partner organisations.

Economy of means is a basic design principle espoused by the architects, reducing the construction cost and operating expenses. The construction cost is on par with the average for Swiss buildings.

The new building was financed or financially supported by the Swiss government, local community, and sponsors.

Distinct parts of the building, such as the penthouse (named the Holcim Think Tank), the large atrium, and the main meeting rooms, were conceived as elements to be offered for sponsorship.

Contextual and aesthetic impact

Sustainable architecture is durable and adaptable. It provides attractive, comfortable, and functional indoor environments. It enhances its surroundings, fitting functionally and aesthetically into its setting, providing culturally valuable indoor and outdoor spaces.

The IUCN Conservation Centre achieves relatively dense land use, yet sensitively preserves and even extends the natural garden on the site.

The extension harmonizes with the original building to form a new whole that functions as one and conveys a coherent image.

The unusual and expressive geometry of the façades echoes the rooftop photovoltaic panels; the edifice thus expresses an environmental response.

The iconic green building with modern, eye-catching architecture is destined to become a new and powerful symbol of IUCN, strengthening the organisation's image.

The building is spacious and dignified without being pretentious or luxurious. It is appropriate for an important, globally active, donor-supported NGO.

Pas de cinq

Energy, Materiality, Economy, Use, and Space

By agps.architecture, Zurich, Switzerland

From left: Hanspeter Oester, Manuel Scholl, Sarah Graham, Marc Angélil, Reto Pfenninger.

From left:
Airport Zurich,
Zurich International School,
IUCN Conservation Centre,
B35, From the Ground up.

From the outset, the International Union for Conservation of Nature was a special client. As the world's oldest and largest environmental network, IUCN is a global player in the fields of conservation and sustainability. With members including more than 1,000 NGOs and governmental organisations as well as almost 11,000 volunteer scientists in some 160 countries, it is difficult to conceive of a more exciting organisation with which to collaborate on the expansion of their headquarters in Gland, near Geneva, Switzerland. The Union asked for a radically progressive building to be achieved with very limited resources – requiring a type of modern alchemy or outright magic.

Developed directly from IUCN's mission and approach, three principles formed the conceptual strategy for the building project. First, the conservation of natural resources was to be achieved through environmental sustainability, focusing on energy and materiality. Second, an economy of means was a fiscal as well as a philosophical principle in the development of the architecture. Third, a highly collaborative design process, reflecting the essential methodology of the institution, maximized the quality of the working space. Together, these principles led to the interplay of five points in a type of dance, or pas de cinq, of energy, materiality, economy, use, and space.

In research, work builds upon previous work, looking beyond its current state toward its own future evolution. Architects, among others, tend to work in series with experiments from one project forming a base of departure for a following work. For agps.architecture, the mandate to set a benchmark in sustainable design for IUCN occurred within a sequence of environmentally designed projects. As early as 1989, the office established a definition for sustainable design in the Esslingen Town Centre, that being ecologically conscious land, energy, and materials use.

Subsequently, the Midfield Terminal (Dock E) at the Zurich International Airport and the Zurich International School in Adliswil, Switzerland, explored strategies for sustainable development of buildings through geothermal energy for heating and cooling, the reduction of duct work, decentralising mechanical systems, and use of concrete as thermal mass. These projects also explored reductive materiality through eliminating additive layers and exposing the primary construction of concrete, steel, and glass. Both were based on an economy of means, and both developed space through careful programmatic assessment. The buildings set the stage for more radical implementation in the IUCN project. Reciprocity among energy, material, economic, functional, and spatial considerations progressed still further in subsequent projects at the building and urban scales utilising concrete building mass and geothermal systems supplemented by the sun. These proposals form an ongoing experiment with architecture perceived as a type of laboratory in which ideas and techniques are reframed, tested, rejected, explored, and redefined, and in which the IUCN project played an important role.

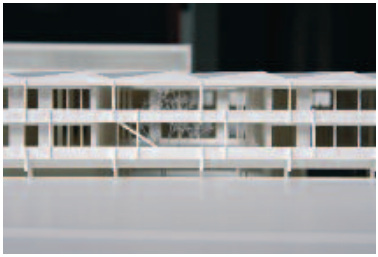
In the new IUCN facility, environmental design is implemented through an economy of means, generating a straightforward albeit generous architecture. Highest Swiss environmental standards (Minergie-P and Minergie-Eco) and LEED Platinum ratings are being implemented. Geothermal heating and cooling utilise the constant ground temperature of the earth 180 metres below using heat exchangers with heat pumps. Decentralised airboxes along the building's exterior walls bring in tempered fresh air. Ceiling panels with CO_2 sensors provide consolidated building services, including heating, cooling, acoustics, lighting, fire sprinklers, and air return. The sensors activate air exchange only when the space is in use, making operation highly efficient. A rooftop power plant is comprised of

From left:
Existing building interior;
turning the building inside-out;
the new building exterior.

photovoltaic panels; rooftop rainwater is stored and employed for grey-water use. Peripheral balconies and adjustable exterior blinds prevent overheating in summer and allow passive solar gain in winter while maximising natural light.

The building's materiality focuses on exposed concrete which is used for cores and ceilings. Both recycled concrete and insulating concrete are exposed, depending upon location. A key factor of the architectural concept is that building components serve multiple purposes and anything unnecessary has been eliminated. The concrete provides a high thermal value, and it expresses a language of intentional roughness, reflecting the economic value placed on sustainability rather than on refined materiality. Working in collaboration with the Swiss concrete industry, various means were laboratory tested to enhance the compressive strength of insulating concrete, including recycled aggregate within the concrete mix. Also investigated were the lifecycle of materials, recycling, and use of local renewable materials throughout the building.

One enters IUCN through the gap between the old and new buildings in a spatial compression created by a cluster of adjacent activities: a library open to the public, cafeteria, stair and hallways, and a rooftop volume hovering above. The original building is organised around central atria filled with tables, machines, plants, books, and the detritus of people working – a hodgepodge of things and activities – all part of the bustle of work in progress. This active and informal space was conceptually inserted into the headquarters expansion but with a reversed reading. While the original building's exterior is largely closed, the new is open, revealing the inner workings of the organisation. Two large courtyards penetrate the simple box of the extension, each with varying area and depth. One extends down



into the parking level, bringing light and air into that semi-below-grade realm. The second courtyard is an outdoor event space, a centre for communal activities. Offices are located along the outside walls, surrounded by exterior balconies which double as fire exiting, thus eliminating the need for rated corridors. The circulation area between the offices is double-height flexible working space, similar to the atria in the existing building, filled with natural light and promoting social interaction. The office walls are non-structural, easily reconfigured as needs change over time.

Formally linked to the folding of the roof is a play of structure subtly expressed on the exterior façade. Staggered steel columns which span only single floor levels and alternate as tension and compression members, plus structural balustrades acting as beams, carry the loads to the ground in an indirect, rhythmic path.

Floating over a north-south folded rooftop sea of photovoltaic collectors is the Holcim Think Tank, a separate and special meeting space. This is the place where ideas are developed in interdisciplinary workshops while looking toward Lake Geneva and the Swiss and French Alps beyond. The big view can hopefully contribute to the making of big ideas. IUCN is by definition a complex organisation with a clear mission, with its diverse membership looking toward solving essential global challenges. The new headquarters building implements and visualizes IUCN's belief in sustainability, its fiscal restraint, as well as its open working methodology in a rich sequence of spaces, proving that something can be made out of nothing – that alchemy in fact works.

The International Union for Conservation of Nature (IUCN)

IUCN is the world's oldest and largest global environmental network. The organisation's vision is a just world that values and conserves nature. Its mission is to influence, encourage, and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that the use of natural resources is equitable and ecologically sustainable.
As a leading authority on the environment and sustainable development, IUCN helps find pragmatic solutions to meet the world's most pressing environmental and development challenges. It supports scientific research, manages thousands of field projects around the world, and brings together governments, nongovernmental organisations, United Nations agencies, private companies, and communities to develop and implement policy, laws, and best practices. IUCN's work is supported by over 1,000 professional staff in 60 offices as well as hundreds of partners in public, NGO, and private sectors around the world.

The new IUCN Conservation Centre

By Daniel Wentz, architect, translator, writer, WentzWords, Magden, Switzerland

IUCN's worldwide activities are directed from its head office in Gland, Switzerland. The headquarters building was built in 1992, designed for 110 occupants. As the organisation grew, up to 155 staff were working in the building and IUCN was renting additional office space elsewhere in Gland. It became imperative to gather all employees under one roof. In December 2003 the IUCN Council mandated the expansion of the headquarters building. The aim was to provide office space for an additional 120 employees, achieving a total capacity of 230 persons. Space would also be created for Commission members and regional employees who visit the head office.

Because IUCN co-ordinates the world's environmental and nature organisations, the new building was conceived to do more than just provide office space. It is designed to accommodate a range of activities with partners, donors, consultants, trainers, and other international organisations. It can accommodate international meetings and other large assemblies. It also offers tenant space for organisations associated with IUCN, facilitating close collaboration. As a Visitor Centre, the building supports interaction with the public. As a hub for all these organisations and for all interested people, the extension is conceived as a multifunctional Conservation Centre.

Global centre for collaboration

IUCN serves as a forum for convening, discussing, sharing, and networking among governments, states, NGOs, the private sector, and civil society. The new IUCN Conservation Centre serves as the place for coordinating knowledge, initiating collaboration, and fostering collective action.

Repository for conservation knowledge

Through its commissions and 11,000 expert volunteers in the field, IUCN coordinates the collection and dissemination of conservation information. IUCN's repository of data on conservation topics is the largest and most respected in the world.

IUCN Red List Training Centre

IUCN publishes the IUCN Red List of Threatened Species™, the most authoritative source of information on the conservation status of species and a basis for conservation decision-making worldwide. Activities conducted in the IUCN Red List Training Centre in the new building aim to build capacity, develop tools, and provide training to gain the maximum benefit from the Red List.

Visitors' Centre

The Visitors' Centre offers all members of the local and global communities interactive information on pressing issues such as global warming, energy production and use, biodiversity, and sustainable development.

