GEOLOGICAL REPORT

FOR

YEURALBA MINING N. L.

Prepared by

A-Z Geological Consultants Pty. Ltd.

C O N T E N T S

THE YEURALBA WOLFRAM DEPOSIT

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I. Introduction

The wolfram bearing rocks of the Yeuralba valley were mapped in detail over a period of approximately 3 weeks. Air photo enlargements at a scale of approximately 100 ft. to 1 inch were used for location and recording of outcrop data.

The wolfram had previously been recorded as both wolframite and scheelite, both are found as disseminated crystals but the wolframite is also recorded in joints and as 'cobs' or massive segregations of wolframite and tourmaline.

The author interprets the wolfram bearing rock as a lode formed directly from the crystallization of an emplaced hydrous magma. In this (and in other features) his interpretation differs from that of previous workers. (Hossfield, Walpole and Drew, MacKay). The rock making up the lode is a wolfram bearing micaceous quartz aplite without feldspar. The mica is a green variety of muscovite (probably gilberite, J. Taylor pers.comm.).

The magma of the lode was a late differentiate of the Yeuralba Granite, which was squirted upward along the granite contact. It formed a composite sill of several separate tongues.

The attitude of the lode was determined with sufficient confidence for inferred reserves of the mica-quartz aplite to be estimated. In the absence of useful grade information these are not ore reserves, and the structural interpretation needs to be confirmed by drilling. Reserves to the point where an

overburden ratio of 2 : 1 is reached are as follows:

not in EL 4903	Gates Hill	..	18,200,000 tons
" " "	O'Sullivan's Hill	..	2,750,000 tons
Eastern margin of EL 4903	Black Cat to Black Diamond	..	1,450,000 tons
	Total	..	22,400,000 tons

II. Geography, Geomorphology and Hydrology

The Yeuralba valley lies 33 miles NE of Katherine. Road access is by a 60 mile route through Mauranboy. The valley is cut out of a plateau whose surface is probably the early Tertiary "Australian surface" (King). The plateau surface is lateritised.

On the east and south sides of the valley, the plateau is developed on a thin sequence of the Cretaceous Mullaman Beds, and the edge is commonly cliffed. The core of the valley is a plain developed on the Yeuralba granite. This plain is largely a pediment studded with residual bouldery hills and groups of tors. A smaller part of the plain is alluvial. The west and north sides of the valley are enclosed by a ridge of Burrell Creek formation sediments which have been hardened by thermal metamorphism near the granite contact. Yeuralba Creek breaches this contact zone between Gates and O'Sullivan's hills. The road to the Katherine river follows a narrow strip of granite plain to the east of O'Sullivan's Hill.

The lode is resistant to erosion and forms a secondary ridge or bench inside the contact zone. The lode outcrops boldly at Gates' Hill, O'Sullivan's and Black Cat at the crest

of a ridge. Southwards from Black Cat the lode outcrops mostly as a degraded cliff on the side of the valley. The upper contact of the lode is a plane of weakness often occupied by a gully. Notably the Back gully at Gates, the Black Cat gully and another at Southern Cross.

A very odd topographic feature is the bench which occurs most prominently on Gates' and O'Sullivan's Hills. The bench is underlain by swelling clay (presumably montmorillonite) derived from the complete alteration of a dyke (presumably a dolerite). Rubble is shifted over the dyke by soil heaving, which is effective at a low slope angle. On the other rock types mass wasting by gravity slippage occurs, and this process is effective only at higher slope angles.

Both hillsides and gullies throughout the valley are mantled with talus and gully-wash of considerable thickness. This cover made mapping of the geology rather difficult. The gully-wash provided the gougers with much of their ore production in easily winnable form.

The debris mantle has accumulated in response to a change in climatic regime from one in which clear, concave slopes were stable to the present climate where talus mantled, uniform slopes are stable. Most probably the former climate was drier than the present one.

The rubble consists mainly of the locally most resistant rock type, and along the east side of the valley this is the lode.

There is perhaps 250,000 tons of the lode present as talus, but since it has been subject to leaching it may be not of economic value.

The rubble has developed largely at the expense of the more prominent cliffs which existed under the previous climatic regime. The relict cliffs are much degraded. The base of the lode is almost always buried south from Black Colt.

Running water was observed in several places in the valley, always in association with springs. One spring next to the remains of a camp is fed from alluvium, all the others drain from the Mullaman Beds through fissures in the granite.

The springs, or more particularly, the Mullaman Beds may prove the most economic water supply for a processing plant. The springs appear to be permanent, but local rumours say that they do dry up. Transpiration from the trees along the gullies accounts for all the water discharged from the springs.

Drilling prospects for water are most favourable in the Yeuralba granite and the Mullaman Beds.

III. Stratigraphy

The rock sequence and events are tabled below:

Quaternary	talus, gully wash, alluvium.
Tertiary	laterite, including breccia associated with the dolerite dyke.
Cretaceous	Mullaman beds.
(sub Cretaceous)	kaolinised rocks below Mullaman beds (possibly caused by Tertiary laterization)
Precambrian	"dolerite" dyke
Yeuralba granite and its differentiates and alteration products	tourmaline quartz rock and associated metasomatic alteration products.
	mica greisen and alteration products
	quartz aplite lode
	Yeuralba granite

Burrell Creek Formation

The Burrell Creek formation forms the country rock into which the Yeuralba granite has been emplaced. The formation is a uniform succession of purplish brown siltstone and fine grained greywacke with bedding planes 3" to 1 foot apart, in the main. It is moderately to strongly folded but has no slaty cleavage.

The Yeuralba Granite

The granite forms an intrusive boss penetrating the Burrell Creek formation. The core of the boss is a normal

granite. The margin of the granite contains granophyre, microgranite and a little porphyry,(all these are much altered to greisen, etc.). The margin of the granite is for the most part regular but sections of stepped contact and various bulges do occur. The contact is frequently conformable with the bedding of the Burrell Creek Formation.

The Wolfram Lode

The rock is a wolfram-bearing micaceous quartz aplite. Its magmatic origin is attested by its texture and included blocks of wall material plucked out during emplacement of the lode. Several separate "blister like" sill intrusions are present. These are sometimes superimposed. Early intrusions tend to be thinner and more properly sills. Later intrusions were evidently more viscous, they have strongly convex lateral boundaries. In composition the later intrusions are lower in 'muscovite' and richer in wolfram. The lode normally lies strictly on the granite contact, but sometimes projections of the granite boss are cut through, the lode taking a less irregular path. The shale block at the north of Gates' Hill is thought to separate two individual sills.

The Greisens

The basic types present are as follows:

(a) Well crystallized mica-quartz greisen

This occurs in lenses, always close to the lode mainly in the area south from Gates' Hill to Black Cat south. (It may actually be part of the lode).

(b) Aphanitic mica-quartz greisen

The rock is a normal greisen with relict textures inherited from the granite. The thickness is irregular, with lobes projecting into the granite particularly where quartz tourmaline bodies are common. The greisen forms a complete mantle around the granite.

(c) Quartz-tourmaline rock

The rock is most commonly a joint controlled replacement of the greisen, though the lode (south of the mapped area, particularly) and the Burrell Creek formation are also affected. The bars of quartz tourmaline rock generally have NW strike and near vertical dip.

(d) Tourmalinized greisen

This rock is an alteration of the aphanitic mica greisen occurring mainly south of the 'Southern Cross' workings, as a thin rim immediately below the lode on the Burrell Creek formation contact.

(e) The "dolerite" dyke

(e) The "dolerite" dyke

The dyke is close to vertical in dip and trends NE. It cuts across the lode isolating Gates and the western section of O'Sullivan's Hill.

(f) Kaolinised zone

A zone of altered Yeuralba granite and Burrell Creek formation up to 50' thick, occurring immediately below the Mullaman beds. It is most prominent in the Yeuralba jump-up area. The outcrop is frequently marked by stands of lancewood. The alteration could be either Cretaceous (connected with the Mullaman beds) or Tertiary (connected with lateritization).

(g) Mullaman Beds

The sequence in this area is less than 50 feet thick, and the upper surface may be close to the depositional surface. The upper unit is porcellanite riddled with anastomosing tubes, an intermediate unit comprises lenses of well bedded siltstone. The lower unit is sandstone and sandy siltstone with some conglomerate lenses at the base.

Fossils are present in a fine grained silty sandstone which appears to be a beach deposit surrounding the 'fossil island' of the contact-altered Burrell Creek formation.

CEC's fossil Creek?

(h) Laterite

Clay pipe structures diagnostic of mottled zone material occurs on the plateau surface on the Mullaman Beds. Ferruginous material (laterite proper) is scarce. It is formed along the drainage lines of the plateau surface, and exposed in the east cliffs of the Yeuralba Valley.

An interesting occurrence of laterite is in Allwich's workings, where a dyke of lateritized breccia cuts the lode. The breccia contains fragments of Burrell Creek sediments and is also wolfram bearing. It was originally a branch of the dolerite dyke which was altered to swelling clay. The swelling and contracting action of the clay allowed surface detritus to fall into the body of the clay mass. Under lateritic weathering the montmorillonite clay was converted to the non-swelling variety, kaolinite.

A similar breccia occurs at the edge of the main dyke at the hill of greisen east of the road south of Gates Hill.

(i) Superficial deposits

(a) Alluvium -
clay-sand mixtures with some gravel
mapped along the major creeks.

(b) Gully-wash (eluvium)

not distinguished in mapping.

(c) Talus

not distinguished in mapping. Occurs immediately over the steeper hillsides. (See section on geomorphology).

Non outcropping areas on the pediments have residual soil cover.

IV. Petrology

Yeuralba granite

The main body of the granite is coarse grained, equiangular biotite granite. Isolated balls of quartz-tourmaline intergrowth are common. The marginal rocks appear to have been similar in mineralogy, except perhaps for the "granophyre" which is characterised by pegmatite like blobs of muscovite/kaolin pseudomorphs (after feldspar) in spots 3 cm. across in a fine grained matrix. All this rock type is now altered to greisen.

Wolfram lode

The nature of the rock changes with the thickness of the outcrop, and also with degree of alteration. The earliest phase of the lode consists of feldspar-free micaceous quartz aplite with green muscovite >10% and apparently free of wolfram. (At any rate this rock was not worked by the gougers). The

later, thicker bodies of the lode are wolfram bearing, micaceous, feldspar free quartz aplite with the content of green muscovite <10%. The quartz in this rock is most commonly medium grained (2 mm.) but some parts are cemented by large crystals which have poikilitically enclosed the normal saccharoidal quartz. In parts of the lode fragments of the wall rocks are incorporated as a breccia, most notably near Yeuralba Creek at Black Diamond and next to the southern shale block at Gates Hill. The larger bodies at Black Cat and Gates have a distinct foliation. The foliation normally is not parallel to the walls of the intrusion. The foliation takes the form of a rough parting with spacing between surfaces of 1 - 2 cm. It is considered to be a force-field marker perpendicular to the maximum stress direction, like a tectonic cleavage.

Wolframite and scheelite are present in the foliated and/or granular parts of the lode as small disseminated crystals, from 0.1 - 5 mm. across; along joint planes larger crystals up to 5 cm. long are common.

Parts of the lode consist of "spotted dog ore", in which cobs of wolframite and tourmaline up to 1 foot across are associated with barren quartz hornfels and wolframite-free cobs of tourmaline. Most tourmaline is associated with an unidentified

yellow translucent mineral thought to be a sericite replacement of topaz. The spotted dog sections of the lode appear to be an alteration of the saccharoidal quartz aplite in response to the introduction of tourmaline. It is suspected that wolfram was lost during recrystallization to spotted dog ore.

Some of the cobs with wolframite could be part of the original saccharoidal quartz aplite.

The greisens

The well crystallized greisens contain green muscovite and quartz in equal proportions, grainsize is approx. 1 mm. The normal greisen shows relict textures throughout. The tourmaline in the quartz tourmaline rocks is diffused in "dotted lines" through pure quartz hornfels. Massive cobs of tourmaline occur also, and these are mostly surrounded by a rim of tourmaline free quartz hornfels. The tourmalinized greisen is normal but for golf ball sized balls of intergrown quartz and tourmaline.

