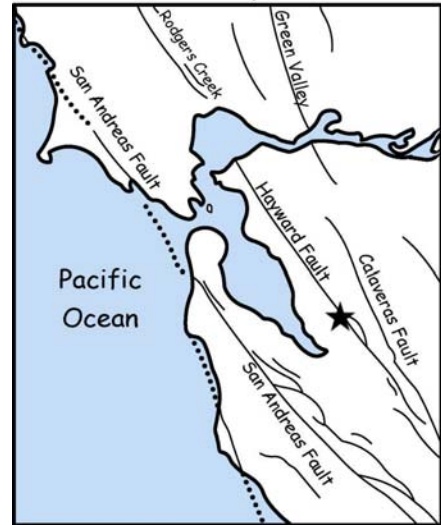


Fremont Earthquake Exhibit Toward a Permanent Trench and Earthquake Walk on the Hayward Fault, in Central Park, Fremont

*The Math Science Nucleus, a non profit organization is seeking funds to create a permanent earthquake exhibit at the **Children's Natural History Museum** in Fremont and to begin the engineering and design process of building an Earthquake Trench Exhibit along the Hayward Fault in Central Park, Fremont.*

October 21, 1868 was a day that people in the East Bay have long forgotten. At 7:53, a projected 7.0 on the Richter Scale, shook the San Francisco Bay area. The energy released was so great it had surface rupture from Berkeley to Fremont approximately 6.5 feet on the Hayward Fault. As we progressed into the 21st century, most people have forgotten the significant threat along the Hayward Fault in the East Bay. A recent U.S. Geological Survey study has shown that the Hayward fault is one of the most hazardous faults in the Bay Area. The Math Science Nucleus, a non profit organization headquartered in Fremont is providing the administrative leadership to create a permanent exhibit and trench over the next 3-5 years.



Star indicates the area for the permanent trench exhibit

The proposal (Phase I) seeks funds to develop a permanent exhibit at the Children's Natural History Museum in Fremont and hire a director. The director's main duties will be to secure the necessary permits and funds for a separate Earthquake Trench Exhibit and trail in Central Park, Fremont.

History of the Exhibit

The success of the first Fremont Earthquake Exhibit (The Hayward Fault Exposed, April – Oct, 2006) warrants developing a strategy for preserving the educational value of the trench. Over 23,000 people visited the exhibit mainly on weekends during a 26 week period. The 1906 Centennial Alliance first designed plans for a trench in Central Park to commemorate the 1906 San Francisco Earthquake. U.S. Geological Survey scientists took the lead in locating, designing, and excavating the exhibit. After financial problems, the Math Science Nucleus (a 25 year old non profit science education organization) with the aid of Robert Wieckowski, a Fremont councilperson located funds to extend the exhibit until the end of October. They developed educational materials, teacher information, and provided 50 free tours for bay area schools in September and October (<http://www.ms-nucleus.org/haywardfault/index.htm>). They developed a walking tour booklet that outlined the different features (e.g. offset curbs, compression ridges) from Tyson Lagoon to Stivers Lagoon (see map).



Area of walking Tour including Tyson Lagoon on the left, present site of Earthquake Exhibit and Stivers Lagoon on the right.

The typical reaction after visiting the exhibit was one of appreciation and fascination at the opportunity to see an earthquake fault and to receive up-to-date information on earthquakes. School children who visited were generally ‘wowed’ by the continuous fault creep. Seeing the offset curbs next to the exhibit make the children see the earth is ‘alive’ and active. Thinking about what happens during earthquakes, and why, sparked their interest and only enhances their inquiry of science.

GOAL

The Math Science Nucleus in cooperation with the City of Fremont and U.S. Geological Survey has concluded that a trench exhibit on the Hayward Fault is a spectacular way of illustrating the power of earthquakes. The educational value to school groups and the general public is high and of interest to the Math Science Nucleus. They manage a 17 acre **Tule Ponds at Tyson Lagoon Wetland Center** (created by Hayward Fault) and **Children’s Natural History Museum** which highlights the Pleistocene fossils in Irvington District (unearthed by the Hayward Fault). We are proposing a two phase project to create the only public trench exhibit in the United States over the next 3-5 years.

The first phase will create a dynamic hands-on earthquake exhibit at the Children’s Natural History Museum in Fremont. The museum is 2 miles from Central Park, but centrally located in Fremont on an acre of land. A director for the project will be hired to coordinate efforts to

design and implement a permanent trench exhibit in Central Park and work with the City of Fremont and other agencies to make this separate exhibit a long term success.

The second phase will build the exhibit and create a 2 mile earthquake walk from the Fremont BART station to Stivers Lagoon. Informational kiosks or markers and a “yellow brick road” of earthquake facts could allow visitors to take an exciting and educational tour of the Hayward Fault’s surface features in Central Park. Visitors would visually see the effects of fault movement and the tours would include preparedness information. Several tours will be created to highlight the trench and to attract visitors from around the area.



*The first Fremont Earthquake Exhibit
(The Hayward Fault Exposed!)*

Why create a permanent Fremont Earthquake Exhibit?

- It would be the only exhibit in the United States that enables visitors to see an earthquake fault below the surface and in three dimensions.
- An exhibit could allow residents to locate where their house is from the fault trace
- The exhibit works to debunk many common myths and reminds people that earthquakes cause disasters but also created our area’s scenic beauty.
- Earthquakes fascinate but can frighten. The exhibit encourages visitors to be prepared, not just scared.
- Educators from University to K-12 schools can take field trips to show how urban landscapes are affected by faults.

Phase I.