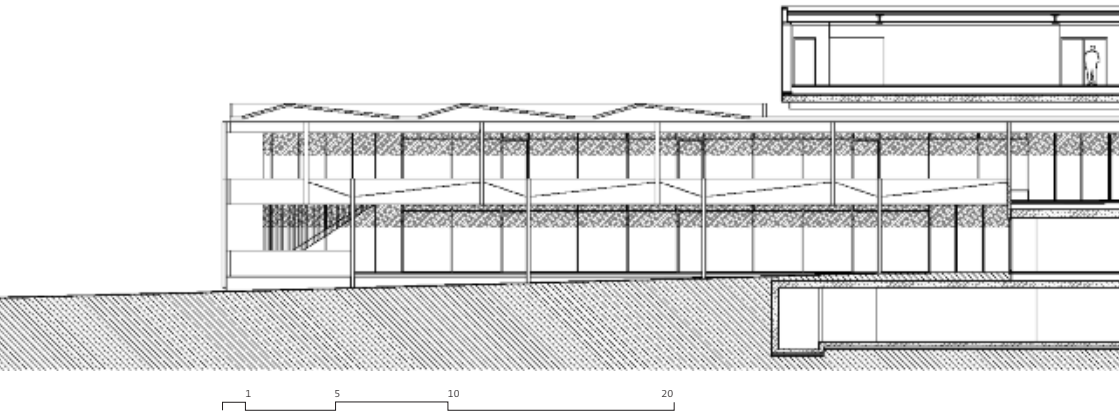
Natural garden

The natural garden on the IUCN grounds is open to the public and has been enlarged as part of the expansion project. Individuals and groups are invited to visit the garden, enjoy nature, and learn about the local flora and fauna as well as some of the challenges faced by local species.

Lofty aspirations and extraordinary teamwork

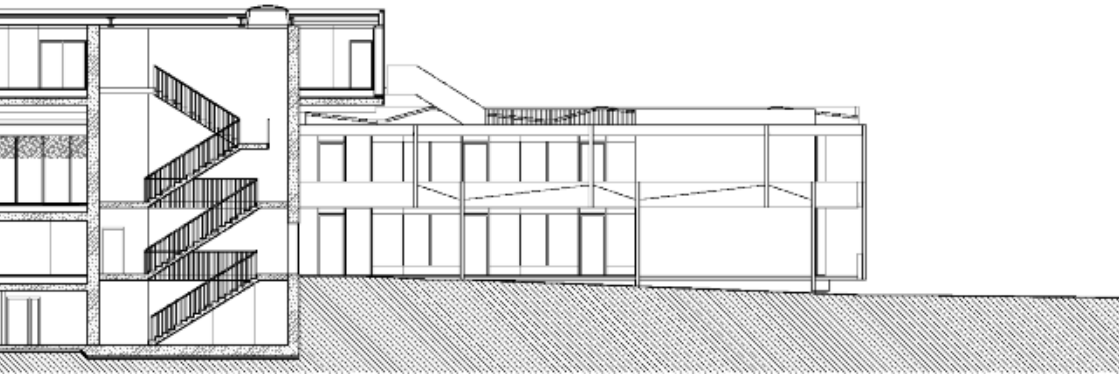
IUCN insisted that the Conservation Centre be designed and constructed to meet the highest standards of sustainability – of course fitting for an organisation committed to the protection of nature. Accordingly, general requirements were set for the project. The extension was to be highly energy efficient. The best available energy sources were to be used for the facility, renewable if possible, or at least future options for such were to be kept open. The IUCN Conservation Centre is intended to be the first building to attain stringent Minergie-P-Eco and LEED Platinum certifications. When agps.architecture was commissioned for the project, the architects began by collaborating very closely with the engineers and the IUCN project committee to develop a design concept that meets all IUCN's requirements and fully integrates the engineering and architecture. The architects presented the design at various stages to the IUCN staff, who had the opportunity to significantly influence their future workspaces. Hanspeter Oester, partner at agps.architecture and project manager for the expansion, explains that "the

Northeast elevation and section through Holcim Think Tank.



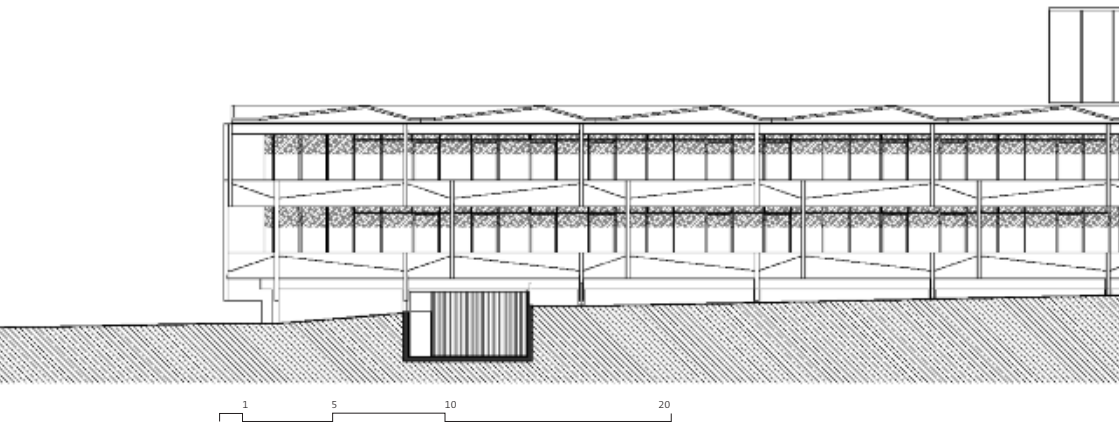
various programmatic requirements, performance criteria, and restraints of schedule and budget were integrated into a comprehensive concept and schematic design that respects the local context and fittingly represents IUCN as the world's leading global conservation union".

The criteria of sustainable development were used to determine the urban, architectural, and functional qualities of the building. Specifically, social responsibility, economic performance, and environmental stewardship are realized through a high-quality and adaptable work environment, moderate construction cost, low operating and maintenance costs, responsible resource use, energy efficiency, and rigorous control of emissions. This design approach supports sustainability by ensuring the utility, economy, and longevity of the building and by minimising the environmental impact. The new building incorporates many innovative green strategies. It will serve its purpose well into the future. In a normal project, the next step would be to develop the



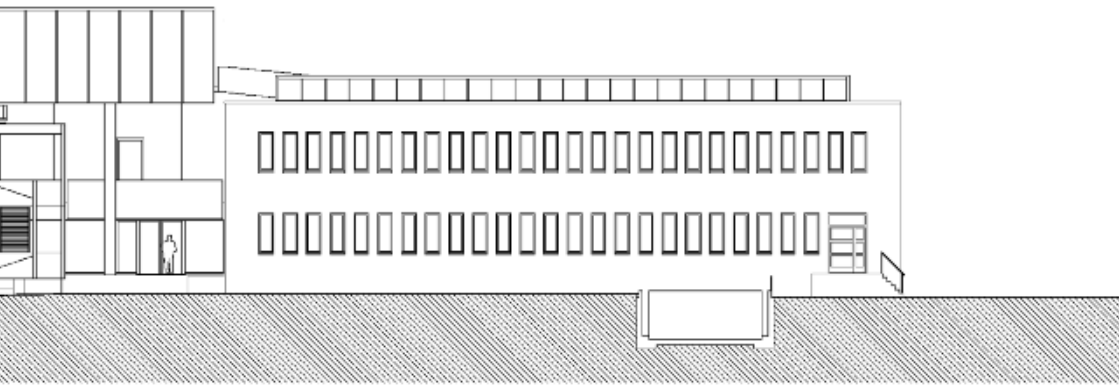
schematic design drawings into construction documents that also serve for tendering (bidding). But with little time and a limited budget, the project team realized that it would be impossible to conduct all phases of this project in the standard manner. The architects had to find an innovative way of working with a general contractor. Several general contractors were invited to an unusual sort of meeting at which the project was presented and the situation explained. Five schematic plans at 1:200 were presented. There were no details, no quantity survey, no specifications, and no building permit. The contractors were invited to submit an offer to construct the building for a fixed fee and to reinvest any surplus budget into the building. One general contractor was to become the total services contractor, assuming overall responsibility for continuing the project. The project panel chose Karl Steiner SA, because of the contractor's strong track record as a total services contractor, experience with Minergie certified buildings, ISO 14001 and 9001 certification, and its convincing presentation by a team who demonstrated that it understood the unusual project and supported the ideals.

Southwest elevation.



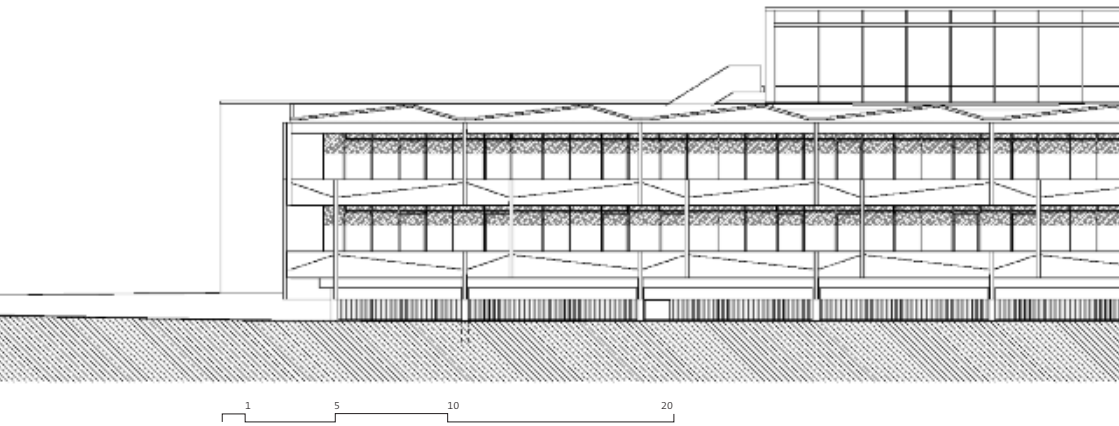
The next phase was to trim the estimated construction cost to the budgeted amount. This phase lasted three months. It was a time of intensive collaboration among the contractor, architects, engineers, and IUCN. It was a process of give-and-take and making trade-offs; all parties knew they must work together to reduce the cost, otherwise the project would die. After this phase, Karl Steiner agreed to construct the building for a fixed price. The contractor, architects, and engineers then collaborated to develop construction documents and tender documents.