V. Structure

In outline the granite intrusion is post tectonic (is later than the folding of the Burrell Creek Formation). Wholesale rotation of the area may have taken place prior to the intrusion of the dolerite dyke which appears to be at or close to its original attitude. Later rocks (Mullaman Beds)

are flat lying.

The primary control on the lode is the granite contact. The lode follows many of the non planar irregularities of this surface, however, over most of the lode plane, parallel upper and lower surfaces are approximately true. By use of multiple cross sections and the sparse dip information it usually proved possible to confine the overall dip of the surface to a range of 10°. Values of the dip are: O'Sullivan's ? 60° - 80° (not certain), Gates 45°, Black Cat 30°, Black Diamond 20°. The dip becomes shallower from north to south.

Converse upper surfaces are primary features formed as the lode was emplaced. A fine example is seen in the western lode of O'Sullivan's hill. The faults in the Gates - O'Sullivan area and the foliation are more difficult to explain. The author's current hypothesis is that the foliation is caused by concentric shear in surfaces perpendicular to the principal stress direction, this stress being the direction of outward expansion of the granite (and this may have been vertical). The dynamics of the process are easier to visualise if the map is thought of as a cross section, with N.30° W. as up. The granite may have been rotated since but this is not necessary to the hypothesis.

Early in the period of lode intrusion, the expansion of the interior of the granite brought about tension in the plane of the granite contact which was released by the inward

rifting of the block represented by the west section of O'Sullivan's Hill. Subsequent intrusions of lode bypassed the rifted block, since the pressure was less in the zone on either side of the rift block.

After the lode was solid, further expansion of the granite core was accommodated by marginal outthrusts (possibly upthrusts) of the solid granite margin. These faults are the system which crosses Gates Hill.

VI. Origin of the lode

The magma for the lode was sweated out of the granite as the granite solidified. It migrated out of the granite along joints which later in the cooling history of the granite, conveyed the boron vapours which caused tourmalinization of the surrounding rock. The granite-shale contact was the only structural surface available where the magma could accumulate, and it built up as blisters on this surface and migrated upward, lifting off the Burrell Creek formation, and developing along diapiric tongues of lode upward from the root zone. The earlier intrusions were fluid and formed sills, the later intrusions were more viscous, and formed bodies more strictly tongue shaped on the granite contact. These either displaced the earlier lode material or formed another intrusion on top of it. The viscous lode magma was more particular about structural control, favouring most strongly the corner of the contact wall represented by the Gates Hill area, which probably

magmatic plucking stoping?

received more than one and possibly three intrusions of the viscous lode magma. The magma plucked out bits of the wall rocks, which tended to settle out against the granite (greisen) wall. At the north end of Gates a large block of shale appears to be the roof of a first viscous intrusion isolated by the intrusion of a second. The early micaceous, sill type intrusions appear to lack wolframite.

VII. Lode Reserve Estimation

The quantity of wolfram bearing feldspar-free micaceous quartz aplite has been determined by use of multiple cross sections to determine the most probable dip and thickness of the lode in conjunction with outcrop and dip information. Structure contour methods have been used to give best results for cross sections where the contact is known to be stepped. The lode is assumed to persist uniformly down dip. It has been assumed that the pitch of ore shoots is 90^{o} on the granite contact, but there are some hints from surface outcrop that pitches to the south of no less than 40^{o} may be present south of Black Cat. It is not expected that this would make much difference to the estimates. In the area south from Black Cat, thin, mica rich and apparently wolfram-free areas not worked by the gougers have been excluded from the estimates.

In the absence of reliable and systematic information on grades, the following estimates can only be considered as inferred reserves of favourable host rock and not as ore reserves.

Indirect evidence favours the deposits from Black Cat to Black Diamond as being ore grade (0.2% or better), since they have been generally worked by gougers. Results from 60 lb. grab samples given in Walpole and Drew are favourable but suspect (0.45% at Black Diamond, 0.85% at Gates). At Gates particularly the admittedly leached surface outcrops appear to be poor in wolframite and suspicion remains that their sample came exclusively from the rich Allwich's workings, and are generally selective and not representative samples.

Gates Hill has few workings but some wolframite can generally be seen in outcrop. O'Sullivan's Hill has no workings and surface outcrops of wolframite are rare. Scheelite is almost impossible to observe in hand specimen in ordinary light.

The tonnage estimate is based on an assumed density of 2.75, based on an assumed dense rock of modal composition 90% quartz S.G. 2.7, 10% low density muscovite S.G. 2.76 - (2.8) - 3.0 and 0.5% wolframite S.G. 7.0 - 7.5.

The following inferred estimates of wolfram bearing quartz aplite (not ore, since grade determination is not available and not indicated reserves, since firm structural control is lacking also) are based on the assumption that recoverable reserves extend to the point where the overburden ratio is 2 : 1. In the case of Gates Hill this assumption leads to a dangerous degree of extrapolation. The more dangerously inferred reserves are quoted separately (See diagramsopposite).

INFERRED TONNAGES OF LODE

GATES HILL (dip 45°)

			a	b	c	d	
Section	Lode thickness	Strike length	Above creek level	Creek level to 200' below creek level	Recoverable wedge below 200' to 400' point on base of lode	Extrapolated reserves beyond "c" to 21 overburden point	Total
1	140'	170'	35,400	543,000	277,500	171,500	1,027,500
3	150'	250'	321,400	565,000	282,500	424,000	1,593,000
6	200'	350'	577,000	1,516,000	758,000	2,280,000	5,431,000
8	300'	200'	638,000	1,276,000	638,000	3,195,000	5,747,000
9	220'	200'	387,000	928,000	464,000	1,390,000	3,168,000
10	160	100'	178,000	400,000	200,000	400,000	1,178,000
Totals			2,444,000	5,260,000	2,630,000	7,860,500	
					10,250,000		18,200,000

a + b + c = 10,250,000

a + b + c + d = 18,200,000

O'SULLIVAN'S HILL (dip 60°?)

Section	Thickness of lode	strike length	dip length	inferred tonnage	Total
1	80'	900'	400'	2,180,000	
2	50'	400'	350'	550,000	
					2,730,000

BLACK CAT (dip 30°)

Section	Lode thickness	Rep. strike length	dip length	Tonnage	Total
(d)	15'	250'	100'	28,500	
(h)	24'	150'	200'	55,000	
(a)	45'	250'	300'	256,000	
(b)	45'	250'	300'	256,000	
(c)	45'	200'	300'	205,000	800,000
BLACK CAT SOUTH					
(e)	45' average	300'	260	266,000	
(f)	40'		240	220,000	243,000
VIVIAN					
(g)	30'	200'	130'	59,000	
(h)	38'	300'	170'	148,000	
(i)	20'	300'	130'	59,000	266,000
SOUTHERN CROSS					
(j)	25'	400'	100'	91,000	
(k_1)	20'	150'	35'	8,000	
(k_2)	25'	200'	40'	45,000	
(k_3)	-	-	-	26,000	170,000
"TOURMALINE HILL"					
	70'	40'	150'	32,000	32,000

"STONE DAM"

Section	Lode Thickness	Rep. strike length	dip length	Tonnage	Total
	8'	100'	50'	2,750	
	8'	200	200'	22,800	
	8'	100'	75'	4,300	
					29,000

BLACK DIAMOND (dip 23°)

Section	Lode thickness	strike length	dip length	Inferred Tonnage	sub-Total	Total
(l,m,n)	25'	200'	300'	103,500		
(o)	10'	100'	150'	11,500		
					115,000	
						1,455,000

Inferred reserves of quartz aplite

Gates'	18,200,000
O'Sullivan's . . .	2,730,000
Black Cat to Black Diamond	1,455,000
TOTAL	22,400,000 tons

VIII. Conclusions

A satisfactory interpretation of the geology has been established, but more work will be needed to establish structural details difficult or impossible to obtain from surface outcrop, most notably the pitch of tongues of wolfram bearing lode, and the degree of persistence down dip.

The absence or unreliability of grade information even of primitive character such as grab samples is limiting the usefulness of the work.

IX. Recommendations

(a) Structural Problems

1. Costeans should be dug across representative sections and along obscured sections of the lode contacts.

2. Drilling should be started with a view to determining the actual dip and pitch of wolfram bearing lodes.

(b) Grade Problems

3. Systematic sampling of all potential ore bodies preferably by sampling from pits dug on a grid pattern on natural surfaces transverse to the dip surface.

4. Channel sampling from transverse costeans (see 1.)

5. Using bulk samples from selected areas as a standard, to determine the size necessary for representative samples in each type of ore.

6. Take samples from drill cores (see 2.).

(c) Further Exploration

7. Exploration of the remainder of the contact of the Yeuralba Granite, particilarly NW from O'Sullivan's Hill, and the suspected outcrop in the King River catchment (alluvium on Katherine 1 : 250,000 sheet).

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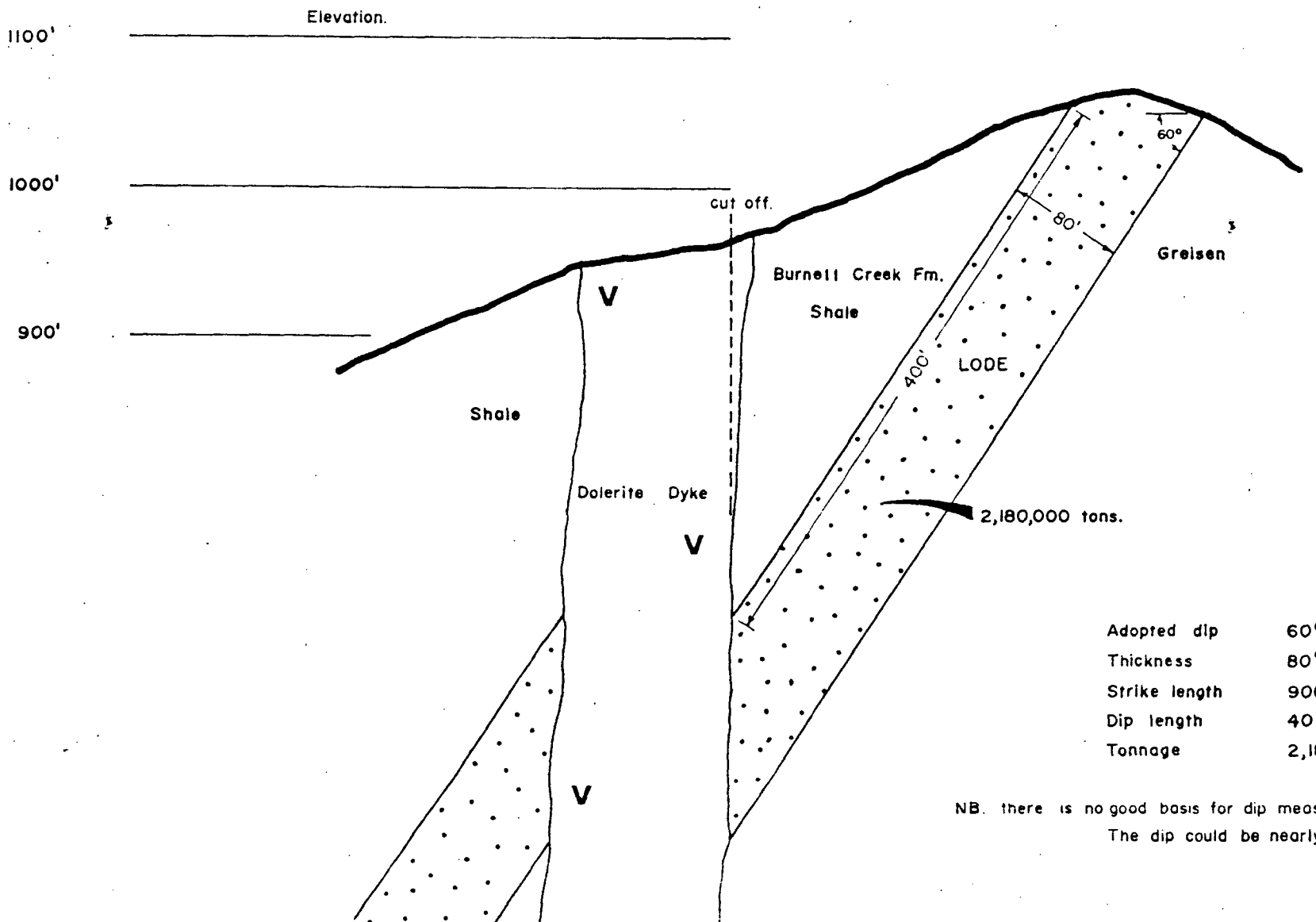
for A-Z GEOLOGICAL CONSULTANTS PTY. LTD.

