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FOR: JOHN GRAHAM AND COMPANY

FOR USE AT WILL

THE SPACE NEEDLE

Fact Sheet

The symbol of the Seattle World's Fair, opening April 21, 1962 -- and its most dramatic building -- is a graceful 600-foot sculptured structure called the Space Needle.

Shaped like a sheaf, the elegant steel spire soars 730 feet above sea level and supports a circular glass-enclosed cocktail lounge and restaurant which will revolve 360 degrees every hour.

While the movement of the 300-seat restaurant's perimeter will be almost imperceptible, diners in the "Eye of the Needle" will be able to start their meals with a spectacular view of the Cascade Range with its snowcapped peaks topped by Mt. Rainier and in succession, as each course is served, be treated with a panoramic view of Puget Sound, the Olympic Mountains, the Fairgrounds, metropolitan Seattle and its lakes stretching out to the northwest -- with Mt. Baker in the distance.

Above the restaurant an observation deck serving an estimated 10,000 visitors daily will have a souvenir shop and a snack bar whose automatic vending machines will cook and dispense a fresh hamburger in fifteen seconds, brew fresh coffee, make its own ice for ice-cold beverages and make change for dollar bills. Its glass-enclosed pavilion and outdoor promenade will accommodate

350 persons and the Space Needle's planners anticipate a turnover every 20 minutes.

Topping the structure, a 50-foot stainless steel gas-lit beacon into which chemicals will be pumped will light up every fifteen minutes in a succession of colors: red, then gold, then green.

Designed by John Graham and Company, well-known architectural and engineering firm of New York and Seattle, the building will cost an estimated \$4,000,000 and will be tallest west of the Mississippi.

Since it began sprouting "legs" in the summer of 1961, the Space Needle has been the talk of Seattle. It's expected that the tower will be a major Northwest tourist attraction for many years and during the six months that the Fair is open it is estimated that a million and a half persons will take the trip to the restaurant or the observation deck above it.

A permanent structure, it will be part of Seattle's new \$50,000,000 Civic Center and it's a foregone conclusion that it will become the symbol of that city just as the Eiffel Tower has symbolized Paris since the Fair of 1869.

Three high-speed Otis elevators shaped like space capsules with large vision "ports", accommodating 30 passengers each, will whisk passengers to the top. Located outside the tower's central core, they will make the trip in 43 seconds at a speed of 800 feet a minute. (One of the elevators, which will be used for service in off hours, will travel at the rate of 350 feet a minute.) The fare will be a dollar for adults and 75 cents for children and the combined elevator capacity will be 1,430 persons per hour.

Three pairs of slender steel "legs" in conjunction with a triangular core of steel lacework supports the Space Needle's tophouse. The utilities

and two screened-in 832-step stairs are located in the central core. The Needle tapers, hour-glass fashion at the waist, and flares out again at the 500-foot level where steel "arms" reach out to hold up the tophouse structure. Its legs are painted "astronaut white", the central core is "orbital olive" and the tophouse is "pre-entry red" and "galaxy gold".

Prior to determining the height of the tophouse "view soundings" were taken from a helicopter at various heights. The restaurant level height finally selected is 150 feet higher than nearby Queen Anne Hill, permitting an unobstructed view of the panorama. Since the tower is a private venture designed to make money, sound economics -- plus aesthetics -- were the factors that prevailed in placing the Eye of the Needle at the 500-foot level, particularly since additional height didn't provide an added view commensurate with the increased cost.

SAFETY -- A TOP CONSIDERATION

One of the prime considerations of its designers was safety. Extensive soil tests on the site revealed the ground to be excellent. The foundations for the Needle's six legs are buried in an excavation 30 feet deep, requiring 250 tons of reinforcing steel and using 72 huge steel anchor bolts 31-1/2 feet long and four inches in diameter to which the legs are attached. The core is anchored with 24 additional bolts 10 feet long and three inches in diameter. Into this excavation 470 truckloads of concrete -- some 5,600 tons -- were poured.