Eighteen months were scheduled for the construction. LEED requirements were included in the contracts with subcontractors, and the work of all subcontractors was carefully monitored. Karl Steiner and the subcontractors handled their contacts in a spirit of support of IUCN, knowing that the project would be a prestigious reference. No one on the team had experience with building a LEED-certified building; after all, LEED is an American rating system. LEED consultant Sally Blair from Architectural Energy Corporation in



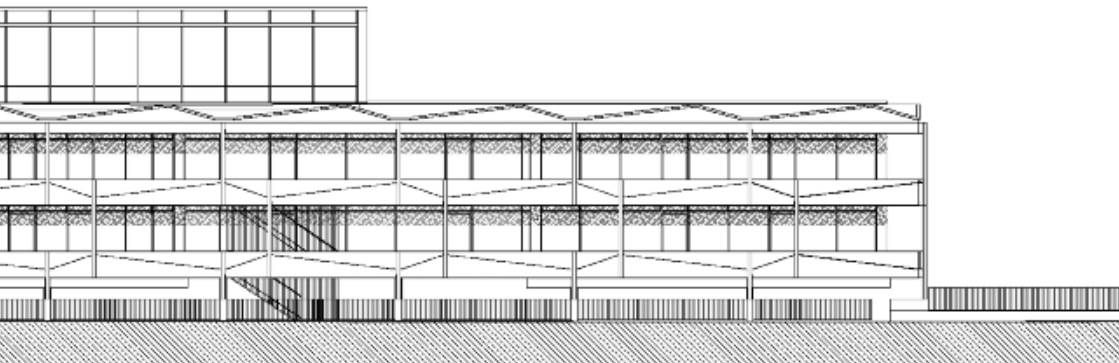
Boulder, Colorado, visited Gland several times to train the team. Dominik Arioli, associate at agps.architecture and project architect, and Matthias Achermann, partner and mechanical engineer at Amstein + Walthert, underwent LEED training in Houston, Texas. Throughout the project, they worked closely with Jean-Manuel Megow, project manager at Karl Steiner SA, to ensure that green construction practices were employed. Hundreds of special measures were taken. For example, deliveries to the site had to be organized to minimise transport. Measures were taken to see that trucks leaving the site would not track mud onto the streets. Excavation material was not allowed to be piled into high mounds on the site, destroying the subterranean ecosystem. Ducts had to be sealed at the end of each working day to make sure that no dust and debris entered. A cleaning person was on site throughout the construction phase, not just at the end. LEED prohibits the use of certain concrete additives and the use of

Southeast elevation.



foam-type sealants at joints of the concrete forms. The gaps had to be sealed the old way – with rope and sand.

Switzerland is a multilingual country with four official languages – French, German, Italian, and Romansh. IUCN is a global organisation with three official languages – English, French, and Spanish. Gland is in the French speaking part of Switzerland. IUCN's official language for administering this project was English. The architects, contractors, and engineers spoke German and Swiss German among themselves. The local contractors and suppliers worked in French. Language was never a problem. Meetings among these groups were conducted in whichever language worked best, and sometimes multiple languages were mixed in one sentence. Such is life in a multilingual country. The multiplicity of languages had the benefit that team members kept their communications short and to the point.



The building site

The corner site borders the Route Suisse between Lausanne and Geneva, the cantonal road that defines the southeast boundary of the building zone of Gland. This is a prominent location in the neighbourhood, at the southeast end of Rue Mauverney, a street lined with multi-storey commercial buildings and apartment blocks. The immediate neighbourhood comprises mainly apartment buildings, four to eight stories high, surrounded by generous green space. A light industrial zone is nearby to the west. The site is a ten-minute walk from Gland train station. Most out-of-town guests attending IUCN events arrive by train, and then proceed to the building by foot or taxi. IUCN staff commute by car, rail, bicycle, or foot.

Site design

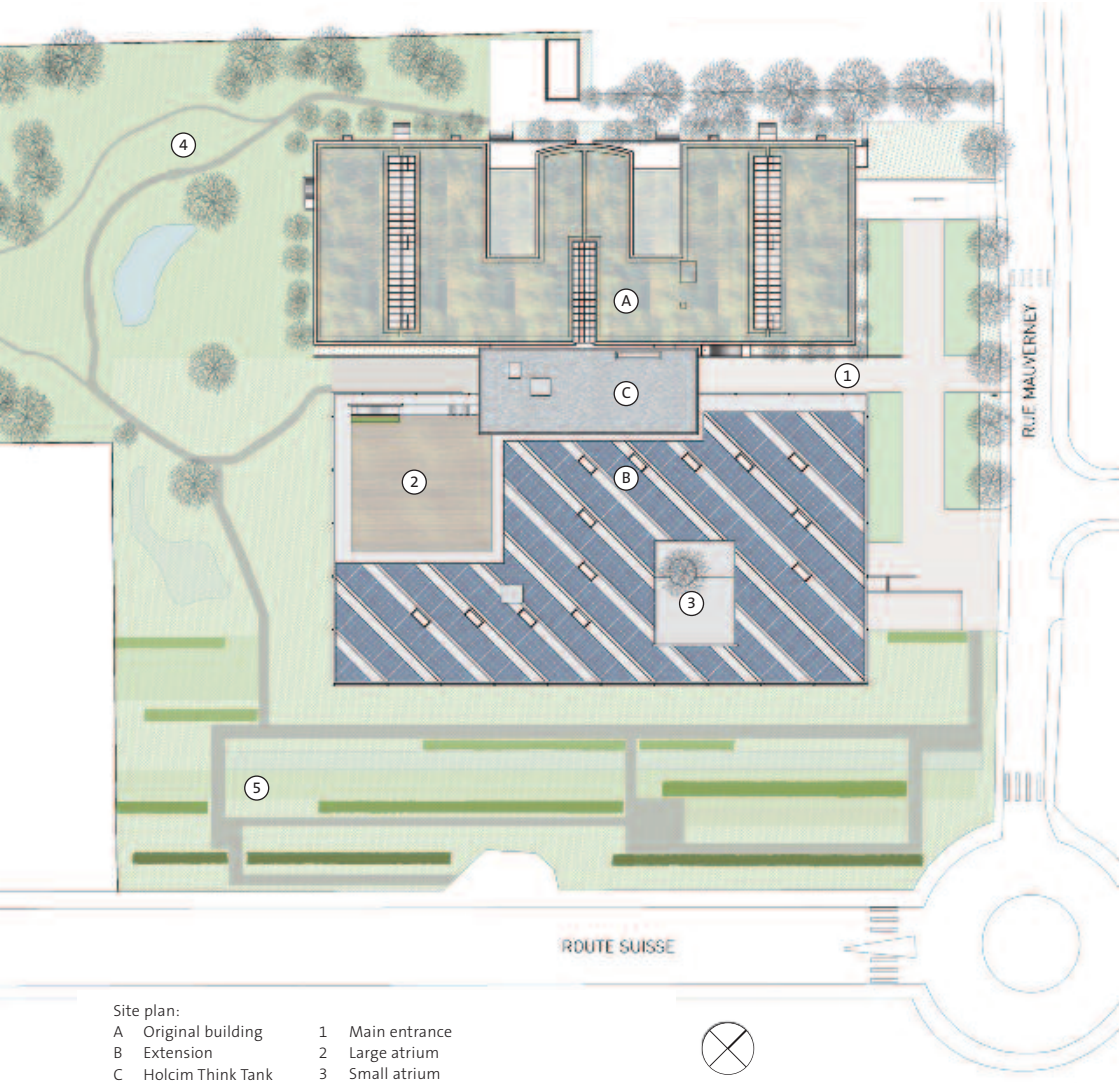
The original IUCN building was not designed to support additional floors, so vertical expansion was impossible. Building the extension as a greenfield structure next to the original building was determined to be the best option. The new IUCN Conservation Centre is situated at the centre of the plot, directly in front of the original building. There is room for horizontal expansion in the future.

Pedestrian and vehicular access to the building is from Rue Mauverney. The strip of land on this part of the site is designed for efficient vehicular and pedestrian circulation. Two vehicular entrances lead directly to the basements of both the original building and the extension. The driveway to the extension is linked to surface parking for 34 cars along Rue Mauverney. New parking spaces are paved with grass block to match the old ones. The walk to the main entrance passes through this parking lot. Both the walk and the new driveway are paved in asphalt.

Natural garden

The largest open area of the site is to the southwest. Here, adjacent to the original building, is a natural garden measuring roughly 3,400 square metres. This man-made meadow expresses and symbolizes IUCN's commitment to conserving the integrity and diversity of nature. It was begun in 1992 and provides habitat to a broad diversity of species, some of which have appeared and disappeared over the years.

Although the garden is situated in a suburban setting, it is home to many rare species found nowhere else nearby, including twelve species of plants and animals on IUCN Red List of Threatened Species™. Unlike many ornamental gardens, this natural garden is full of life all year round, even in the



Site plan:

A Original building
B Extension
C Holcim Think Tank

1 Main entrance
2 Large atrium
3 Small atrium
4 Natural garden
5 Extension: natural garden/ecological farmland

dead of winter. Maintenance of the natural garden consists of occasional cutting of trees, removing neophytes, and mowing grass. Grass is mowed in a piecemeal fashion, circumnavigating nests, spider webs, etc. to preserve populations.

Biologist and ecology consultant Florian Meier has been in charge of the natural garden since he created it, and he is now expanding it to the southeast as part of the IUCN Conservation Centre project. The expanded section reproduces the hydro-geological conditions of much Swiss marshland, ninety percent of which has been lost over the past decades, and the remainder of which is now protected. Rather than creating detailed plans, Florian Meier works in dialogue with nature as the project progresses and as the site takes form. He seeks not to shape nature to fit an ideal, but rather to create conditions on the site for nature to thrive. As he says, "You cannot plan nature; you can accommodate it and hope it cooperates."

In the newly created marsh, Florian Meier excavated an area of some 1,000 square metres to within 30 to 60 centimetres of the water table. A thin layer of clayey and sandy topsoil has been placed over the exposed subsoil, glacial till. He is planting an assortment of suitable indigenous grasses, shrubs, bushes, and trees of various heights here – including some rare species with spectacular blossoms, such as sword flag, also called marsh gladiolus (gladiolus palustris). Nature will consummate the transformation of this area over the forthcoming decade.

The expanded garden now contains a wider range of habitats with varying soil hydrology and mineralogy. From pond to marsh to dry meadow to gravely soil to rock, a range of ecological conditions has been created to support a great diversity of indigenous species – a fitting achievement for

IUCN in 2010, named the countdown year for stopping the loss of biodiversity and the International Year of Biodiversity.