Brisbane
15th December, 1970.

O'Sullivans Hill (Eastern lode)

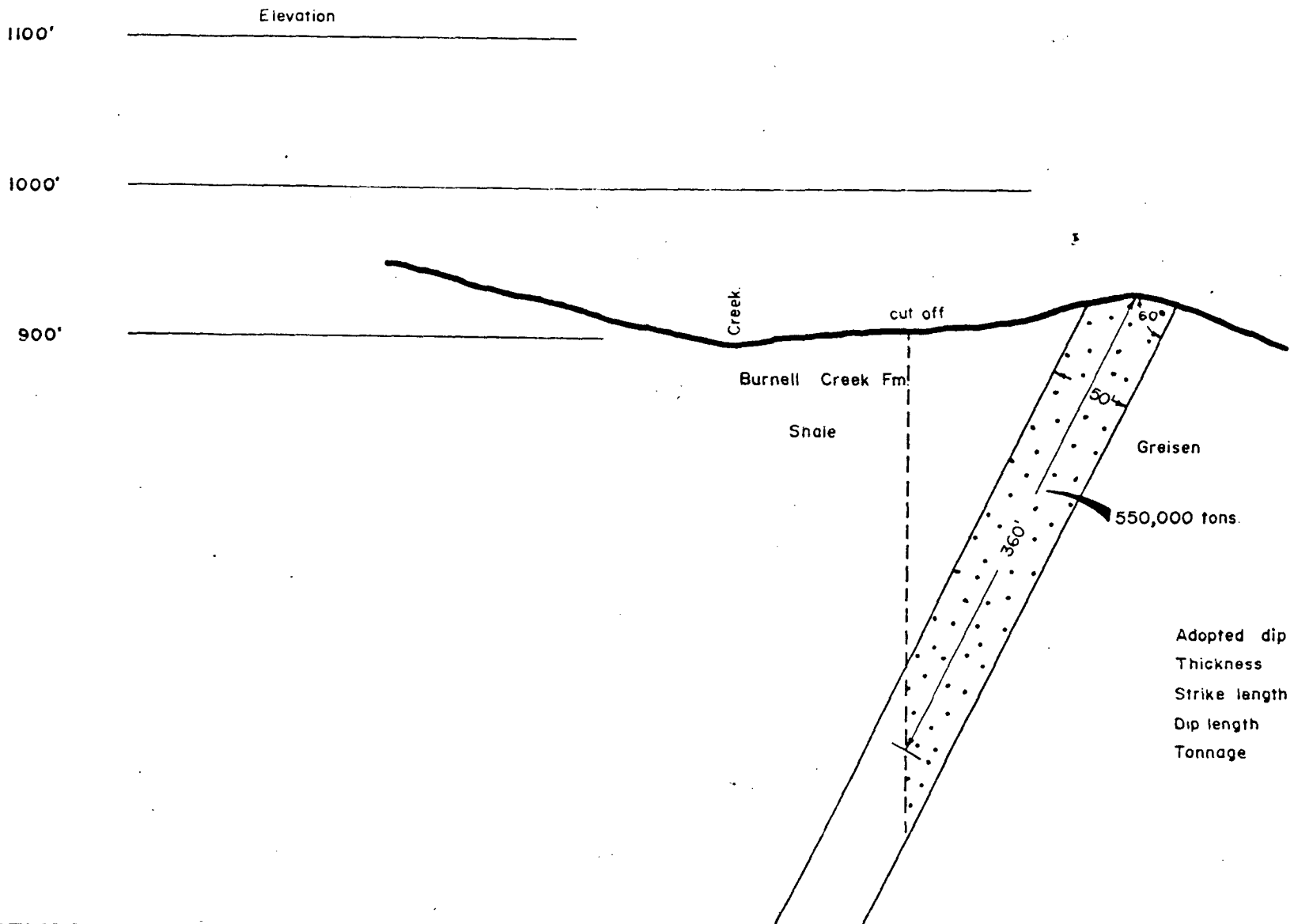
Section 1



Adopted dip	60°
Thickness	80'
Strike length	900'
Dip length	400'
Tonnage	2,180,000 tons.

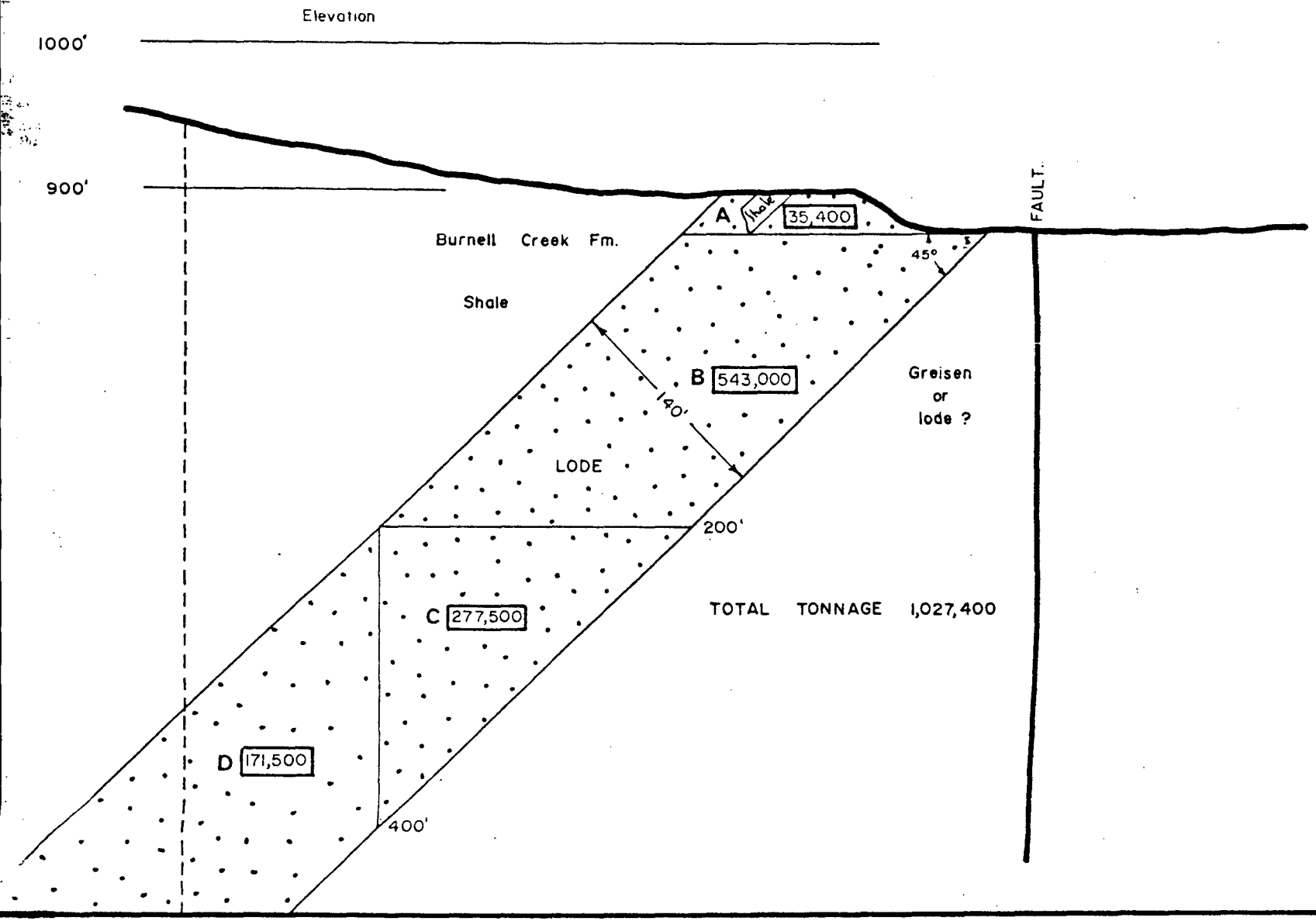
NB. there is no good basis for dip measurment on this body of lode. The dip could be nearly 90°.

O'Sullivans Hill (Western lode) Section 2



Gates

Section 3

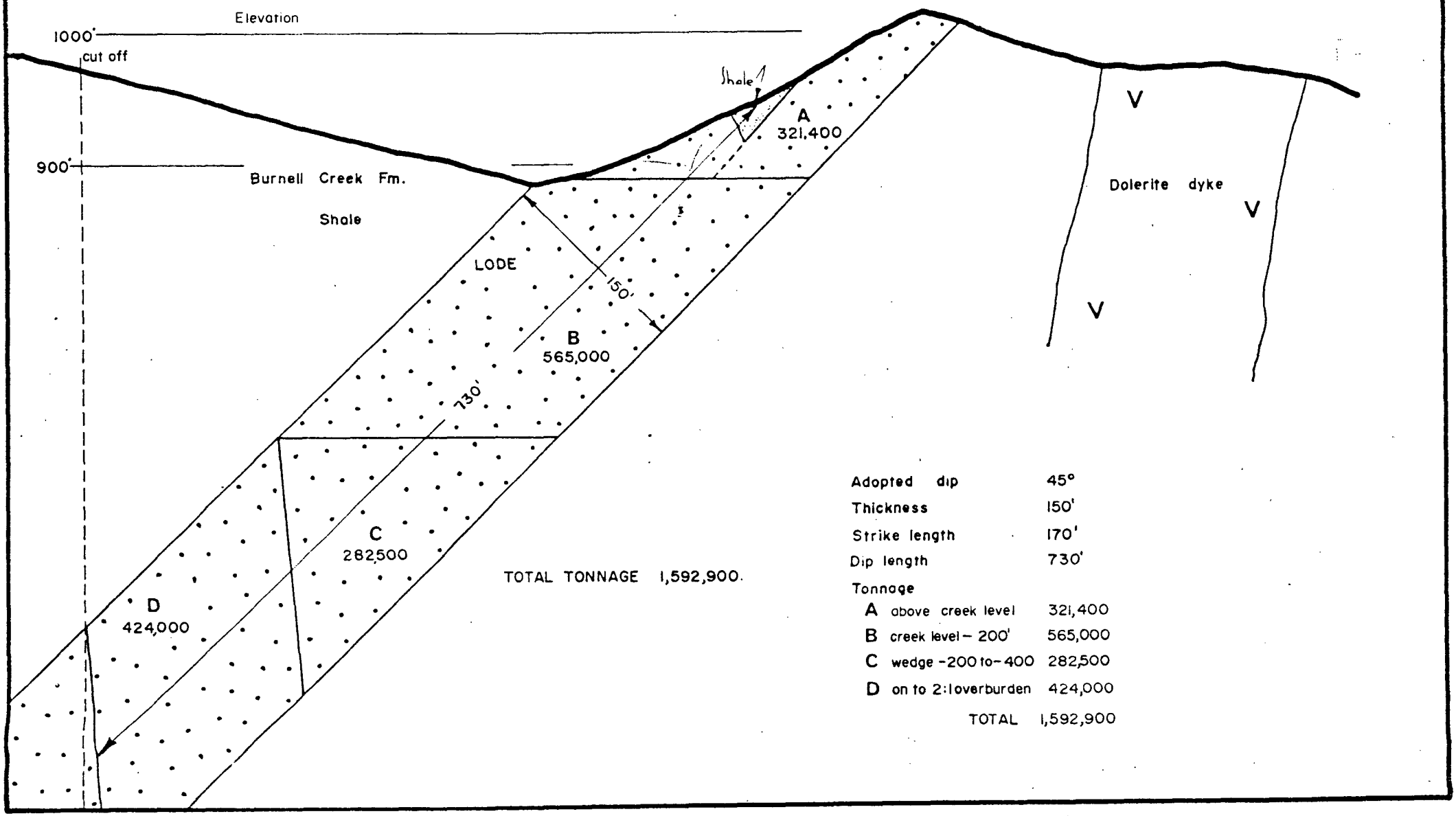


Adopted dip	45°
Thickness	140'
Strike length	170'
Dip length	650'

Tonnages

A	above creek level	35,400
B	creek level—200'	543,000
C	wedge 200-400'	277,500
D	on to 2:1 overburden	171,500
	TOTAL —	1,027,400

Gates Section



TOTAL TONNAGE 1,592,900.