A permanent earthquake exhibit at the **Children’s Natural History Museum** in Fremont will highlight how the Hayward Fault created the landscape. Key to the exhibit will be interactive displays where people will be able to locate their house and find out any information about how the fault dissects the East Bay. There will also be a working seismograph and shaking tables to provide museum visitors with palpable experiences. The Natural History Museum is only 3 years old, but has conducted over 150 classes for local school groups in the last year along. This exhibit will help interested people learn about the importance of learning about earthquakes, and will be geared for school children. We are hoping this display will bring in more people as they can learn how to find how the faults in the bay area can affect their lives.

1. Creation of an **Earthquake Hall** at the Children’s Natural History Museum in Fremont (about 1000 square ft). These exhibits will focus on the Hayward Fault in the East Bay and its effect on the landscape and safety. It will tie in the other exhibits in the museum especially

since the Hayward Fault is responsible for unearthing the Ice Age fossils that are highlighted in the museum. This may include a geologic table that is computerized so visitors can find their home and locate geologic features plus many other landmarks (\$50,000.00 Tilty Table). This hall will also look at the different hazards that can be found. We may have a mock playhouse that has gone through different disasters. A donor can request we name this hall if get their name associated with the hall. **Estimated cost: \$50,000 - \$100,000.00**

2. Tour guides and free field trips during the first year for 50 classes (approximately \$150.00 per class (\$7500.00). Written materials and teacher workshop to prepare the local community for the exhibit will be created (\$5500.00). After a year this will be offered as a separate field trip. **Estimated cost:\$14,000.00**

3. Hire an **Earthquake Director** who would mainly work on the plans and exhibit at Central Park would oversee implementation, walk and guide, fund raising, development of partners and work with Earthquake committee, oversee design competition, plan meetings, develop strategies for sustainability, work with City of Fremont, investigate the management of Trench exhibit in Central Park; report to a steering committee of local and government officials (\$50-60,000.00 per year + benefits). **Estimated cost: \$80,000.00**

4. Working with U.S. Geological Survey, California Geological Survey, and independent scientists to determine the best place (geologically) to erect a permanent exhibit. This would include the area just to the northwest of the present exhibit, which might be more desirable to the city. This may include 5 trenches at \$1000 each; staff time of \$10,000. USGS staff time is donated. **Estimated cost: \$15,000.00**

5. Engineering plans for permanent exhibit (\$20,000 - \$25,000) (for geotechnical firm) and \$30,000 - \$40,000 for architectural plans with city approval; MSN staff time to work with engineering and design groups \$10,000.00; city staff time to work with engineers \$5,000.00. We may use some of these funds for a design competition with engineering students. We would do this in coordination with Pacific Earthquake Engineer Research Center (PEER), which have done similar competitions in the past. However, we have to determine the logistics of this exhibit which will be unique, so a competition may not be realistic. **Estimated cost: \$50,000.00**

Total funds needed for planning for the Earthquake Trench Exhibit. - Total: \$209,000.00 - \$259,000.00

Phase II.

The cost of Phase II would be determined by the preliminary study of Phase I. There may be unforeseen circumstances where a permanent exhibit on a fault may not be possible. A potentially significant impediment is current restriction of the state's Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code 2621, that prevents new buildings that straddle active faults. However, since this law was written in the 1970's, engineers have developed new designs that can accommodate sudden fault offsets as well as creep, however, the law as written may not allow such newer designs. A change in state law may be required to allow

consideration of a proposed roof over the fault. This could be a simple "fix" if carefully crafted. The Seismic Safety Commission sponsored the latest amendments to this law that encourage retrofits of collapse-risk buildings in A-P Zones without triggering trenching. California Geologic Survey (CGS) is the primary regulatory agency. Early consultation with them will help expedite a mutually acceptable solution. Other opportunities may also surface during Phase I. The Earthquake Trench Exhibit will be geared for the public.

1. Kiosk and trail. Because the kiosk and markers will be custom-made, a cost may range from \$10,000 - \$100,000 depending on the size and whether it includes virtual components and how many. We need to work with the city staff to determine funds for permitting whether we need sidewalks around the area; change of sprinkling system, and other engineering details. Staff time about \$10,000; permits and city staff time \$5,000.
Total budget: **\$115,000**

2. Education Materials and Tour development. A tour will be developed from Tule Ponds at Tyson Lagoon Wetland Center (a 17 acre Alameda County owned facility that the Math Science Nucleus manages) to Stivers Lagoon (part of Central Park). This represents over 2 miles of features that can be divided into several components. Field trips would be free to school groups (about 100), for the first year, educational presentations to funders, local agencies, etc (1 year salary part time –full time + benefits \$25,000 - \$62,000 per year)
Total **\$62,000.00**

3. Earthquake Trench Exhibit. This exhibit will be a permanent area where people can walk down into a trench and see the offset of the Hayward Fault. There will be exhibits and information to help guide the visitor to learn about the faults in the Bay Area and what they mean. Since Central Park is only ¼ mile from the Fremont BART Station it is easily accessed from around the Bay area. Tule Ponds at Tyson Lagoon could be a starting point of a walking tour and it is 100 feet from the BART with a 1000 square foot classroom. One of the proposed areas is near a small conference facility (Teen Center) that could be used for special talks or celebrations. There is ample parking in the area. Alameda County Main Library is only 200 feet from the desired sight and could also host meetings. Phase I will determine the scope and cost of this exhibit and trail with informational kiosk. The Earthquake Director will be working with city staff and regional governments to see how this exhibit can help bring a continuous message of preparedness for years to come. The design will have to be accepted by the City and long term maintenance and revenue generating activities will also be developed.
Possible range of cost: (simple open air, covered but gated: \$150,000.00 to enclosed with climate control with exhibits (separate museum) (\$2-\$5 million).