Ecological farmland

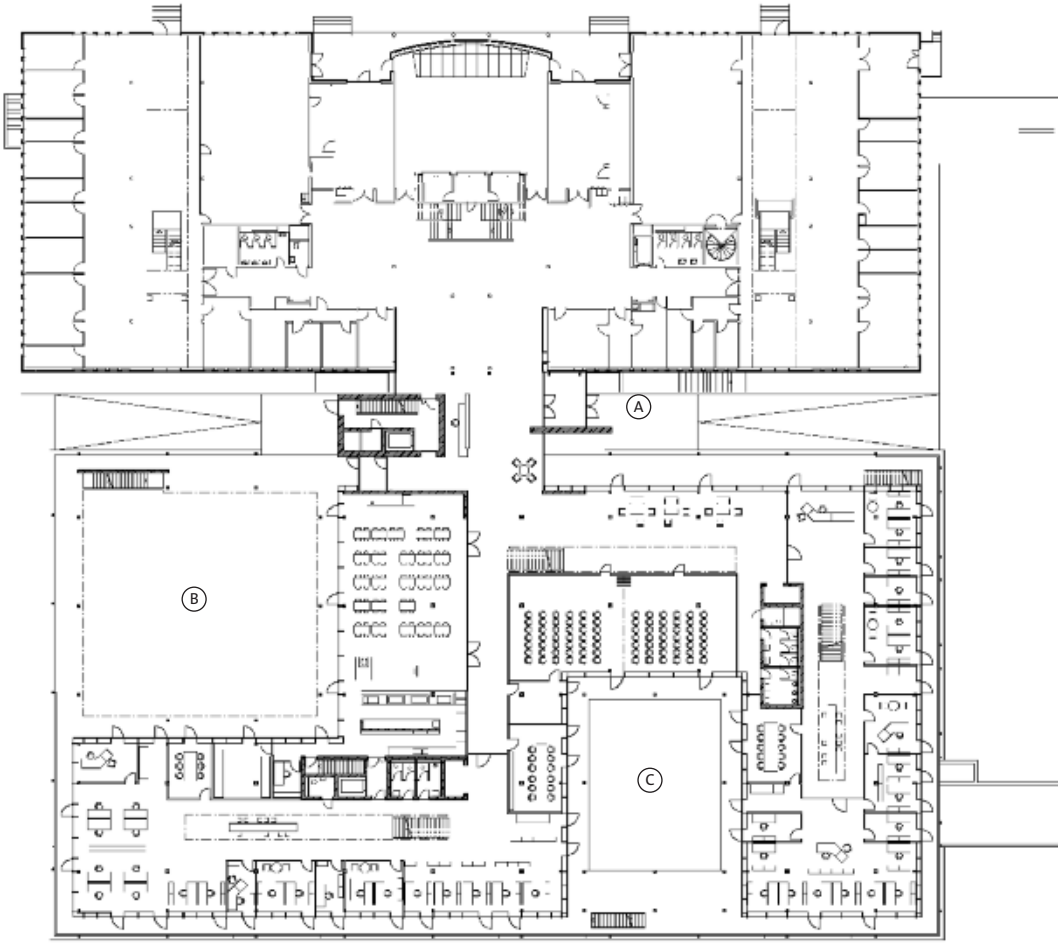
The long strip of land at the southeast of the site, roughly a third of a hectare, is designed to illustrate the type of environmentally compatible farmland that was once indigenous to the region. Here, old varieties of crops are planted, harvested, and rotated. Of course, no pesticides, herbicides, or artificial fertilizers are used here or anywhere on the site. The absence of herbicides will enable threatened adventitious flora to flourish on the ploughed soil. Stones removed from the field are piled in rows, in the traditional manner. Adapted vegetation thrives in this rockscape, as do many reptiles, amphibians, and rodents. A living hedgerow woven of thorny bushes illustrates the old way of naturally fencing in farm animals. This part of the site shows that, before monoculture, farmland used to support biodiversity – and it could once again.

The expansion of the garden was made possible by a generous donation from the Loterie Romande. The entire site is open to the public. Paths lead through all parts of the garden. This is an attractive and multifaceted place for observing nature, for walks, guided tours, and for learning about local flora and fauna and the habitats these species require. In the spirit of IUCN, the site is a microcosm of Conservation of Nature.

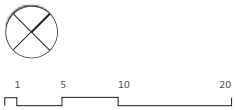
Architectural concept

The extension and the original building form a pair of equal volumes linked at the centre by the entrance tower. The extension is penetrated by two perimeter atria. These effectively transform the building volume from a rectangular block measuring 78 by 42 metres into a winding linear envelope 16 metres wide, a width that allows good daylighting of the perimeter spaces. Along the central axis is a very wide corridor, intended not only for internal circulation but also for furniture and activity. Semi-private meetings, group collaboration, informal exchange, and unplanned communication happen here. Hanspeter Oester says that "the interaction is in the corridors, not inside the offices". Centrepiece of these corridors is an open stairwell, creating a two-storey space. Skylights on axis with the corridors provide natural light. Balconies circle the building, serving as the fire exit path, thereby freeing the corridors to be used as open workspace.

Large windows wrap the building, allowing natural light into the space, which can be laid out with great flexibility because the column-and-slab structure is virtually free of bearing walls. Private offices, group offices, open offices, or meeting rooms can be created anywhere along the building perimeter. This flexibility of the floor plan is not theoretical, but thought out to the last detail. It is supported by the spacing and location of exit doors, windows, columns, light fixtures, electrical outlets, and air vents. Each space, no matter what size or shape, enjoys optimal lighting and climate control, and has at least one door to the outside. This "infrastructure" allows offices to be partitioned into the standard sizes prescribed by IUCN. Offices in the extension are the same sizes as those in the original building; there is no "first or second class".

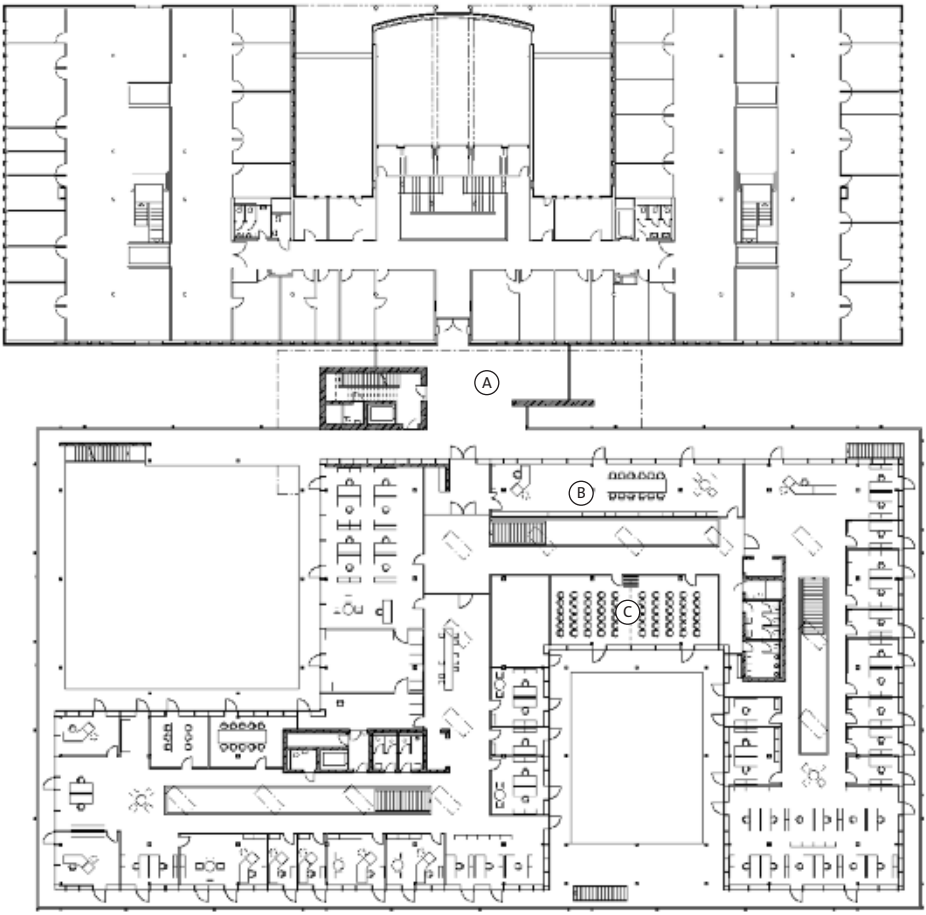


Ground floor:
A Main entrance
B Large atrium
C Small atrium

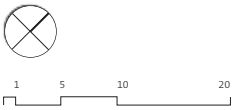


The floor plan can be economically and easily adapted to the changing needs of IUCN because nearly all partition walls are movable. The partition panels extend to the floor slab above; there is no suspended ceiling to get in the way. Opaque panels can easily be replaced with glass panels. The finish, acoustical qualities, and stability of the partition system give the impression of permanent walls, yet the panels can be disassembled and relocated within a few hours. This is done without the disruption and debris that would be caused by the demolition of frame, gypsum, or masonry partitions, and without waste or the need for replacing materials. The system embodies considerable grey energy but it promises a very long lifespan.

Building materials were selected for low environmental impact. Preference was given to certified and sustainably produced materials, recycled materials and materials that can be recycled easily, materials with low grey energy, locally sourced and produced materials, materials by certified suppliers, and bright green products, even if non-local. Ninety-five percent of the materials were locally sourced. Seventy-five percent of the wood is FSC certified (the remaining twenty-five percent comprises wood products for which no certification exists). All interior finishes in the building are non-toxic and solvent free.