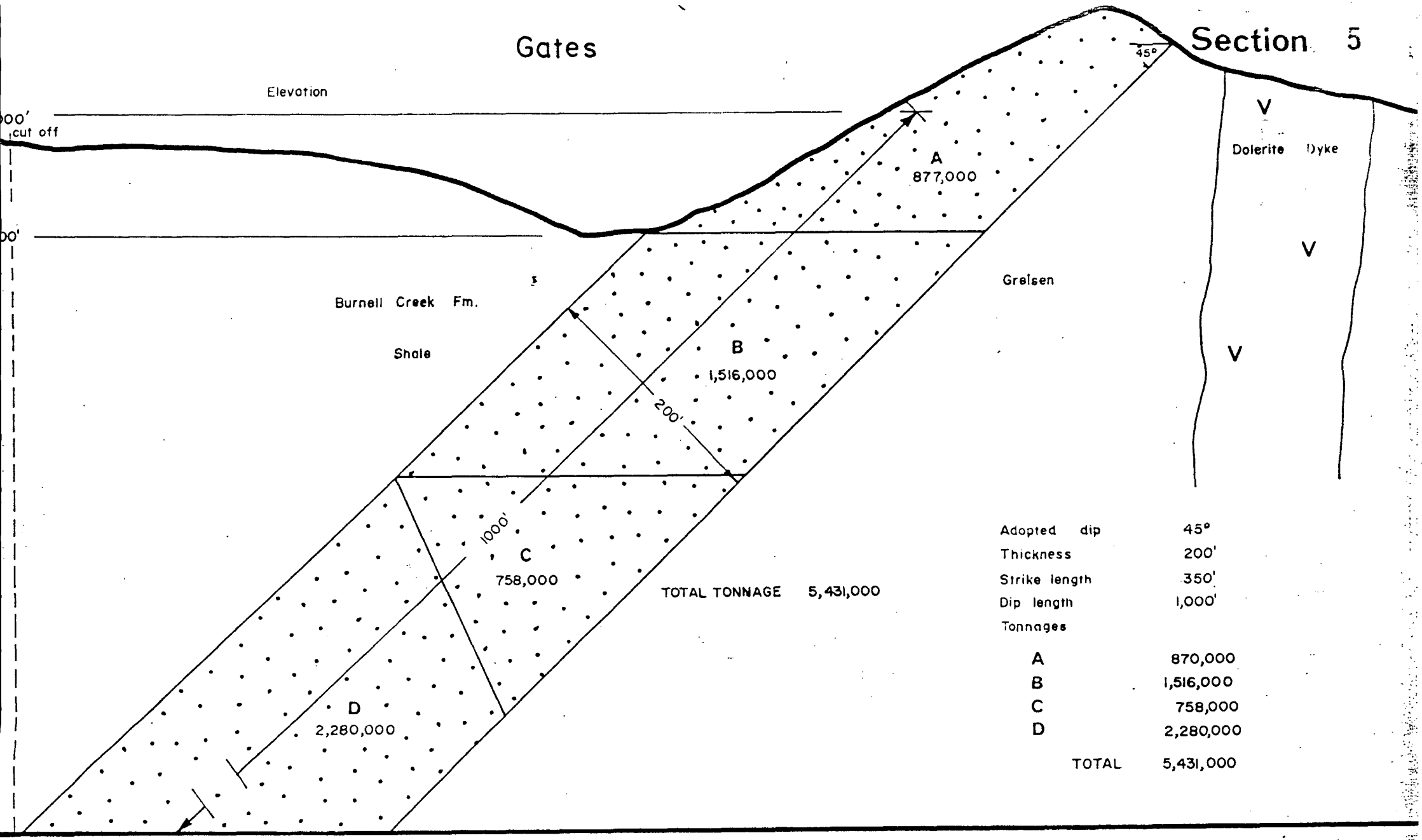
Adopted dip	45°
Thickness	150'
Strike length	170'
Dip length	730'

Tonnage

A	above creek level	321,400
B	creek level – 200'	565,000
C	wedge -200 to -400	282,500
D	on to 2:1 overburden	424,000
	TOTAL	1,592,900

Gates

Section 5



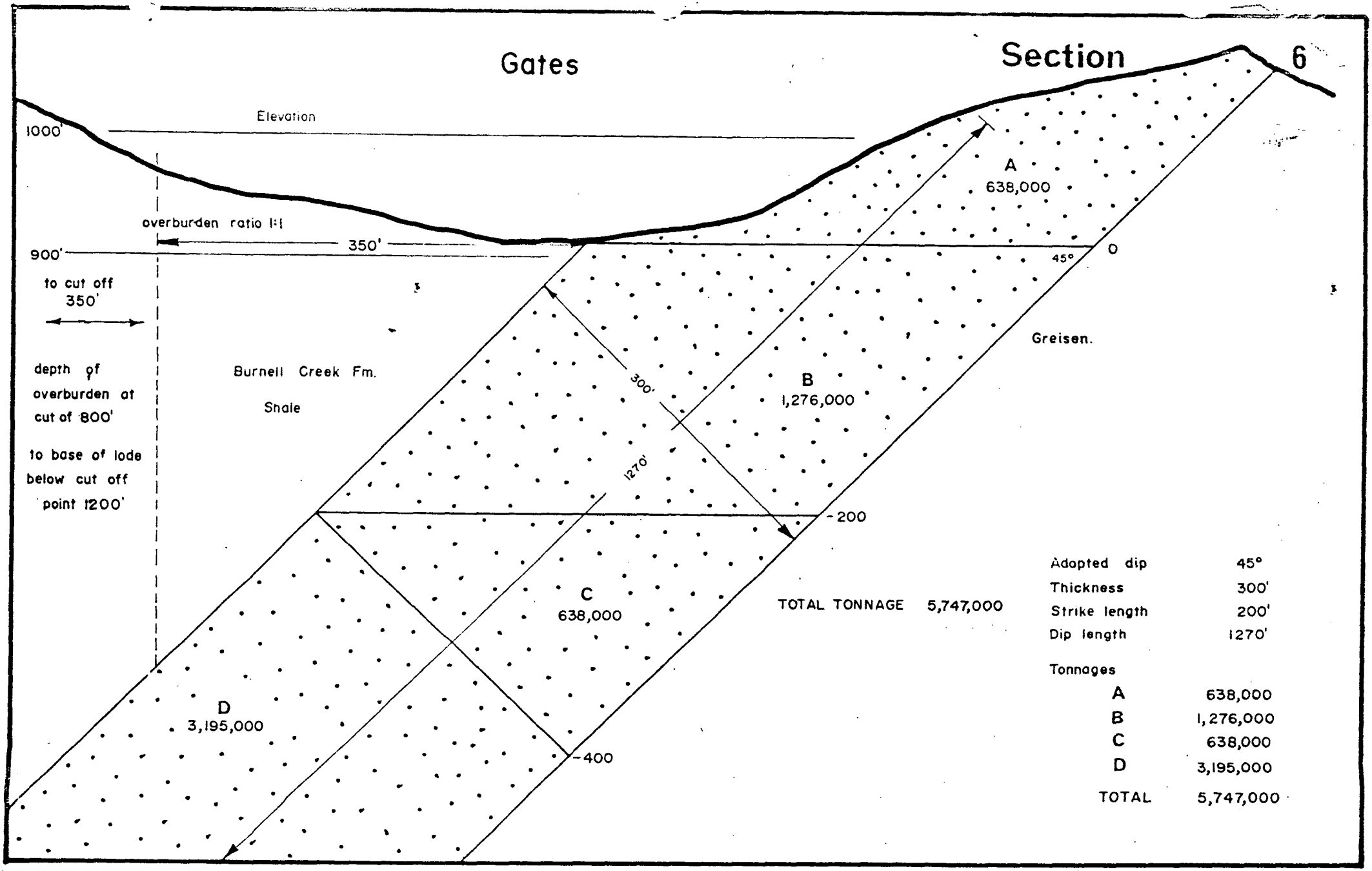
TOTAL TONNAGE 5,431,000

Adopted dip	45°
Thickness	200'
Strike length	350'
Dip length	1,000'

Tonnages

A	870,000
B	1,516,000
C	758,000
D	2,280,000
TOTAL	5,431,000

Gates Section 6

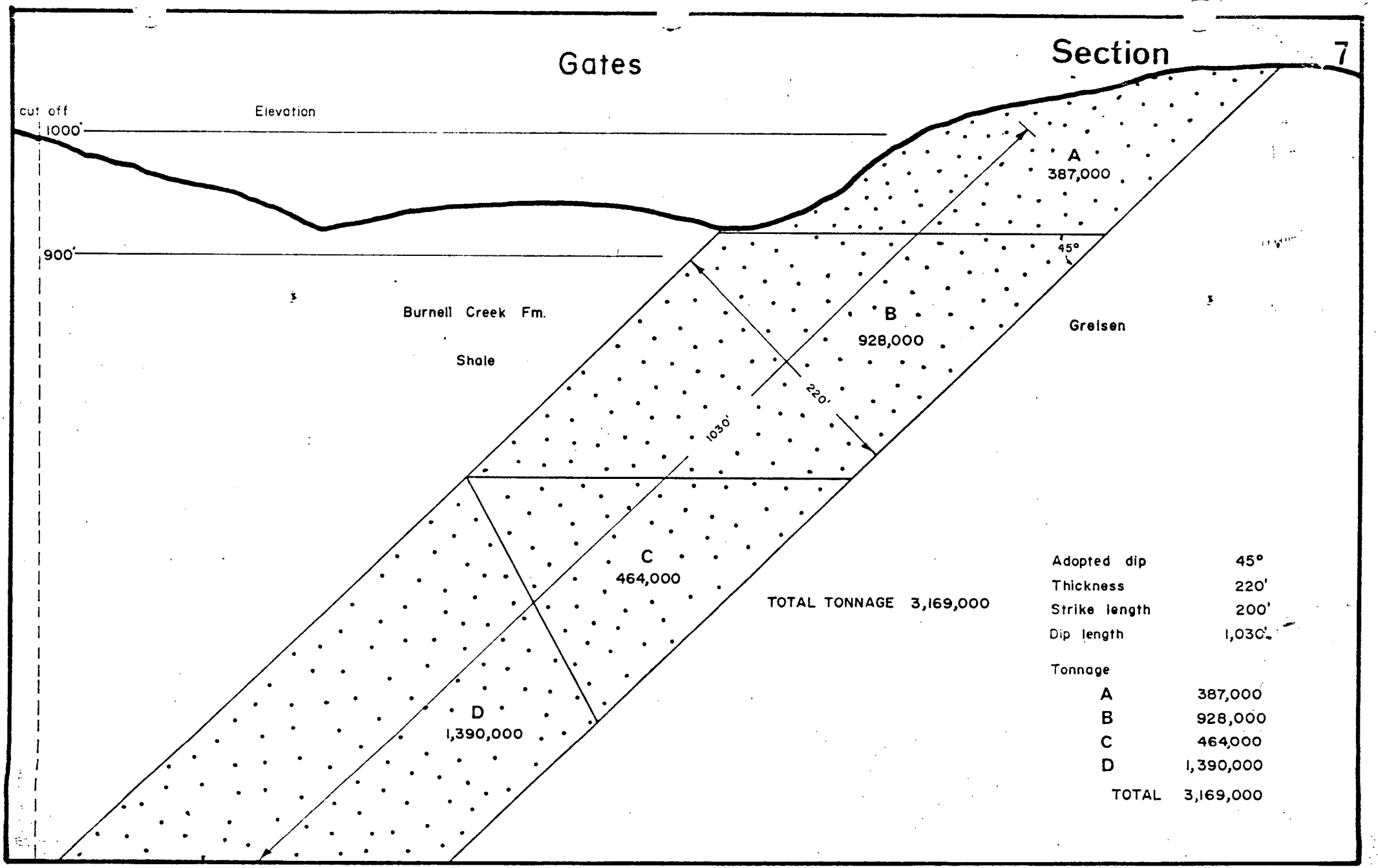


Adopted dip	45°
Thickness	300'
Strike length	200'
Dip length	1270'

