Amsterdam Airport Schiphol
“Create a Barrier of Silence”
Design Contest

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spf:architects

TRB Committee ADC40 Summer Meeting
Dayton, Ohio
July 2009
2002: 84 ground noise complaints
2003: Runway 18R-36L ("Polder Runway") opens
2004: 5,257 ground noise complaints
Complaints led to preliminary investigation (2004 – 2006)

- 2003 Environmental Impact Report for the new runway had underestimated or not anticipated the degree of annoyance and complaints

- 2004 investigation “to determine the cause of the nuisance, to acquire an insight into its extent and to analyze possible limiting measures”
  - Conducted by Wyle, TNO, and NLR
  - Monitored by technical supervision group (SHP, residents, municipality)

- Results (Feb. 2006):
  - Transfer of ground vibrations too weak to produce observable vibration levels
  - Airborne sound transfer path may produce nuisance under favorable propagation conditions
  - Confirmed primary cause of nuisance was low frequencies typical of aircraft ground noise
  - Identified goal of 5 to 10 dB reduction at 31.5 Hz
Design contest announced (March 2008)

- Two phases:
  - Phase 1: rough plans submitted (2 months)
  - Phase 2: shortlisted applicants develop preliminary designs (4 months)

- Prizes
  - Grand prize €750,000
  - Two additional prizes of €250,000 each
Design Criteria

1. **Improve quality of life in Hoofddorp-Nord by reducing LFN by 7 dB.**
2. Allow the design to interact with the landscape in a way that will improve the quality of life in the Haarlemmermeer polder.
3. Create a landmark for the international “hub of sustainability.”
4. Create an idea that accentuates the innovative power of Amsterdam Airport Schiphol.
5. Think beyond the boundaries of possibility, go beyond your imagination and create a unique landmark in a unique area.
6. Make it profitable.
7. Create a design that fits the requirements of an international airport.
8. Meet legal standards and requirements.
9. Create a design that can be realized in 18 months.
10. Combine function and design in a unique design which will achieve more than just sound reduction.
60-ha Project Area
(1,300 x 2,000 x 375 m)

Hoofddorp

Runway 18R-36L

1,700 m

Basemap: Google Earth
ICAO Development Restrictions

Space and height restrictions for take-off and landing
Phase 1 Submittal: **Arrivals**

Image: **spf:architects**
Phase 1 Submittal: Departures

Image: spf:architects

Hoofddorp
Phase 1 Submittal: Departures

Image: spf:architects
Phase 1 Submittal: Departures

Image: spf:architects
How to Move a Noise Barrier

Concept: Uni-Systems
Images: spf:architects
Phase 1 design concept presented by SPF architects

- Nine 12.5-meter high retractable noise barriers
- Recycled tires
- Landscaped terraces between barriers
- Wind turbines
- LED lighting on ends of barriers
Shortlisted! Now what?

- 97 entries from 17 countries around the world, including China, Japan, New Zealand, the United States and several European countries.
- Four months for preliminary design; Phase 2 submittals due December 2008.
- Further acoustical design to optimize performance led to revised design concept.
Phase 2 Submittal: Arrivals

Image: spf:architects
Phase 2 Submittal: Departures

Image: spf:architects
Phase 2 Submittal: Departures

Image: spf:architects
Phase 2 Acoustical Analysis

- Barrier effect (diffraction)
- Horizontal flanking
- Transmission loss
- Resonances
- Standing waves
**Improve quality of life in Hoofddorp-Nord by reducing LFN by 7 dB**

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Create a landmark for the international “hub of sustainability.”
Create an idea that accentuates the innovative power of Amsterdam Airport Schiphol.

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Image: spf:architects
Allow the design to interact with the landscape in a way that will improve the quality of life in the Haarlemmermeerpoeder.

Image: spf:architects
Combine function and design in a unique design which will achieve more than just sound reduction.

Image: spf:architects
Phase 2 Winner, January 2009

Ecobarrier
by Toine van Goethem

“Of all entries, the Ecobarrier achieved the highest scores in terms of sustainability, innovation and noise reduction.”