First floor:
A Connecting terrace
B Visitors' Centre
C IUCN Red List Training Centre



Mechanical, electrical, and plumbing engineering

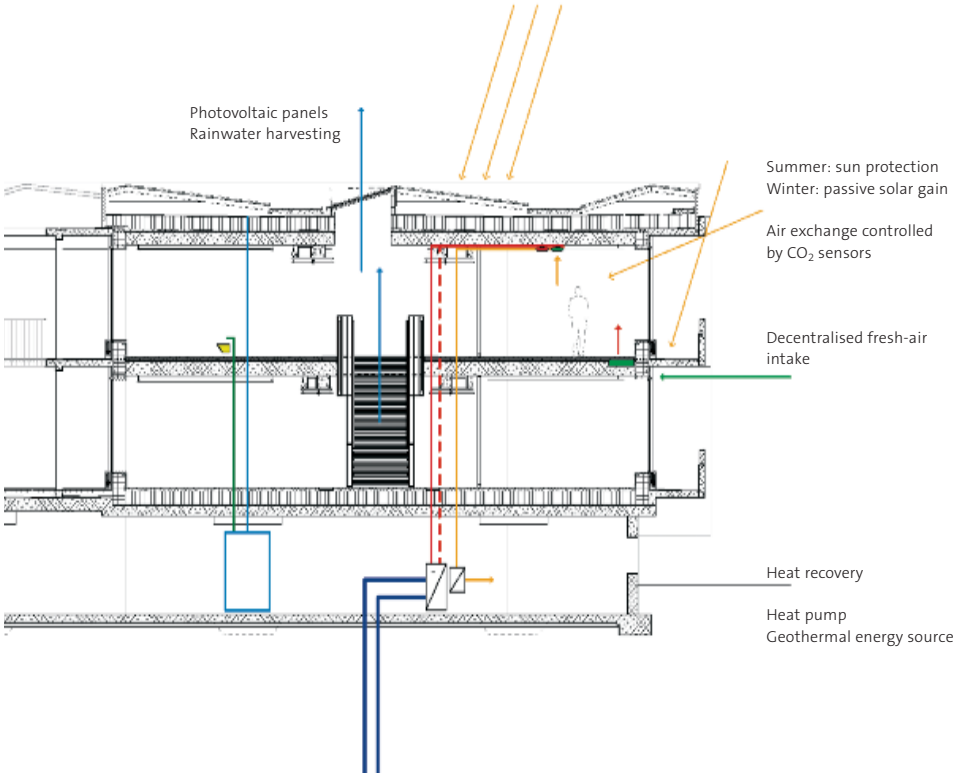
The engineering firm Amstein + Walthert handled the mechanical, electrical, and plumbing engineering for the building, and was charged with designing to meet Minergie-P-Eco standards and supporting the architects to achieve a design that meets LEED Platinum standards. The engineers implemented a holistic and highly innovative mechanical concept.

Heating, ventilation, and air conditioning

The engineering team applied a lean-tech approach to the design. Gisela Branco, consultant for energy and environment at Amstein + Walthert and responsible for Minergie certification for the IUCN Conservation Centre, explains that this approach is to first design the building shell to minimise thermal loads (passive design) and then to design the mechanical equipment (active systems) to meet the reduced requirements. Super-insulated, airtight buildings reduce thermal loss to a minimum, thereby opening a wider field of options for heating and cooling systems. Balconies are another passive element, shading against overheating in summer and permitting solar gain in winter, while allowing good daylighting year round. The balconies wrap the perimeters of both main floors, and are thermally isolated from the floor slabs.

A geothermal heat pump is used to heat and cool the building. Fifteen pipe loops extending 180 metres into the ground circulate a water-glycol mixture, extracting heat from the earth in winter and creating a heat sink for cooling in summer. The loops are connected to a heat pump, which may be bypassed when temperature conditions allow, achieving even greater efficiency. The heat-transfer fluid is carried to three types of HVAC (heating, ventilation, and air conditioning) units in the building: ceiling-mounted convectors, sub-floor airboxes, and large air-handling units in the basement.

Convectors are part of the primary system for heating and cooling most of the building. The heat-transfer fluid (warm in winter and cold in summer) is conducted through a three-pipe ceiling-mounted feeder following the corridors of each floor. Branch piping extends to ceiling-mounted convectors. These units warm the air (or cool it in summer), while the thermal mass of the concrete structure is directly heated (or cooled) by the system. Heating or cooling the thermal mass eliminates peak loads, in line with the lean concept. Response time is slow due to thermal lag, but tolerable because the indoor temperature fluctuation is very low.



Airtight buildings require the controlled exchange of indoor air. In the IUCN Conservation Centre, this is provided by floor-mounted airboxes located along the perimeter walls. Each airbox includes a filter, fan, and heat exchanger. They draw in outside air through vents located beneath the balconies, filter it, adjust the temperature, and force the air through a short duct feeding three floor vents. The airboxes must be serviced once a year. A removable panel in the floor provides easy access to each box. The boxes are located in front of each door to the outside, where they will never be covered by furniture, and in front of windows. The short straight duct runs can easily be cleaned to eliminate dust build-up, so the ducts will have a long service life.

Exhaust air is drawn into ceiling vents. The rate of air exchange is controlled by sensors that measure CO_2 in the indoor air. As an energy-saving mechanism, when the CO_2 level in a room drops below a defined value, dampers are automatically activated in the fresh air and exhaust air systems reduce or stop the air flow. Thus the air exchange rate is higher when needed, and lower when spaces are unoccupied. Matthias Achermann, partner at Amstein + Walthert, says that “the building breathes at the same rate as the people in it”.

The CO_2 sensors and exhaust-air vents are integrated into innovative ceiling panels that also incorporate convectors, lights, sprinkler heads, and perforated acoustic baffles. The devices in the multifunctional panels are connected to the ceiling-mounted building systems spine that circulates through the corridor. The panels not only assemble the several mechanical and electrical devices into an organized and aesthetically pleasing unit, they blend perfectly with the raw concrete ceilings on which they are mounted. The panels are located to allow flexible floor plans and partitioning.

The ventilation system is powered and controlled by digital wiring, which provides a neat installation and ideal control. The system is simple and versatile, serving adequately even when space use changes. It replaces windows as the means of ventilation. The exterior doors have closers and are not intended for ventilation. The carefully controlled HVAC system efficiently maintains a comfortable indoor climate; experience with similar systems shows that ventilation controlled by building users interferes with proper climate control.

This is a radical HVAC concept without precedent in this part of Switzerland, but it is not a prototype experiment. Hansjürg Leibundgut, partner at Amstein + Walthert and Chair of Building Systems at the Swiss Federal Institute of Technology, is the mastermind of the efficient decentralised concept. He says it will soon become a mainstream practice: "We are moving in a new direction in building design – away from creating prototypes and towards creating high-efficiency systems ready for industrialization. This high-efficiency system has been developed and proven through a series of buildings, and it is fully integrated with the architecture." Small mechanical units are used that can be multiplied and located decentrally. Besides using energy at its most efficient, this concept can speed construction, reduce costs, and give complete flexibility, because any set of units can be adjusted as needed without affecting the others. Separate air-handling units in the basement serve the restaurant, kitchen, conference hall, and penthouse. These systems incorporate heat recovery from exhaust air. A metering system records and analyzes the consumption of thermal energy for the entire building.

Electrical systems

The IUCN Conservation Centre runs entirely on green energy, a mix of hydroelectric and photovoltaic power. The photovoltaic plant on the roof generates 150 kilowatts – enough power to cover about seventy percent of the building's requirements. At the beginning of the project, the system was calculated to produce 120 kilowatts. By the time the panels were installed, the technology had improved, and efficiency had increased by twenty-five percent.

Lighting is a major power consumer in office buildings. Natural lighting is maximised by skylights in the corridors and large windows throughout the building. Glare and overheating in summer are controlled by balconies that shade the windows and by exterior blinds that extend from the bottom up. Exterior blinds for the office windows are motorized and centrally controlled. Nevertheless, occupants are free to control the blinds in their offices as they choose. The central control system has the flexibility to adapt to changes in layout and room use.

The building incorporates two main types of artificial lighting fixtures. Thin-tube fluorescent fixtures provide general illumination and incorporate motion and daylight sensors. Lights operate only when needed, and turn off automatically. Adjustable LED spotlights provide light with a warm colour temperature. The fluorescent and LED systems can be operated independently. Philips worked closely with the architects and engineers to develop an optimal lighting solution for this building, and donated the fixtures, which are very efficient, rated Class A according to EU energy stan-

dards. The company conducts extensive research and has made many environmentally friendly advances in the lighting field.

High- and low-voltage power cabling and data-transmission cabling is easily accessible, installed in sub-floor raceways. All outlets are floor mounted. Placing outlets in the exterior walls would have compromised the thermal performance and added costly detail work. Outlets are not placed in the partition walls because the walls are movable. The design team studied a variety of furniture layouts to determine the best locations for the outlets.

Digital wiring is used throughout the IUCN Conservation Centre. An uninterrupted power supply is provided for sensitive installations such as the data centre and telecom systems. Tenant spaces have individual metering.

Plumbing

The IUCN Conservation Centre is designed for efficient water management. Faucets are equipped with motion sensors and timers to automatically close valves. Low-flow fittings conserve water. Urinals are waterless. Rainwater is harvested on the roof and collected in a large tank. The water is used to flush toilets and irrigate the garden.

Four drinking fountains are installed in the main corridors, not only for the thirsty, but also perhaps as a reminder that safe drinking water is a basic human right – one that over a billion people are denied. The fountains use tap water, which is preferable to bottled water because it eliminates the need for deliveries, handling, and packaging. Hot water for the lavatories and the kitchen is heated by thermal energy reclaimed from the refrigeration rooms.

Structural engineering

The structure of this building is a veritable showcase of modern and emerging concrete technology, featuring CO_2-reduced concrete, recycled concrete, prestressed concrete, insulating concrete, precast concrete, and of course ready-mix concrete. Concrete is used as load-bearing material, thermal mass, lateral stiffener, finished surface, and architectural accent. The project illustrates many green concrete practices.

The building structure is an earthquake-resistant flat-slab reinforced-concrete frame. Structural bays measure 7.8 metres in both directions, and column spacing is 3.9 metres at slab edges. This grid suits the flexible partitioning scheme and the parking layout in the basement. Columns are precast, which allowed rapid and precise placement. The slab above the basement is thicker around the columns and thinner in the fields, to save material. Slabs above interior spaces are flat. The structure is laterally stiffened by concrete cores and diaphragm walls that extend from the foundation slab to the roof slab. The building rests on a concrete surface foundation, thickened at concentrated loads. This foundation system costs the same as one with isolated footings would, but is better suited to the soil conditions and is less susceptible to differential settlement.

CO_2-reduced concrete was used throughout the building. For this concrete, part of the clinker (manufactured in an energy-intensive kiln process) in the cement has been replaced with high-quality limestone. All aggregates and cement used in the concrete for the building were sourced and processed within a radius of twenty-five kilometres from the site.