Tonnages

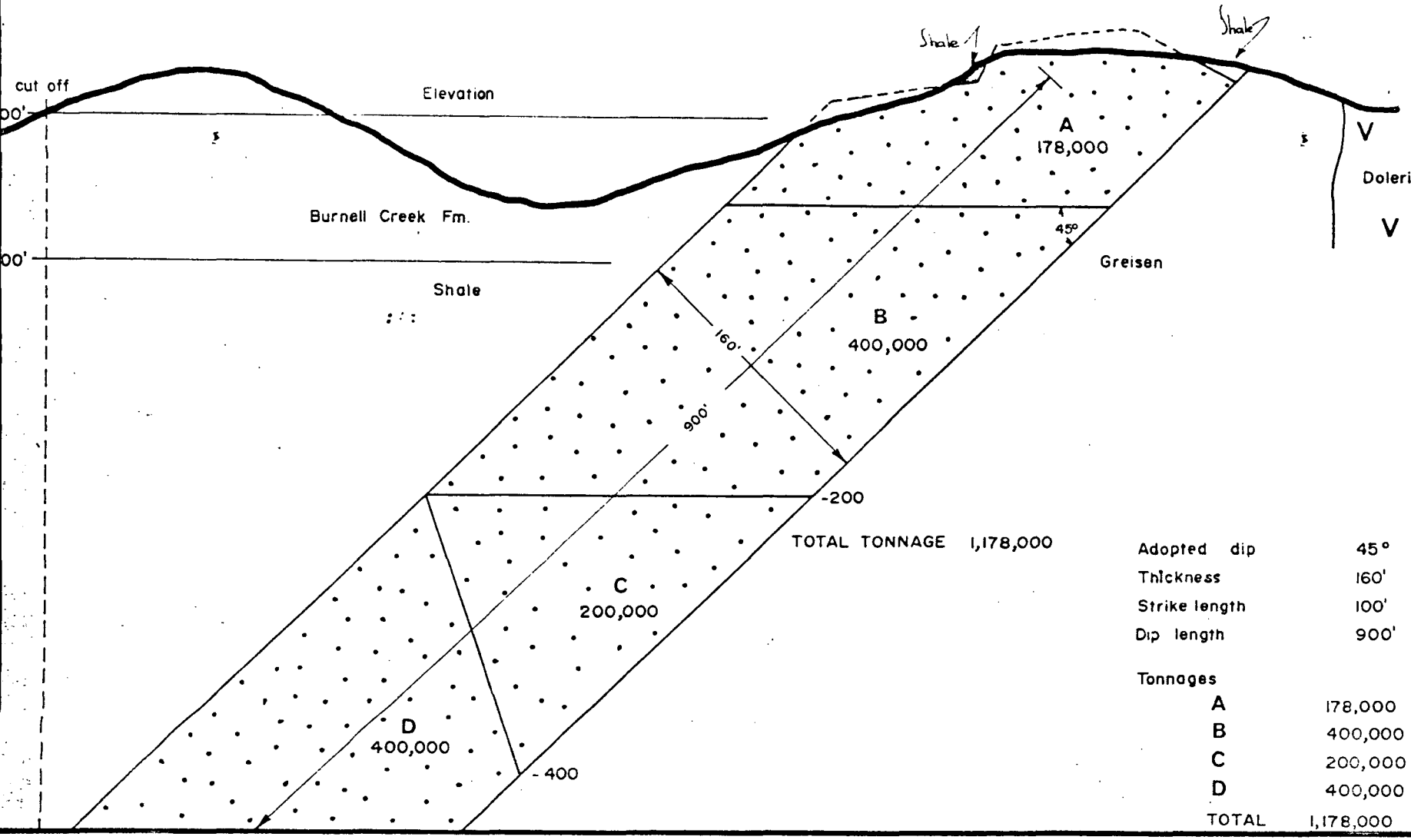
A	638,000
B	1,276,000
C	638,000
D	3,195,000
TOTAL	5,747,000

Gates Section 7



Gates

Section 8



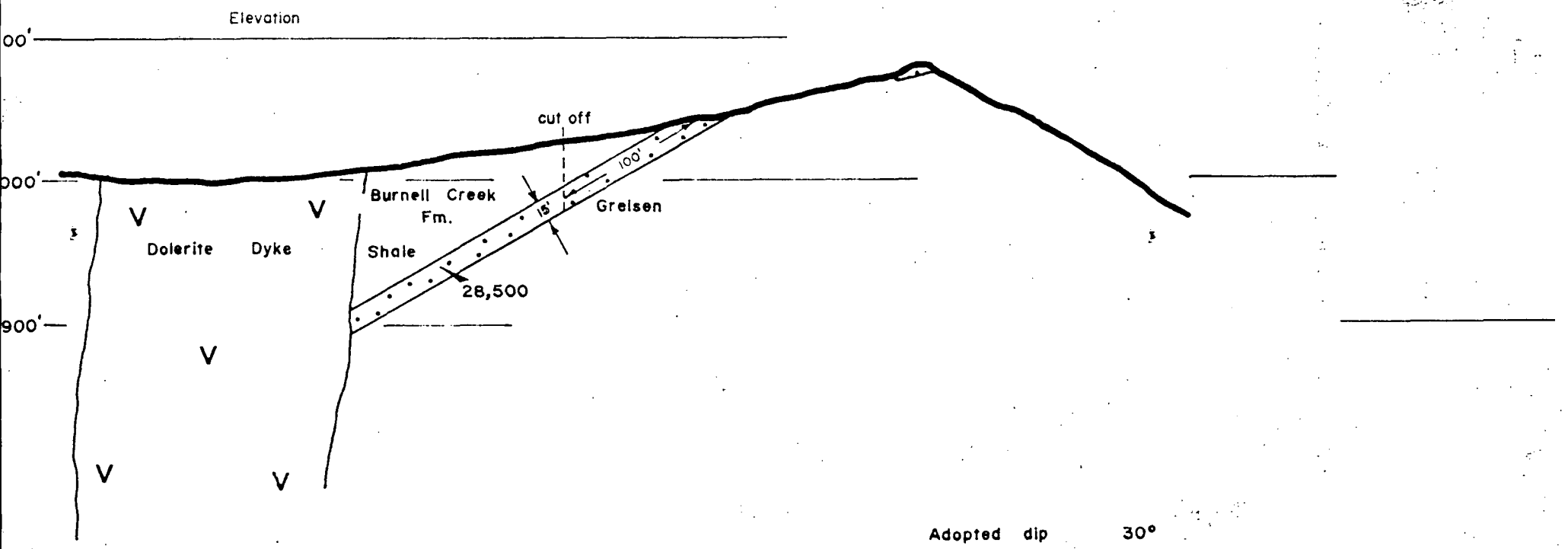
Adopted dip	45°
Thickness	160'
Strike length	100'
Dip length	900'

Tonnages

A	178,000
B	400,000
C	200,000
D	400,000
TOTAL	1,178,000

Black Cat

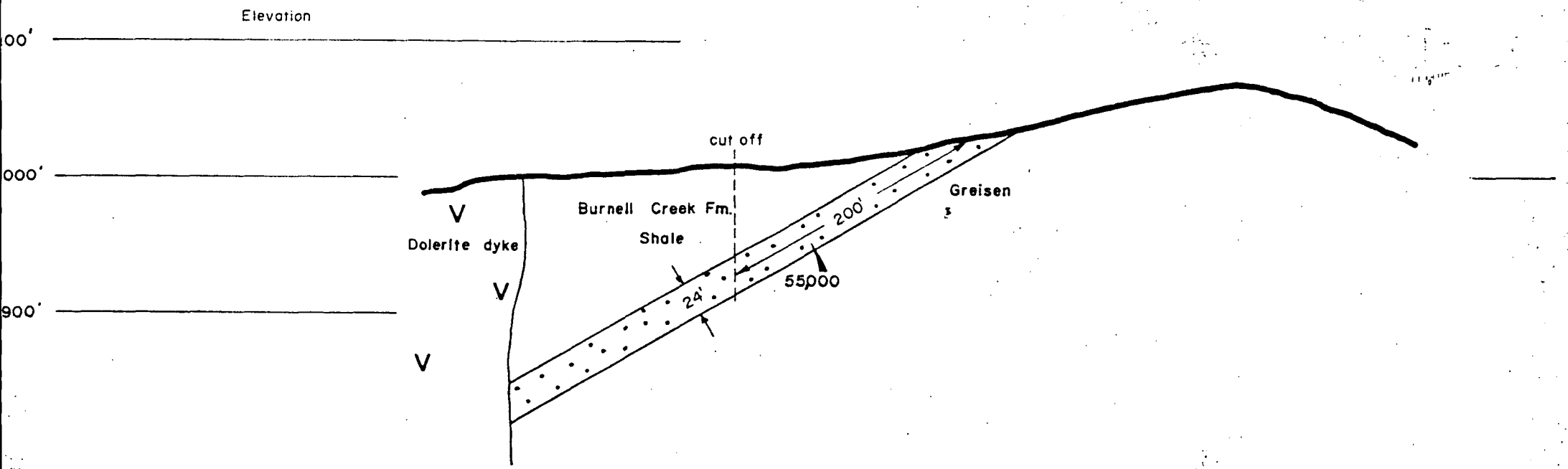
Section 9



Adopted dip	30°
Thickness	15'
Strike length	250'
Dip length	100'
Tonnage	28,500

Black Cat

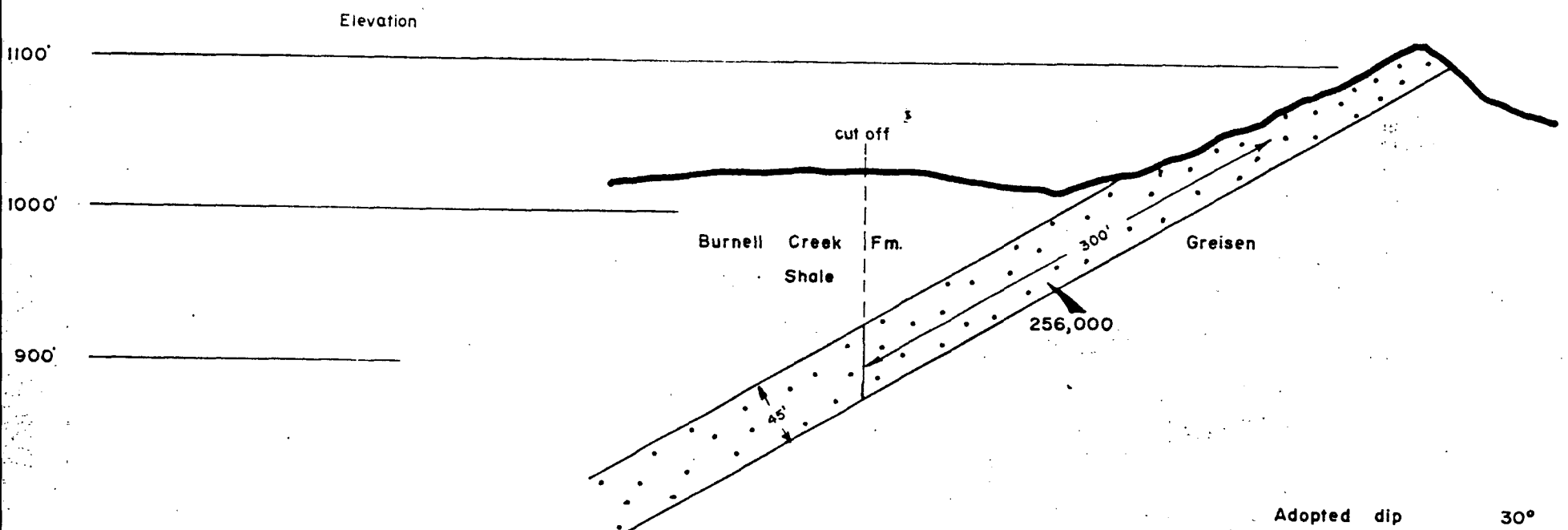
Section - 10



Adopted dip	30°
Thicknes	24'
Strike length	150'
Dip length	200'
Tonnage	55,000

Black Cat.

