TEMPLATE FOR PROPOSING NEW MARS SCIENCE LABORATORY LANDING SITES. M. Golombek[1] and J. Grant[2], [1]Jet Propulsion Laboratory, Caltech, Pasadena CA 91109, mgolombek@jpl.nasa.gov, [2]Smithsonian Institution, National Air and Space Museum, Washington, DC 20560, grantj@si.edu

REPLACE WITH THE TITLE OF YOUR ABSTRACT. A. B. Author[1] and C. D. Author[2], [1]Affiliation (include full mailing address and e-mail address if desired) for first author, [2]Affiliation for second author (full mailing address and e-mail address).

Introduction: Provide a short summary of the science and engineering merit of the candidate site along with any supporting references that can be provided. Give detailed location information (latitude, longitude of center of proposed landing ellipse) and state whether site is "go to". Include a figure with the proposed ellipse (see below) and the areas of prime science interest and their priority. Background on the landing site selection process and the workshops and the final 4 landing sites being considered for the Mars Science Laboratory can be found at [1] and [2].

Science Merit Related to MSL Objectives: A description of how the proposed landing site potentially satisfies MSL science criteria should be provided. More specifically, comments should include discussion (as is possible) of whether there are multiple rock units present of diverse morphology and mineralogy that display systematic trends and clear stratigraphy and cross-cutting relations (diversity). A statement regarding the geologic framework and chronology of the site and whether it will likely enable placement of MSL observations into regional context should be included (geologic context). Any mineralogical or geomorphic evidence for habitability or indicators of amount, nature, and duration or water are important (habitability). Finally, a comment on the environment and timing of target minerals relative to evolution of surface forms is needed (preservation potential). Information supporting the key interpretations of the site should be included. A presentation with more description of these science criteria can be found at [3].

Engineering Constraints: Engineering constraints on potential landing sites are described in [4] and have remained largely unchanged by the launch in 2011. Most of the constraints listed in Table 3.3 of that document related to terrain relief and slopes, rock height, radar reflectivity, load bearing surface, and winds remain unchanged. However important changes have occurred with regard to latitude, elevation and ellipse size that bear on any new sites. In general, any new site must be as safe as existing landing sites, which bounds the latitude and elevation to be within those of the final 4 MSL landing sites currently under consideration [5].

Latitude. The final 4 MSL landing sites currently under consideration [5] effectively limit the latitude of any new landing sites. The northernmost landing site under consideration is Mawrth Vallis at 24°N. The southernmost landing site under consideration is Holden crater at 26.4°S. As a result, any new site must be within 25°N and 27°S.

Elevation. Simulations of landing at the seven sites under consideration prior to the last down-selection, effectively limit the elevation of any new sites. The highest site considered was Nili Fossae trough at -0.6 km with respect to the MOLA geoid. Entry, descent and landing simulations show no timeline margin and issues with deploying the parachute at high mach number leading some entry, descent, and landing project review board members to judge this site to be unacceptably risky. From these analyses it is anticipated that surfaces below about -1 km can be considered for any potential new MSL landing sites.

Ellipse Size. Detailed landing simulations with entry appropriate for the 2011 opportunity are still being run by the project so specific ellipse geometries for different latitudes are being worked. However, enough margin is expected in the azimuth and size that definition of an ellipse that is 25 km long by 20 km wide oriented east-west should be sufficient for new ellipses.

Table 1: Engineering constraints on potential new MSL landing sites different from [4]

Engineering Parameter	**Requirement**
Latitude	25°N to 27°S
Elevation	<-1 km MOLA
Ellipse Size	25 km by 20 km oriented east-west

Information Required for Potential New Landing Sites: In order to review, evaluate, and obtain information on potential new landing sites, certain standard information will be needed.