Recycled concrete was used for all slabs except the foundation slab. This represents forty percent of the concrete used in the building. Recycled concrete is concrete made with crushed demolition concrete as aggregate.

The demolition material for the recycled concrete used in the IUCN Conservation Centre came from a building demolished a few kilometres from Gland. The recycling of rubble from demolished buildings not only helps solve the landfill problem, it conserves gravel as a natural resource. This is particularly important in this region of Switzerland, where gravel supplies are dwindling.

Demolishing old buildings and reusing the material to create new ones can be repeated indefinitely, which is the essence of sustainability. But recycled concrete does have its limitations. It is not suitable for exposed applications where chemicals and freeze-thaw cycles can attack it. As usage increases, there will be shortages of demolition rubble. Recycled concrete requires about five to ten percent more cement than normal concrete does, and the structural members, e.g. concrete slabs, may have to be somewhat thicker, depending on the structural system. The technology for recycled concrete is still developing.

The entrance tower has its own separate structural system, employing bearing walls that pass through the interior and are also exposed to the outdoors. For these walls, the engineers sought a single material to serve simultaneously as structure and insulation. Insulating concrete was found to be the most cost-effective way to construct them. These walls are the rectangular stair core and the monumental piloti at the entrance, which is 55 centimetres thick, 7 metres long, and 12 metres high. These two structural elements support the tower and provide earthquake resistance.

Insulating concrete contains expanded clay and expanded glass as aggregates, both of which are full of tiny air pockets. This concrete weighs only 950 kg per cubic metre, over two-and-a-half times lighter than normal concrete. It is lighter than water; in fact, it floats. Insulating concrete cannot be vibrated as long as normal concrete, otherwise the lightweight aggregates would rise in the matrix like bubbles – therefore this concrete displays a pattern of surface voids. Many tests and studies were conducted to verify the strength and the casting behaviour of the concrete. Core samples were taken to verify the density and compressive strength. Long-time creep, shrinkage, and behaviour under permanent loading remain properties we are still learning about.

Claudio Pirazzi, structural engineer at INGENI SA Geneva*, which handled the structural design of the building, has a good deal of experience designing Minergie buildings, but says that this was the first time INGENI used recycled concrete and insulating concrete: “To apply these innovative materials and systems, we had to enter unknown territory. Because the material properties and material behaviour were not fully known, we had to conduct a good bit of research and work with sound hypotheses. For this, we worked closely together with Holcim Switzerland, particularly with Blaise Fleury, Project Manager, and Stefan Cuchet, Laboratory Head. Contributing to the realisation of this innovative and pioneering building has given us not only experience and knowledge, but also pride.

* At the time of construction of the IUCN Conservation Centre, INGENI SA Geneva was called Guscetti & Tournier SA.

The building exterior

The striking characteristic of the exterior is the play of diagonal lines of the balustrades and the roof edge. The balustrades comprise two rows of precast concrete panels that meet along zigzag diagonal lines. One side of each trapezoidal panel has a smooth finish, and the other is sandblasted to expose the course aggregate. The finished side of each row is paired with the sandblasted side of the interlocking row, accentuating the diagonal lines at which the panels meet. A difference in thickness further emphasizes the diagonals. This was a cost-effective and simple way to achieve the visual effect without expanding the material palette.

The slope of the diagonals of the balustrades matches the oblique angles at which the saw-tooth superstructure of the roof intersects with the plane of the façade. Thus the expressive lines of the façade derive from the orientation and incline of the solar panels. The inclined roof lines are not simply repeated down the façade; the balustrade diagonals are offset or reversed at each floor. The design is organically motivated and rigorous, yet lively.

Dark steel balcony columns build on this theme. They are discontinuous, and the segments are offset rather than extending from roof to ground. The mind's eye connects the segments, creating another pattern of diagonals. The transposition of seen and imagined diagonals over the orthogonal backdrop of doors and windows creates a three-dimensional meshwork. The visual effect is potent, especially when the viewer is walking, and the two planes of the façade seem to shift against each other.

The question will be asked, how can discontinuous columns carry loads? The trapezoidal balustrade panels transfer the loads from the column above to the offset column below. As intriguing as this construction is, the balconies are not primarily intended for architectural expression. They shade the windows, provide a visual extension of the indoor space, serve as fire exit corridors, and protect the louvers and external blinds from the weather.

The balustrades, as the first layer of the façade, follow the outermost rectangular perimeter of the building. The exterior walls, as the second layer, follow the enclosure as it winds around the atria. These walls are constructed of wood framing to which three types of modular elements are attached in a rhythmic pattern: large windows, opaque doors, and aluminium-clad panels. Windows are triple-glazed fixed panels. Each is fitted with exterior blinds that extend from the bottom up. This allows shading in summer at the bottom only, where the sun strikes the glass, while fully preserving views and allowing the greatest amount of daylight. Doors are insulated wood. Opaque bays of the façade are clad with ventilated aluminium composite panels. Most of these panels are on the northwest façade and at corners; the other façades have more glazing for solar gain.

The two layers of the façade part ways at the atria, as the balcony becomes a two-tiered viaduct that follows the outer perimeter of the building. From the large atrium, this structure frames views of the natural garden and the scenery beyond.

The original building and its extension

The extension is perceived as a building volume roughly equal to that of the original building. It is separated from the original building by a mere 7.25 metres. You walk through this alley as you approach the entrance tower that links the two volumes. Both the old and the new are in view simultaneously. The original building, on the right, is post-modern, a flat rectilinear travertine façade pierced with small windows. The extension, on the left, displays a three-dimensional edifice – balconies, columns, balustrades, and diagonals against a backdrop of large windows and deep indoor spaces beyond.

Does this juxtaposition of old and new clash or does it harmonise? In fact, the odd couple works. The volume, alignment, and height of the extension correspond well with the original building. Although the materials and architectural language of the two buildings differ, the compatible colours and scale create a balanced whole. The colour of the aggregate in the concrete balustrades was carefully chosen to match the travertine.

If there is a discrepancy between the old and new, it is not in formal compatibility, but in energy efficiency. The IUCN Conservation Centre is an energy miser, whereas the original building reflects old standards – it could use an upgrading of insulation, new doors and windows, and a more efficient mechanical plant. Even then, it would not come near the level of performance of the extension.

The extension obliterates the views from the windows on the southeast side (formerly the front) of the original building. These were beautiful views of fields, forests, Lake Geneva, and the Alps. Some of these rooms continue to be used as meeting rooms; others have been converted into

storage rooms and other secondary spaces. An unavoidable drawback of dense development is that views become limited, and as populations increase and we strive to use land more efficiently, loss of view will become an issue.

Entrance tower

A three-storey tower dominates the entrance court, distinctly marking the main entrance, which is set back some twenty metres from the street façade at the end of the gently ascending walkway. The top floor of the tower is a rectangular penthouse that protrudes forward to shelter the entrance. It also cantilevers towards the original building, nearly touching it, but leaving a slit of sky visible. Thus it seems to float for dramatic effect.

Holcim Think Tank

The penthouse was not included in the construction budget; this important element was sponsored by Holcim and has been named the Holcim Think Tank. Literally and figuratively the high point of the building, it is designed to accommodate important and prestigious events hosted by IUCN, many of which will be attended by prominent guests. The southeast wall is fully glazed, offering a perfect view of the photovoltaic roofscape and a stupendous view of the Alps across Lake Geneva.

Rooftop photovoltaic plant

The roof of the main building is a flat concrete deck covered with 34 centimetres of insulation and sealed with a polymeric waterproofing membrane. Rows of shallow gables are installed upon this assembly, covering the entire roof. The wood-frame saw-tooth superstructure is rotated at a 45-degree angle to the building to gain southern orientation. The south-

facing slope is completely covered with photovoltaic panels inclined at 10 degrees. The north-facing slope is covered with aluminium-clad panels and is pierced with a pattern of skylights. Between each pair of rows is a walkway for service access.

The architects call the roof the fifth façade of the building, and rightly so. The highly ordered geometry wraps around the edges to integrate with the vertical façades, and the roof is perceived as an edifice from the penthouse windows above. With large openings, windows, and aesthetic appeal, this roof is, to use the words of Mexican architect Louis Barragan, "a façade to the sky". Two peripheral atria penetrate the roof, a smaller one opening towards Lake Geneva, and a large one opening towards the natural garden.

Small and tall atrium

When you drive into the garage, the small and tall atrium is a delightful surprise. As soon as you descend the ramp and enter the basement a half level down, you are back outside, in this tall courtyard, open to the sky above. A single tree reaches upward, accentuating the verticality of this space. As you drive further you are once again beneath the building. Because the basement is partially open, it is very well ventilated and enjoys natural light.

This atrium is also the delivery and service court, providing access to mechanical equipment rooms and storage rooms in the basement. From the windows of the floors above, one sees food and materials being delivered, cars arriving and leaving, and other service activities. No need to hide the rhythm of everyday life somewhere behind the building. Noise of activities is not a nuisance because the windows are well insulated.