As a result of this massive foundation the Space Needle's center of gravity is very near the ground level. Wind-tunnel tests with a six-foot architectural scale model at the University of Washington covering drag, air flow and other technical questions, produced the basic criteria for the structural design. The model was tested in the equivalent of 100 mile-an-hour winds --

the highest velocity recorded in Seattle was 67 miles per hour -- and its resistance to earthquakes is almost twice that required by Seattle's building codes. At 53 mile-an-hour winds the completed structure had less than a quarter-of-an-inch deflection at the top.

In addition to the expert engineers and architects in the Graham firm, outside consultants as John K. Minasian, consulting structural engineer of Pasadena, California and specialists from the University of Washington and the California Institute of Technology were retained. "Safety on a structure such as this is paramount," Graham said. "We've gone beyond the maximum requirements for safety in our engineering of the Space Needle and we also wanted to avail ourselves of the best thinking -- because nothing like this has ever been built."

ORIGINS OF THE SPACE NEEDLE

The Space Needle had its origin in a meeting held in May 1959 between Graham and Century 21's top management: Edward E. Carlson, a western hotel chain executive who, since 1955, had been spearheading the idea of a World's Fair for Seattle; Joseph Gandy, a business executive who took over the presidency of the Fair when Carlson resigned; and James Douglas, president of Seattle's Northgate Shopping Center.

They were determined that the Fair should have not only a spectacular structure to personify its theme, "Man in the Space Age" -- but an attraction that would have great gate-appeal. And they wanted a building that would serve as a permanent, profit-making attraction to the city of Seattle.

The man they took their problem to was a quiet, incisive architect

whose offices in Seattle, New York, Honolulu and Toronto are responsible for vast and complex structures in many parts of the world and whose firm is noted for both engineering and architecture. One of the country's pioneers in shopping center design -- his firm had designed Douglas' successful Northgate in 1948, the nation's first planned regional shopping center -- Graham had a reputation as a keen businessman who frequently built for his own account and who would appreciate their need for a sound return on the capital investment.

Carlson had been impressed, on a recent trip to Germany, when he learned that the restaurant on top of the Stuttgart Tower, a chimney-type structure, attracted 800,000 persons annually. He mentioned this to Graham whose firm, at that very time, was designing a revolving restaurant atop a 25-story office building in Honolulu's Ala Moana Shopping Center.

Graham explained the assignment to his architects and engineers. In June, designer Arthur E. Edwards submitted a drawing based, in part, on the successful scheme his colleague, John Ridley, had evolved for the Ala Moana Building in Honolulu. Edwards' idea called for a revolving restaurant, shaped like a flying saucer on top of a thin monolith higher than the Washington Monument. Century 21's management like the idea and the Graham firm began to work on its development.

It first undertook studies to determine the structure's economic feasibility. It reviewed the success of commercial towers built in Tokyo, Dortmund and Rotterdam as well as the Stuttgart and Eiffel Towers, the Washington Monument and the Empire State Building

It analyzed the number of visitors to Seattle, compared price schedules of various towers for admittance, estimated how many persons the elevators could hold and the staying time on top; and made a projection of the

operating income versus the cost of building, operating and financing -- right down to taxes and interest.

With this information in hand, the first steps were taken to obtain financing and an appropriate site and the plans went from the first schematic drawings to preliminary designs. A single 500-foot concrete shaft was developed, but as the structural design advanced it became apparent that the requirements to resist wind and earthquake stresses would so thicken the shaft that it would lose its original elegance and grace. In order to maintain this original concept further design studies were necessary, and to this end Victor Steinbrueck, a professor of architecture at the University of Washington, was engaged during his summer vacation to assist Mr. Graham, his partners and staff. The result was the addition of supporting legs to reinforce the center shaft and form a more adequate support for the restaurant and observation deck. This, then, was developed and reached the final concept illustrated in Earle Duff's now famous rendering of the Space Needle.

Duff's painting immediately fired everyone's imagination. In December of 1960 it was shown to Century 21's officials. They immediately agreed that this, precisely, was what Seattle needed. It combined drama, imagination and grace with a sound commercial concept.

PIE IN THE SKY

During the early stages when the project was still only a dream it was kept a closely-guarded secret. Other than Graham's staff, only top officials at the World's Fair and a few businessmen knew about it. Inasmuch as the Needle would be a lasting attraction to the city long after the Exposition closed its gate, the first approach for financing was to the County Board of Commissioners.