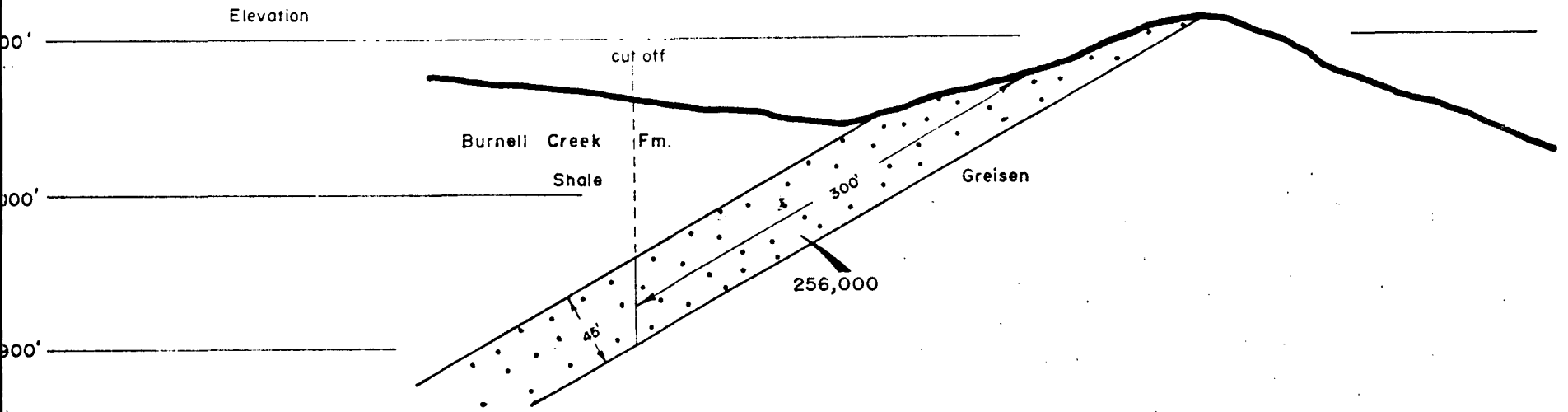
Section 11



Adopted dip	30°
Thickness	40'
Strike length	250'
Dip length	300'
Tonnage	256,000

Black Cat

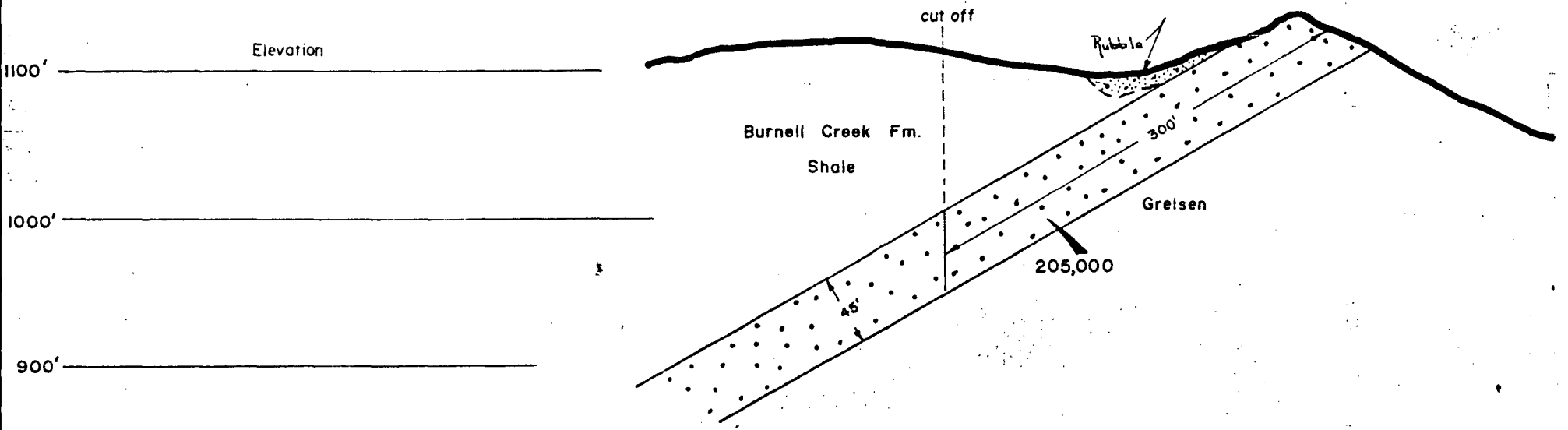
Section 12



Adopted dip	30°
Thickness	45'
Strike length	250'
Dip length	300'
Tonnage	256,000

Black Cat

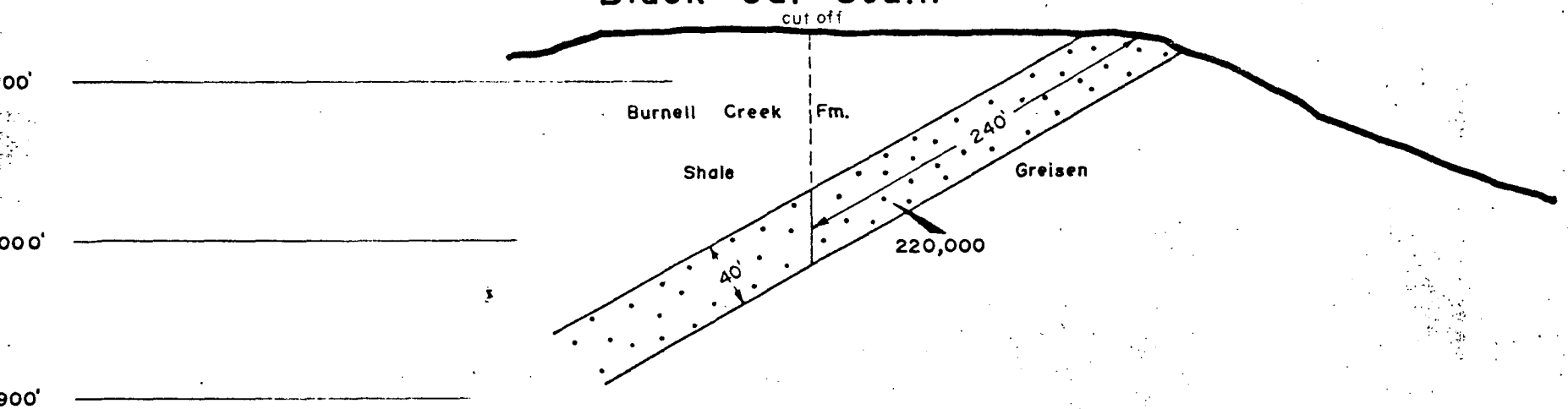
Section 13



Adopted dip	30°
Thickness	45'
Strike length	200'
Dip length	300'
Tonnage	205,000

Black Cat South

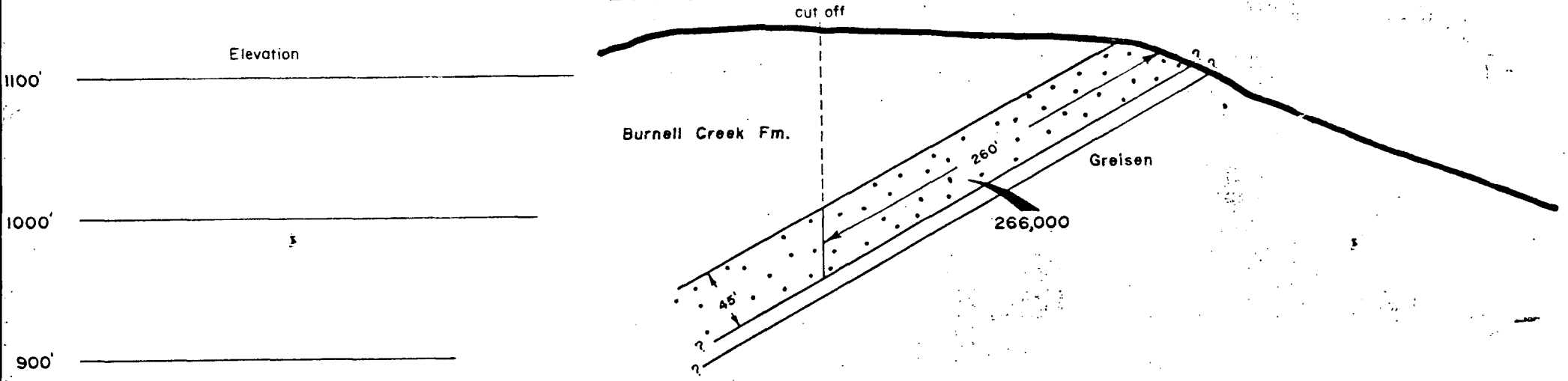
Section 14



Adopted dip	30°
Thickness	40'
Strike length	300'
Dip length	240'
Tonnage	220,000

Black Cat South

Section 15



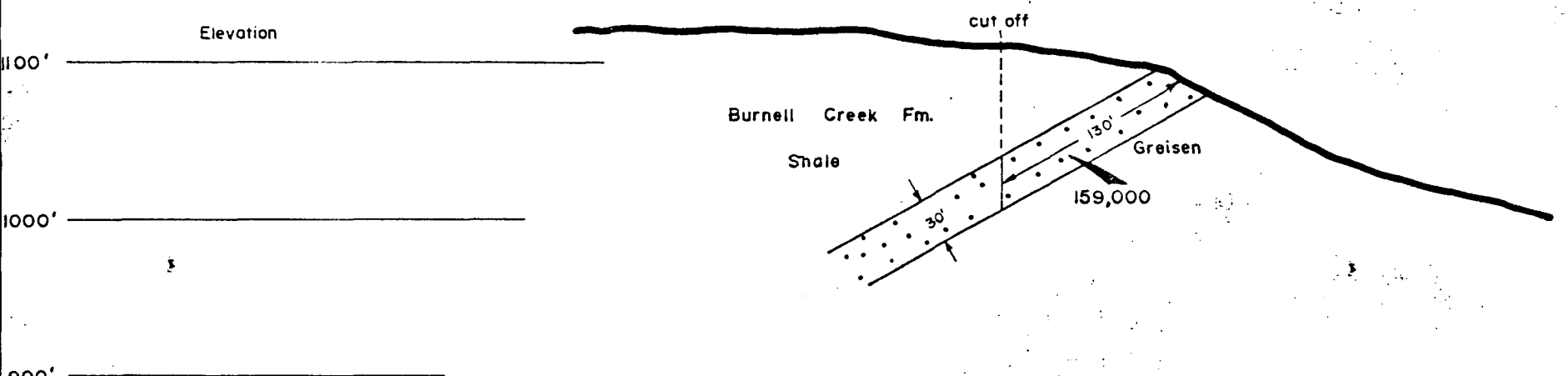
Adopted dip	30°
Thickness	45'
Strike length	300'
Dip length	260'
Tonnage	266,000