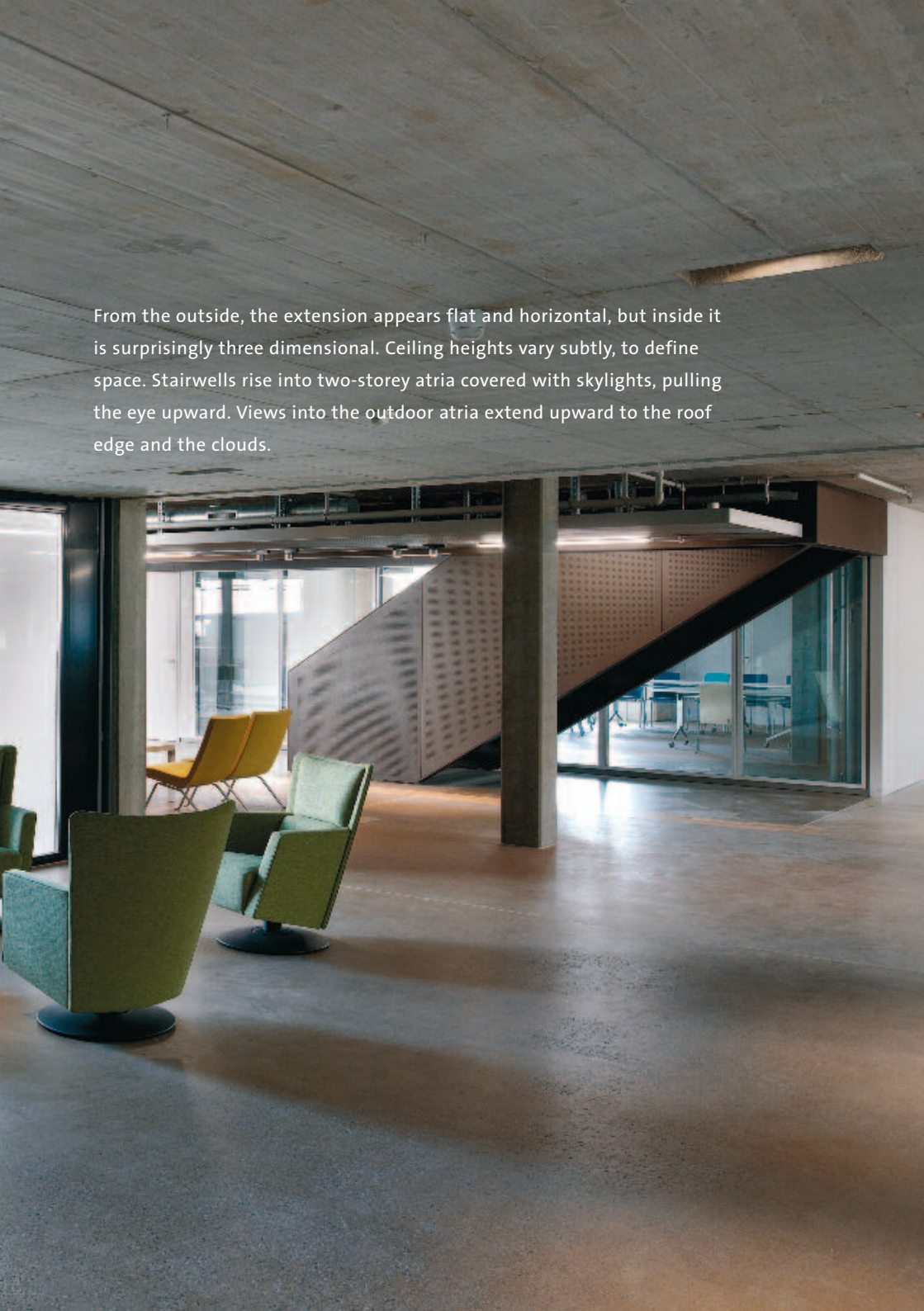
Large and wide atrium

The atrium at the west corner of the building measures 21.5 by 22.5 metres. Only half enclosed, it is as much a terrace as an atrium. This outdoor space can be used for many functions, such as eating, receptions, exhibits, or performances. It is located adjacent to the cafeteria. All terrace furniture is moveable. The deck is cumaru, certified by the FSC (Forest Stewardship Council). This South American wood was chosen to showcase the sustainable use of tropical wood and to support sustainable forstry in

the tropics. This atrium was financed by the MAVA Foundation, an NGO that works to preserve ecosystems and biodiversity by promoting scientific research, training, and integrated management practices and by finding solutions that deliver balanced cultural, economic, and ecological benefits. The MAVA Foundation has moved its headquarters into the IUCN Conservation Centre, thereby ensuring long-term and close collaboration with IUCN.

The building interior

The IUCN Conservation Centre consists of four levels: the basement, two full floors, and the penthouse. The basement and the two main floors align with and connect to the corresponding levels of the original building, so the expanded facility functions as one.



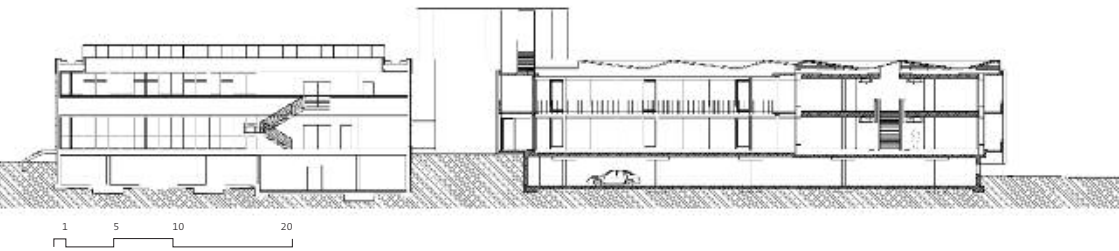
From the outside, the extension appears flat and horizontal, but inside it is surprisingly three dimensional. Ceiling heights vary subtly, to define space. Stairwells rise into two-storey atria covered with skylights, pulling the eye upward. Views into the outdoor atria extend upward to the roof edge and the clouds.

Main entrance

The new entrance is located where the main entrance stairs formerly stood in front of the original building. Because the entrance has not moved, the floor plan of the original building continues to work well. The entrance lobby, with reception desk and views into many parts of the extension, functions as the main point of orientation. It is ideally situated for efficient circulation in both the extension and the original building. Stairs and elevator connect it directly to the parking level below, to the conference rooms and cafeteria on the ground floor, to the Visitors' Centre and the IUCN Red List Training Centre above, and to the Holcim Think Tank. Corridors on the ground floor and upper floor lead to offices and meeting rooms in both the extension and the original building.

The new lobby incorporates the old one to form a large unified space designed for flexible use. It can serve as an extension to the cafeteria, an exhibition room, a place for receptions, a hall to display merchandise, or a venue for other sorts of public, social, or business gatherings.

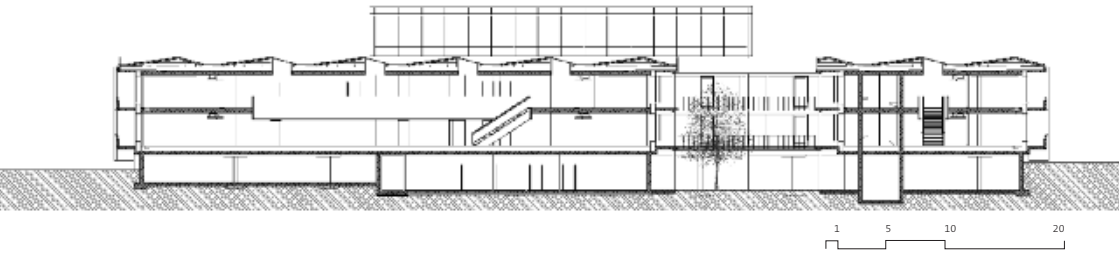
Section through large atrium.



Materials and finishes

The interior has an unpretentious and simple elegance. This is achieved by the clear layout and design, expansive windows and surfaces, and the harmonious composition of honestly expressed materials and finishes. The architects used a limited palette of interior materials to produce a comfortable, warm, and attractive indoor environment. The main materials are brown anhydrite flooring with oak accent panels, off-white-stained spruce window trim, partitions in glass and warm light-grey laminate, perforated MDF (medium-density fibreboard) panels stained dark brown, perforated aluminium-finish multifunctional ceiling panels, and raw concrete columns, ceilings, and accent walls. Displaying the natural colour and texture of these materials, even manufactured ones, is a design ethic carried throughout the interior. The architects shunned plaster, cladding, and other layered coverings, which unnecessarily add cost, consume materials, and will ultimately become waste.

Section through small atrium.



The anhydrite floor is not only extremely robust, it shows the nuances in texture and colour of a material worked by hand.

Window sills are 40 centimetres deep, reflecting the thickness of the façade insulation. The height and depth of the window sills make them ideal for sitting on, and the wood is pleasant to the touch. Sills and window surrounds are spruce. The matt finish is a semi-opaque oil stain with white pigment; knots and grain pattern remain visible.

Inside the building, many types of concrete elements are seen simultaneously: columns, walls, ceiling, and balustrades. Colours and textures vary but harmonize. The columns are prefabricated concrete elements, made on a 100-year-old machine located a few kilometres from the site, thus the grey energy of these columns is very low. The smooth-finish columns are left unpainted and display a beautiful variegated texture. Each is unique.

Dark-brown-stained perforated MDF is used for balusters at the open stairs and around the stairwells. These are the only dark elements in the otherwise light interior. They accentuate the stairs and add weight to the central vertical spaces. Wood finishes in the building include the access panels in the floors, handrails at the stairs, and the pulls for entrance doors – all FSC-certified oak. Wood was chosen for pulls and handrails for its tactile qualities. The full-height pull of the entrance door flexes as you draw it. Nature greets you as you step into the IUCN building.

Bright green furniture

The furniture in the IUCN Conservation Centre adds bright splashes of colour. It was donated by Kinnarps, a Swedish manufacturer of furniture for offices, schools, and hospitals. Kinnarps is one of the few global furniture makers to assume responsibility for the entire supply chain from raw materials to furnished space. All the wood used in production at Kinnarps is from monitored or certified forests. The company delivered the furniture wrapped in protective blankets that are being reused again and again. Kinnarps uses a minimum of packaging, and leaves none of it behind.

A story of walls

The IUCN Conservation Centre tells a story of walls. Permanent walls, movable walls, and sliding walls. Windows treated as walls. Naked walls and painted. Glass partitions millimetres thin and massive walls of concrete half a metre thick. Walls that first block your view, and then suddenly reveal a magnificent vista. Walls that pass through other walls. Green, living walls. Double-layer walls that separate and reunite. Sleek walls and rough ones. Look twice at the pitted concrete wall behind the reception desk. It is not polished but painted silver.

Two exterior walls at the entrance enter the building with you. The wall to the right is travertine veneer, and to the left, a massive monolith of insulating concrete, 12 metres high. Both walls are "stone" – natural or man-made – and each displays its own characteristic pattern of surface voids. The two walls stand vis-à-vis as you open the door. Both continue into the entrance vestibule. Here, the old and new meet for the first time in an interior space. The wall to your left accompanies you further as you step into the lobby. At once an exterior and interior wall, it defines the entrance as a place of transition from outdoors to indoors.

Of all the walls, however, the most memorable is the façade. With zigzag lines, balconies, a saw-tooth silhouette, and columns staggered like notes on a sheet of music, this is an iconoclastic image. It says that buildings can be different, and should be. It says that IUCN is open for change, and initiates it. It says that we should preserve not the status quo, but the life-sustaining ecosystems of our planet.