Landing Ellipse: A visual image or map showing the landing site is required. Figure 1 shows an example on a MOLA topography and shaded relief map. The image background could be any easily obtainable image such as MOLA shaded relief, THEMIS thermal, HRSC, CTX or other image base. The ellipse must be 25 km by 20 km oriented east-west and the center latitude and longitude must be provided (preferably in

MOLA planetocentric coordinates). Areas of science interest in and around the ellipse should also be designated on the image. Also a table (Table 2) that includes the name of the site, the ellipse center coordinates, site elevation, the prime science targets, and the distance and priority of the prime science targets from the center of the ellipse. In general, the surface of any proposed landing site must appear smooth and flat throughout the ellipse in available images and topographic maps. While we do not expect detailed analysis of potential hazards in the ellipse by site proposers, we would like to be made aware of any potential hazards that are discovered by the proposer.

Table 2: Example table required for any landing site proposed.

Site Name	Ares
Center Coordinates Latitude, longitude	Between 25°N and 27°S XX.XX°N or S, XXX.XX°E
Elevation	<-1.00 km
Prime Science Targets	Smectites [Highest Priority] Layered materials Channels [Lowest Priority]
Distance of Science Targets from Ellipse Center	Smectites – 13 km to W Layers – 8 km to NW Channels – 3 km to E

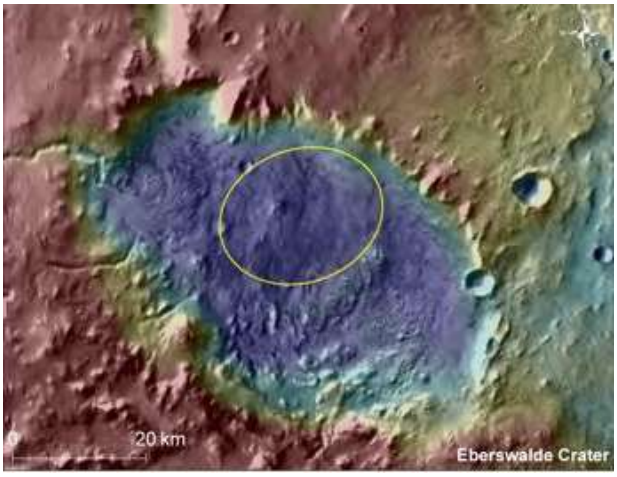

Figure 1: Example 25 km by 20 km ellipse on MOLA shaded relief topography at Eberswalde crater. The ellipse is centered at 23.86°S, 326.73°E at an elevation of -1.45 km with respect to the geoid in MOLA planetocentric coordinates. The prime science targets are phyllosilicates within the ellipse associated with a delta just to the west of the ellipse.

References: Use the brief numbered style common in many abstracts, e.g., [1], [2], etc. References should then appear in numerical order in the reference list, and should use the following abbreviated style:

[1] Author A. B. and Author C. D. (1997) *JGR, 90,* 1151–1154. [2] Author E. F. et al. (1997) *Meteoritics & Planet. Sci., 32,* A74. [3] Author G. H. (1996) *LPS XXVII,* 1344–1345. [4] Author I. J. (2002) *LPS XXXIII,* Abstract #1402.

[1] http://marsoweb.nas.nasa.gov/landingsites/ [2] http://webgis.wr.usgs.gov/msl/ [3] J. Grotzinger, MSL Science Goals and Site Evaluation Criteria at http://marsoweb.nas.nasa.gov/landingsites/msl2009/workshops/3rd_workshop/program.html [4] MSL Landing Site Selection User's Guide to Engineering Constraints at http://marsoweb.nas.nasa.gov/landingsites/msl/memoranda/MSL_Eng_User_Guide_v4.5.1.pdf [5] M. Golombek et al., Selection of Four Landing Sites for the Mars Science Laboratory, Lunar and Planetary Science XL, Abstract #1404, Lunar and Planetary Institute, Houston (CD-ROM) at http://marsoweb.nas.nasa.gov/landingsites/msl2009/memoranda/MSL_Site_Selection_March2009.pdf