When it became apparent there would be no opportunity for municipal or public financing, Gandy began a search for someone to pull a privately-financed project together. His quest led to C. Bagley Wright, Jr., an energetic 32-year-old Seattle businessman.

Wright discussed the project with a small group of Seattle business leaders including D. E. Skinner, the Fair's vice-president, who had sparked the difficult underwriting campaign for the entire exposition, and Allen H. Link, representing the Norton Clapp Enterprises. Enthusiasm for the project was high. The men conceded the project was a sound business venture as well as one that would be beneficial to the city and region. With Wright calling the signals the private investors, including Graham and Howard S. Wright, whose construction firm is building the tower, formed the Space Needle Corporation. The five men guaranteed a loan, local banks provided the capital and the corporation set to work.

A permanent 120-foot by 120-foot plot in the fairgrounds was secured from the city; soil and wind-tunnel tests were made; Carlson's Western Hotels, Inc. agreed to operate the restaurant; and on May 22, 1961 -- almost two years to the day since Graham's first meeting -- the first concrete was poured for the foundation. By this time Earle Duff's rendering had been reproduced by Century 21 in a dramatic colored poster and had appeared in newspapers throughout the world.

Said Joe Gandy on returning from one of his many trips abroad: "I've covered forty countries and the one thing that has identified us throughout the world is this tower."

RACE AGAINST TIME AND WEATHER

Once the foundation was poured, the job of building the steel structure in the five months allotted in the Graham timetable was a Herculean task. Says Alfred Fast, project architect on the Needle, "The time schedule was kept because everybody was enthusiastic -- from top executives at U. S. Steel down to the ironworkers who hoisted huge girders in winds that sometimes whipped the steel cables like a thin fishing line. Everyone had that feeling that he was participating in a unique venture and that his job was THE important one."

Six days after the order for the special "A-36" steel was placed with U. S. Steel's Chicago plant, the 90-foot beams, weighing up to 27,000 pounds each, were on their way to Seattle on extra-long railroad gondolas.

Developed by the American Society for Testing Material, U. S. Steel's researchers had just put the new steel on the market. Graham specified its use because it provided 10% greater strength, permitted higher design stresses and additional factors of safety. The weight of the structural steel alone is 3,600 tons.

Seattle's Pacific Car & Foundry Co., sub-contractors for the steel fabrication and erection, welded the wide-flange, 36-inch beams flange-to-flange, stiffened them with diaphragms and curved those sections of the legs that formed the Needle's waist. The firm had to make a painstaking traffic survey just to get the trailers through downtown and to the fairgrounds.

Shortly after its three lofty pairs of legs began to emerge, the Needle became the talk of Seattle. Pacific Car & Foundry's construction boss, Paul Collop, was writing a weekly column about the Needle for the Seattle Times. The Seattle Post-Intelligencer and the Times ran a story or picture almost

daily. News about the Needle flooded the local airwaves. All Seattle followed the Needle's daily growth with the interest Brooklynites used to lavish on their beloved Dodgers. Residents living on the many hills ringing the Fairgrounds checked its progress daily through binoculars. Sidewalk superintendents and amateur photographers crowded the site and rumors and stories were spread at luncheon tables and cocktail parties.

The problem of how the structure would continue to grow skyward, once it got above the reach of the crane lifting the first steel sections into place, puzzled not only sidewalk superintendents but also Pacific Car & Foundry.

Their ingenious solution: a derrick crane that literally climbed its way up the inside of the Needle's core. It unfolded its boom, reached out and hoisted 50-foot sections of the tower which the welders and ironworkers fastened. Then the derrick hoisted itself up the completed section 50 feet in one jump and repeated its performance.

TURNTABLE

One of the misconceptions about the Needle is that the entire tophouse rotates. Actually, the portion that revolves is a 14-foot ring next to the windows, on which the tables are placed. The inside core, 66-1/2 feet in diameter, is stationary and is used for service and kitchens, elevator lobby, stairway, washrooms and a reception foyer.