Certified green buildings

Green design is that which is "aware of and respects nature and the natural order of things; it is a design that minimizes the negative human impacts on the natural surroundings, materials, resources, and processes that prevail in nature". This definition by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) is as useful as any general definition of green buildings. Green building is promoted by many international nonprofit organisations and associations around the world, including the International Initiative for a Sustainable Built Environment (iiSBE), the United Nations Environment Programme (UNEP) Sustainable Building & Climate Initiative (SBCI), the Sustainable Building Alliance, the Green Building Challenge, Minergie, and the World Green Building Council (WGBC). The WGBC is a union of councils from 16 nations that collectively represent fifty percent of the world's construction activity.

Most of the national organisations that promote sustainable construction have created or adapted rating systems and voluntary certification programs for green buildings. These mechanisms are an effective way to improve and measure the performance of buildings, set practical standards, provide concrete targets, build public awareness of the issue, and effect change by heightening market expectations and generating demand. In 1990 the British Research Establishment developed the first rating and certification system for green buildings, the Building Research Establishment Environmental Assessment (BREEAM). Other systems followed, including Minergie in Switzerland, Green Star in Australia, and the Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) in Japan. One rating system, however, leads them all. Leadership in Energy Efficiency and Design (LEED) by the USGBC (U.S. Green Building Council) has become the world's pre-eminent system for rating the design, construction, operation, and renovation of green buildings.

LEED

The USGBC has designed at least eight LEED rating systems to cover virtually all building types and every life-cycle phase. The program is intended for the USA, but has found global use. Under the programme, the independent Green Building Certification Institute (GBCI) verifies that LEED buildings are constructed as intended. GBCI includes a network of ISO-compliant international certifying bodies, ensuring the consistency, capacity, and integrity of LEED certification.

There are several versions of the various LEED systems. The IUCN Conservation Centre is being certified under LEED for New Construction Version 2.1, which has since been superseded. Under LEED rating systems, points are earned when a building fulfills the defined criteria. Depending on the total number of points, the building will receive one of four levels of certification. Points are awarded for high performance in energy savings, water efficiency, CO_2 emissions, indoor environmental quality, stewardship of natural resources, and environmental sensitivity. The main categories of the various LEED systems are as follows.

Sustainable sites

Choice of building site is perhaps the single most important determinant of the sustainability of a building. Points are awarded for infill projects, building on previously developed parcels or other preferable sites, avoiding building on undeveloped land or in environmentally sensitive places, minimizing the building's impact on ecosystems and water-ways, regionally appropriate landscaping, appropriate transportation choices, and controlling storm-water runoff, erosion, light pollution, the heat-island effect, and construction-related pollution.

Water efficiency

Buildings are heavy consumers of water. Points are awarded for smarter use of water, indoors and out. Consumption can be reduced by using efficient appliances and low-flow fixtures and fittings and by employing water-efficient landscaping.

Energy and atmosphere

Buildings are heavy consumers of energy, especially electricity. Points are awarded for efficient design and construction, use of renewable and clean sources of energy generated on or off site, monitoring energy use, innovative solutions, and the use of efficient appliances, systems, and lighting.

Materials and resources

During construction and operation, buildings consume considerable volumes of materials and resources and generate extensive waste. Points are awarded for using construction materials and products that are sustainably grown, harvested, produced, or transported, for reuse and recycling of waste and other materials, and for reducing waste, also taking into account waste generated at a product's source. Under LEED for Existing Buildings, points

are awarded in this category for sustainable purchasing of supplies and food consumed in the building.

Indoor environmental quality

Most people spend the majority of their lives indoors, where air quality can be significantly worse than outside. Points are awarded for measures to improve indoor air, control acoustics, and provide daylighting and pleasant views.

Awareness and education

Green buildings deliver full benefits only when the occupants use the green features properly. Points are awarded for giving owners, tenants, and building managers the education and tools they need to understand what makes their building green and how to derive the maximum benefit.

Innovation in design

Bonus points are awarded in this category for projects that use innovative technology and strategies to boost building performance well beyond what is covered by other LEED credits or in green building areas not covered by LEED.

Regional priority

In the USA, each of USGBC's regional councils, chapters, and affiliates has identified environmental issues of local import. Six LEED credits that address these local priorities have been selected for each US region. A project that earns a regional priority credit earns one bonus point in addition to any points awarded for that credit. Up to four extra points can be earned in this way.

Minergie

Minergie is a Swiss certification for green buildings, introduced in 1994. It is a commercial certification endorsed by the Swiss government. Minergie-certified buildings are energy efficient, use renewable energy sources, have low environmental impact, and provide a comfortable indoor environment. Minergie-P is a more stringent level of Minergie certification. The P stands for passive design. Minergie-P buildings are not just super-insulated structures; they are an integrated system of all building elements designed for

high efficiency, comfort, and cost-effectiveness. The main Minergie requirements are low specific thermal energy consumption, controlled indoor air exchange, prevention of overheating in summer, insulation and air tightness of the building shell, energy-efficient appliances, additional cost of green building maximum 15 percent, and simple operation of the building and systems. Minergie-Eco is a further level of Minergie certification for buildings that are healthful for occupants and have limited environmental

impact regarding raw material consumption and recycling as well as manufacturing and processing of building materials. The requirements for healthful indoor environments include adequate daylight, low noise emissions, and low emissions of indoor pollutants and radiation. The requirements for low environmental impact include the use of plentiful raw materials, local materials, certified green materials, and recycled materials, building materials with low grey energy and low emissions during processing, and the use of building methods that allow materials to be easily reclaimed (sorted) or disposed of in an environmentally responsible way.

Besides stipulating requirements for green buildings, Minergie also forbids the use of less-preferable or harmful practices and materials. In the interest of healthful interiors, the use of biocides and wood preservatives are prohibited in interiors, as well as certain solvent-based products and wood products that emit formaldehyde. In the interest of controlling environmental impact, the use of materials containing heavy metals is controlled, the use of recycled concrete is required if it is available within a radius of 25 kilometres, the use of non-local wood is prohibited unless it is environmentally certified, and the use of adhesive and sealing foams is prohibited.

Certification and sustainability

The general intent of LEED and Minergie-P-Eco is the same; the main differences are in the approach, weighting of criteria, definition of limits, and specific categories. Minergie is one of the few rating systems for green buildings that take building cost into consideration. LEED for Existing Buildings is probably the only system worldwide that defines food consumed by building occupants as an aspect of green building. This notion could be logically extended to include all activities conducted within a building and the resulting environment and social impact. Thus LEED is

probing the limits of a controllable scope of green building design and operation. How much control is necessary, and how much influence is possible? Many sustainable buildings have no green rating whatsoever, because green building certification is voluntary. But all buildings must meet building codes. Governments and authorities can promote progress in two ways: first, by stipulating green certification as a requirement for a building permit. Several city and state governments in the US are doing this for public buildings, as well as branches of the federal government for their own buildings. The second way is to adopt individual criteria of green building into building codes, making them mandatory for every builder. This process is beginning in America and Europe. Today, the Swiss building code requires the level of energy efficiency that Minergie had set two years ago – which has forced Minergie to raise its standards in order to avoid becoming obsolete.

LEED Platinum and Minergie-P-Eco are two of the world's toughest standards for green buildings, and the two together create the most comprehensive set of criteria imaginable for green building. The IUCN Conservation Centre strives not only to meet this set of criteria, but to go beyond it. Green building is only one aspect of sustainable construction, and even a bright green building is not necessarily an outstanding work of architecture. Great architecture cannot be measured with points, and excellence is achieved not by rating systems, but by the meticulous application of competence. Nevertheless, to achieve widespread progress toward sustainability, formal frameworks are necessary. Green building rating systems serve this purpose, and have just begun to instigate change. They are constantly being developed for greater effectiveness.

Addresses

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Credits

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Daniel Wentz

Photos Alain Bucher, Bern, Switzerland

Sources

agps report, 2009

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USGBC website

"Building the Future", IUCN, 2010

"Superlabel in Erklärungsnot", Hansjürg Leibundgut, archithese 6/2009, pp. 34, 35

Project and technical data

Project data	**Building type:** multi-purpose – offices, library, exhibition space, conference centre, cafeteria
	Site area of the extension: 10,400 m²
	Construction period: June 2008 to March 2010
	Construction cost (Building Cost Plan 2 with fees): approx. CHF 20 million
	Cost per m³, as per SIA 116 including design fees: CHF 600/m³
	Cost per m³, as per SIA 416 including design fees: CHF 730/m³
Technical data	**Building volume as per SIA 116:** 31,700 m³
	Building volume as per SIA 416: 26,115 m³
	Building areas:
	Building footprint: 3,400 m²
	Gross floor area: 5,400 m²
	Useable floor area: 4,100 m²
	140 workspaces: 2,000 m²
	Atria and balconies: 1,900 m²
	Basement parking: 2,200 m²
Energy performance	**Heating energy demand:** 25 kWh/m² year (SIA standard allows 45)
	U-value of walls: 0.1 watt/m²K
	U-value of triple glazing: 0.5 watt/m²K
	U-value of window assembly: 0.7 watt/m²K

Promoting and rewarding sustainable construction

The Holcim Foundation for Sustainable Construction promotes innovative approaches to sustainable construction. The objective of the Holcim Foundation is to encourage sustainable responses to the technological, environmental, socioeconomic and cultural issues affecting building and construction, regionally as well as globally – through a range of initiatives.

The Holcim Awards is a series of international competitions for future-oriented and tangible sustainable construction projects. They recognise any contribution to sustainable construction – irrespective of scale – in architecture, landscape and urban design, civil and mechanical engineering and related disciplines. Prize money of USD 2 million per three-year competition cycle encourages and inspires achievements that go beyond convention, explore new ways and means, and draw attention to and identify excellence. The Awards competition is conducted in partnership with some of the world's leading technical universities* who lead the independent competition juries to evaluate entries according to the "target issues" for sustainable construction. www.holcimawards.org

The Holcim Forum is a series of symposiums for academia and practitioners to encourage discourse on the future of the built environment. It supports sustainable construction in the scientific field, among experts in the construction sector, business and society. www.holcimforum.org

* The partner universities of the Holcim Foundation are the Swiss Federal Institute of Technology (ETH Zurich), Switzerland; Massachusetts Institute of Technology (MIT), Cambridge, USA; Tongji University (TJU), Shanghai, China; Universidad Iberoamericana (UIA), Mexico City, Mexico; and Ecole Supérieure d'Architecture de Casablanca (EAC), Morocco. The Universidade de São Paulo (USP), Brazil, and The University of the Witwatersrand (Wits), Johannesburg, South Africa, are associated universities of the Holcim Foundation.

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