N.B this section covers the same ground as section 14 ∴ contribution

$\frac{266,000}{2} = 133,000$

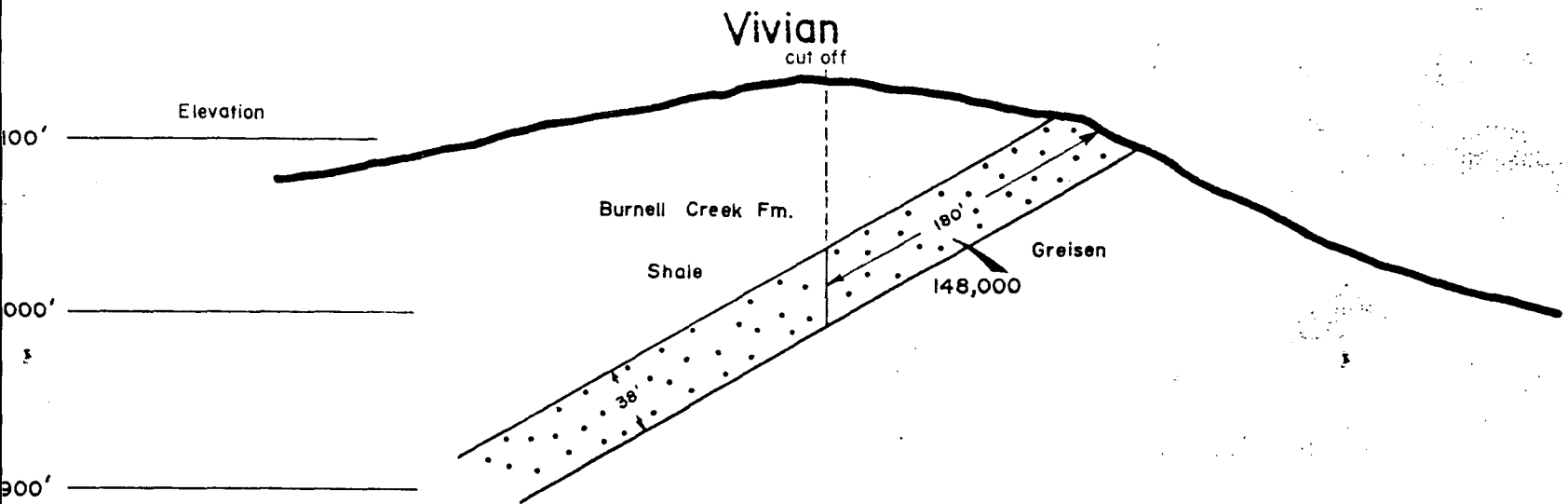
Vivian

Section 16



Adopted dip	30°
Thickness	30'
Strike length	200'
Dip length	130'
Tonnage	159,000

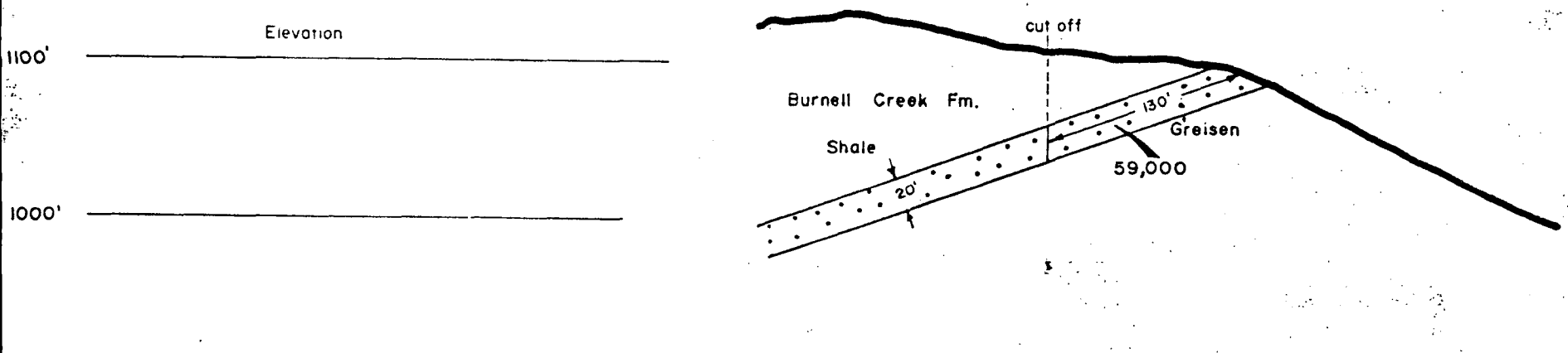
Section 17



Adopted dip	30°
Thickness	38'
Strike length	300'
Dip length	180'
Tonnage	148,000

Vivian.

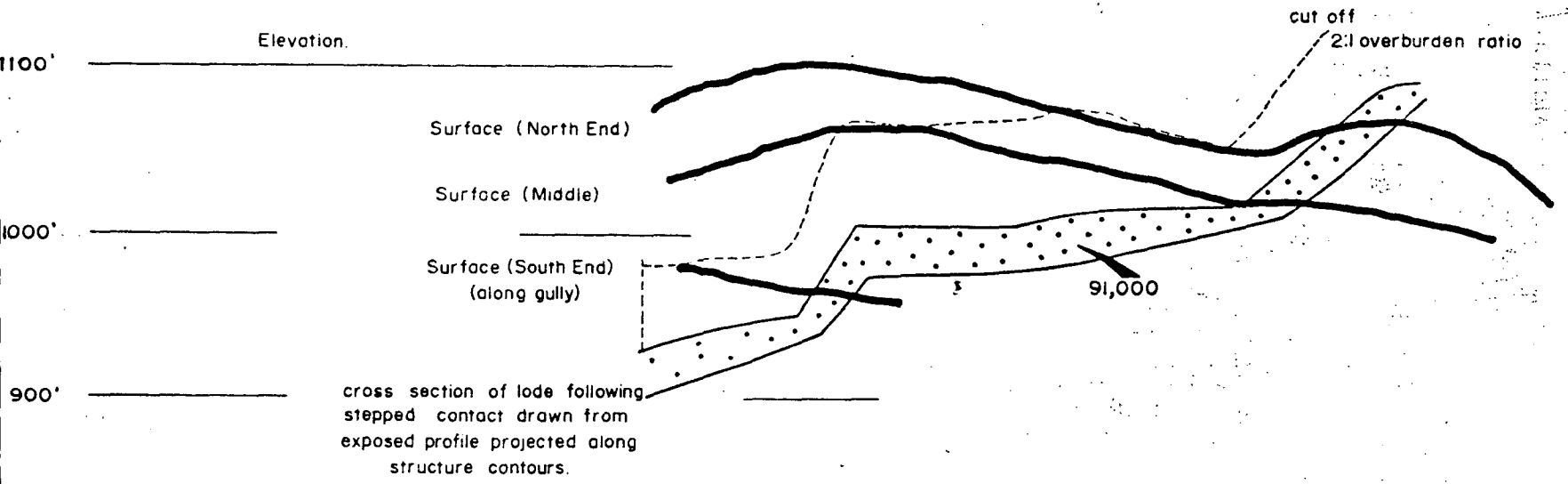
Section 18



Adopted dip	20°
Thickness	20'
Strike length	300'
Dip length	130'
Tonnage	59,000

Southern Cross.

Section 19

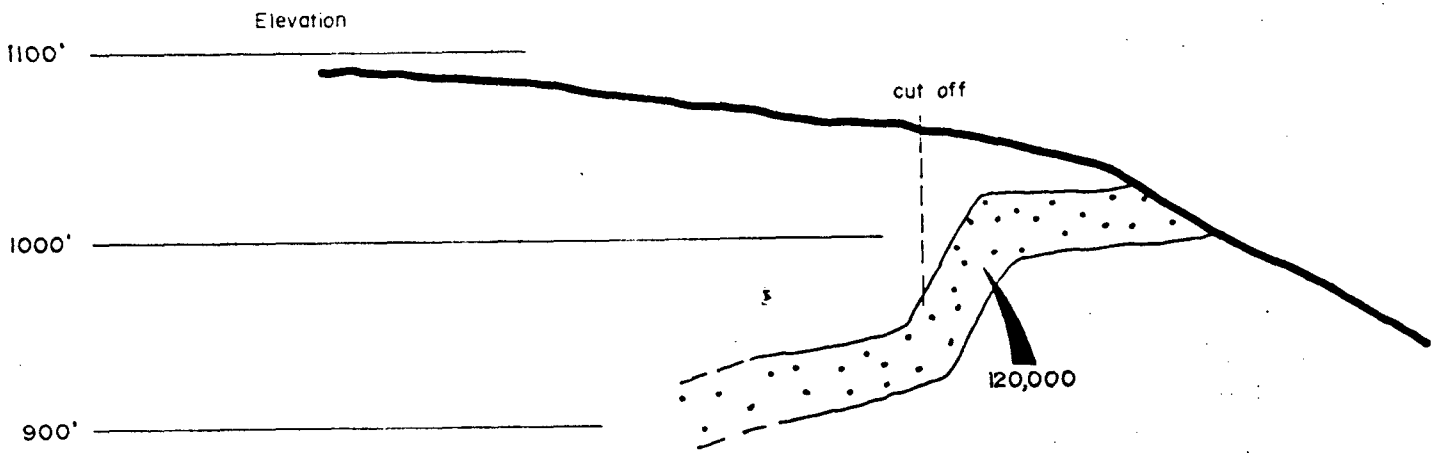


Adopted dip	20°	(overall)
Thickness	30'	(average)
Strike length	400'	
Dip length	100'	(adopted)
Tonnage	91,000	

N.B. this body includes sections not worked by gougers.

Southern Cross

Section 20

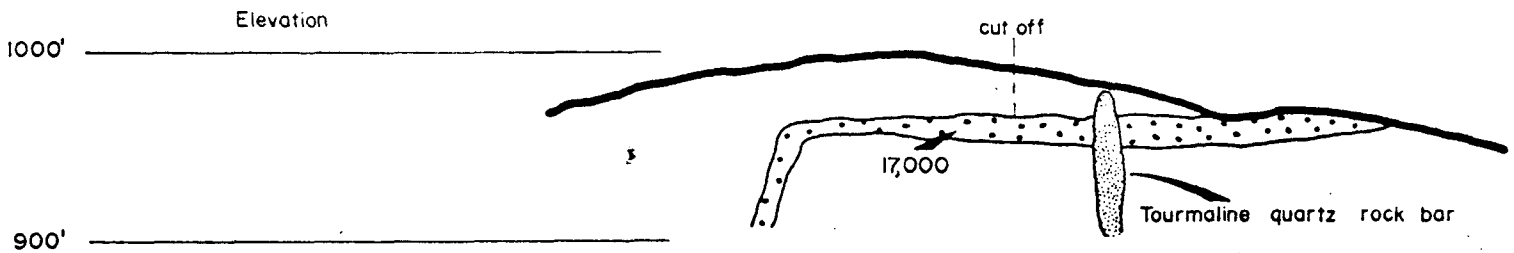


Adopted dip (variable)	30°	
Thickness	30'	
Strike length	350'	
Dip length	150'	
Tonnage	120,000	*

* somewhat doubtful (80,000 tons used in total)