Western Gear Corporation of Seattle whom Howard S. Wright Constructors, Inc. engaged to design, manufacture and install the complex turntable system, fabricated it in 24 sections in their Everett, Washington plant. Equipped with 48 anti-friction bearing rollers, the power is supplied by a one horse-power

electric motor which, by means of a reducer providing a reduction of 800:1, can deliver a force of 18,850 pounds to the turntable drive shaft. The moving portion of the floor rides on steel wheels and on tracks located near the inner and outer edges of the perimeter ring. With full flooring, furniture and guests, the rotating part will weigh about 90 tons. Yet so carefully balanced is the turntable that a man can easily start it rotating on its tracks by hand.

Graham made a series of rigid requirements for the turntable: it had to be free from vibration and noise, be economical to manufacture, require minimum maintenance and above all, be accurate in its movement. During shakedown tests in the Everett plant, prior to being installed in sections in the Needle, it functioned precisely as planned by the architects. A cigarette stood on its end, a half-dollar balanced on its edge and its timing had the precision of a fine electric clock.

EYE OF THE NEEDLE

Western Hotels, Inc., which will operate the Eye of the Needle, operates a number of properties in seven western states and in Canada, including the St. Francis and Sir Francis Drake in San Francisco. Its president is Edward E. Carlson, who headed the commission appointed by the Governor in 1955 to explore the feasibility of a world's fair in Seattle.

The most elevated restaurant in western United States, it will be a quality eating place of distinction and elegance in decor, design and cuisine to match its lofty location.

Its unusual height and its revolving ring present interesting problems

for its management. Since the elevators, at least for the duration of the Fair, carry some 1,430 persons an hour to the top, they are available to hoist "The Eye's" supplies only during the hours between midnight and ten a. m. Precision estimates of the day's needs and no last-minute deliveries face Jack Borg, Prague-born manager and his chef, Rene Scheiss, who had been preparing foods in leading restaurants of Europe for 12 years prior to becoming Sous Chef at Seattle's Olympic Hotel in 1959.

Conventional kitchen equipment is designed to fit rectangular rooms and some thirty plans were laid out and discarded before a plan that would fit the circular cooking area was evolved.

Another problem Borg had to anticipate would be the problem of waitresses locating their rotating guests. The solution: the restaurant is divided into four sections with a different hue predominating in the color scheme of each division. Entrances placed at either end of the kitchen will permit service to start at the beginning of the meal from one kitchen exit and continue for the latter half from the opposite exit.

Just above the restaurant-lounge level a mezzanine will provide extra area for food preparation, storage, dishwashing, office space and public rest rooms.

CARILLON

An additional aspect of the Space Needle is the world's largest carillon, containing 549 bells, which will be played in a small music room open to public view at the base of the Needle. Some 39 stentors, ranging from 19-1/2 inches to 54-1/2 inches in length, placed at the 200-foot level will peal out at intervals

throughout the day. Top American and European carillonners will be invited to perform and their renditions of classical and modern music will be able to be heard for a considerable distance.

Speaking about his creation, John Graham says, "The story of the Space Needle, from its original concept to the final completed structure, can't be credited to any single individual. It reflects the approach practiced by our firm for over sixty years: to bring into play a maximum of professional talents available and integrate them toward one common goal -- a handsome structure, that functions well, and makes money for its owners. The Space Needle, I like to think, will fulfill that goal."

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SPACE NEEDLE TO SYMBOLIZE SEATTLE WORLD'S FAIR

This graceful 550-foot "Space Needle" observation tower topped by a revolving restaurant will be the symbol and one of the dramatic attractions of Century 21 Exposition in Seattle in 1962. Designed by John Graham and Company, architectural and engineering firm of New York and Seattle, it will be a permanent structure and part of Seattle's future Civic Center. The 260-seat restaurant will revolve 360 degrees once every hour, providing diners with a spectacular panoramic view of the Olympic and Cascade Mountains, Seattle's many lakes and bays and the metropolitan area. The \$3,500,000 structure, located on the highest ground of the 74-acre exposition site, soars 730 feet above sea level and is believed to be the tallest building west of the Mississippi. High speed elevators will carry visitors to the restaurant and to an observation platform above it.

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