Old Camp Spring

Section 21

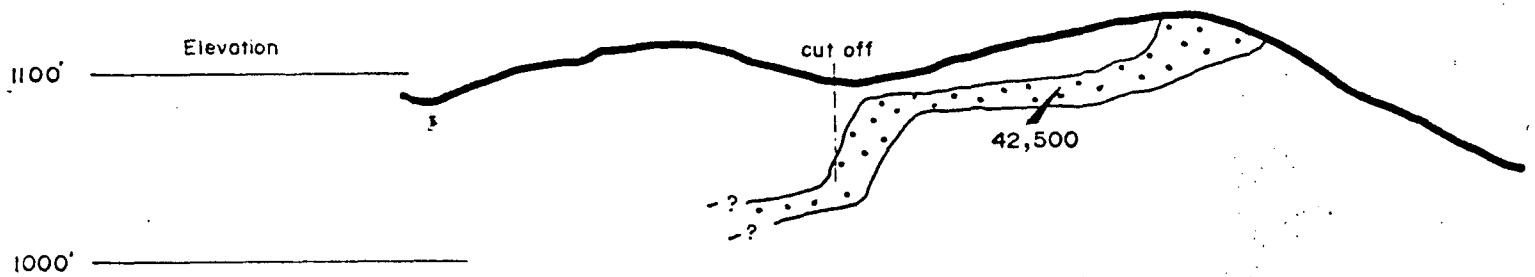


Adopted dip		0°
Thickness	*	15'
Strike length		100'
Dip length		150'
Tonnage	*	17,000

* thickness and hence tonnage dubious. Tonnage

Old Camp Spring

Section 22

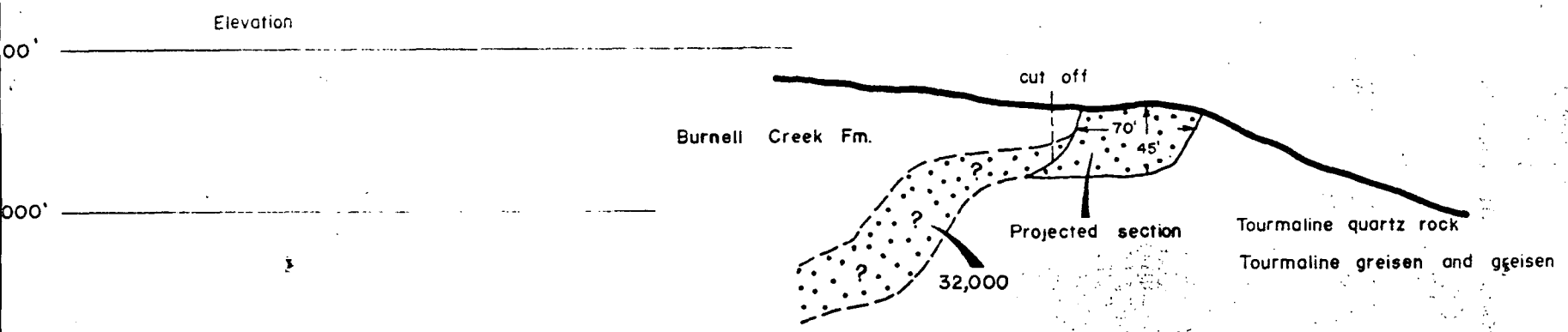


Adopted dip (variable)		c 20°
Thickness	*	15'
Strike length		150'
Dip length		250'
Tonnage	*	42,500

* all dubious tonnage excluded from total.

Tourmaline Hill

Section 23

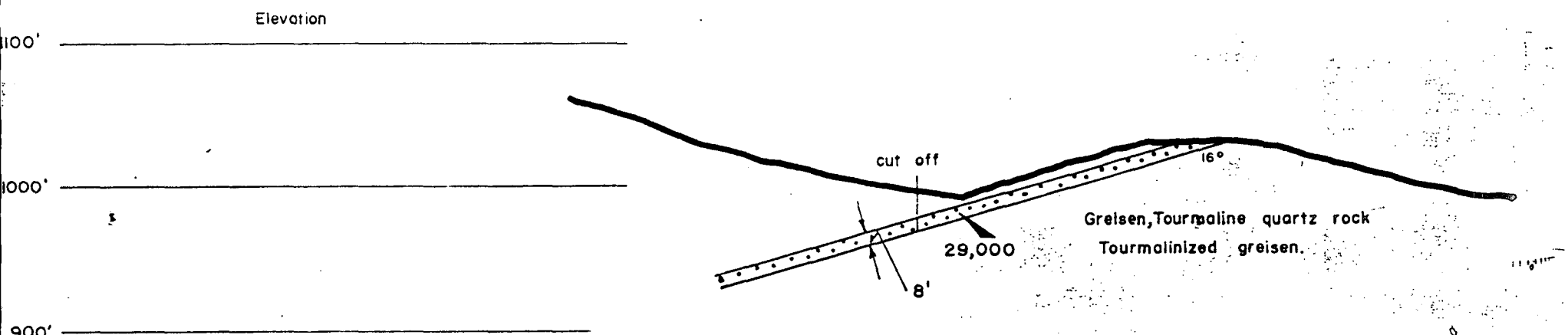


Adopted dip	? 20°
Thickness	40'
Strike length	150'
Dip length	70'
Tonnage	32,000

N.B Greater tonnage is likely (see projected continuation of lode)

Stone Dam

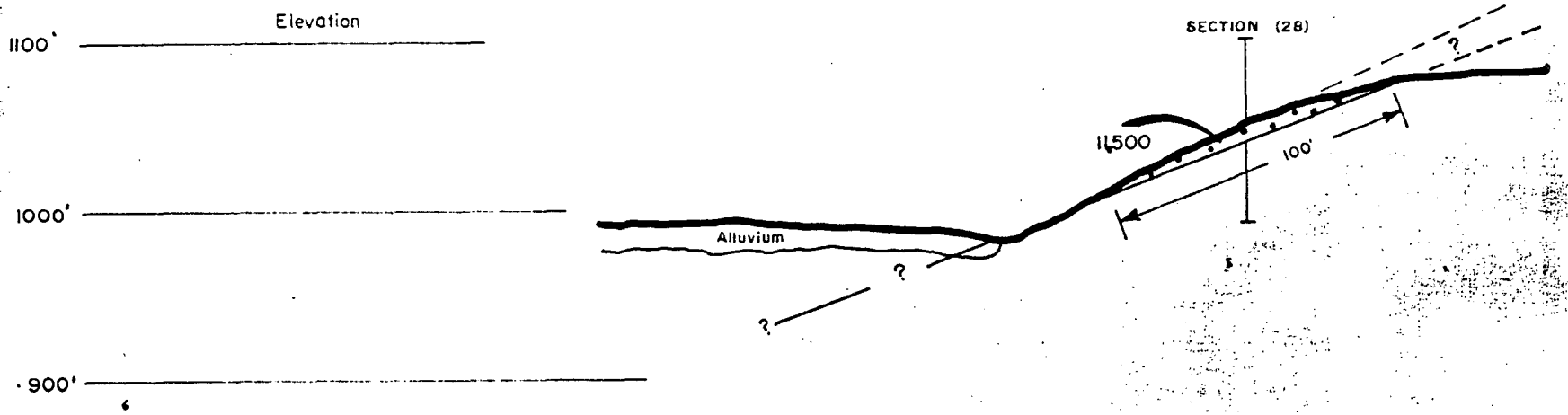
Section 24



	Adopted dip	16°
	Thickness	8'
(1)	Strike length	100'
	Dip length	50'
	Tonnage	2750
(2)	Strike length	200'
	Dip length	200'
	Tonnage	22,800
(3)	Strike length	100'
	Dip length	75'
	Tonnage	4,300
	Total Tonnage	29,000

Black Diamond

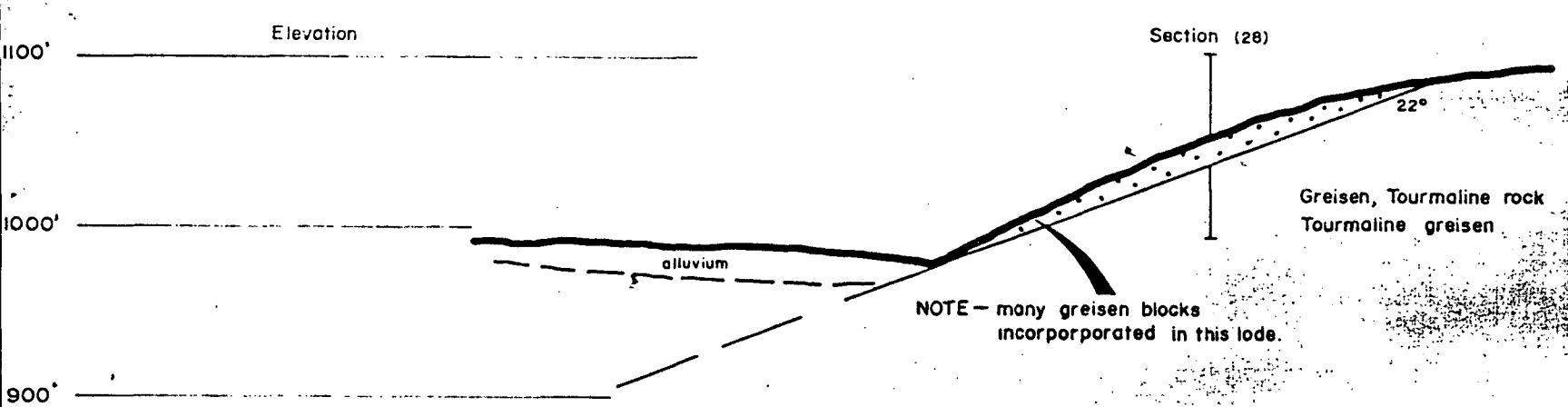
Section 25



Average	Adopted dip	21°
	Thickness	10'
	Strike length	150'
	Dip length	100'
	Tonnage	11,500

Black Diamond

Section 26

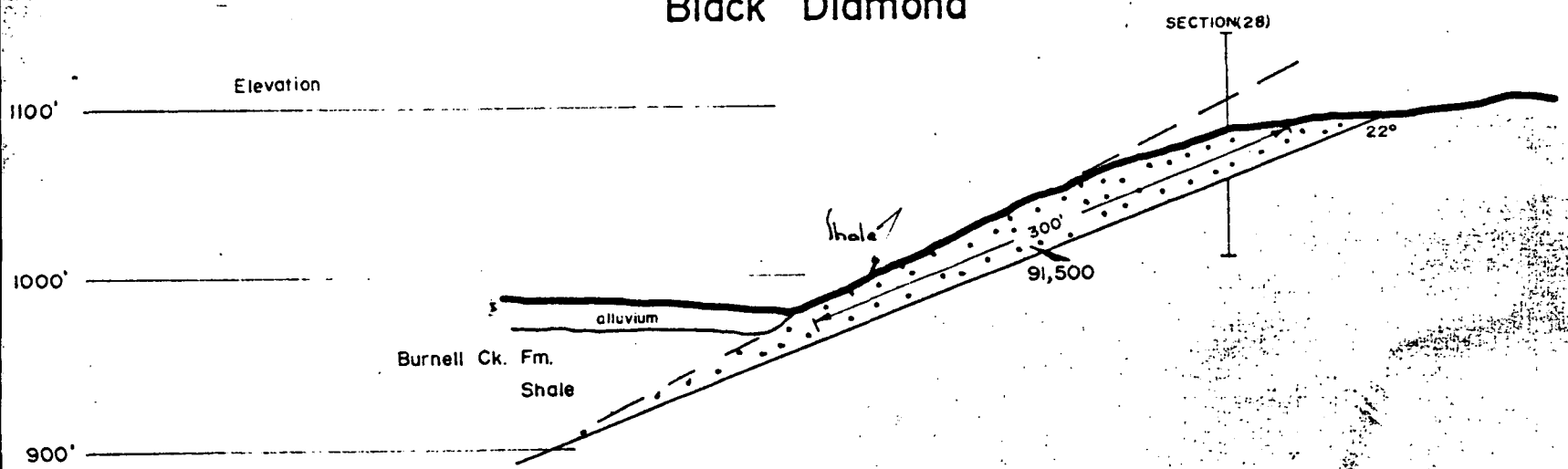


Average thickness 25'

Used for determining average thickness of lode exposed

Black Diamond

Section 27



Dip	22°
Adopted Thickness	25'
Strike length	200'
Dip length	300'
Tonnage	91,500

Black Diamond

Section 28

Perpendicular to sections 27-26